The University Of Sheffield.

How are Young People in the UK Experiencing and Engaging with Concerns Around Climate Change?

What engagement or support would they like from others (peers, school staff, parents)?
How can Educational Psychologists support this?

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1 Abstract

How are young people in the UK experiencing and engaging with concerns around climate change?

Background: Research in climate psychology has identified that some young people are very concerned about climate change and/or experience '*climate anxiety'*. This thesis uses Q methodological analysis to move beyond an anxious/not-anxious spectrum, constructing nuanced and holistic accounts of some ways that young people are experiencing and engaging with concerns around climate change.

Method/Rationale: A literature review, semi-structured online interviews, plus pilot studies informed the development of a sixty nine statement Q-set. Thirty two young people completed online Q-sorts using collaborative whiteboard software (thirty Q-sorts were retained). Each participant was interviewed online after completing their Q-sort.

Q methodological analysis of participant responses was undertaken using PQMethod. Three factors were identified, then online focus groups were undertaken with thirteen of the original participants to explore what engagement and/or support they felt would be helpful.

Findings: Three distinctive perspectives (factors) were identified:

1. Environmental and humanitarian concern, whilst feeling hopeful, supported, and interconnected with others.
2. Fear towards the future, with a sense of urgency that large changes are needed to avert climate catastrophe.
3. Frustration and resignation that climate catastrophes may be inevitable, with a focus on adaptation.

Focus group participants emphasised the importance of feeling that their school staff and families listen to and respect their concerns. They also expressed desires for emotional support and collaborative engagement.

Discussion: All participants held significant concerns, but displayed different ways of coping with them, often relating to their levels of hope and psychological distance from the issues. Recommendations are made for systemic support.

Key Words: Climate Anxiety, Climate Psychology, Q Methodology, Young People

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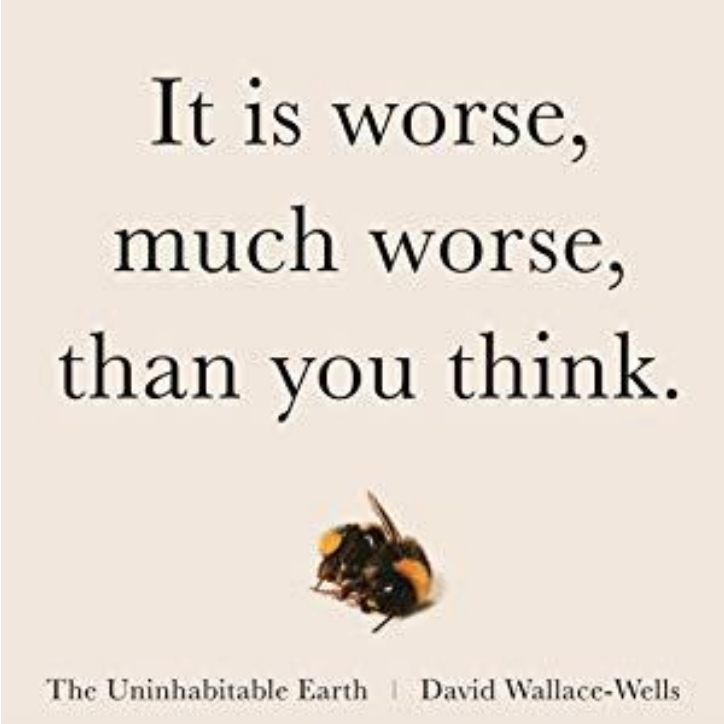
3. Foreword: My Motivations for the research and my Research Journey



(Wallace-Wells, 2019, p.3)

The deliberatively provocative opening line of David Wallace-Wells' book 'The Uninhabitable Earth' gave me a jolt of nausea tinged with adrenaline when I first read it, but then I had already been primed for such statements a few weeks earlier after a Wikipedia binge resulted in me clicking onto Jem Bendell's controversial paper "Deep Adaptation: A map for navigating climate tragedy" (2018). Published as an 'Occasional Paper' by the University of Cumbria, this article made significant waves (allegedly being read by over 100,000 people, i.e. far more than most academic texts: https://www.vice.com/en/article/vbwpdb/the-climate-change-paper-so-depressing-its-sending-people-to-therapy) due to its (fairly) systematic but bleak argument that societal collapse will be a likely consequence of climate change due to the increased challenges and pressures to our existing world systems (ecological, economic, political, social) that we will face due to the changing climate.

Whilst Bendel uses standard academic prose for most of the article, he breaks from this style about one-third of the way through to deliver this particularly disturbing paragraph:

"When we contemplate this possibility of 'societal collapse', it can seem abstract.

The previous paragraphs may seem, subconsciously at least, to be describing a situation to feel sorry about as we witness scenes on TV or online. But when I say starvation, destruction, migration, disease and war, I mean in your own life. With the power down, soon you wouldn't have water coming out of your tap. You will depend on your neighbours for food and some warmth. You will become malnourished. You won't know whether to stay or go. You will fear being violently killed before starving to death."

(Bendell, 2018, p.13)

This paragraph (in the context of the article as a whole) helped to trigger a mini-existential crisis for me, and reflecting on it now, I think that it did this partly because Bendell was able to identify and pierce my white middle-class assumptions that whilst 'bad things' are likely to happen due to climate change, it will be people living 'elsewhere' who will mostly experience the consequences at an unknown point in the future (which I now know to be a classic example of 'psychological distance [social, spatial and temporal distance]' in relation to climate change). In contrast, the above lines made me feel personally threatened and truly *scared* about climate change and prompted me to confront how the aspects of modern life that I value are vulnerable and could even collapse within my own lifetime. Prior to this point, I had mostly just experienced background feelings of irritation, frustration, and a vague sense of doomed resignation about climate inaction and injustice that was intertwined with concern that the world was heading in a dangerous direction (this was in early 2019 in the context of Brexit and Trump dominating the headlines). However, when I read this text it made concerns around climate change feel *personal* (reducing my psychological distance from the issue), in a way that other articles had previously failed to do.

Thankfully, my emotions around climate change have continued to develop since this point. In April 2019 I joined the Climate Psychology Alliance (a group for therapists & psychologists who undertake work supporting people with concerns around climate change, who also explore the complex psychological and systemic factors that might impact our engagement with the issue) and attended a workshop that they organised, at which Jem Bendell was a speaker. Whilst I only spoke briefly with him 1:1, my impression of him throughout the day was that he was sincere in his beliefs, he appeared reluctant to engage with some of the unknowns (around timescales, plus social, economic, and political responses) that could potentially act as sources of hope. Additionally, by this point in time some volunteers had set up a Deep Adaptation Facebook Group (with his support) in response to his article; whilst there were many well thought-out and reasoned posts on the group, the page also

appeared to have attracted a number of very paranoid people, including people who seemed to be fantasising about 'the end of the world', which left me feeling uneasy at what I felt was quite a laissez-fair attitude by Bendell towards the potential impact of his writing (of course, some of those posts may have been written by trolls or in bad faith – see Roozenbeek & van der Linden's (2020) work on the risks of online misinformation).

Further research around this issue has helped me to reach what I hope to be a relatively balanced perspective on concerns that people might face around climate change. Whilst some climate change campaigners have reported that they find Bendell's work a helpful 'call to action' (e.g. the XR Handbook [Rebellion, E. 2019]), other prominent climate scientists and campaigners such as Michael Mann (2021) have argued that the position he takes amounts to 'doomism'/'doomerism' that can foster a sense of helplessness and distract from meaningful discussion around how we can still avoid the worst impacts of climate change. Of course, both of these positions can clearly be true for different people at different times; for example, I initially felt distraught and hopeless after reading Bendell's article, but reading it also provoked me into doing further research on the subject, and also contributed to me choosing to pursue climate change concern as a thesis topic.

At the same time, I now believe that Bendell's paper draws conclusions that aren't necessarily justified by his arguments. Whilst it doesn't automatically follow from this that his conclusions are wrong, they do not yet appear predetermined. Current meteorological observations and predictions about the threats that we face are certainly very concerning, both worldwide (World Meteorological Organisation: Pritchard & Turner 2021) and for the UK (Met Office: Kendon et al. 2021). However, whilst a number of key 'tipping points' (where a natural negative feedback system that helps to maintain the temperature, air quality, acidity etc. has broken down) are likely to have already been exceeded (Ripple et al. 2021), the medium-term consequences of this plus the timescale for other tipping points being reached is still being modelled and researched (particularly with regard to rising sea levels, e.g. Pattyn et al. 2018). Additionally, whilst climate science itself is a very well-established and respected field (with some areas of the field engaged in meta-meta-analyses, e.g. Scholes 2016), the impact of changing environmental conditions depends not just on the ecological systems involved, but on political systems, economic systems, and social systems. I've therefore reached the opinion that with so many variables interacting between so many interconnected complex systems, it becomes too difficult to make categorical predictions about how climate change will impact any particular person's life in the upcoming decades.

Whilst not mentioned in Bendell's paper, there is already research into such areas which frames climate change in terms of vulnerability, resilience, risk, and stressors upon multiple systems that interact dynamically; this has been done through case studies of particular communities already affected by ecological changes (e.g. Bennett et al. 2015, McCubbin et al. 2015) and also through modelling projects such as the one undertaken by the University of Notre Dame that use measures of vulnerability and risk to predict each country's relative preparedness for climate change (https://gain.nd.edu/our-work/country-index/). Such work is also happening at a governmental level, where changes to the climate are framed in terms of national security – for example, the UK Ministry of Defence recently published public information about their Climate Change and Sustainability Strategic Approach (2021) in which they ominously state that climate change is '*now firmly a Defence problem*' (p.5).

Exploring such research into the threats we face and various psychological responses towards threats posed/exacerbated by climate change has helped me to gradually develop greater nuance in my own concerns around climate change (I remain deeply concerned, though try to avoid 'doomism', whilst also finding ways to manage my anxiety around the issue, preferably through 'meaning-focused coping', i.e. through finding sources of value and meaning in life that are ends-in-themselves, regardless of how they may be impacted by climate change), as did meeting other psychologists through the Climate Psychology Alliance and the Mind and Life Summer Research Institute 2021 (which focused on the social and psychological implications of climate change). As such, I feel that my research journey when undertaking the thesis has helped me to process some of my own anxieties around climate change, and I hope that this growth will prove useful in my practice when supporting children and young people with climate anxieties, by affording me a greater capacity to offer containment of their challenging emotions around the issue (Bion, 1970) whilst simultaneously strengthening my ability to be able to empathically inhabit their positions of worry.

Whilst I personally found this process very helpful, the demands upon educational professionals are very high and it would likely be impossible for them to engage with all challenges to the depth that they may ideally require. I would therefore not expect many educational psychologists and professionals to necessarily go through a similar process. However, the three positions (factors) that the current research has **identified** and **explored** are probably best framed as mindsets/ways of engaging that people may come to inhabit at various points in time; I certainly have personally experienced all three of them at different times and other professionals to whom I've presented my work have reported similar engagement. I therefore hope that a consideration of these ways of

engaging by educational psychologists and other educational professionals will be able to help support them to reflect upon their own forms of engagement with climate anxiety, helping them to gain greater self-awareness of how their own anxieties and difficult emotions may affect their capacity to support and engage with young people experiencing challenging emotions relating to climate change.

I also hope that the results and recommendations outlined in the current research will be able to inform school practices around their students' emotional (and practical) engagement with climate change (potentially with support from Educational Psychologists and other professionals). As explored in **Section 4.3.1**, there are many factors that can erode young people's mental health and wellbeing; whilst climate anxiety appears to occur relatively independently from generalised anxiety (Hogg et al. 2021), it is nevertheless likely to be another factor that can negatively impact some young people's mental health and wellbeing, so it makes sense for it be considered as part of each school's strategy to support mental health and wellbeing amongst their students.

Support for young people's emotional engagement with climate change is a particularly pertinent issue in light of the Department for Education's upcoming Sustainability and Climate Change Strategy (2022). The first action listed within this paper policy is to promote increased climate education across all areas of the curriculum. The strategy is also notable in that its strategic aims include *'preparing all young people for a world impacted by climate change'* (https://www.gov.uk/government/publications/sustainability-and-climate-change-strategy/sustainability-and-climate-change-a-strategy-for-the-education-and-childrens-services-systems#vision-and-aims). Whilst these policies and aims are necessary as part of a forward-thinking sustainability strategy, the increased coverage of climate change within the curriculum will make it harder for young people (and school staff) to take an avoidant approach towards climate anxieties. This may result in further young people experiencing challenging emotions around climate change, so I hope that the current research can help contribute towards a coherent school strategy to help students to manage their emotions.

When I first began writing this thesis, my background in philosophy (and my attendance at multiple University of Copenhagen Phenomenology Summer Schools during my doctorate) meant that I became concerned with a lot of the foundational issues surrounding my work. In particular, I became concerned with how to adopt a coherent philosophical framework that would allow me to assert the realism of research produced within climate science, whilst also drawing on a range of psychological research within climate psychology, some of which operates from social constructionist perspectives.

Such considerations are usually covered within the fields of 'ontology and epistemology' for research within Educational Psychology and I have had a strong interest in both of these fields for many years, since they hold the potential to get to the heart of what it means to be a human in relationship with the world. In particular, my thinking has been deeply impacted and inspired by modern research within enactive and embodied cognition; I believe that such approaches are able to provide a reliable and self-consistent grounding for psychology in a way that cognitivist approaches fail to do and that these approaches hold the potential to contribute insightful perspectives to many areas of interest to educational psychologists (such as: autism, dyslexia, ADHD, the process of assessment, scaffolding, thinking around psychiatric diagnosis, emotions, gender diversity, and mindreading/social understanding).

My concerns with coherently grounding my work led me to write an extensive section on my positionality, ontology and epistemology, which formed the introductory part of this thesis. The relevance of this was extensively discussed between my examiners on the day of my viva. Whilst the ultimate decision was for this section to be retained, I was also asked to substantially expand my literature review. Upon reflection, I feel that my original introductory section now interrupts the flow of my thesis, when it would be preferable to move from this foreword straight into the existing research exploring people's concerns about climate change. I have therefore consolidated this work and moved it to **Supplementary Appendix A**, so that it is treated as supplementary material that (hopefully) enhances the thesis but which is not intended to be treated as an integral part of it.

Finally, it is important to address the context of the current research, particularly since this context has shifted a lot since I began my research. I first began considering whether psychological factors surrounding climate change could be an interesting topic to research back in early 2019. At this point in time, the School Strikes for Climate were steadily gaining momentum, with millions of young people across the globe protesting over the course of the year (e.g. https://www.theguardian.com/environment/2019/sep/27/climate-crisis-6-million-people-join-latest-wave-of-worldwide-protests). This was accompanied with increased media coverage of issues around climate change (Anderson, 2020), supported by initiatives such as 'Covering Climate Now' (https://coveringclimatenow.org/) that encouraged media outlets to improve their reporting standards and engagement with environmental issues. In January 2020 the severe Australian wildfires made headlines around the world, and for the months immediately prior to the Covid-19 pandemic, Ipsos MORI reported that for the first time in over 20 years, 25% of Britons surveyed felt that climate change was one of the most important issues facing Britain (Ipsos MORI 2020a).

Unfortunately, the Covid-19 pandemic and the UK lockdown in March 2020 changed everything; it dominated the UK news cycles, put a (temporary) halt to the School Strikes for Climate, and took a lot of momentum from high-profile campaigns to tackle climate change such as Extinction Rebellion. Additionally, it made face-to-face research impossible for my university cohort. This significantly complicated my research plans, since I had hoped to undertake my research with groups of students in two of the schools with whom I was working on placement, which theoretically might have taken as little as 2-4 research days.

In place of this, I had to recruit, organise, and attend 1:1 online sessions with each student undertaking the research, which meant that the main data-collection phase spanned the entirety of the Autumn term of 2020 plus the start of Spring 2021, rather than being completed within the first half of the 2020 Autumn term. Additionally, at the end of the 2019-2020 academic year my research supervisor (Martin Hughes) retired, which meant that I was assigned a new supervisor (Lorraine Campbell) for the 2020-2021 academic year onwards.

Interestingly, despite the research taking place in a very different social climate to the conditions in which it was conceived, the participants who undertook the research generally said that they felt just as concerned about climate change as they were prior to the Covid-19 pandemic. It's likely that some selection bias occurred here (since students who were less concerned about climate change were less likely to take the time to participate), but it's also possible that their engagement with such issues during a formative time may support their continued engagement as they age – for example, Shani et al.'s 2020 longitudinal work with youth peace activists in Germany suggests that their values remained stable over time, even if their engagement lessened as they aged.

4 Literature Review – the Context and Complexities of Climate Anxiety

Many people find climate change concerning, but it can be difficult to judge quite how concerned they are and how these concerns compare with other concerns that they hold. The first part of this review will therefore begin by exploring the context for such concerns. I will begin by summarising key trends in UK newspaper coverage (**Section 4.1.1**) and UK public concern (**Section 4.1.2**) about climate change over recent decades. Next, I will summarise existing research exploring whether young people in the UK feel concerned about climate change (**Section 4.1.3**). Building on this, I will then explore how schools currently educate children and young people about climate change (**Section 4.1.4**).

In the main part of the review I will introduce the concepts of climate anxiety and eco-anxiety (**Section 4.2**). Exploring this further, I will highlight the importance of avoiding pathologisation of people's climate anxiety (**Section 4.2.1**). I will also outline the contribution of scales and taxonomies that are designed to measure relative climate anxiety and highlight some limitations of each approach (**Section 4.2.2**). This will lead into considerations around the potential pitfalls of using a climate anxiety framework to reductively understand people's concerns and experiences (**Section 4.2.3**). Turning my attention to how Q methodology can be used to support a project to avoid some of the pitfalls outlined (**Section 4.**3), I will then undertake a broader systemic examination of the developing psychological theory around some of the complexities in how people are engaging with concerns around climate change (**Section 4.3.1**). Bringing the focus back to education, I will then examine current policy documents and practice literature related to children and young people's mental health in order to explore how challenging emotions around climate change are situated alongside broader challenges to young people's mental health and wellbeing (**Section 4.3.2**). Finally, I will summarise the main points of the literature review (**Section 4.4**).

4.1.1 The Historical Context of Climate Change Awareness and Coverage in the UK Media

(Right wing newspapers publishing misleading and occasionally baffling headlines about climate change)

In 2023, public concern about climate change is high in the UK. However, to appreciate how high it is, it is helpful to place current concerns within the broader historical context of the past 50 years. The UK environmental movement first began to gain momentum in the 1970s with the foundation of The Ecologist in 1970, the British Friends of the Earth in 1971, and the Welsh Centre for Alternative Technology in 1973; however, the movement's initial focus was primarily around pesticides, pollution, and environmental destruction (Prendiville, 2014). For most non-activists and non-scientists, the first widely-reported information about climate change was released by the World Meteorological Organization's first 'World Climate Conference' in 1979. At this conference leading climate scientists published a joint consensus about climate change, which stated:

"it appears plausible that an increased amount of carbon dioxide in the atmosphere can contribute to a gradual warming of the lower atmosphere, especially at higher latitudes... It is possible that some effects on a regional and global scale may be detectable before the end of this century and become significant before the middle of the next century."

(World Meteorological Organization 1979, p.2)

From this first public announcement, the number of UK media articles about climate change gradually grew throughout the 1980s and the topic became increasingly referenced in political debate in the late 1980s, in part influenced by a high-profile speech by Margret Thatcher in 1988 in which she stated rhetorical (but not tangible) support for action to monitor and mitigate climate change (Anderson 1997). As the topic entered public discourse, research began tracking public opinion; public polling in the UK has included questions about climate change and environmental concerns since at least 1988 (IPSOS Mori, 2021) and the British Social Attitudes (BSA) Survey has included questions exploring public attitudes towards climate change since at least 1990 (Taylor 1997, p.119).

The BSA survey reported high levels of concern around climate change through the early 1990s, with 58% of respondents from 1990-1996 selecting 'agree' to the statement '*the government should do more to protect the environment, even if it leads to higher taxes*' (Taylor 1997, p.119-120). Similarly, a Gallup 'Health of the Planet' survey from 1992 reported that 28% of respondents from Great Britain said they were concerned '*a great deal*' about the environment and an additional 53% were concerned '*a fair amount*' [making a combined total of 81% showing concern] (Dunlap et al. 1993, p.11).

I have not been able to find any reliable summaries of UK concern around climate change throughout the mid 1990s. However, Habermas (1962) argues that mass media coverage has become interrelated with wider public discourse, both reflecting and shaping private and political discussion on the topic, creating dynamic feedback loops within the discourse. Consequently, analyses of the coverage of the topic within the UK media can potentially provide a rough indication of public dicsourse over this period. This hypothesis was explored in relation to Japanese media coverage by Sampei & Aoyagi-Usui (2009), who found a strong correlation between public concern and the frequency of media coverage of climate change over the period 1998-2007.

UK media portrayals of climate change risk reduced significantly between 1991-1996, in part due to increased media focus on the 1991 UK economic recession, with public discussion of climate change appearing to have significantly receded over this period (Carvalho & Burgess 2005, p.1464-1465). In 1997 there was an increase in UK media coverage of climate change due to the third IPCC report

being released and the Kyoto Protocol agreement attracting significant international attention, however coverage and public discourse dipped once again during the early years of New Labour until severe flooding was experienced in the UK in Autumn 2000 (Carvalho & Burgess 2005, p.1465 report that the increased newspaper coverage depicted in **Figure 1** can mostly be traced to increased public discourse around climate change following the flooding in Autumn 2000):

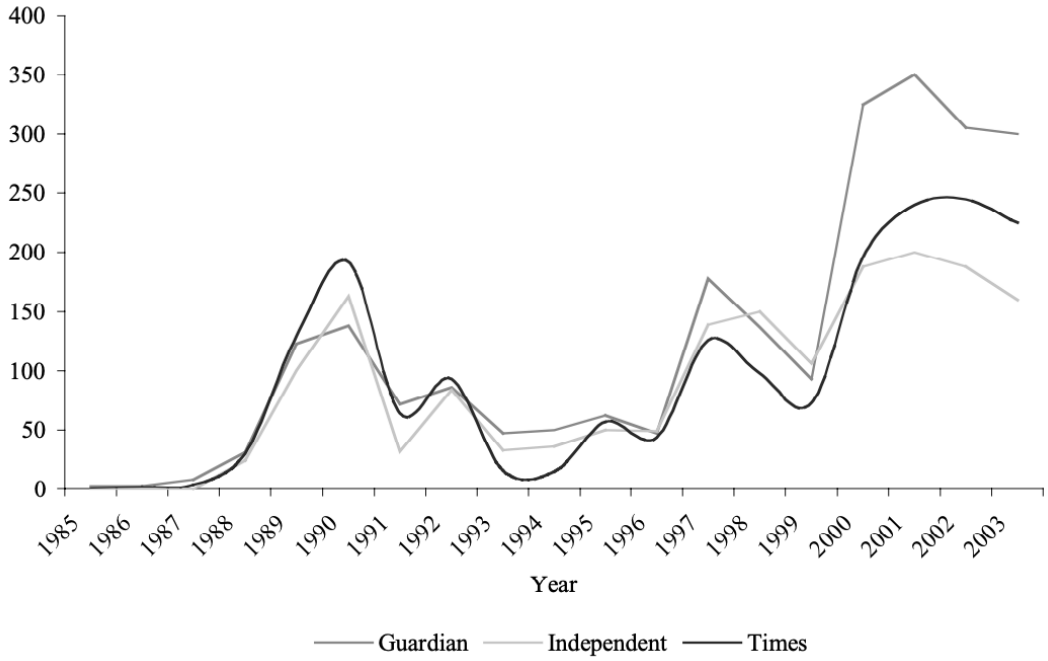


Figure 1: Distribution of newspaper articles on climate change by major UK newspapers: 1985–2003 (Carvalho & Burgess 2005, p.1462)

Whilst overall UK newspaper coverage around climate change remained low throughout the early 2000s, there was a gradual increase between 2004-2008 as New Labour adopted a "*green hero*" discourse that portrayed the UK as a world leader in tackling climate change (Romsdahl et al. 2017, p.5) and this government passed the 2008 Climate Change Act that enshrined the targets of the Kyoto Protocol into UK law (https://www.legislation.gov.uk/ukpga/2008/27/contents). There was an overall decrease in UK media coverage following the 2008 financial crash, with the exception of a large number of newspaper articles specifically covering the 'climategate' controversy in 2009 (Romsdahl et al. 2017, p.9) in which climate researchers from the University of East Anglia has over 1000 emails hacked and then selectively published for the purpose of casting doubt upon the legitimacy of their research - all researchers involved were completely exonerated (Hartman & Oshita, 2013), but the incident helped fuel existing climate change denialism within the right-wing

media (Painter 2011, p.109) and also amongst political conservatives more broadly, particularly fuelling 'sceptical' and denialist narratives within English-speaking online discourse (Leiserowitz et al. 2013).

Between 2010-2014 UK media coverage of climate change was relatively low, with Climate Change being low on the political agenda and the issue receiving relatively little attention in the 2015 and 2017 general election debates (Anderson 2020, p.3-4). However, media coverage increased gradually between 2015-2020, particularly from 2018 onwards as the activities of activist movements such as Extinction Rebellion and the School Strikes for Climate increasingly made UK headlines (Graham & De Bell, 2021), with corresponding increases in online searches and discourse on social media (Thackeray et al. 2020), which likely further shaped coverage in print media. Coverage of climate change then decreased dramatically in 2020 as coverage of the Covid-19 pandemic dominated the headlines (Robin et al. 2020), but has shown a substantial increase from late 2020/early 2021, influenced in part the lead-up and coverage of the COP26 climate conference in Glasgow in November (Chandler et al. 2021). The Media and Climate Change Observatory at the University of Colorado has tracked coverage of climate change by six major UK newspapers since 2000, illustrating the trends outlined above (**Figure 2**):

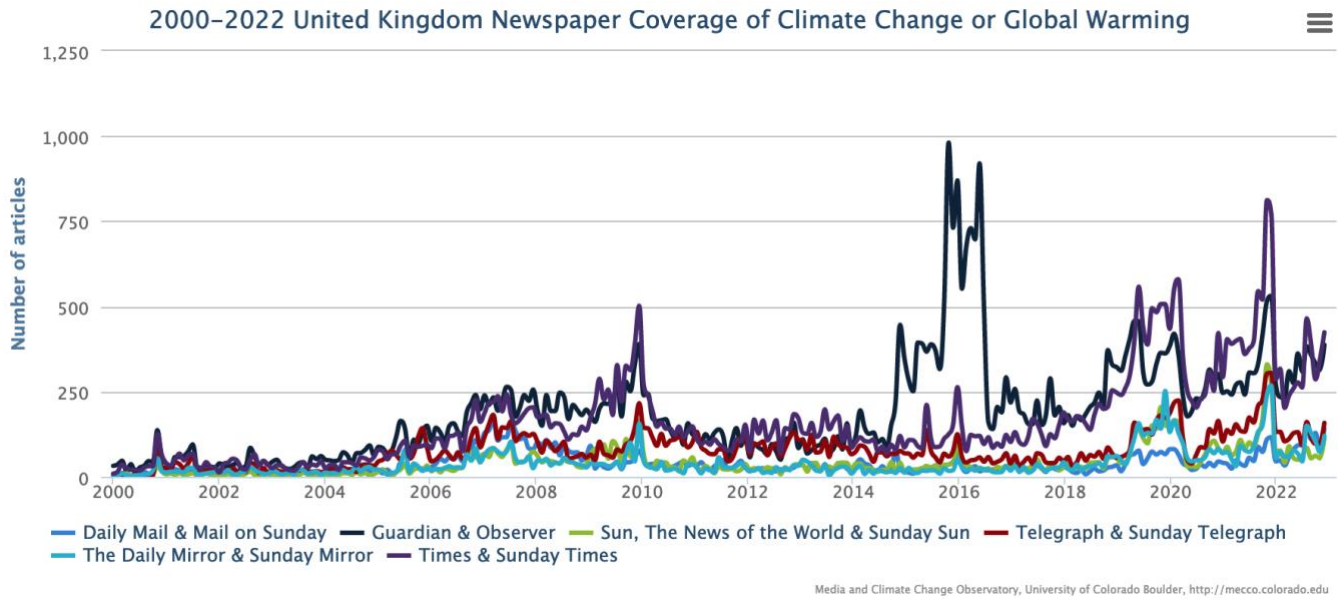


Figure 2: Climate Change related articles in six major UK newspapers from 2000-2022, accessed at: https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/uk/index.html (Boykoff et al. 2023)

4.1.2 UK Public Attention and Concern about Climate Change

Report: Average American Must Have Life Ruined By Natural Disaster Every 6 Minutes To Fear Climate Change

(the above article by the Onion is satirical)

As this section will illustrate, UK public attention about climate change has increased substantially over the past ten years. However, the information that people encounter about climate change does not occur in a vacuum; as outlined by Davenport and Beck (2001), many ideas and pieces of information simultaneously compete for our attention within the 'attention economy', which means that the relative amount of attention that people direct towards climate change is likely to depend in part upon the other information that they are faced with, along with how emotionally compelling other information is in comparison with the information they encounter about climate change. As explored in **Section 4.3**, information about climate change can feel 'psychologically distant' (Spence et al. 2012) when it is perceived as geographically distant (affecting places far from the UK), temporally distant (occurring far in the future), socially distant (affecting unknown others), or uncertain/hypothetical (when the impacts are unknown or the issue feels abstract). Consequently, the amount of attention that a person may direct towards information about climate change is likely to be dependent in part on how salient they find other sources of information that they encounter, both within the media and in other areas of their lives.

This phenomenon can also make it challenging to measure relative public concern around climate change. One of the most helpful sources for measuring relative public concern about climate change over time that I have been able to find are monthly reports by the poling company Ipsos Mori. This organisation conducts face-to-face surveys with representative samples of 1000 UK citizens aged 18+ each month about a range of topics and concerns. Importantly, climate change is not the main focus of the surveys (reducing selection bias); householders are asked about their concerns around a range of topics, which Ipsos Mori use to produce reports. As data from Ipsos Mori will show (**Figure 3**), self-reported public concern can fluctuate significantly from month-to-month and appears to be significantly influenced by not just by media coverage, but also other competing concerns that may take priority in people's minds.

Key factors that appear to influence self-reported public concern around climate change include the presence of any recent extreme weather events such as flooding or wildfires, which generally increase public concern (Ipsos Mori 2021, p.16), levels of media coverage over the previous months (e.g. UK public concern rose in the run-up to the COP26 conference in Glasgow, over the period that newspaper coverage of climate change significantly increased [Boykoff et al. 2022]), and public concern towards other threats (such as Covid-19; UK public concern towards climate change decreased sharply at the start of the pandemic [Lyytimäki et al. 2020]). Additionally, each of the above factors may intertwine; for example, extreme weather events are likely to result in significant media coverage of climate change and the environment, whilst the presence of other threats may take precedence in news coverage over other articles, including articles about climate change.

When this section was first written in Autumn 2021, public concern was the highest that had ever been recorded by Ipsos MORI (2021a, 2021d). However, UK public levels of concern have decreased following the conclusion of the COP-26 climate summit in Glasgow in November 2021. At the time of this final write-up (September 2022, corrections December 2022), 23% of respondents who were polled by Ipsos listed climate change amongst their top concerns affecting Great Britain, placing it as the third most common concern (p.4). Their 'Issues Index' report for August 2022 (the most recent 'Issues Index' published as of December 2022) contains the most up-to-date graph published by Ipsos showing how concern about climate change has developed over time:

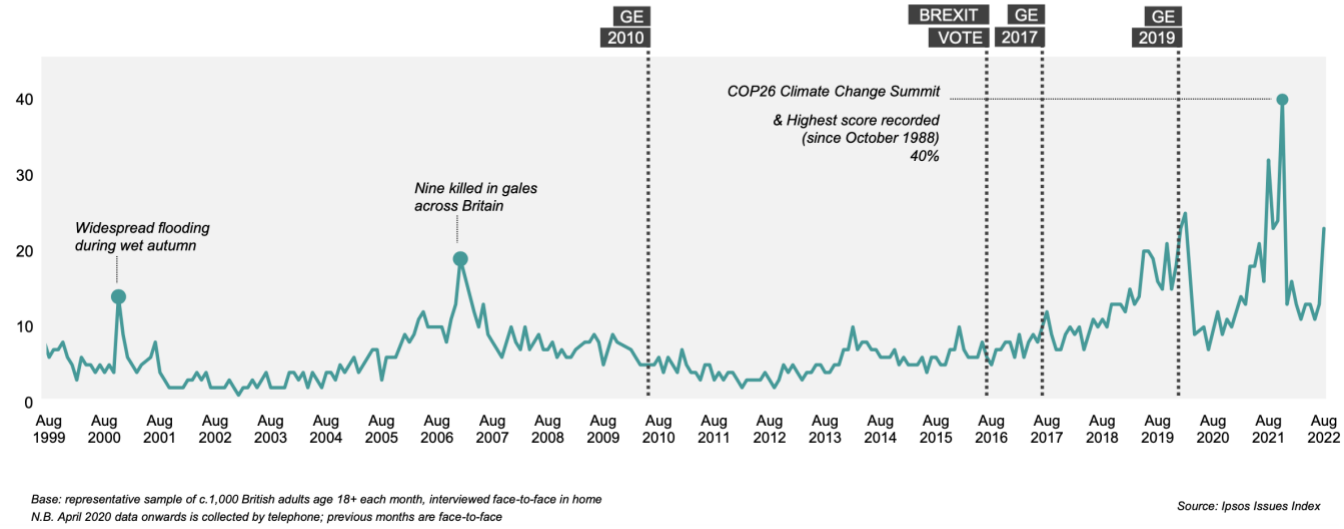


Figure 3: The percentage of respondents from Great Britain who listed climate change (or pollution/environmental issues) as an important issue facing Britain, from August 1999 to August 2022 (Ipsos 2022a, p.9)

Taking a global perspective, Ipsos MORI's 'What Worries the World' survey for November 2021 indicated that public concern in the UK was the (equal) third highest in the world, behind Germany and Canada and tied with Australia, likely reflecting increased media coverage due to COP26 being hosted in Scotland. However, as of the November 2022 survey, UK concern has dropped to 16%, making UK concern levels joint 10th worldwide (Ipsos Mori 2022b, **Figure 4**):

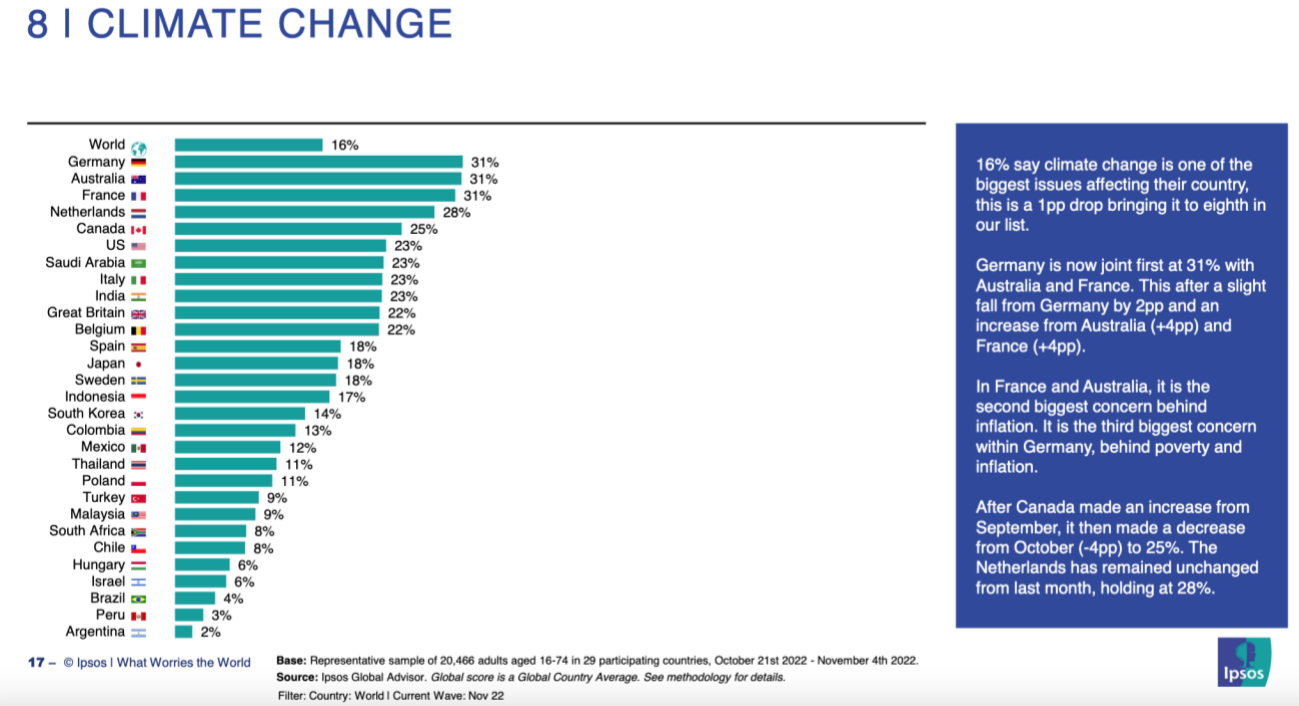


Figure 4: The percentage of respondents from each country who mentioned climate change in their top three concerns in November 2022 (Ipsos Mori 2022b, p.17)

4.1.3 Young People's Concerns about Climate Change

Ipsos Mori's surveys are conducted with adults aged 18 and older and as far as I'm aware there is not currently an equivalent ongoing survey that has been carried out with children. However, within the growing field of climate psychology a number of researchers have undertaken research exploring young people's concerns:

- Early research by Tucci et al. (2007) into a range of fears held by 600 Australian children aged 10-14 found that some children they interviewed were concerned that the world might 'end' in their lifetime due to climate change.
- Survey research of Swedish children by Marie Ojala (2012a, surveys conducted 2009) found that 29% of (90) children, 62% of (146) teenagers, and 61% of (112) university students who were surveyed expressed significant worry about climate change.
- From interviews with 50 young people aged 10-12 in the USA, Strife (2012) reported that 82% of young people interviewed expressed strong emotions about environmental problems such as sadness, fear, and anger.
- Research by UNICEF UK/Ipsos (2013) reported that 74% of young people aged 11-16 (sample size not made available) in Britain agreed with the statement that they are '*worried about how climate change will affect the future of the planet and believe the world will have changed as a result of climate change by the time they are adults'*.
- In a review of existing surveys of young people's attitudes towards climate change worldwide, Corner et al. (2015) concluded that on average young people in the late 2000s and early 2010s reported being more concerned than adults about climate change.
- A poll for the Kaiser Family Foundation of 629 teenagers in the USA (by Kaplan & Guskin, 2019) reported that 57% of teens said that climate change makes them feel afraid and over 70% believed that climate change will cause a moderate or great deal of harm to their generation.

Some of the above studies (particularly Ojala, Strife, and the Ipsos/UNICEF poll) have potential challenges around generalisability because young people who are concerned about climate change were more likely to respond to their recruitment drives. However, what they can establish is that there are at least a portion of young people who self-report being significantly worried, sad, or angry about the effects (and future impacts) of climate change.

Some relatively strong evidence that a substantial portion of young people in the UK are concerned about climate change comes from the 2019 Good Childhood Report (Children's Society, 2019). Almost 2400 young people aged 10-17 were surveyed about a range of issues affecting them, and 77% of young people reported being at least 'a little worried' about the environment, 25% 'quite worried', and 16% 'very worried', with girls expressing higher levels of concern on average than boys about the environment (**Figure 5**). The finding that girls self-report being more concerned about climate change than boys (on average) triangulates with findings from the Pew Research Centre's 2015 Global Attitudes Survey, which concluded that "*Female, younger, and less religious people tend to worry more about climate change in English-speaking Western democracies*" (Lewis et al. (2019), p.793).

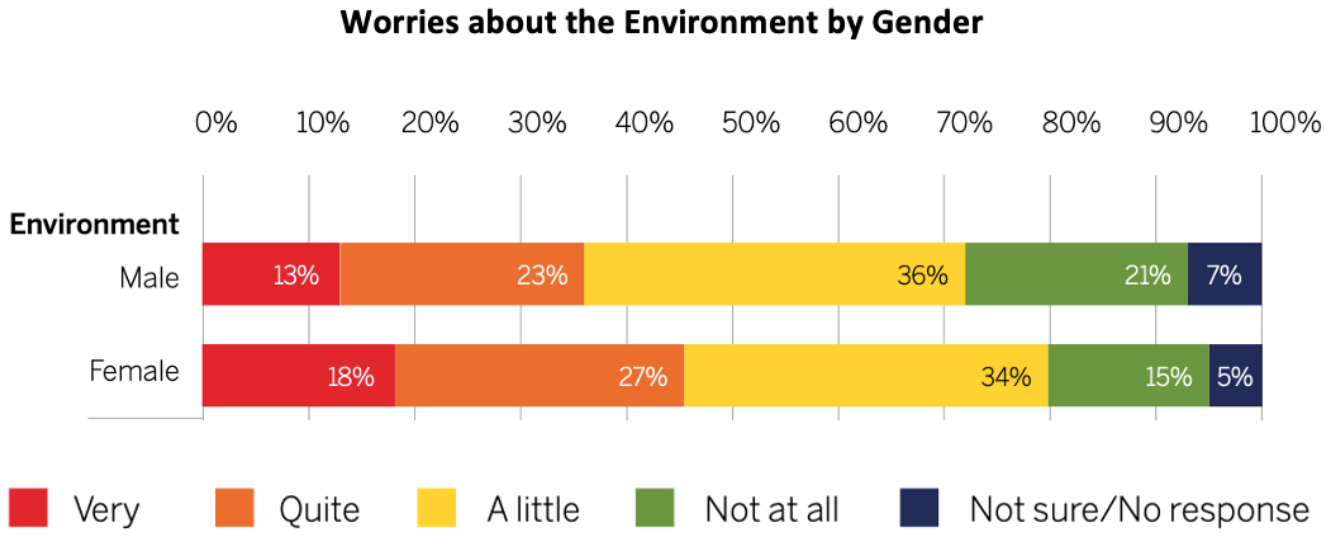
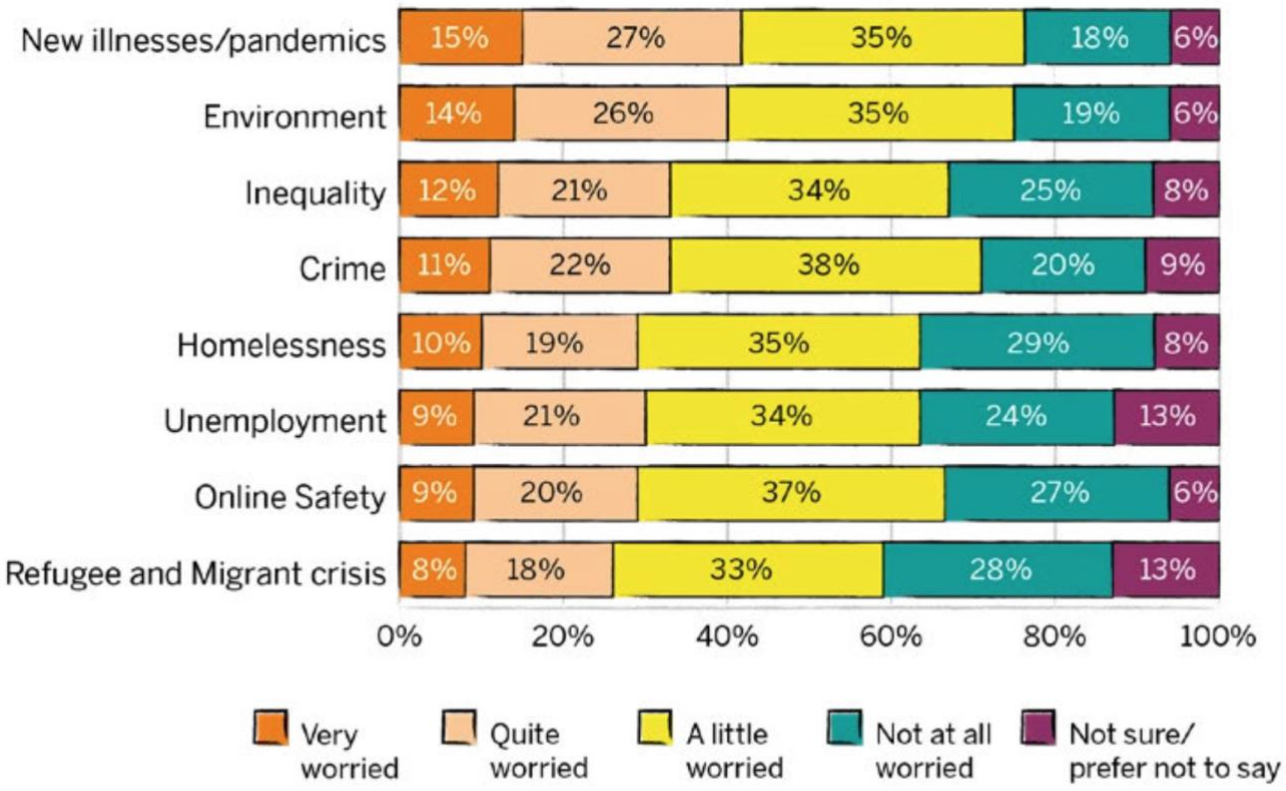


Figure 5: Young people's worries about the environment according to gender (The Good Childhood Report 2019, p.69)

The Good Childhood reports did not explore environmental concerns prior to 2019 and the 2020 report's data collection appears to have been administered by a different provider who did not ask questions about the environment. However, the 2021 report introduced a section exploring young people's worries about a range of 'broader issues'. 2000 young people aged 10-17 were asked how concerned they were regarding about 'eight broader issues' (The Good Childhood Report 2021, p.48) and 75% of young people self-reported feeling at least 'a little' concerned, with 26% of young people self-reporting that they felt 'quite' concerned, and 16% of young people feeling 'very' concerned (**Figure 6**):



Source: The Children's Society's Household Survey, Wave 20, April-June 2021, 10 to 17 year olds, United Kingdom.

Figure 6: Young people's worries about the environment in comparison to other 'broader' issues (The Good Childhood Report 2021, p.49)

The Children Society's 2021 report is helpful in-part because the data suggests that levels of concern amongst young people about climate change have not changed significantly since the 2019 report. However, it is also helpful because it shows young people's concerns in the context of other 'broader' concerns that they may hold. Whilst 'New Illnesses/Pandemics' was listed at the top concern in the 2021 report, self-reported concerns about this had fallen by the time of The Children Society's 2022 report. Consequently, whilst self-reported concern amongst young people about the environment appears to not have significantly changed since the 2021 report (the proportion of young people who reported being 'a little' worried fell by 1%, but the proportion of young people who reported being 'very' or 'quite' worried remained the same), by the time of the 2022 report, concern about the environment had become the most widely held worry amongst young people when compared with other 'broader issues' about which they may be concerned (**Figure 7**). As with the previous report, 2000 young people aged 10-17 were surveyed:

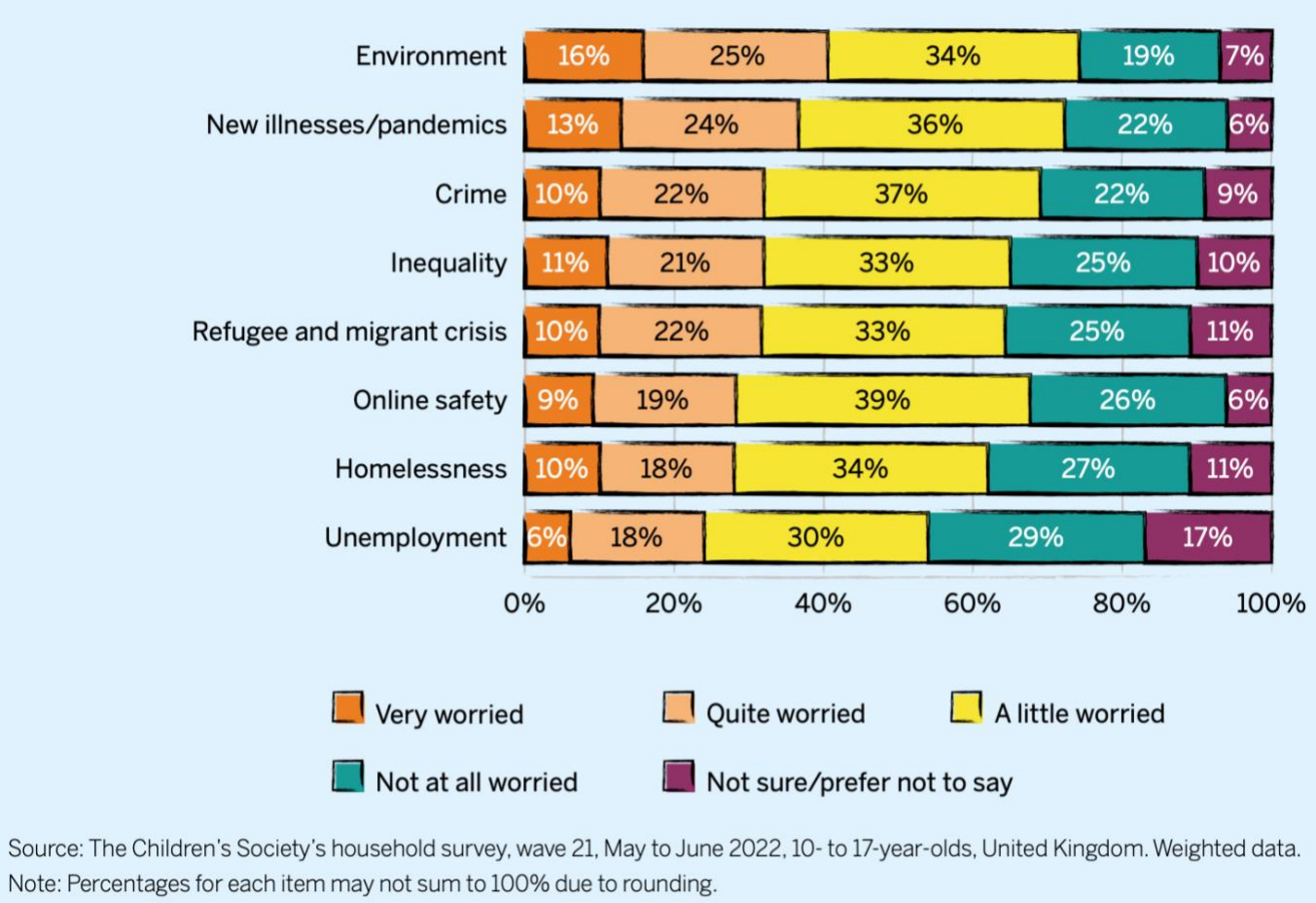


Figure 7: Young people's worries about the environment in comparison to other 'broader' issues (The Good Childhood Report 2022, p.19)

Further evidence that a substantial proportion of young people are significantly concerned about climate change comes from a large-scale study in 2021 that involved a multidisciplinary team of climate psychologists, philosophers, and public health researchers from the UK, USA, and Finland (Hickman et al. 2021). This study was conducted with funding (but without interference) from the campaigning organisation Avaaz, who released the key findings to the media prior to COP26 (e.g. https://www.bbc.co.uk/news/world-58549373) and with the study itself being formally published in the Lancet in December 2021. Whilst there is a clear bias behind the study (i.e. the funders and researchers were hoping to provide evidence that children are concerned about climate change), the methodology used and analysis undertaken by the researchers appears appropriate (and has not attracted any public criticism from the wider research community, despite its high media profile).

For the study, Hickman et al. (2021) organised an online survey of 10,000 young people aged 15-25 from 10 countries (1,000 per country). The researchers used an online polling company (Kantar), who did not reveal the survey topic to respondents prior to participation, in theory lessening recruitment bias towards young people highly concerned about climate change. Out of the 1,000 UK respondents, 94% reported being at least '*a little worried*' about climate change, 80% at least '*moderately worried*', 49% at least '*very worried*' and 20% '*extremely worried*' (**Figure 8**). Concerningly, 28% of UK respondents also said that they felt that their worry had at least some '*impact on my functioning*':

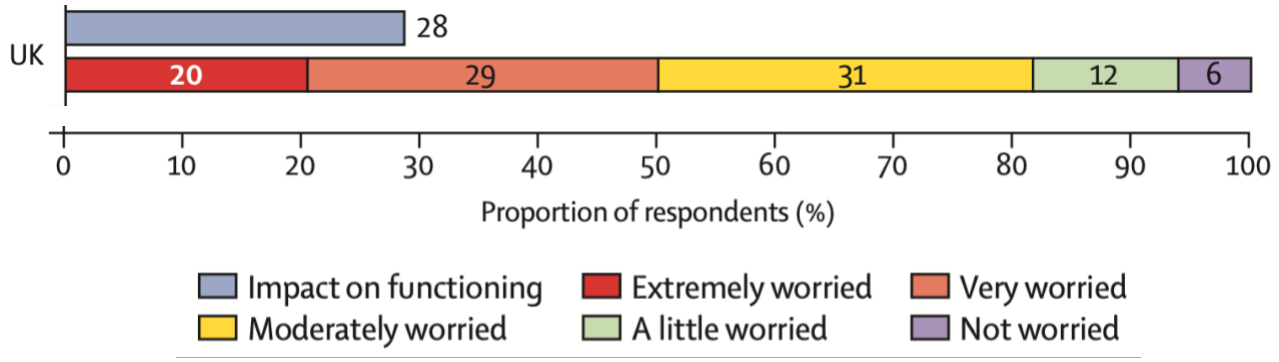


Figure 8: Young people's worries about the environment and self-reported impact upon their functioning (Hickman et al. 2021, p.e866)

In addition to their more generalised expression of worry within the survey, 72% of the UK respondents agreed with the statement that '*The future is frightening [due to climate change]*' (compared with 75% across the whole sample), 51% from the UK agreed with the statement '*Humanity is doomed*' (56% across the sample), and 39% believed that their '*Family security will be threatened*' (51% across the sample) over their lifetime. The proportion of young people expressing significant worry and negative beliefs about climate change appears to have come as a relative surprise to the researchers themselves, who end their article with the reflection:

> As a research team, we were disturbed by the scale of emotional and psychological effects of climate change... W*e wish that these results had not been quite so devastating*"
>
> (Hickman et al. 2021, p.e872).

I believe that the above studies are sufficient to establish at a minimum that a proportion of young people are concerned about climate change. Questions of generalizability are complex (as they are for most studies: Kukull & Ganguli, 2012), since even the larger-scale studies mentioned lack detail around whether the young people expressing concern are more likely to be part of particular age groups or demographics. However, even if only a relatively small proportion of young people were to experience substantial concern or anxiety around climate change, it would still be useful for Educational Psychologists to have access to information about this area, since as a profession we are disproportionately likely to be asked to work with young people who face challenges that are relatively uncommon in schools. **Section 4.2** will therefore explore existing thinking around 'climate/eco-anxiety' and **Section 4.2.1** will examine some of the complexities around the potential pathologisation of people's worries about climate change. However, prior to this (in **Section 4.1.4**) I will consider an additional component to young people's engagement with climate change: the information (or lack of information) and discussion that they may engage with as part of their education:

4.1.4 The Educational Context: How schools currently seek to educate children and young people about climate change

This section will how schools currently seek to educate children and young people about climate change. It will consider pupil voice/preferences around climate education (**Section 4.1.4.1**), the current state of climate education within schools (**Section 4.1.4.2**), research exploring the potential impacts of climate education (**Section 4.1.4.3**), and new and emerging initiatives (**Section 4.1.4.4**). Of course, young people will encounter information around climate change from a range of sources and could engage in thinking and discussion around it in a range of settings (e.g. with peers, at home, on the internet, in community groups). However, the inclusion of education about climate change within school settings provides an opportunity to ensure that young people encounter high quality information that (hopefully) avoids climate disinformation and provides opportunities for them to engage in critical discussion and reflection on the potential implications of such information for the world and for their own lives.

4.1.4.1 Pupil voice/preferences for education around climate change

Several surveys have been carried out over the past few years exploring young people's opinions about the education that they receive about climate change in school. As noted in **Section 4.1.3**, one challenge of such surveys is the risk of selection bias, i.e. young people who care more strongly about education around climate change in school are potentially more likely to take the time to complete surveys that ask them about this topic. However, with this caveat taken into account, the following research has been undertaken:

'Teach the Future' is a group which promotes a youth-led campaign to encourage UK schools and colleges to provide high-quality education around the climate emergency plus support for students to develop the skills to thrive in an environment that will be impacted by climate change. Their survey results indicate that only 4% of students surveyed felt that they knew a lot about climate change, whilst 68% of students wanted to learn more about the environment (Brindle 2020). Slightly more encouragingly, the international development charity Plan International reported that 82% of young people they surveyed in the UK felt they had learnt at least some information about climate change at school (although higher proportions of UK respondents felt they had learnt information from environmental groups and social media), with 74% saying that they had learnt about climate change in science lessons (Rost et al. 2021). At the lower end of survey results for student desire for education on climate change, the insurance company Zurich commissioned a survey on climate education, finding that 32% of young people surveyed (in the UK, aged 7-17) wanted greater numbers of lessons covering climate change in school (Dickson & Wagstaffe, 2020). As the authors of this study note, even with this surprisingly low percentage, when extrapolated to the UK youth population, "Millions of young people want more climate change education" (https://www.zurich.co.uk/media-centre/millions-of-young-people-want-more-climate-change-education).

What form would students want climate change education in school to take? Prior to the COP26 conference in Glasgow in November 2021, a group called MockCOP invited 330 youth delegates from 140 countries To consider this and other questions. This led to the creation of a declaration of their wishes for education on the climate crisis around the world:

"Each country shall ensure that all school age children, regardless of how they are schooled, are provided with comprehensive and up to date teaching regarding the climate emergency and ecological crisis. Such teaching shall be adapted to be age and region specific and to give all young people the information they need to enable them to understand the extent, nature and structural causes of the crisis, the measures which need to be taken to substantially address and reduce the crisis and [to] mitigate and adapt to its consequences.
Each country shall implement national laws to ensure free access to impartial climate science and data, and provide legal redress against those making false claims relating to the climate emergency and ecological crisis.
Each country shall ensure that all school age children, regardless of how they are schooled, are given the opportunity to learn about their connection with nature, including (but not limited to) drawing upon the knowledge and practices of Indigenous peoples"

(MockCOP, December 2020, p.9)

This statement suggests that potential priorities for students who consider climate education to be very important include the provision of reliable information and data, presented in a manner appropriate for each age group and culture. The students would like information to include the structural causes of the crisis (presumably in terms of our current reliance on fossil fuels), actions that can be taken to substantially address such causes, plus information about potential adaptation. There was also a wish for there to be a crackdown on climate misinformation, opportunities for nature connection, and links to be made between current proposed environmental solutions and indigenous knowledge and practices. To cover this range of topics, it would be likely that climate change would need to be a topic across many areas of the curriculum, including economics, politics, history (to track how fossil fuel use has developed), geography, science, critical thinking/philosophy (to tackle climate misinformation), cultural studies/human geography (to cover indigenous knowledge and practices), and design and technology. Nature connection could also be facilitated through the use of forest schools for lessons.

4.1.4.2 Current situation for climate education

Andrew Charlton-Perez, Professor of Meteorology at the University of Reading, explored the coverage of climate change within the school curriculum in England in 2021. He summarised his findings as follows:

> "*The word "climate" features twice in the science curriculum for Key Stage 4 (KS4) for 15- and 16-year-olds – instructing teachers to explain the "potential effects" of greenhouse gases, plus "evidence and uncertainties" for human-caused climate change. And once for KS3 (12-14 years), but not at all for KS2 (8-11 years) and KS1 (5-7 years). In geography, there are three mentions in the KS3 curriculum, including the requirement to teach "the change in climate from Ice Age to the present" and "how human and physical processes interact to influence and change landscapes, environments, and the climate*".
>
> (Charlton-Perez 2021)

Charlton-Perez does mention that when approached for comment the Department for Education made the case that other teaching was also relevant to climate change, including KS1 lessons on seasons lessons and habitats, KS2 lessons on climate zones (tropical/temperate etc.) and how environments can change, KS3 lessons where topics that relate to climate may be encountered in chemistry (e.g. the atmosphere and nitrogen cycle) and biology (e.g. also the nitrogen cycle, plus ecosystems). However, as Charlton-Perez notes in his article: "*all of the above examples are restricted to the sciences and geography*". Surveying this information, Educational Psychology professor Dan O'Hare states that "*It is possible to move through primary school without formally or necessarily learning about climate breakdown and its subsequent effects*" (O'Hare, 2022, p.16).

Whilst it is possible that some teachers may choose to cover climate change as an extracurricular topic in lessons, the lack of formal training for teachers around climate change reduces this likelihood. From a survey of 4690 teachers across England, Brindle (2022) reported that 75% felt that they had not received sufficient training to feel confident to educate their students about climate change, whilst only 33% felt that the topic was meaningfully embedded within the

curriculum. Additionally, across each subject area, between 39-48% of teachers felt that they would require allocation of additional time to adapt their curriculum content to cover climate change. These results suggest that substantial increases in the coverage of climate education are unlikely to occur in most schools (in which teachers' time and resources are already stretched) without either changes to core curriculum content or strong leadership from school Senior Leadership Teams which ensures that teachers are provided with adequate CPD and time to develop lesson plans that integrate climate education into their existing curriculum.

4.1.4.3 Research Relevant to Climate Education

Whilst it is possible for information about climate change to be taught in a similar manner to most other topics on the school curriculum, educational researchers have also explored some of the nuances around climate education, both in terms of challenges and opportunities. Observing that scientific information about climate change can sometimes be perceived as quite abstract by younger (KS2) age groups, Taber & Taylor (2009) explored the impact of a science unit on climate change that utilised hand-on activities, reporting that this practical approach proved highly effective in increasing pupil understanding about climate change. However, in another early study, Chawla (1998) reported that the attitudes of teachers towards climate change (which they termed 'environmental sensitivity') appeared to have a significant impact on student pro-environmental attitudes. The potential influence of teachers' views has since been similarly highlighted by Marie Ojala (2015a), who reported that students who perceived their teachers as dismissive about of their negative emotions regarding climate change were more likely to adopt dismissive or denialist attitudes themselves. Such studies highlight the impact of the 'hidden curriculum' (Jackson, 1968) in which students can become influenced not just by what is taught, but also the way that teachers engage with topics and the attitudes that they hold towards them.

A second way that the *hidden curriculum* can be communicated is through the format of lessons. Cutter-Mackenzie & Rousell (2018) undertook research exploring the impact of a programme of climate education in which the students were given the opportunity to co-create artistic and research projects as part of a wider programme called '*Climate Change and Me'*. The researchers report that this approach proved highly engaging and inspiring for the young people, in addition to helping them learn about climate change. In particular, students seemed to find it helpful and

supportive that they were encouraged to acknowledge and consider their own personal and emotional engagement with climate change as part of their learning and the project left them motivated to continue to engage with the topic in the future.

One particular challenge that teachers may encounter when facilitating climate education is that some students they are teaching may hold sceptic or denialist views. This challenge isn't unique to climate change; for example some biology teachers may teach students who are denialists about evolution. However, the presence of students who are predisposed towards rejecting the information that they encounter can potentially be a complicating factor for climate education. With regards to climate scepticism/denialism, Stevenson et al. (2014) explored the impact of increased understanding about climate change upon students' views. Research by Kahan (2012) had previously suggested that (at least in the USA) adult respondents with highly individualistic and authoritarian worldviews were actually more likely to display strong climate denialism if they had a relatively good understanding of climate change, compared with respondents with similar views who had a lower understanding. The researchers hypothesised that this was due to the ideological values and beliefs held by people with such worldviews, which predisposed them towards cognitive biases of disbelief when encountering such evidence. From an educational perspective, this raised questions around the effectiveness of teaching information about climate change within educational settings. Thankfully, Stevenson et al. (2014) explored this phenomenon with regards to students aged 11-15 in the USA, and reported that whilst respondents with individualistic worldviews were more likely to engage in climate denialism, this phenomenon was most pronounced amongst those with a poor understanding of climate change. The researchers therefore conclude that even for students who might be ideologically predisposed towards climate denialism, increased understanding of climate change appears to have a protective effect and lowers the overall prevalence of denialism amongst students with individualistic worldviews.

Conducting a systemic review of research around climate change education, Monroe et al. (2019) explored various factors that could support student engagement and understanding. Their review supported some of the themes covered earlier, namely that environmental education is most effective and engaging for students when active teaching methods are used (such as hands-on learning) and that it is helpful for students to have the opportunity to explore ideas and themes that are personally relevant for them (as with the *climate Change and Me* project). In addition to

this, the researchers explored techniques for helping students to move beyond a basic understanding of the science of climate change, identifying four key themes that helped to enhance students' learning:

> *"(1) Educators used deliberative discussion to help learners better understand their own and others' viewpoints and knowledge about climate change. (2) Learners were given the opportunity to interact with scientists and to experience the scientific process for themselves. (3) Programs were specifically designed to uncover and address misconceptions about climate change. (4) Learners were engaged in designing and implementing school or community projects to address some aspect of climate change."*
>
> (Monroe et al. 2019, p.801)

The above themes arguably emphasise the personal and emotional elements of climate education, which is particularly important for a topic such as climate change which can engender a range of challenging emotions. Discussion with others can help build empathy with those whose emotional responses to information differ from our own. Engagement with scientists can help students to come to an understanding of how climate research is undertaken and the complexities that researchers must consider when ensuring that their results are accurate and reliable, whilst also providing an opportunity for experts on climate change to share their own emotional engagement with the topic. As noted by Stevenson et al. (2014) it's important to recognise that some students may have encountered climate misinformation or themselves be sceptics or denialists, and it's possible that such students will show more openness to information and plasticity in their views than adults who have fallen into denialist positions. Finally, the opportunity to engage in practical projects relating to climate change has the opportunity to help inspire and empower students as active participants in learning projects, rather than passive recipients of knowledge (which Freire [1970] refers to as the 'banking' mode of education, in which knowledge is 'deposited' into students brains).

4.1.4.4 New Planned Initiatives

Whilst the status of official changes is currently uncertain (as of Jan 2023), it appears that the government has plans to improve and increase climate education within schools. In April 2022 the Department for Education published its 'Sustainability and Climate Change Strategy' for all education settings in England (https://www.gov.uk/government/publications/sustainability-and-climate-change-strategy/sustainability-and-climate-change-a-strategy-for-the-education-and-childrens-services-systems). The Minister for Education and cabinet has changed several times in the months since the plans were announced, but so far have not been rescinded (though the degree of implementation of the plan remains unclear). Climate Education is the first 'Action Area' on the plan, which has been broken down into sub-sections. The first of these is 'learning about the natural environment', which the DfE state includes learning about:

- *"nature*
- *the causes and impacts of climate change*
- *the importance of sustainability"*

(Department for Education Sustainability and Climate Change Strategy, 2022)

More tangibly, the DfE have announced plans to introduce a Natural History GCSE by 2025 which will include practical fieldwork exercises and a focus on conservation. The Education Secretary at the time (Nadhim Zahawi) focused on this part of the initiative specifically, stating that:

> *"The new natural history GCSE will offer young people a chance to develop a deeper knowledge and understanding of this amazing planet, its environment and how we can come together to conserve it."*

(Zahawi 2022, https://www.gov.uk/government/news/uk-to-lead-the-way-in-climate-and-sustainability-education)

The plan also emphasises that students will engage with climate education across other curriculum subjects, including *'understanding of the world and the natural environment*' within the Early Years Foundation Stage, *'science, geography and citizenship'* at primary school, and with optional coverage of sustainability in '*design and technology, food preparation and nutrition, and economics'*

at secondary school. Outdoor learning, recycling, vegetable growing, and energy monitoring will be encouraged as educational activities (in lessons and/or in school eco clubs). It is currently unclear whether this plan includes modification of core subject curricula, or whether the above areas are being suggested as contexts in which climate education can be incorporated, without changes to the core curriculum. However, the DfE also plans to introduce an annual climate literacy survey for all school leavers, to help track the impact of climate education within schools, which could be a logical first step towards incorporating climate literacy targets into wider school targets.

The above plans will be accompanied by initiatives to support school staff with changes. The DfE plan includes the introduction of CPD on climate change and sustainability for science teachers, sharing of best practice examples, and consideration of whether sustainability themes can be incorporated into future teacher training. The DfE will also encourage the co-creation and sharing of new teaching resources. School grounds are referred to in the plan as the '*National Education Nature Park*', and the DfE intends to create online resources to support staff to use their school grounds to support the teaching of sustainability and climate change. It is currently unclear whether this support will include access to finding or grants. Schools will also be required to appoint 'sustainability leads', who will undertake carbon literacy training as CPD, which they will then offer as cascaded training to all other school staff. Additionally, the DfE plans to develop a '*Climate Leader's Award*' for children and young people, which will be similar to other extracurricular awards that young people can work towards such as the Duke of Edinburgh award, but will focus on sustainability.

The Sustainability and Climate Change Strategy also seeks to link with a previous cabinet's 'Green Industrial Revolution' strategy (this was an initiative announced by Boris Johnson in November 2020: https://www.gov.uk/government/news/pm-outlines-his-ten-point-plan-for-a-green-industrial-revolution-for-250000-jobs; all mentions of the environment in relation to jobs/the economy were abandoned by Rishi Sunak in his strategy announcement in January 2023: https://www.gov.uk/government/speeches/pm-speech-on-making-2023-the-first-year-of-a-new-and-better-future-4-january-2023 which calls into question whether the government is still planning to implement their Green Industrial Revolution strategy, but at the time of writing it has yet to cancel or revise the strategy). As part of the Sustainability and Climate Change Strategy, the DfE announced a greater focus on green skills and careers, which includes:

- The introduction of 'T-levels' by 2023 which will support young people into green careers such as agriculture, land management and production,
- The introduction of 'Wave 3 Green Skills Bootcamps' that will build young people's skills in areas such as nature restoration, waste management and recycling, woodland management and arboriculture,
- Increased support for apprenticeships focusing on jobs relating to sustainability, such as arborist, forest operative, agriculture or horticulture professional advisor and ecologist,
- Further investment in Institutes of Technology (IoTs) across England to offer training in STEM subjects, including subjects relating to the 'built environment' and 'agri-tech' sectors
- Better careers advice for 'green career pathways' provided through the National Careers Service, plus careers advice in schools.

Other initiatives that are part of the overall plan (though do not solely/specifically relate to climate education) include:

- The requirement for schools to begin reporting their emissions by 2024 (this will most probably form part of the role of the sustainability lead),
- The phasing out of single-use plastics in schools by 2025,
- The requirement for schools to develop Climate Action Plans by 2025 to both increase sustainability and assess if adaptations are required to mitigate risks relating to climate change (such as flood risk and heat wave/fire risks, water shortages, and local air pollution).
- Targets to be set for schools to aim for net zero emissions by 2030,
- Consideration by the DfE of whether to widen the use of online exams (which is being framed by them as reducing emissions),
- New school buildings to be designed to withstand a 2 degree average temperature increase (and 'future-proofed' to be able to withstand a 4 degree average increase),
- The Good Estate Management for Schools (GEMS) guidance to be updated to incorporate advice around sustainability and climate change when managing the school estate,
- Encouragement for schools to improve their supply chain management and waste management of resources, including increased transparency around sourcing of food for school dinners (as part of a 'whole school approach' towards food in schools)

Unfortunately, the requirement for large school suppliers (i.e. those who deliver contracts of £5,000,000 and over) to commit to achieving Net Zero by 2050 and publish a "carbon reduction plan" has been erased between the publication of the draft plan and the final plan.

The Westminster Education Forum conference on climate education held in June 2022 provided an opportunity for educational providers to meet and discuss the DfE's strategy. Reporting on the conference, IFF Research stated that whilst the initiatives were met with broad approval in terms of their ambition and overall aims, there was also some caution and concern around how the plan would be implemented. They note that:

"A fundamental factor here will be teachers' ability to embed climate concerns within their teaching practices… [T]eachers typically focussed on two enabling factors: having the time and capacity for developing content; and collaborating with other subjects to develop cross-cutting sectoral content on climate change issues.

But there is also a considerable gap in training provision… [T]he majority of teachers who currently teach climate change content have not received training on the climate crisis. This creates considerable risks that pupils are not receiving the best education they can, while it also creates a perception among both teachers and pupils that the issue is not sufficiently important to merit investment in training…

Teachers and leaders consistently work long hours. How teachers and schools can find ways to prioritise this important area within a busy workload doesn't have an easy solution."

(IFF Research, https://www.iffresearch.com/blogs/climate-change-in-education/)

As noted by the IFF, whilst the DfE's strategy is welcome and long-overdue, the effectiveness of its implementation is likely to be contingent on the training provided for teachers, the changing of curricula so that climate education is part of the core curriculum rather than an (encouraged but) optional extra, the allocation/ringfencing of sufficient planning time to ensure climate education is well integrated into lesson plans, and funding for sufficient resources to support such education. The DfE has stated that its strategy is aligned with the National Climate Education Action Plan (https://www.reading.ac.uk/planet/climate-education/climate-education-plan) and I believe that the closer the strategy can follow these principles (below), the greater impact it is likely to have:

National Climate Education Action Plan

1. *Everyone involved in the education of children in school and college settings should be encouraged and supported to access accredited continuing professional development (CPD) to improve their personal understanding of up-to-date data and science of our changing climate and the impacts of these changes.*
2. *All teacher trainers and initial teacher trainees should be able to access training that empowers them to effectively incorporate climate education within their teaching across all levels and subjects.*
3. *Teachers and school leaders should be encouraged and empowered, both at a national and local level, to ensure time and space within and beyond the teaching day is included for climate education.*
4. *Every school and college should identify a senior staff member to lead on climate education and provide them with support and funding.*
5. *A structured programme or climate award for schools, colleges and youth organisations should be developed, providing a national focus to a range of extra-curricular activities and supporting resources to aid delivery.*
6. *A national scheme of quality assurance of teaching resources for climate education should be developed.*
7. *A regular national meeting of the dynamic, well-supported national networks of educators, scientists and young people should be held, to share ideas and promote collaboration among representatives of these groups.*
8. *Professionals working in climate research and policy, from science and non-science disciplines, should pledge a proportion of their working time to providing help to teacher-led climate education initiatives.*
9. *A national, guiding framework for all educational providers that outlines compulsory climate education for all young people via schools and colleges should be developed and implemented.*

(University of Reading: https://www.reading.ac.uk/planet/climate-education/climate-education-plan)

4.2 Eco-Anxiety and Climate Anxiety

Research into people's worries and concerns about the impacts of climate change has prompted the development of terms that can be used to either refer-towards or shed-light-upon the phenomena being explored. Some terms have been explicitly created as part of theoretical work; for example the philosopher Glen Albrecht coined the term 'solastalgia' (2005) to refer to distress that some people feel when the natural environment around their home has changed or degraded in a way that they find distressing. However, the origins of other terms within the climate psychology literature are less clear and appear to have been adopted more organically. This appears to be the case for the terms '*eco-anxiety*' and '*climate anxiety*'.

One of the first organisations to explore the use of the term 'eco-anxiety' was the task force established by the American Psychological Society (APA) in the late 2000s to report upon 'T*he Interface Between Psychology and Global Climate Change*' (Swim et al. 2009). As part of their effort to locate the term 'eco-anxiety' within existing psychological theory, the APA task force utilised existing theory from clinical psychology. This work frames anxiety as "*a future-oriented mood state associated with a sense that events are proceeding in an unpredictable, uncontrollable fashion*" (Swim et al. 2009, p.82). In a detailed analysis of anxiety and other emotions, Miceli & Castelfranchi (2005) argue that one of the distinguishing features of anxiety is that it is primarily an 'anticipatory emotion' in which "*the object of anxiety is not a danger, but an event which implies a possible and uncertain danger*" (p.294). The anticipated danger/threat may be determinate (e.g. concern about flooding/forest fires/starvation) or indeterminate (e.g. '*we only have 12 years until…*'), but the key causal factor in the triggering of anxious states appears to be a sense of not having enough control over the situation in order to be able to reliably avoid or anticipate and cope with the anticipated danger(s) (Barlow, 2002, Ch.3).

One interesting implication of this description that is explored by Miceli & Castelfranchi (2005) is that if a person considers a situation to be hopeless or unavoidable, their anxiety around the situation will often decrease. It does not follow that overall distress around the situation necessarily decreases, but it can mean that the negative emotions that a person experiences in relation to the situation are more likely to become characterised by a sense

of despair rather than anxiety. Consequently, Miceli & Castelfranchi (2005) posit that anxiety will often involve "*a mixture of fear and hope"* (p.295) about the anticipated threat in which the anxious person has little influence/control over the source of hope. Furthermore, they draw on work by Higgins (1998), who argues that anxiety is often characterised by a focus on the prevention of negative outcomes (i.e. threats that make the current situation worse), rather than by a concern about an absence of some potentially positive outcomes.

Miceli & Castelfranchi (2005, p.295) suggest that their account is reflected in the commonly referenced 'Tripartite Model of Anxiety and Depression' (Clark and Watson, 1991). Whilst depression is characterised as consisting of high negative affect, neutral/low physiological arousal, and low positive affect, in contrast, anxiety is characterised by high negative affect, high physiological arousal, and normal positive affect. This suggests that positive emotions such as hope are often still accessible to anxious people whilst depressed people may struggle to find hope in situations. Consequently, when an anxious person starts to lose hope that their anticipated negative outcomes can be avoided, they may be more likely to enter a state of despair, which may develop into depression in the longer-term.

Considered in light of these frameworks, the climate crisis has a high potential to induce anxiety amongst people concerned about its environmental or social impacts. For non-specialists (including myself) it is hard to obtain clear predictions about what environmental changes will look like and what their impact will be (both globally and personally). Most public and political narratives maintain at least some hope that the worst outcomes can be prevented, but the scale and systemic nature of the problem means that no individual will be able to control or even significantly affect the situation on their own, which results in low influence/control over potential sources of hope. Furthermore, only 17% of UK respondents surveyed by IPSOS Mori (2021b) during the 2021 COP26 conference said that they trusted UK politicians to ensure that an agreement would be reached "*that protects the planet from the effects of climate change*", which suggests that many people feel that at least some of their external sources of hope are unreliable. This constellation of factors is not unique to climate change (for example, Lifton [2017] highlights some of the parallels between people's anxieties around the threat of nuclear annihilation during the Cold War and people's current anxieties around climate change). However, in light of Miceli &

Castelfranchi's (2005) account of anxiety, it is unsurprising that engaging with information about the climate crisis may make people feel anxious.

Exploring the history of the term 'eco-anxiety', the APA task force reported that the first uses of the term in print appear to be found in newspaper articles written in the mid 2000s (Swim et al. 2009, p.83). Following the Task Force's definition and provisional use of the term, its use in both media and journal articles increased gradually over the 2010s. In 2019, as media coverage about climate change grew substantially, the Oxford Dictionary reported a 4,291% increase in searches for the phrase "eco-anxiety" (Oxford Languages, 2019), with a particular peak occurring around the September 2019 climate strikes (**Figure 9**):

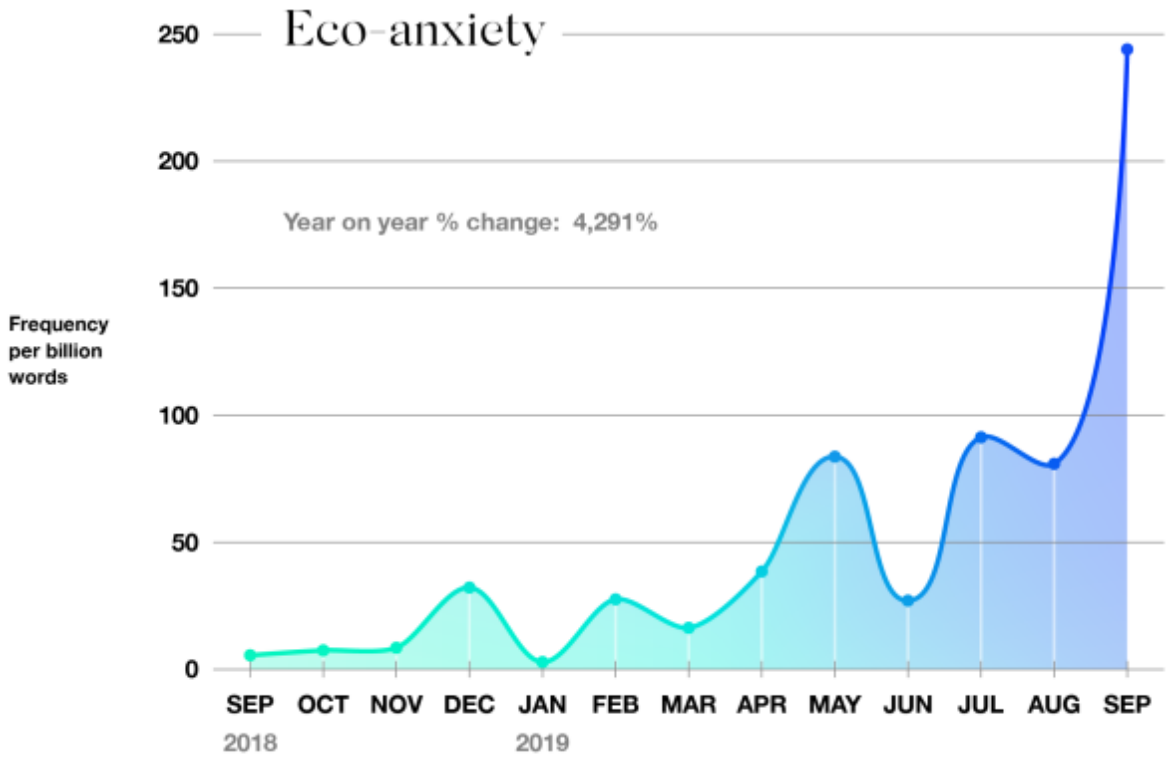


Figure 9: Searches for the term 'Eco-anxiety' within the online Oxford Dictionary between September 2018 and September 2019 – Data provided as part of Oxford Languages' 'Word of the Year' analysis: https://languages.oup.com/word-of-the-year/2019/

Alongside the increased usage of the term 'eco-anxiety', there have attempts by researchers to formally define it. Albrecht (2011) described it as "*the generalized sense that the ecological foundations of existence are in the process of collapse*" (p.250). This highlights the

potentially uncontrollable nature of the situation, whilst the idea that the process of collapse is already happening, combined with the idea that our ecological environment forms the '*foundations of [our?] existence*', implies that the object of anxiety are the *consequences* of relative or complete environmental collapse, which at a minimum can be classed as "*an event which implies a possible and uncertain danger*" (Miceli & Castelfranchi, 2005, p.294). Consequently, this definition appears to locate climate anxiety within existing thought about anxiety relatively well. Conversely, Clayton et al. (2017) offered a working definition for the APA and EcoAmerica that defined eco-anxiety as "*a chronic fear of environmental doom"* (p.68). At first glance, their use of the term 'fear' appears to challenge existing distinctions in emotion research literature between 'fear' (as "*a reaction to an explicit threatening stimulus, with escape or avoidance the outcome of increased cue proximity*" [Lang et al. 2000, p.144]) and 'anxiety' (as "*a more general state of distress, more long lasting, prompted by less explicit or more generalized cues*" [ibid.]), but this may possibly be intentional. There was discussion within influential environmental blogs during this period about whether the term 'anxiety' risked internalising and pathologizing people's engagement with the climate crisis, with some practitioners preferring to employ the term 'eco-fear' in order to describe a "*genuine and realistic response to an outer crisis*" (Buzzell & Chalquist, 2016, paragraph. 8). Consequently, the term 'chronic fear' may have sought to legitimise the externally-driven threat response, whilst also highlighting the long-term nature of the response. Additionally, their use of 'doom' arguably captures a sense of 'uncertain [or unspecified?] danger' and 'a lack of control', although it also risks minimising the role of 'hope' that was emphasised by Miceli & Castelfranchi (2005, p.295).

A recent review by Pihkala (2020) concludes that the term 'eco-anxiety' still tends to be used relatively loosely and eclectically in climate psychology literature to refer generally to negative emotions about the environment, such as 'fear', 'worry', 'stress', and 'distress' (p.4-6). Some psychologists argue that a broad and inclusive approach is preferable; in a paper specifically exploring 'eco-anxiety', Hickman (2020) cautions against "*making what is an emergent phenomenon 'too concrete'*" (p.413) and suggests that the term 'eco-anxiety' is best treated as a general signifier that simply points towards "*our emotional response[s] to the threat posed by the climate and biodiversity*" (p.414) rather than a specifically delineated psychological state. In a later paper, Hickman et al. (2021) do provide an introductory description of climate/eco-anxiety for their large-scale survey, but the

researchers appear to embrace Hickman's (2020) framing of 'climate/eco-anxiety' as gesturing towards a broad spectrum of responses, stating that it "*can be connected to many emotions, including worry, fear, anger, grief, despair, guilt, and shame, as well as hope, although the presence of these vary between individuals*" (p.863).

Along with the term 'eco-anxiety', use of the term 'climate anxiety' has simultaneously increased, to become one of Collins Dictionary's 'Words of the Year' for 2021 (https://www.collinsdictionary.com/woty). Pikhala (2020) states that use of the term has significantly increased since 2017, when Greta Thunberg began speaking publicly about her own anxieties relating to climate change, drawing media attention to the term. Not all publications distinguish between the terms 'eco-anxiety' and 'climate anxiety', but when a distinction is drawn, researchers generally define 'eco-anxiety' as the broader category referring to any ecological destruction (or the potential consequences of this destruction), whilst 'climate anxiety' is used to refer to "anxiety which is significantly related to anthropogenic climate change" [i.e. as a smaller category subsumed within 'eco-anxiety'] (Pikhala 2020, p.3). However, Pikhala (2019, 2020) and others (Hickman et al, 2021) suggest that whilst the distinction between the terms can be meaningful in some circumstances, the boundaries between them are very blurred. Consequently, the Climate Psychology Alliance's (CPA) 'Handbook of Climate Psychology' states that "The term climate change anxiety is often used synonymously [with eco-anxiety]" (CPA 2021). Within this thesis, the two terms will be used interchangeably, unless otherwise noted.

4.2.1 Complexities in the Pathologisation Climate/Eco-Anxiety

One fundamental point emphasised by almost all researchers exploring concerns about climate change is that it is important not to unnecessarily pathologize climate anxiety, but simultaneously important to recognise that some young people can benefit from or require support to manage and process the emotions that they experience. This is not an easy balance to strike; as noted by Hickman: "*mental health professionals, parents and teachers need to 'hold the tension' between listening to how the child feels without labelling their feelings as mental illness, and this can be complex*" (p.414). The main arguments put forward for why pathologisation of climate/eco-anxiety is inappropriate can be ordered into the following categories:

1. **Anxiety is a reasonable response**: whilst there are various uncertainties about timescales and the capacity of political, economic, and social systems to cope with ecological changes, we are facing a very significant threat that is very likely to result in the deaths of a large number of people. The consensus amongst researchers is that it is reasonable/rational to feel some anxiety about this. Many research papers include comments supporting this argument, including:

→ Hogg et al. (2021) state: "*We, along with many other researchers, warn against pathologising psychological and emotional responses to the environmental crisis, because doing so assumes these responses are maladaptive, unhelpful, or disproportionate to the threat posed… Eco-anxiety and climate change anxiety are rational responses, given the enormity of the crisis*" (p.18).
→ Hickman et al. (2021) state: "*Although painful and distressing, climate anxiety is rational and does not imply mental illness."* (p.863).
→ Hickman (2020) "*whilst understanding, validating and supporting people to help with the disturbing feelings* [is an important thing to do], *this needs to be done without pathologising or labelling the distress as an individual struggle, or a mental illness*" (p.414). Hickman (2020) also concludes: "*there is also a risk that in talking about 'curing' their eco-anxiety then it is being treated as a problem that needs to be fixed, and that is close to calling it a mental illness again. This paper has argued that eco-anxiety in children and young people should be seen as an emotionally congruent healthy response to the climate and bio-diversity crisis*" (p.422).
→ Cunsulo et al. (2020) "*ecological grief and anxiety are reasonable and functional responses to climate-related losses*" (p.261).
→ Pikhala 2020 "*as a whole eco-anxiety should not be pathologized… a reasonable amount of worry is a rational reaction to ecological concerns and it is evident that eco-anxiety is experienced by numerous people who do not suffer from existing mental health issues or exceptionally strong anxiety sensitivity*" (p.8).
→ Clayton and Karazsia (2020) "*Given the projected impacts of climate change on human health and wellbeing, it seems reasonable for it to have negative emotional consequences, such as increasing anxiety*" (p.2).

→ Helm et al. (2017) "*Given some inconsistency in the usage and implications of the term eco-anxiety… including the extent to which it may be linked to a disorder, we are instead using the terms perceived ecological stress and ecological coping to capture the ways in which individuals may cognitively and emotionally respond to the stressors stemming from climate change. Stressors denominate conditions "that the average person would perceive as actually or potentially threatening, damaging, harmful or depriving*" (p.160).

2. **Climate anxiety appears distinguishable from generalised anxiety or other mental health conditions through its common causes, presentation, and actions that can help support people**: this is complex, since climate anxiety and general anxiety or other mental-health conditions can co-occur and influence each other reciprocally/dynamically (see also Hickman 2020, p.418). However, it is argued by various researchers that:

    - **a.) Climate anxiety is specific**: Climate anxiety can have distinctive causes; for example, Doherty & Clayton (2011) provide a taxonomy of 'direct', 'indirect', and 'psychosocial' impacts that can cause climate anxiety and Cunsolo et al. (2020) document the impact of 'anticipatory grief' about climate destruction. There is evidence that climate anxiety appears more prevalent in people with specific profiles such as having strong ecological values (e.g. Helm et al. 2018). Additionally, it may be connected with specific and tangible facets of our ecological situation such as '*perceived inadequate government response'* which can lead to people feeling betrayed and lacking in the power/influence required to meaningfully address the problem (Hickman et al. 2021, p.e863). In support of the specificity of climate anxiety, a survey by Verplanken & Roy (2013) of 132 participants found "*a near-zero correlation… between habitual ecological worrying and pathological worry*" (e74708).

    - **b.) The presentation of climate anxiety appears distinct from general anxiety or other pathologized conditions**: Hogg et al.'s (2021) analysis of participant responses to general anxiety scales plus their eco-anxiety scale concluded that '*eco-anxiety is comprised of more than just affective symptoms* [of anxiety]*'* and that their factors of '*rumination*' (about negative

environmental effects), '*behavioural symptoms'* and '*anxiety about one's impact on the planet*' (p.14) were each statistically distinct from generalised anxiety (and remained statistically significant when general anxiety was controlled for). Additionally, from a psychiatric practitioner perspective, Woodward (2019) offers a framework that distinguishes "climate-related despair" from "depression", arguing that climate-related despair is characterised by feelings of emptiness and loss and negative thoughts about climate-related problems, but that people who suffer from it can still respond to positive events, feel positive emotions, and their self-esteem is more likely to be preserved. In contrast, the DSM-V description of depression lists a contrasting list of symptoms such as: anhedonia, persistent unhappiness even in the face of positive events, few positive emotions, a sense of personal guilt and failure, and low self-esteem involving feelings of worthlessness or self-loathing.

- **c.) Researchers have begun to identify interventions that specifically target people experiencing climate anxiety**: Baudon & Jachens (2021) undertook a 'scoping review' in which they explored 34 published articles detailing interventions undertaken to support people experiencing climate anxiety. Through thematic analysis, they identified four overall approaches used to support therapeutic clients: '*fostering clients' inner resilience, encouraging clients to take action, helping clients find social connection and emotional support by joining groups, and connecting clients with nature*' (p.1).

  Other research also supports intervention methods developed specifically to address ecological worry; approaches such as spending time enjoying nature (Dean et al. 2018), pro-environmental behaviour or ecological volunteering (Binder & Blankenberg, 2016), nurturing meaning-focused coping to activate positive emotions even when the problem might not be solved (Ojala, 2012a) or participating in 'Climate Café' groups (https://www.climate.cafe/) to connect with others who are concerned, are listed as interventions that specifically target climate concerns and anxiety rather than more generalised anxiety (although could of course also prove beneficial in some cases for

people experiencing other wellbeing challenges). Within this review, Baudon & Jachens (2021) also noted that a number (13 of 34) of psychotherapists supporting clients with climate anxiety found it helpful/necessary to undertake their own '*self-exploration and self-education on the topic of climate change and eco-anxiety'* (p.12) in order to feel sufficiently equipped to support their clients in this area.

3. **Climate anxiety is best framed as a response to a 'stressor' rather than as a diagnosable 'condition'**: Efforts to distinguish climate anxiety from generalised anxiety can risk framing it as its own 'condition', which then risks becoming a stepping stone towards its medicalisation and pathologisation. Clayton (2020) argues that pathologisation of climate anxiety risks problematising individuals by "*imply[ing] that the[ir] emotional response is inappropriate*" (p.3), when anxiety can be an appropriate response to stressors, even when unpleasant. A comparison with 'covid anxiety' might be appropriate, in which anxiety can be a justified response to a frightening situation, but is (usually) framed in terms of adaptive or maladaptive responses to a genuinely concerning set of stressors, rather than a medical condition in its own right. Along these lines, Wu et al. (2020) argue that '*feelings of climate distress might also compound other daily stressors to negatively affect overall mental health*' (p.e436), but it is the response/engagement with stressors that can become maladaptive, rather than the experience of the stressors themselves. Taking a pragmatic approach to support, Mah et al. (2020) therefore argue that climate anxiety is best framed in terms of coping and resilience; concerns about climate change form a stressor for people to learn to manage, and the purpose of support and interventions should be to help build individual and collective resilience to help to support people's ability to cope with such stressors.

4. **Climate concern and anxiety appears connected with various pro-social and empathic traits (which are positive things to nurture):** Hickman (2020) argues that "*people would not feel the anxiety or distress [around climate change] if they did not connect with and care about the planet, people and other species*" (p.416) and some research suggests that (even though they may also be concerned about the impact on their own lives) a significant proportion of people feel distress or anxiety about

climate change because they are concerned that it will impact upon something that they care about beyond themselves. Examples include a general concern about the impacts on the natural world, due to strong ecological values (e.g. Helm et al. 2018, Dean et al. 2018), or a general concern for others (e.g. Corner et al. 2014, p.412) found that people who self-identify with self-transcendent values such as "*altruism, forgiveness, and loyalty*" were more likely to express concern about climate change and Kahan (2012) reported that people with egalitarian and community-minded values were more likely to report concern about climate change than those with individualistic and hierarchical values). This has led Hickman (2020) to suggest that "*We could also reframe eco-anxiety and change our perception by thinking of it as eco-empathy, eco-compassion or eco-caring*" (p.416) and that "*maybe eco-anxiety could be reimagined as 'the shadow' of eco-empathy*" (p.417). Additionally, Seaman (2016) has proposed that climate anxiety can stem from people feeling a sense of connectedness to a 'greater whole' that they perceive as under threat and that this sense of connectedness itself is a psychologically healthy phenomenon.

Along similar lines, some eco-psychoanalysts such as Sally Weintrobe (2021) have argued that part of what makes climate change distressing for some people is a sense of 'moral injury' in which people experience distress at a sense of "*violation of 'what's right'*" (p.241). Weintrobe argues that our neoliberal culture of 'uncare' can encourage us to emotionally distance ourselves from the injustices perpetuated through climate change and the ways that we may be complicit in these practices. Whilst increased emotional distance or disavowel of complicity can reduce the frequency or intensity of negative feelings experienced about climate change, Weintrobe argues that this is ultimately an immature response and that '*Experiencing moral injury is a sign of mental health, not disorder. It means one's conscience is alive'* (p.241).

Of course, most climate psychologists agree that concerns around the inappropriate pathologisation of climate anxiety should be balanced against the need to support people who are experiencing significant anxiety or distress that is related to their concerns. This has been an ongoing theme in climate psychology literature since the topic of climate concern/anxiety first began to be explored, for example the landmark publication by the

APA Task Force for Psychology and Climate Change (2011) was already exploring what degree of worry might be 'normal' or 'pathological':

"*Extrapolating from current diagnostic guidelines (American Psychiatric Association, 2000), differentiating between normal and pathological worry regarding climate change would include examining the content and pervasiveness of climate-related worries, interference with functioning as a result of worry, and the degree of perceived control over the worry process."*

(Swim at al. 2011 p.83)

The focus on 'functional diagnostic dimensions' (Hayes et al. 1996) such as worry, interference of functioning, and degree of perceived control over the worry (as recommended above by the APA task force), could arguably fit well with a 'transdiagnostic approach' towards climate anxiety (e.g. Harvey et al. 2004), in which professionals focus upon understanding and supporting/treating the specifics of each person's distress rather than using a diagnostic label to guide appropriate treatment. Such an approach has multiple interpretations, but one potential benefit that a transdiagnostic and more personalised approach can offer is to allow a young person's anxious thoughts and emotions about climate change to be considered specifically within the context of wider research into people's concerns about climate change (plus consideration of other factors within the young person's wider life) rather than being regarded as a decontextualised 'anxiety' to be treated without regard for the object of such anxiety.

A balance is clearly needed here and it is likely that there will be overlaps in how young people engage with a whole range of different distressing topics and that there will be general good practice for how EPs might work with young people/schools/families to address many of these. However, as I hope my thesis will show, there are also specific nuances to how some young people may engage with concerns about climate change. I therefore hope that my current research will support educational psychologists to develop a more holistic and nuanced understanding of how some young people are engaging with such concerns and that this will inform how such practitioners support young people,

schools, and families, and also inform the development of future Educational Psychology Service policies regarding such issues.

4.2.2 Scales Created to Measure Climate Anxiety (and the challenges posed by this)

Over the past few years researchers such as Clayton & Karazsia 2020 and Hogg et al. 2021 have moved beyond initial exploratory work (e.g. the surveys outlined in **Section 4.1.3**) and definitional work (**4.2**) to devise scales intended to measure climate-anxiety/eco-anxiety. Hickman (2020) has also provided some sample descriptions of common features she has observed when people experience climate anxiety at different intensities.

Whilst the positionality of the climate and eco anxiety scales is not explicitly stated within Clayton & Karazsia's (2020) and Hogg et al.'s (2021) papers, it is common for most scales to adopt post-positivist perspectives towards the phenomena that they seek to measure, i.e. they commonly adopt broadly realist positions in which they hold that the questions that they use are able to accurately and reliably measure the underlying psychological phenomena that they seek to measure. The ontology and epistemology grounded in situated cognition that my thesis adopts (**Supplementary Appendix A1**) is able in principle to accommodate post-positivist positions (indeed, a major part of my reason for adopting this positionality was in order to avoid taking an anti-realist position towards climate change research). However, from a practitioner perspective, I am currently neutral on whether such scales should be treated as pragmatic screening tools (which become useful because they can allow for quicker and wider screening of student emotions around climate change), or whether it may be more useful for school staff and educational psychologists to take a more personal approach and explore the topic of climate change through discussions with students.

The purpose of this section is therefore not to evaluate the merits of each scale. Rather, I consider the operationalization of the concepts around climate anxiety within these scales interesting, because the process of factor analysis used in the creation and standardisation of the scales itself presents a hypothesis about some of the components from which climate anxiety or eco anxiety might be comprised.

More concretely, for both scales the process of factor analysis used to create the survey tools statistically groups together statements to which participants provide similar responses (e.g. when a participant replies 'often' on the HEAS-13 to the statement that they have been 'worrying too much', they are also statistically more likely to reply 'often' to the statement that they have been 'feeling afraid', since both are located within the same factor). One statistical assumption of such groupings is that questions/statements within the same factor are likely to explore the same underlying construct. Additionally, each scale identified convergent validity between the scale's factors, which implies a second statistical assumption: that the factors in each scale relate to a single broad or unifying concept (of climate anxiety for Clayton and Karazsia's scale and eco anxiety for the HEAS-13). Of course, the risk of this process is that it can become unhelpfully reductionist, prioritising statistical similarity between variables over conceptual coherence or a more holistic account of each subject's experience. However, it is still arguably useful to explore what the researchers for each scale found to be the key components for climate anxiety/eco-anxiety and whether their research can contribute further to the discussions of definitions of climate/eco-anxiety in **Section 4.2**. by positing various dimensions that may be part of the core construct.

Clayton & Karazsia's (2020) Climate Anxiety scale was designed to explore situations in which climate anxiety might be affecting people's emotional states ('cognitive-emotional impairment') or coping within daily life ('functional impairment'). The scale focuses on behaviours that may relate to anxiety (e.g. sleeplessness, nightmares, crying), that have already been measured within established scales of functional impairment (Weiss, 2000) and rumination (Treynor, 2003). There is a circularity in the conceptual process of the creation of their scale; it appears that the scale questions were developed to explicitly measure 'cognitive-emotional impairment' and 'functional impairment' in relation to climate change and then these concepts became the underlying factors that the scale was then considered to measure. However, whether such circularity is considered problematic depends in part on how reliable the pre-existing measures of each 'impairment' are considered; if they are both considered to be well-grounded measures and concepts, then the scale can be seen as an application of existing established research to the area of climate anxiety. From this perspective, the research therefore suggests that the experience of climate anxiety can be sub-divided into 'cognitive-emotional impairment' and 'functional impairment'.

In contrast with the Climate Anxiety scale, the 'Hogg Eco-Anxiety Scale' (Hogg et al. 2021) [HEAS-13] began with questions from the General Anxiety Disorder (GAD) scale (Spitzer et al. 2006) that focus on subjective feelings of anxiety rather than facets of the emotion that are easier to observe externally. Four questions adapted from this scale form the first factor, three questions form a factor consisting of '*ruminative thoughts about negative environmental events*' three questions form a factor for '*behavioural symptoms'* and three question form a factor relating to '*anxiety about one's personal impact on the planet'*.

The '*rumination*' factor of the HEAS-13 overlaps quite strongly with the 'cognitive' questions for the '*cognitive-emotional impairment*' factor of the Climate Anxiety scale, whilst the '*subjective anxiety*' factor shared a conceptual similarity with the '*emotional*' part of the Climate Anxiety scale's '*cognitive-emotional impairment*' factor. Additionally, the '*behavioural symptoms*' factor of the HEAS-13 strongly overlaps with the '*functional impairment*' factor. Consequently, the HEAS-13 broadly supports the position that can be derived from the Climate Anxiety scale that anxiety relating to climate/environment can be sub-divided into at least cognitive-emotional and behavioural-functional components.

However, whilst the Climate Anxiety scale contained additional questions (relating to the factors: '*experience of climate change'* and *'behavioural engagement'* i.e. adaptations to behaviour to reduce one's own emissions), the derived factors did not show convergent validity with the '*cognitive-emotional impairment'* and '*functional impairment'* factors that the researchers consider to be part of the core concept of climate anxiety. Consequently, the researchers do not frame these experiential and behavioural factors as part of the core concept of climate anxiety. In contrast, the final factor of the HEAS-13 scale ('*anxiety about one's personal impact on the planet'*) did show convergent validity. This research can therefore be interpreted as presenting the hypothesis that Climate/Eco-Anxiety consists not just of anxious thoughts, emotions, and behaviours relating to climate change, but also consists of concerns relating to the impact of one's own actions; this is interesting in part because it suggests that Eco-Anxiety may have a personal ethical/moral dimension to it.

The main criticism that could be levelled at both scales is that whilst they ground their questions in existing and well-established research around anxiety and mental health, the

act of doing so arguably misses the opportunity to explore what may be unique or distinctive about Climate/Eco-Anxiety. Put another way, the use of existing measures of anxiety as the basis for exploring climate/eco-anxiety makes the assumption that climate/eco-anxiety can be framed and thought about in the same way as anxiety towards any other topic, which inadvertently erases a lot of what makes the field of climate psychology interesting and valuable. One consequence of this is that taken in isolation, any individual respondent's score does not provide a researcher with particularly nuanced information about their concerns or experiences of climate/eco-anxiety; the scales are only able to provide a broad indication of how anxious an individual feels around the topic and the impact of this on their life. Additionally, neither scale attempts to provide a baseline value for a 'default' or 'healthy' level of anxiety, so the anxiety scores provided merely indicate relative anxiety compared to the sample population studied; participant scores therefore have no inherent meaning beyond this context of comparison. However, it would also be reasonably to reply that both sets of researchers were not aiming towards a broad or nuanced scope nor an absolute 'objective' measure of Climate/Eco-Anxiety, but were explicitly developing a screening tool that could allow for relative comparisons between a large number of people.

In contrast with a scale-based approach, Hickman's (2020) paper on eco-anxiety emphasises qualitative description over quantitative measurement. Rather than creating a tool/scale that could output a score indicative of relative Climate/Eco-Anxiety, she has drawn from her experience as a climate psychotherapist to construct qualitative descriptions of 'mild', 'medium', 'significant' and 'severe' manifestations of eco-anxiety. Hickman developed her descriptions on the basis of discussions she had with clients within her practice as a therapist. The precise method through which she derived the descriptions is not provided, but it appears that it was primarily through reflection and experience, which makes her evidence-gathering technique closer to the generation of knowledge within psychoanalytic practice, rather than the experimental and statistically driven research of Clayton & Karazsia (2020) and Hogg et al. (2021). As a methodology, Hickman's (2020) work therefore has almost the opposite strengths and weaknesses to the survey approach, i.e. her methodological justification for her output is less testable and open to scrutiny, but her descriptions are much richer and more holistic.

Hickman cautions against using the descriptions "*too rigidly or… to 'fit' people into the model*…", but states that she hopes it will be "…*supportive in helping people make sense of their experiences and feelings*" (p.417). Whilst I recommend reading the full descriptions, I have summarised and organised the main features of each description in **Table 1**:

Severity	Emotions	Responses
Mild	Some occasional upset, usually transient	Can be reassured or distracted from upset by others, optimistic about the crisis & believe 'others' have the solutions (probably technological), may undertake minor lifestyle changes, some disavowal of crisis to minimize painful emotions, little cognitive disruption, can feel security when reassured
Medium	Upset weekly, relative discomfort	Can be reassured by discussion with others, has some doubts about solutions to the crisis but trusts they will be found by 'experts', some lifestyle changes, less defensiveness/disavowal so more painful emotions, some knowledge of severity of climate crisis but not 'obsessed', some cognitive disruption
Significant	Daily upset and distress, guilt, grief, fear	Struggles to find reassurance from anxiety, little trust in solutions from 'others', significant lifestyle changes, painful emotions (anxiety, distress, guilt, grief, fear, shame), fears of climate change lead to fears of social collapse, cognitive disruption, feel insecure, willing to end relationships with people who are in denial about the climate emergency, seek security in activism/campaigning
Severe	Terror, anger, lack of positive emotions	Not able to be reassured (feel certain of collapse), no trust in solutions or mitigation of problem by 'others', disruptive lifestyle changes (what's the point?), extreme emotions that are hard to manage (terror, anger), strong belief in likely social collapse and extinction, severe cognitive disruption (intrusive thoughts including of violence or suicide, insomnia, may struggle to function), high levels of insecurity, may find some security in group activism

Table 1: Summary of Hickman's (2020, p.417-418) descriptions of eco-anxiety

For therapeutic practitioners, qualitative descriptions of eco-anxiety/climate anxiety may potentially prove more useful than quantitative scales for exploring emotions and beliefs when working with individuals or small groups. Additionally, I respect that Hickman (2020) has a significant amount of clinical experience of working with people experiencing eco-anxiety and that it is her experience that grounds and justifies her descriptions. However, qualitative descriptions are also in-part justified by the persuasiveness of their accounts, so I would like to question how strongly the severity of a person's climate anxiety affects some of the factors mentioned in the descriptions, or whether other causal factors may potentially have greater influence over them:

- **Hope in 'technological solutions'**: whilst this could reflect a preference for solutions that do not affect one's lifestyle, hopes could be significantly affected by political allegiance (for example, the 2020 Conservative government rhetoric appears to strongly prioritise technological 'fixes' over systemic change), by an individual's religious beliefs (Hope & Jones, 2014), or potentially by individuals having greater knowledge of technological approaches to mitigation (Ratinen, & Uusiautti, 2020).

- **Lifestyle Changes**: whilst greater anxiety could conceivably drive more significant lifestyle changes, Dickenson et al. (2016) report that overall 'people with moral values such as compassion and fairness', 'people with greater belief in climate change', 'more liberal people' (in the USA) and 'younger people' were more prepared to make lifestyle changes in comparison with people with different beliefs, values, or demographics. The relationship here appears complex, since people who meet such criteria may potentially also have greater climate anxiety in comparison with other groups. However, Dickenson et al.'s (2016) report does suggest that a willingness to make lifestyle changes is at least potentially multi-factorial, rather than solely dependent upon relative eco-anxiety.

- **Willingness to end relationships with people who are in denial**: again, whilst this is conceivable, a range of personality factors, wider political beliefs, and the nature and quality of existing relationships are likely to be significant factors. From multi-country surveys, Goldberg et al. (2022) report that *'beliefs and behaviours [concerning climate change] commonly differ between romantic partners*' (p.1), with

53% of partners holding different views. However, they did find greater correspondence between beliefs when one partner was 'alarmed' (the most significant category of concern in the study) by climate change, which appears to at least partially support Hickman's (2020) descriptions of relationships for people with 'significant' or 'severe' eco-anxiety.

- **Seeking security in activism/campaigning**: there is evidence that XR activists find hope and security in campaigning (Stuart, 2020), but also that people are more likely to become politically engaged around climate change when they have hope that changes can be made (Marlon et al. 2019). Ojala (2012b) reports that people self-reported feeling greater hope about climate change when they felt less anxious about it; if this finding can be combined with Marlon et al.'s (2019) findings, it would suggest that at least some people may become engaged in climate activism whilst experiencing relatively low anxiety about the crisis, out of a hope that it will have a positive impact, rather than as a means to seek emotional security. Of course, this doesn't mean the connection between greater anxiety and membership of activist groups is inconceivable, but at the very least, the motivations for engaging in climate activism appear to be many and varied (e.g. Martiskainen et al. 2020).

- **'Doomism' in severe eco-anxiety**: the association between increased eco-anxiety and reduced belief that we will tackle climate change is certainly reasonable. However, if anxiety involves uncertain outcomes, hope, and a focus on prevention, then holding beliefs that climate change is inevitable may itself be a way that people reduce their anxiety (Mann, 2021 argues that 'doomist' movements such as Deep Adaptation adopt fatalistic positions in part because they are less anxiety-inducing. Additionally, the results of this current thesis support this hypothesis). Of course, it would be fair for Hickman (2020) to argue that her eco-anxiety descriptions include emotions beyond anxiety; in the AVAAZ paper co-authored by Hickman et al. (2021), the researchers state that Climate Anxiety "*can be connected to many emotions, including worry, fear, anger, grief, despair, guilt, and shame, as well as hope"* (p.863), which suggests that she prioritises a broad and inclusive definition of the term over a more precise and clinical one.

Whilst I have questioned parts of Hickman's descriptions, I do not mean to suggest that the descriptions themselves lack value. I believe that ongoing description and discussion around climate anxiety is important to help practitioners develop deeper understanding and empathy around how people are engaging with their concerns around climate change and what this might look like in practice. My questioning of Hickman's (2020) descriptions (which form only part of her paper) is therefore intended as a means of contributing to a collective reflection around climate anxiety and how best to describe it, or indeed how best to operationalise it through scales such as Clayton & Karazsia's Climate Anxiety Scale (2020) or the Hogg Eco-Anxiety Scale (2021).

This process is made complex in-part by the very concept of 'anxiety' having become a highly medicalised one, which in some cases may include diagnosis and 'treatment'. It appears that the vast majority of researchers within the field of climate psychology are sensitive to this (see **Section 4.2.1**), but there is a risk of reductionism within all paradigms and research projects. The next section will therefore consider some potential risks of reductionism when engaging with the concept(s) of Climate/Eco-Anxiety.

4.2.3 The Risk of Reductively Applying a 'Climate Anxiety' Framework

This literature review has so far documented that climate/eco-anxiety is becoming an increasingly common experience for a range of people (including young people). It has presented the argument that worry or anxiety can constitute a reasonable response to a substantially concerning phenomenon and has shown that such anxiety is usually conceptualised by researchers in terms of 'degree of anxiety', rather than diagnostic thresholds indicating pathology. In outlining such research, it is important to emphasise that I am not trying to imply that it is desirable for people to experience anxiety; my research is merely motivated by the idea that if young people have particular worries or concerns, educational psychologists should seek to listen and understand these in order to consider how best to work with schools and young people around such issues.

Addressing this directly as part of his wider 'Fearlogics' project, Fisher (2019) argues that the use/promotion of fear is neither a justified nor reliable means to achieve inherently valuable end goals, such as slowing climate change. The question of the moral justification for the use of fear to try to prevent suffering feels complex; in the case of large-scale threats a utilitarian argument could potentially be made that a large-scale public response that is motivated in part by fear might result

in less overall long-term suffering. However, the effectiveness/ineffectiveness of fear as a motivator and the longer-term consequences of encouraging such fear would also have to be factored into such utilitarian calculations and I feel that it is very likely that the promotion of fear would be likely to have many unintended and undesirable consequences (in addition to the actual intended consequences, which themselves would allow for psychological harm as part of their means-end calculation). Consequently, it is not something that I am personally willing to engage in; whilst I believe that it is desirable for young people to have an age-appropriate understanding of climate change (which includes the recognition that the question of what is 'age appropriate' is itself complex), I believe that the role of educational psychologists should be to help young people (and parents & school staff) to manage any anxiety that arises, and that care should be taken to reflexively consider the emotional impact of information about climate change when it is shared with others.

As noted at the end of the previous section, whilst the term 'climate anxiety' meaningfully summarises (or points towards) the experiences of a range of people, there are some potential pitfalls with the term and the narratives that it can facilitate. Firstly, the effort that climate psychologists have taken to emphasise that climate anxiety is not inherently pathological (**Section 4.2.1**) is required in-part because researchers (including myself) have chosen to utilise a medicalised term that often denotes pathology ('anxiety') as a key part of the conceptual framework through which people's worries and concerns about climate change are discussed. This does not mean that research that relies upon the term 'climate anxiety' is misrepresentative or untrue, but as with any framework or paradigm, the use of particular terms can emphasise or prioritise particular aspects of an experience or phenomenon, whilst minimising or neglecting others. Consequently, there's a risk that narratives that frame concerns about climate change primarily in terms of degrees of 'climate anxiety' can risk predisposing psychologists towards particular ways of responding so that we may focus upon how to 'treat' people experiencing such anxiety, when other ways of framing people's concerns could potentially lead to more open, creative, or systemic responses. Additionally, even when anxiety is not taken to be pathological, the term's medical roots can risk predisposing people to engaging it as a 'within-person' phenomenon, rather than a complex interpersonal phenomenon that emerges through (and is embodied within) young people's engagement with the world.

A second dimension of this is that the term 'climate anxiety' can risk encouraging reductionist thinking amongst psychologists/researchers about the distress that some people feel, which can result in the range of worries and concerns expressed being compressed into a single

'anxious←→not-anxious' spectrum. This can neglect that different young people may be concerned/anxious about very different aspects of climate change (e.g. their personal safety or the safety of their friends/family, their future prospects, the impact upon people in areas most vulnerable to extreme weather, environmental devastation, or a complex/evolving mixture of concerns) that can get lost within a generalised narrative of 'anxiety'. It can also potentially neglect or minimise discussion of other emotions that young people might have relating to climate change, such as anger, disillusionment, disappointment, grief, or hope. The risk in research is that once a particular question or conceptual framework (such as climate anxiety) becomes well established, a disproportionate amount of new research can end up focused on the phenomenon and on responding to previous research exploring the phenomenon, which can result in other interesting perspectives on the topic being neglected (e.g. the research paradigm around 'theory of mind').

Thirdly, narratives of climate anxiety amongst young people can sometimes be used to position them in the role of 'innocent victims' by campaigns seeking to tackle climate change. A careful balance needs to be struck here, since young people are indeed growing up in a world full of environmental problems that they did not create, and there are significant issues of climate justice both geographically (Blomfield, 2019) and generationally (Skillington, 2019) in which some of the people who have contributed least to climate change will be those worst affected by it. Consequently, many young people may justifiably feel that they are victims of a problem that they have inherited from older generations (e.g. Sarrasin et al. 2022). However, when this narrative is used, it is important that it is 'done with' young people, rather than being 'done to' them without their consultation and that the focus is on the support of such young people, rather than the use of their distress to further political ends without their consent and participation in the process (regardless of how justified those ends are).

In part due to my concerns around adopting a framework that focused reductively on climate/eco-anxiety, I decided to use a methodology that would allow me to explore a range of ways that young people may engage with concerns around climate change. Q methodology felt like a good fit for this goal, since one aim for the creation of the statements used within Q is to achieve a good overall 'coverage' of the ways in which a participant may engage with the topic being explored (Watts, 2008). The next section (**4.3.1**) therefore outlines a wealth of research and ideas which incorporate ideas of climate anxiety and distress, but which also explore a range of other facets of young people's engagement with concerns around climate change.

4.3 Exploring Concerns about Climate Change Using Q Methodology

The potential pitfalls/problems outlined in the previous section are primarily at risk of arising if a reductionist approach is taken towards young people's experiences. As a consequence, whilst my research is motivated in-part by the concern that some young people experience significant climate anxiety, I will also seek to avoid excessive reductionism. As part of this, it's also important to note that a significant number of young people may not experience much concern around climate change; factors such as personality, experiences, relationships, knowledge/beliefs, and life situations will inevitably impact how people engage with the issue and I want to avoid a one-size-fits-all approach.

A range of qualitative (or mixed-method) research techniques could potentially allow me to construct a nuanced and detailed account and I do not seek to assert that the method I chose (Q methodology) is unequivocally superior or more appropriate for research into than other methodologies. However, I believe that Q methodology is particularly well suited for exploring young people's concerns around climate change for the following reasons:

1.) Whilst conducting my literature review I became aware of both the large number of studies already exploring people's views and experiences and the diverse range of academic disciplines that have approached the topic. From this I concluded that my research would benefit from a methodology that could meaningfully incorporate and explore existing ideas from a range of different research areas. My desire to draw on pre-existing research meant that 'inductive' approaches to qualitative research that seek to avoid excessive influence of existing theory upon the analysis would be less appropriate (e.g. Grounded Theory [Hodkinson, 2008] or Interpretative Phenomenological Analysis [Smith et al. 2012]. Thankfully, Q methodology allowed me to explicitly incorporate existing research by using the ideas presented as the inspiration for the statements in my Q set (**Section 4.3.1**).

2.) People's psychological engagement and responses to climate change can be a very emotive subject and initial discussions with colleagues and friends helped to highlight that people tended to express broadly positive or negative responses to facets of the topic rather than focusing upon how strongly they felt about each issue considered in relation to other issues on the topic. The Q-sorting process (**Sections 5.2.2, 5.5.1**) supported my participants to consider how strongly they felt about

each issue *in comparison* with the other issues covered by the study, helping to scaffold a more nuanced and holistic account of young people's positions on the topic.

3.) Most current research on young people's climate concerns/anxiety consists of either purpose-built surveys (**Section 4.1.3**), quantitative anxiety scales (Clayton & Karazsia 2020, Hogg et al. 2021), or qualitative descriptions (Strife 2012, Hickman 2020). Each of these methods has merit but also areas for improvement; the surveys have large samples but are unstandardised so construct validity is asserted on face value, the quantitative scales are grounded in existing measures of anxiety but facilitate reductive accounts that frame climate anxiety as just anxiety with regards to a particular topic (possibly with extra parts added on, in the case of the HEAS-13), and the qualitative descriptions are richer but (for the existing studies) there are questions around the rigor of their methodologies. Q methodology provides a technique that mitigates some of the challenges faced by this existing work; the validity of its constructs (factors) are justified on both quantitative and qualitative grounds, and the descriptions provided of factors are more holistic than those offered by existing scales, and the methodological technique is (at least in theory) sufficiently rigorous to justify in-depth descriptions of each factor.

4.) In parallel with existing scales and descriptions of climate anxiety, researchers within the field of climate change communication have used segmentation studies to investigate how people engage with climate change. These studies have the strength of being able to explore a range of ways that people engage with concerns about climate change, but the boundaries between 'segments' can be relatively arbitrary and the distinctive features of each segment quite limited. Q methodology can address this through the construction of 'factors' (positions) that can be distinguished on both qualitative and quantitative grounds, plus detailed descriptions of what makes each factor distinctive. Such considerations are beyond the main scope of this thesis (and could be seen as a separate research project using the data from the current research), so are covered in **Supplementary Appendix B1**, rather than in the main body of the text.

In combination, I believe that these factors highlight a gap in the climate psychology research literature that my Q methodological research into how young people engage with concerns around climate change can fill. Through adding to the existing literature and having a specific focus upon the experiences of some young people living in the UK, I hope that my research can inform the practice of educational psychologists, so that they can better work with/support a range of young people (and school staff working with young people) with the concerns around climate change that

they experience. To conclude this literature review, I will therefore use the rest of this section to demonstrate how Q methodology was able to incorporate a range of ideas from research within climate psychology, through its incorporation of such ideas as statements within the final Q Set (**Section 4.3.1**) and will also consider the wider context of legislation and practice supporting young people's mental health in schools (**Section 4.3.2**). This latter section will then form the foundations for later discussions around how the results of the current Q methodological study should be applied when supporting young people with their concerns around climate change (**Section 8.3**).

4.3.1 An Ecosystemic Approach to Concerns around Climate Change

Despite climate psychology having only developed into a distinctive field of research within the past 10-15 years, the literature within climate psychology is incredibly rich and insightful. This may be in part due to its heavily multidisciplinary nature; unlike some academic fields (such as phenomenology) that were initially founded from a single clear theoretical lineage, people's psychological engagement with climate change has been explored from the start by researchers from a very diverse range of fields. This includes strains of research within psychoanalysis (e.g. Weintrobe 2014), media studies (Anderson, 1997), education/pedagogy (Haslett et al. 2011), risk perception (Hornsey et al. 2016), social psychology (Fielding et al. 2014), cognitive psychology (Beattie & McGuire 2018), sociology (Webb, 2012), phenomenology (Peeters et al. 2015), anthropology (Crate, 2011) and many other disciplines that analyse the engagement of people within the world. Positively, applied fields such as clinical psychology (Vergunst & Berry, 2022) and educational psychology (e.g. this thesis and https://edpsy.org.uk/blog/2022/is-it-time-eps-advocated-for-children-and-young-people-to-have-increased-contact-with-nature/) are also now beginning to show an interest in this area. However, one challenge for applied researchers seeking to engage with climate psychology is that many strains of research that relate to the field operate in parallel and there is not yet a centralised knowledge base or journal that attempts to integrate all the different strands.

This proved to be a challenge for the current thesis. Whilst I recognise that the field of climate anxiety is becoming increasing well developed and operationalised, I was still keen to avoid prematurely restricting my research focusing solely upon levels of anxiety, since my intuition was that other strains of research within climate psychology could also offer some helpful insights into young people's engagement with climate change. In practice, the notion of anxiety (and other forms of psychological distress) does play a key role in my results and discussion; this makes sense for research within educational psychology, since a natural focus for applied psychologists is to

prioritise identifying challenges and suggesting support. However, during the literature review and background reading process, I wanted to include a broader focus on a range of ways that young people may engage with climate change; key concepts from the climate psychology literature are therefore included in this section.

This wider focus initially posed a challenge in terms of organising and structuring the ideas that I encountered. Thankfully, during my training as an educational psychologist, I became very influenced by Bronfenbrenner's (1989) eco-systemic model (plus other ways of conceptualising interpersonal and systemic influences, such as the Monsen Problem-Solving Model [Monsen& Frederickson, 2016]). I therefore decided to use Bronfenbrenner's (1989) model as a framework for organising the eco-psychology literature into influences and factors that might impact upon young people at the personal, interpersonal, and at wider systemic levels.

Bronfenbrenner's framework (**Figure 10**) can be used to emphasise how a young person's interpersonal relationships and interactions (their '*microsystem*', which includes family, school, and community groups) may influence them and their development (whilst also recognising influences at the individual/personal level). The framework posits that In turn, people and organisations within a young person's *microsystem* will be influenced by their own situations, relationships, and social structures (the '*exosystem'*, which influences the microsystem through the *'mesosystem'* of interactions) and the overall process will be shaped through the '*macrosystem'* of attitudes, values, and practices that characterise the wider culture(s). Bronfenbrenner also highlighted that all of these factors and influences will change and develop over time (he introduced the '*chronosystem'* to account for this), affecting both the individual and also affecting the culture(s) within which the young person is situated (i.e. having direct and indirect influences).

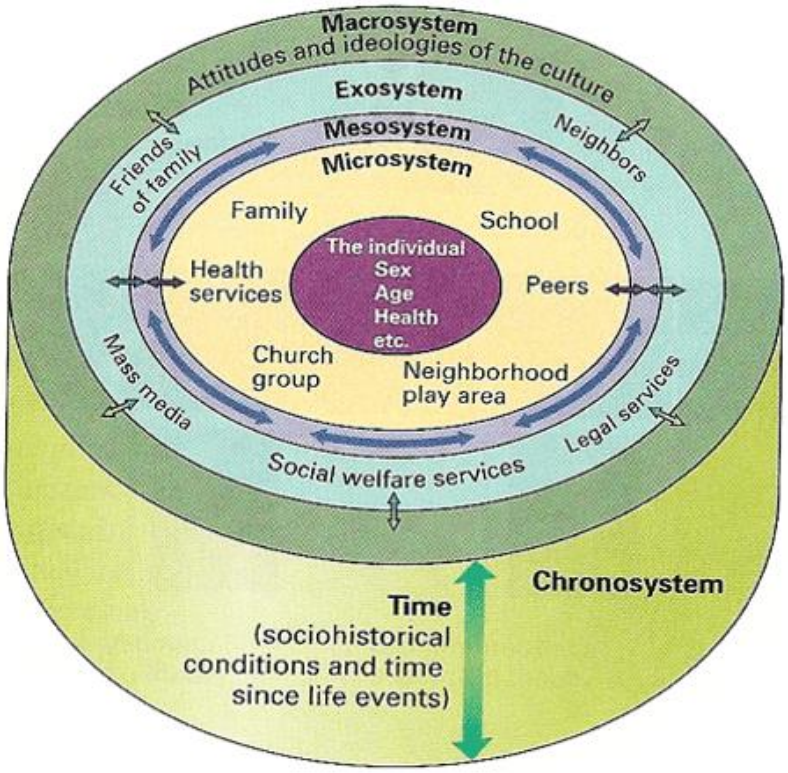


Figure 10: Bronfenbrenner's (1989) ecological framework

This way of thinking about individual and systemic influences is one that is thankfully already present within some areas of climate psychology; in particular, research at the University of Bath appears to incorporate such ideas into their approach. For example, in his introduction to the Climate Psychology Alliance's first book, Paul Hoggett (2019) provides an excellent example of the potential influence of factors such as race, socio-economic status, gender, political affiliation and religious beliefs upon a person's concerns and engagement:

"*Consider a white, male, Catholic garbage collector living in the USA.*
As a white working class man he may feel climate change is some kind of liberal hoax devised by an educated elite. But the Catholic in him may be aware of and stirred up by the Pope's Encyclical on the Environment and the responsibility of stewardship to God's creation. He takes pride in his job and is also troubled at times by the casual way in which people, particularly those in affluent suburbs, treat their mountains of waste. He has two young children and sometimes worries about what kind of world they will grow up in.
Each of these identifications pull him in different ways."

(Hoggett, 2019, p.7)

Hoggett's example is helpful because it highlights how particular factors may have influence at multiple levels of Bronfenbrenner's (1989) framework. As an example, self-identifying as a 'white working class man' can simultaneously be framed as factors at the level of an individual (as part of their identity), factors influencing the person's interactions within their microsystem and exosystem (i.e. their race, gender, and socio-economic status may influence their interpersonal relationships, plus these relationships themselves with be influenced by wider assumptions that emerge within the community), and factors at a macrosystemic level (e.g. the idea of 'working class' only makes sense within a system where people have other relationships to work or forms of work). Additionally, in Hoggett's (2019) example, these factors predispose the man towards a conservative or 'anti-liberal' political bias, which could arguably be framed as an 'individual' factor, except that the strong association of political conservatism in the US with climate denial has been strongly influenced by conservative think-tanks, media, and the Republican Party (Klein, 2015), but this is a position that leaders within such organisations have chosen, rather than an inevitable/unavoidable outcome of being politically conservative (although Klein [2015] also notes that an adequate response to climate change is likely to involve economic investment plus the introduction of regulations to curb emissions by corporations, which is at odds with the economic preferences of most conservatives). Consequently, for the analysis presented within this section, whilst I have classified most strands of research into a single section of Bronfenbrenner's (1989) model, I am aware that many of them with hold influence at multiple levels.

Application of the Ecosystemically-Organised Research to Q Methodological Statements

Whilst I found Bronfenbrenner's (1989) model to be a useful means for conceptually organising the research that I encountered, it was important to me that this research informed my current project where possible. As outlined in **Section 5.3.1**, I did this by attempting to summarise the key concepts that I encountered into short statements, which then became the basis for statements used as part of my Q-Set for the Q methodological study. I have debated whether this information would be better placed within the 'methodology' section (specifically **Section 5.3.1**), but have decided to include examples within the current section of how the research formed the basis for the Q statements so that readers do not need to switch between two different sections to see how some of the ideas have been incorporated into the study.

One complication of using Bronfenbrenner's model is that it was originally constructed to support psychologists and educators to think about systemic factors from a third-person perspective (i.e. "*X*

can affect child development by helping to cause/encourage/inhibit Y") whilst my Q-set statements explore participants' '*understandings*' of the topic (Curt, 1994, see **Section 5.3**/**Appendix C2.1**), which meant they investigated influences from a first-person perspective. This meant that not only did I have to consider how to summarise the potential influence of factors identified in the literature, but I also had to consider whether aspects of the factor could be directly experienced by individuals, what this would feel like to them, and whether it would be reasonable to expect a young person to be able to identify the factor within their experience, to reflect upon it, and to make a relatively intuitive judgement about how strongly they identify with the factor (which is then indicated through how strongly they agree or disagree with the statement). In practice, this meant that Bronfenbrenner's model had to be applied quite loosely, since ideas relating to macrosystemic and exosystemic factors often became expressed through statements that related to personal experiences or views. For example, statement **45**: "*It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products*" was inspired by an Klein's (2015) analysis of how the ideology of neoliberal economics can result in people reductively viewing 'personal freedom' in terms of consumer choice (an influence from the macrosystem), but the statement itself expresses an view rooted in a personal value, which could be considered an individual factor (of course, it is possible for an influence to be macrosystemic and unacknowledged by the individual whilst simultaneously being expressed as an individual/personal view).

Additionally, as emphasised by Watts & Stenner (2012, p.65-66), whilst a researcher is likely to have an intention for how each statement will be interpreted by participants, the participants themselves will necessarily engage in their own interpretive process, through which they may frame or understand a statement in a different way to that envisioned by the researcher. Stainton Rogers (1995) terms this process "*effort after meaning*" (p.183) and sees it as a net positive, since the effort helps to ensure that potentially confusing statements are still meaningfully engaged with by participants. For the current Q-set, there were some statements that could be interpreted in a localised or more abstract manner (e.g. **34**: "*I worry about people criticising me for not doing enough to tackle climate change*" and **68**: "*I wish that others were more understanding around how I feel about climate change*" could be interpreted as referring to specific people/others within the young person's life/microsystem, or as referring to more abstract concerns about being judged by people or groups the young person does not directly know). Consequently, the systematic organisation (below) of some of the key statements inspired by the research literature should be taken as a broad indication of my own thinking about the statements, rather than as definitive positions within an ecological framework:

Macrosystem

Several influential sociologists have looked at what could be classed as macrosystemic influences on how we engage with climate change:

- Kari Norgaard (2011) undertook an ethnographic analysis of how villagers living near a ski resort in Norway that was slowly becoming unviable due to rising temperatures were engaging with climate change. Norgaard used the term 'socially organised denial' (p.9) to describe the (often unspoken) pressure people felt to continue operating as normal, despite the evidence that this would become unsustainable. This idea was condensed into statement **20**: "*I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't*".
- Alan's Johnson's (2018) work is also highly relevant; Johnson outlines how multiple social and economic pressures that encourage us to follow a '*path of least resistance'* (p.80) throughout our day-to-day lives within society. With regards to climate change, this can be seen both economically (e.g. it is more expensive to buy local and organic food, and quicker and cheaper to take a plane rather than a train to Europe) and socially (opting for more ecologically friendly options is often framed as a luxury rather than the default). This concept was phrased as statement **35**: "*The way the world works makes it really difficult for me to be environmentally friendly*".
- Rittel & Webber (1973) coined the term "wicked problems" to describe complex societal challenges that lack straightforward solutions because proposed responses will influence multiple other systems within a society in potentially unpredictable ways. Levin et al. (2009) argue that proposed responses to climate change face a range of additional problems, such as being time-sensitive (until changes become much harder to address/reverse), lacking a central coordinating authority (each country responds with relative autonomy when a coordinated response is necessary), requiring immediate action that only sees results in the longer-term, and the fact that "*those who cause the problem also seek to create a solution*" (p.3). Consequently, the researchers posit that the complex systemic nature of the climate crisis (which they term a '*super wicked problem'*) makes it a particularly tricky problem to both conceptualise and to adequately address. It was challenging to capture this idea in a simple sentence, but after multiple iterations, it led to statement **29**: "*My concerns about climate change involve many social and political issues that all impact upon each other in complex ways*".

- Marie Ojala (2012a-c) undertook a number of studies exploring *hope* with regards to climate change amongst teenagers in Sweden. She found it to be associated with '*meaning-focused coping*' in which "*people do not deny the climate problem but are able to activate positive emotions that can help them to bear the worry associated with the awareness of this threat*" (2012a, p.212). Whilst it could be argued that hope is a *within-person* factor, the *objects* (in a phenomenological sense) towards which people look for hope are arguably macrosystemic. Ojala's work therefore influenced the development of statements **14: "***My faith or beliefs help me to feel hope around climate change*", **15**: "*I feel hope that we will find technological solutions to fix climate change*", and hope drawn from denial/assertion of uncertainty in statement **30**: "*I don't engage with concerns about climate change because we don't know what is going to happen to the environment*" (statement 30 was also influenced by psychological distance relating to uncertainty).

Finally, I wanted to include some statements relating to demographics and diversity (or lack thereof) amongst climate change campaigners. One of the most interesting pieces of research was a survey of 2041 US adults by Schuldt & Pearson (2016), who reported that people from ethnic minority groups in the US self-reported less polarised views (of very high concern about climate change or of scepticism about it) compared with white people in the US. I tested a range of ideas and statements in my phenomenological interviews and pilot studies, but it was difficult to construct a statement to which people demonstrated a strong response. However, I settled on statement **59**: "*You don't see many people from my background being involved with climate change issues*" (unfortunately, in practice, I think that many participants interpreted this statement in terms of personality or ideology rather than demographics and diversity).

Exosystem

- Bronfenbrenner (1989) considers media influences to form part of a person's exosystem; the person is unlikely to directly know the news reporters or researchers, but media coverage of climate change has the potential to influence the young person both through their consumption of media and through the impact that the media has upon the people in their microsystem. See **Section 4.1.1** for a summary of how media coverage of climate change has developed over time. In practice, the final statements about media (**56** and **67**) were primarily influenced by comments from young people during the phenomenological interviews and

pilot studies, rather from specific research, but the existence of research around media coverage helped ensure this area received coverage within the Q set.

- One way of interpreting the exosystem could be to see it as a person's general sense of the others around them (as opposed to their direct relationships with others); Heinämaa (2019) refers to this as a form of 'normativity', since it can reflect what the default position is within a peer group. Statements **54**: "*It feels like most people my age are concerned about climate change*" (which unfortunately blurs the line between an 'understanding' and a 'representation') and **55**: "*I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable*" attempt to capture facets of this normative influence, as does statement **34**: "*I worry about people criticising me for not doing enough to tackle climate change*" (though as mentioned earlier, this statement could alternatively be interpreted in a more localised rather than general manner). Whilst there were not many studies exploring the Student Strikes for Climate at the point when the Q-set was being developed, the strikes regularly made the news and were well-covered on a range of social media, so I also wanted to explore the influence of these (whilst avoiding statements relating to 'conduct'). I settled on one relating to hope (again influenced by Ojala 2012a-c): **46**: "*The student strikes for climate give me hope for the future*" plus one statement relating to media and values: **47**: "*When people criticise the student strikes for climate I feel that my values are being attacked*" (as with statement 34, this could alternatively be interpreted in a localised manner).

Microsystem

- Ojala has also explored the impact of beliefs, attitudes, and forms of coping exhibited by people around teenagers in Sweden (i.e. the people who make up their microsystem) on how such young people cope with their concerns about climate change. Ojala & Bengtsson (2018) explored the impact of "*communication patterns with fathers, mothers, and friends… one solution oriented and supportive, and one dismissive and doom-and-gloom oriented*" (p.907) and concluded that the solution orientated and supportive pattern correlated with more meaning-focused coping and problem-focused coping amongst the young people, whilst the negative pattern correlated with deemphasising of the problem by young people. This research inspired statements **60**: "*My family will listen to me and take my feelings about climate change seriously*" and **53**: "*I can discuss concerns around climate change with others in my friendship group(s)*".

- Ojala (2015a) also explored the influence of teachers' attitudes on their pupils' engagement with climate change; she concluded that pupils who perceived their teachers as accepting or supportive of their negative emotions regarding climate change were more likely to demonstrate a constructive sense of hope, whilst pupils who perceived their teachers as dismissive were more likely to demonstrate hope based in denial. Ojala's focus on support in school helped inspire statement **61**: "*I am confident that my teachers would be supportive if I talked to them about my concerns around climate change*". It also influenced the development of statements exploring the experience of a lack of support or rejection, such as **68**: "*I wish that others were more understanding around how I feel about climate change*" and **50**: "*I avoid talking to others about my worries around climate change in case they react negatively*".
- Minson & Monin (2012) identify a phenomenon they call '*do-gooder derogation'* in which people disparage those they perceive as holding beliefs/engaging in behaviour that conflicts with the societal default, in-part due to their belief that the 'do-gooder' may be judging them (Heinämaa (2019) would characterise such acts as also designed to reinforce the normativity of their existing behaviour). The idea that some young people may feel concerned about making themselves targets for 'do-gooder derogation' through expressing their concerns about climate change was unfortunately cut from the final Q-set, but an alternative statement that explored whether young people might engage in a form of do-gooder derogation towards other climate activists (in the form of accusations of hypocrisy) remained as **63**: "*Some people just pretend they care about climate change so they can act like they're better than others*".

Individual

One aim for this thesis was to attempt to move beyond and build upon accounts that reduce young people's engagement with concerns about climate change down to an anxious←→not anxious spectrum. As part of this, one of the key areas that I also wanted to develop was a richer description of young people's emotional responses. As emphasised by Hickman et al. (2021), "*Climate anxiety can be connected to many emotions, including worry, fear, anger, grief, despair, guilt, and shame, as well as hope*" (p.e863), and such emotions are key components of the complex engagement that each individual will have with climate change:

- The phenomenon of 'worry' has been extensively explored within psychological research; in an influential account, Borkovec et al. (1983) provide a working definition of worry as "*a chain*

of thoughts and images, negatively affect-laden and relatively uncontrollable; it represents an attempt to engage in mental problem-solving" (p.10). In recent work, Stewart (2021) used this idea of worry as primarily being characterised by negative thoughts to develop a climate change worry scale; item 9 on the scale is "*Once I begin to worry about climate change, I find it difficult to stop*" (p.5), which formed the basis for statement **1** in the Q-set: "*Once I start to think about climate change, I find it hard to stop worrying about it*". Consideration of the impact of worry also prompted the creation of statement **13: "***Worrying about climate change is negatively affecting my mental health*".

- Buzzell & Chalquist (2016) argue that significantly distressed reactions to climate change are "*genuine and realistic response to an outer crisis*" (paragraph 8), so would be better characterised as *fear* rather than *anxiety* (which is distinguished from fear by Lang et al. [2000] as "*a more general state of distress, more long lasting, prompted by less explicit or more generalized cues*" [p.144]). Whilst such distinctions can be debated, I felt that it would be helpful to incorporate both forms of distress were worth exploring, so developed statement **2**: "*I feel some background anxiety about climate change most of the time*" to cover anxiety, and statement **10** to cover fear: "*I feel a lot of fear about climate change*".
- As noted in Levin et al.'s (2009) work around 'super-wicked problems', one particular barrier to effectively addressing climate change is that "*those who cause the problem also seek to create a solution*" (p.3). Whilst Levin et al. were primarily framing this issue in global terms (i.e. in terms of the actions of governments and large corporations, whose impact far outstrips any individual actions), the issue they identify can also pose challenges on a personal level. Jensen (2019) argues that people's complicity in what he calls 'global ecological harm' can result in guilt and that this can either act as a barrier to effective action or as motivation to engage productively in seeking to address climate change. His work also covers emotions such as shame, but through pilot study feedback it emerged that some people struggle to meaningfully distinguish between guilt and shame, so I cut shame and was left with statement **3**: "*I sometimes feel guilty that I'm not doing more to tackle climate change*".
- Alongside thinking around climate anxiety, the concept of '*ecological grief*' has also gained significant traction, primarily due to the work of Ashlee Cunsolo (Cunsolo & Landman 2017, Cunsolo & Ellis 2018, Cunsolo et al. 2020, Ojala, Cunsolo et al. 2021). Cunsolo & Ellis (2018) define ecological grief as "*the grief felt in relation to experienced or anticipated ecological losses, including the loss of species, ecosystems and meaningful landscapes due to acute or chronic environmental change*" (p.275). They identify three major causes or 'pathways' of such grief: "*Grief associated with physical ecological losses*" (p.276), "*Grief associated with*

loss of environmental knowledge" (p.277), and "*Grief associated with anticipated future losses*" (p.278). These ideas were condensed into a statement relating to ecological losses: **4**: "*I feel a sense of grief about the damage that climate change will cause to the natural world*" and a statement about grief associated with anticipated future losses: **42**: "*I feel grief that climate change will limit the opportunities I have for my life as I grow older*".

- Interestingly, there seemed to be a relative lack of research around anger with regards to climate change when compared with other challenging emotions. This was surprising in part because existing psychological research has linked anger around social issues with collective action (e.g. Van Zomeren et al. 2004, Iyer et al. 2007). However, Stanley et al. (2021) have explicitly explored links between what they termed 'eco-anger' and climate action, finding eco-anger to be more strongly correlated with action than their measures of eco-anxiety or 'eco-depression' were, whilst also being less correlated with their measure of lower wellbeing. I was uncertain about what would be the most appropriate target of anger include within the statements, so used the phenomenological interviews to explore what/who the interviewees identified as an object of anger. From these, three main sources of anger were identified: people in power (governments and oil companies), older people (due to their complicity/inaction), and climate change deniers. These targets of anger became the basis for statements **6**: "*I feel angry that governments and oil companies say they care about climate change but don't make the changes needed*", **7**: "*I feel angry at people who deny the existence of climate change*" and **8**: "*I have more immediate concerns to worry about and don't have the space to think much about climate change*".

In addition to considering the emotions that young people might experience, I also wanted to include some statements exploring how they engage with/are affected by such emotions. Sally Weintrobe (2013) has explored climate anxiety from a psychoanalytic perspective. Drawing from Klein's (1946) account of 'splitting', Weintrobe argues that people can struggle to manage their experience of anxiety with regards to climate change, which can lead them to adopt defensive coping mechanisms in which they cling to a naïve optimism that the problem either doesn't exist or will be fixed, or fall into nihilistic hopelessness (aka 'doomism') in which anxiety is replaced by despair (Weintrobe, 2013, p.34-40). It was challenging to capture the concept of 'splitting' in a short statement that was simple for people to understand, and the final statement is far from perfect: **9**: "*I switch between feeling great about the future and awful about it*".

Other emotional responses that I chose to explore included Bendell's (2018) case for deep adaptation, which I summarised in statement **18**: "*For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring*". Ojala (2012a-c) applies Folkman's (2008) analysis of problem-focused coping (in which plans are made or actions are taken to address a problem) and meaning-focused coping (in which problems that are not easily solvable are acknowledged, but additional sources of meaning or pleasure are found to help people cope with the challenging emotions invoked by the problem) to coping with young people's concerns. This inspired two statements relating to problem-focused coping: **21**: "*Taking actions to reduce my ecological impact helps me to manage how I feel about climate change*" and **22**: "*Caring about climate change has made me rethink the impact of the food I eat and the things I buy*" (unfortunately, these statements may fall into Curt's [1994] category of 'conduct' statements rather than statements relating to 'understandings'), plus one statement fore-fronting values relating to meaning-focused coping: **23**: "*I feel a responsibility to be environmentally conscious regardless of the wider difference it makes*".

One final set of within-person factors that I felt were particularly valuable to consider came from Spence et al.'s (2012) work on '*Psychological distance from climate change'*. The researchers applied Liberman & Trope's (2008) work on *Construal level theory*, which posits that people are less likely to meaningfully engage with an issue (and take action) if they psychologically frame the issue in a way that makes it feel distant or less immediate. Liberman & Trope highlight four key ways through which issues can feel psychologically distant:

- Geographical distance (it affects places far away but not here),
- Temporal distance (it will happen a long time in the future),
- Social distance (it will affect others I don't know but not me),
- Uncertainty/hypotheticality (it might not happen, or feels abstract).

Spence et al.'s (2012) survey research provides evidence that all four dimensions can affect people's engagement with concerns around climate change, whilst also providing evidence that 'goal setting' (inspired by researchers such as Locke & Latham, 2002) by individuals can help make issues feel more salient to them and also inspire action. The ideas of geographical distance and social distance inspired statement **24**: "*I feel very concerned about how climate change will affect people's lives in the poorest counties*"; this was not a perfect translation and in retrospect it might have been better to separate out social concern for others and psychological distance. Temporal distance was more

straightforwardly translated into statement **32**: "*Climate change feels distant to me because it will mostly be affecting people in the future*".

Social distance was not translated directly into a statement, since it seemed likely to me that most participants would perceive a significant social pressure to disagree with a statement such as '*climate change feels distant to me because it will affect others but not me'*, regardless of how the statement actually related to their experience. However, during one of the pilot studies the idea was expressed by a participant that change or even collapse of our current systems due to climate change may actually be exciting, rather than just terrifying. This seemed to contain the implicit assumption that the participant themselves would either not be affected, or would do well in such a situation, which seemed to suggest a form of social distance. The idea of social distance therefore ended up influencing statement **19**: '*Part of me is excited to observe what happens when things start collapsing due to climate change*'.

Distance due to uncertainty was translated into a climate denialist statement: **30**: "*I don't engage with concerns about climate change because we don't know what is going to happen to the environmen*t". However, within Liberman & Trope's (2008) work, uncertainty is also linked with intangibility. This seemed to fit very well with Morton's (2013) argument that climate change is a complex 'hyperobject', i.e. a phenomenon which is challenging to fully comprehend due to the massive timescales involved, the fact it is *non-local* (i.e. whilst phenomena are caused/influenced by climate change and these can be measured statistically, we can never directly point to 'climate change'), the fact we are *within* it (like a fish in water), and climate change's unending complexity (influencing phenomena from a microscopic to a whole planetary scale). Morton's work was therefore combined with Liberman & Trope's (2008) work on psychological distance due to hypotheticality/intangibility, inspiring statement **28**: "*Emotionally, climate change feels very distant to me because I can't directly see or feel it*".

It was challenging to translate Spence et al.'s (2012) work around goal-setting theory reducing psychological distance directly into a statement, since I was trying to avoid focusing on direct actions (due to young people having less control over their CO_2 emissions that adults). I therefore translated the idea into a statement based upon how young people believed others might behave: **31**: "*I trust that most people would reduce their carbon footprint if they could track their emissions and see their impact*". This statement went through multiple re-wordings in the pilot studies, but in retrospect it

still could have been improved, since it mixes goal-setting theory with beliefs/trust about others, and veers close to being a representation about how others engage with concerns about climate change.

Chronosphere

Bronfenbrenner (1989) added the chronosphere to his model in order to be able to account for (individual and) systemic influences on development over time. As a model of child development, the focus was primarily upon influences that had already occurred. Most reported concerns about climate change are either present or future-focused so I did not create many statements about past experiences, with the exception of one that emerged not from the research literature but from the phenomenological interviews: statement **17** "*Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change*" (during the initial Covid-19 UK lockdown in March/April 2020 there were a number of news articles and social media posts showing wildlife recovering in areas where significant numbers of people remained at home, which likely influenced interviewees to mention this). I was aware when using this statement that the short-term wildlife recovery was primarily due to temporary behaviour change, which had only a very small impact on longer-term climate changes. However, this statement explored not just participants' factual comprehension of the impact, but also their emotional response in relation to seeing behaviour change that had a tangible (if very short-term) impact upon wildlife.

From a phenomenological perspective our anticipation of future events (implicit or explicit) is a key factor that structures our experience in the present moment (Heidegger, 1927). I therefore took the position that whilst Bronfenbrenner (1989) did not explicitly include consideration of future events into his model, the combination of his model with an ontology of the individual grounded in situated cognition means that a subject's anticipation of likely future events forms part of their chronosphere. I drew broadly from existing philosophical concepts to create some statements relating to this; Freud's concept of the absurd (1917) inspired statement **38**: "*Knowing about climate change makes our modern way of life feel completely absurd*". Heidegger's (1927) writings on 'inauthentic' responses to the future in which beliefs about a future in which current values become irrelevant (such as 'the rapture' or societal collapse) cause someone to find a lack of meaning in current activities formed the inspiration for statement **40**: "*I see no point in my education because climate change means I won't have a future*". Conversely, Heidegger's (1927) writings about an authentic response to the future in which consideration of future changes helps to disclose/'unconceal' (*Aletheia* in Heideggerian terminology) our relationship with the world formed the inspiration for

statement **39**: "*Climate change means I need to recognise how my life relies and impacts upon other people and systems*".

Heidegger's later lecture on '*The Question Concerning Technology*' (1954) is more pessimistic about the possibility of authentic unconcealment of 'being' within a society in which a technological mindset 'enframes' (forms the framework for) the possibilities that we have in the world; this idea influenced statement **36**: "*I want to make sure that I travel the world before places become worse due to climate change*" (this statement also emerged from one of the interviews, but was interesting in part because it seemed to embody some of Heidegger's ideas). The idea of climate change limiting our future possibilities for being-in-the-world also influenced statement **42** ("I feel grief that climate

change will limit the opportunities I have for my life as I grow older"). Statement **41** also touched upon this theme (whilst emphasising choice): "*The idea of potential collapse due to climate change has made me question whether to have children*" (this statement was additionally influenced by research into whether people are starting to question whether to have children due to the potential impacts of climate change, such as work by Schneider-Mayerson & Leong [2020]).

Finally, a late addition to the Q-set was statement **69**: "*I feel insecure due to the uncertainty around what our future will look like in light of climate change*". This statement was inspired by Giddens' (2020) work on '*ontological security*', i.e. the idea that the formation of 'the subject' within society is inevitably accompanied by the fear that its ontological status will be threatened, but that subjects achieve a degree of security through their stable relationships with others in the world and can feel ontologically insecure when the certainty of their relationships is threatened. Unfortunately, the complexity of Giddens' ideas was not captured in the final statement.

4.3.2 How challenging emotions around climate change are situated alongside broader challenges to young people's mental health and wellbeing

Whilst there is now a growing body of research exploring the challenging emotions that some young people feel around climate change and the impact of this upon their mental health (summarised in **Sections 4.1.3** and **4.3.1**), young people's concerns about climate change do not exist in a vacuum. Rather, such concerns are situated within the broader context of young people's lives. This context will be unique for each young person, but is likely to include a range of other concerns (at individual, interpersonal, community, and societal levels) that may challenge their wellbeing/mental health, whilst hopefully also including a range of protective factors (again at multiple scales) that may help to support them and form a foundation for their resilience to stressors. How such factors interact for each young person will necessarily be a vastly complex process, and each individual context is likely to contain a variety of particular nuances. However, I have found that MacDonald and O'Hara's *'Ten Element Map of Mental Health'* (1998) provides a helpful framework for

facilitating my thought around the types of factors that may to promote or erode the wellbeing of young people in general.

The '*Ten Element Map'* is underpinned by a particular ontology of mental health. Rather than treating being mentally healthy as the default state of most people, MacDonald and O'Hara draw upon Antanovsky's (1979) *salutogenic* model in which mental health is framed in dynamic terms, as a process that is in continual flux at both large-scale and small-scale levels across both shorter and longer timescales (this is similar to how physical health is continually in flux, dependent upon a regular input of food, water, and sufficient warmth on the shorter timescale, whilst simultaneously being impacted by exercise, diet, and the presence/absence of particular diseases/conditions across longer timescales). As such, Antanovsky posits that it is more accurate to think of mental health (and physical health) not as a mental state or condition, but as a range of temporary locations along an *ease/dis-ease continuum* in which supportive/protective factors are in continuous interaction with stressors/eroding factors, in a way that will dynamically impact each person's overall wellbeing.

Building from this ontology, MacDonald and O'Hara posit that there are five dimensions or categories of factors that will commonly support or erode mental health: environmental quality, self-worth, emotional processing, stress, and social inclusion. Each of these five dimensions will contain elements that are potentially supportive or corrosive to a young person's mental health (forming the 10 elements in total); the social inclusion dimension consists of a social participation element (supporting mental health) and a social exclusion element (eroding mental health); the stress dimension consists of self-management skills (supporting) and stress elements (eroding); the emotional processing dimension consists of support for emotional processing (supporting) and emotional negligence (eroding); the self-worth dimension consists of support for self-esteem and emotional abuse elements; and the environmental dimension consists of environmental quality and environmental deprivation elements. In a similar manner to Bronfenbrenner's (1989) Ecosystemic model (**Section 4.3.1**), particular factors that support or erode a person's mental health may operate at the scale of the individual (taking into account their developmental history), across personal relationships and interactions (e.g. with family, friends, peers, and school staff), at an organisational level (e.g. school or community), and/or at a wider societal level.

Whilst the systemic framing of MacDonald and O'Hara (1998)'s model is inspired by Bronfenbrenner's (1989) ecological framework and co-opts the labels he used to refer to each level, MacDonald and O'Hara slightly modify the way Bronfenbrenner's terms are used. Within Bronfenbrenner's ecological framework, the '*microsystem'* refers to direct relationships between an individual and important others (e.g. with family/friends), the *'exosystem'* to wider organisations and other people whose interactions or attitudes may impact upon the people in a person's microsystem, the '*mesosystem*' to the ways through which an exosystem and microsystem interact, and the '*macrosystem*' to wider societal structures and assumptions/attitudes that affect all the systems within it. In contrast, within MacDonald and O'Hara's (1998) model, the microsystem refers to the individual and their family/friends, the mesosystem to organisations that impact upon a person and their family/friends, and the macrosystem to wider culture and policy plus those who impact upon the mesosystem. These changes are probably best considered as a pragmatically-motivated simplification of the original model, rather than as a critique of it, since whilst Bronfenbrenner's narrower usage of the term 'mesosystem' holds explanatory value, its role within MacDonald and O'Hara's model is expanded to encompass what Bronfenbrenner termed the 'exosystem', reducing the total number of terms that the model requires. **Figure 11** illustrates MacDonald and O'Hara's framework:

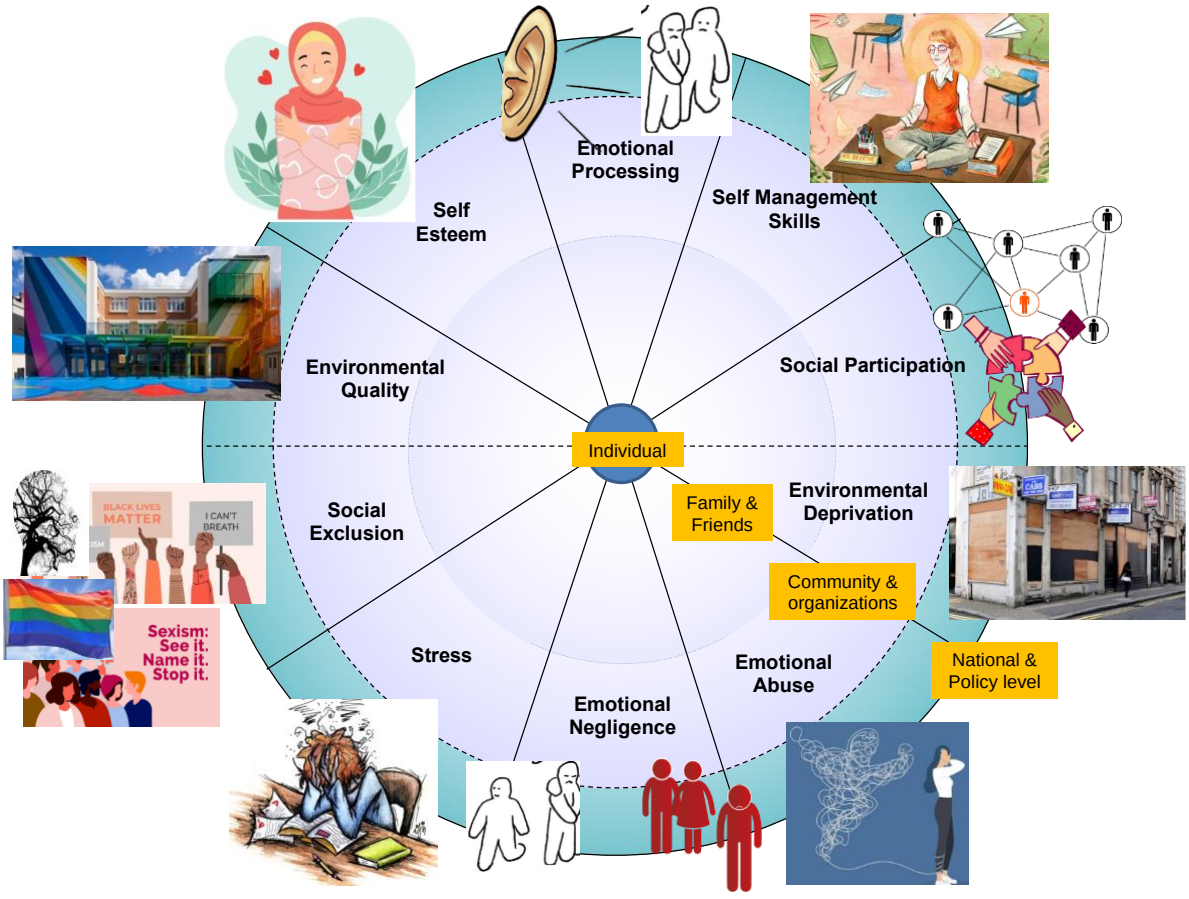


Figure 11: MacDonald and O'Hara's (1998) Map of Ten Elements of Mental Health
The five elements above the horizontal line will support/promote mental health, whilst the five elements below this line will erode it. Each element is located opposite its inverse.

4.3.2.1 Examples of how challenging emotions around climate change may potentially act as eroding factors for a young person's mental health, using the framework provided by MacDonald and O'Hara's Ten Element Map

As outlined in detail in **Section 4.3.1**, factors that affect how young people engage with concerns around climate change will hold influence at all ecosystemic levels, from individual to macrosystemic. Additionally, from the perspective of MacDonald and O'Hara's model, many of the phenomena and process that have been outlined will be social and psychological factors that could potentially erode a young person's mental health. The points below provide practical examples of potentially eroding factors for each of the five dimensions of the model (working anti-clockwise round the model):

- **Social Participation/Social Exclusion**: Young people may feel isolated in their concerns around climate change if others in their microsystem of family and friends seem unconcerned about their concerns (Ojala & Bengtsson, 2018) or if people in their wider mesosystem such as teachers minimise them (Ojala, 2015a). At a wider societal and policy level, young people may also feel that their perspectives are ignored by their government (Hickman et al. 2021). Within MacDonald and O'Hara's model, such occurrences fall under the 'Social Exclusion' dimension, which can erode mental health.
- **Self-management skills/Stress:** Whilst the term 'stress' is often used in quite broad and unspecific ways, Koolhas et al. (2011) define the term as referring to "*conditions where an environmental demand exceeds the natural regulatory capacity of an organism, in particular situations that include unpredictability and uncontrollability*" (p.1291). This includes anticipatory stress, in which an individual anticipates that a future environmental demand may exceed their capacity. The complex systemic nature of climate change makes the risk posed to any individual hard to predict (Rittel & Webber, 1973), but if young people perceive a current absence of adequate response amongst those around them at the micro-, meso-, and macrosystemic levels, it would be reasonable for them to worry that this response will continue to be inadequate as the threat posed by climate change increases. For some young people, the anticipatory anxiety that they feel about the threat of climate catastrophe would also fall under the category of 'stress' within MacDonald and O'Hara's model.

- **Emotional Processing/Emotional Negligence:** Ludwig & Rostain (2009) define 'emotional neglect' as a '*pattern in which an individual's affectional needs are consistently disregarded, ignored, invalidated, or unappreciated by a significant other*' (p.103). With regards to concerns or anxiety around climate change, the work of Ojala & Bengtsson (2018) and Ojala (2015a) is again highly relevant, since the dismissing of a young person's concerns and emotions by friends and family (in the young person's microsystem) or teachers (in their mesosystem) would constitute such 'emotional neglect'. Additionally, Hickman et al. (2021) present evidence that '*climate anxiety in children and young people should not be seen as simply caused by ecological disaster, it is also correlated with more powerful others (in this case, governments) failing to act on the threats being faced'* (e871). As such, Hickman et al.'s (2021) results suggest that a proportion of young people (in their case, 63.8% of 1000 respondents from the UK [e869]) perceive inadequate governmental action on climate change as a failure in '*taking my concerns seriously'* (e869), which would be an example of perceived emotional neglect at the macrosystemic level within MacDonald and O'Hara's model.
- **Self-Esteem/Emotional Abuse:** Minson & Monin (2012)'s concept of 'do-gooder derogation' (see **Section 4.3.1**) is probably one of the more useful ideas for thinking about 'emotional abuse' in relation to young people's concerns about climate change. Some people may perceive that young people who are concerned about climate change hold beliefs or values that challenge our existing way of life, since a substantial and adequate systemic response to climate change would pose a challenge to a broadly neoliberal economic system by requiring large scale government funding and restrictions on corporations (Klein 2015, **Section 4.3.1**). Such beliefs may therefore be perceived as a violation of the normativity of our current system (Heinämaa, 2019), which may provoke actions taken to reassert such normativity through 'do-gooder derogation' towards the young people experiencing concern. Examples can include mocking the young person, using accusations of hypocrisy as a tool to silence their concerns, and framing the young person as naïve, foolish, or dangerous for holding concerns and expressing them. When governments or agencies engage in such practice, this constitutes emotional abuse at a macrosystemic level; when (predominantly right-wing and neoliberal) media mock young people's concerns (see Section 4.1.1) or do-gooder derogation occurs within a young person's school or wider community, this constitutes emotional abuse at a mesosystemic level, and such practices constitute emotional abuse at a

microsystemic level if this occurs amongst a young person's friends and family. Additionally, if the young person internalises such abuse at an individual level, they may in turn engage in 'do-gooder derogation' towards others, in a cycle of abuse.

- **Environmental Quality/Environmental Deprivation:** MacDonald and O'Hara's (1998) concept of 'environmental deprivation' includes not just the physical deficiencies of an environment (such as poor housing, lack of safe play/social areas, lack of transport, threats of violence, and poverty), but also the ethos embodied by the environment (such as a lack of care/concern for the young person's wellbeing). With regards to climate change, young people may perceive a lack of care/concern in their environment when the ecological impact of the environment around them is considered unimportant by others. At a microsystemic level, this might be embodied through a perceived lack of concern amongst family and friends about the carbon footprint of their actions or the beneficial impact of recycling. At a mesosytemic level this may be embodied through littering, polluting, unnecessary waste, and high carbon emissions by their school or local community, plus a lack of recycling, sustainable transport, and green spaces. At the macrosystemic level, this may be embodied through a perceived lack of support for businesses and homes to reduce their carbon emissions.

4.3.2.2 Other systemic, interpersonal, and individual factors that may potentially act as eroding factors for a young person's mental health

The above section provides examples of how some young people's concerns and anxiety around climate change may put them at risk for factors that have the potential to erode their overall mental health. However, as noted in the introduction to **Section 4.3.2**, young people's concerns about climate change are also likely exist alongside a range of other concerns that can also act as eroding factors towards their mental health. Some of these concerns may be large-scale and systemic in nature, in which case their impact upon a young person's mental health will be influenced by both the macrosystemic situation and how trusted others around the young person (in their mesosystem and microsystem) respond to their concerns. However, others will be more individual or interpersonal.

With regards to other large-scale and systemic issues, as explored in **Section 4.1.3** (particularly **Figure 6** and **Figure 7**), the surveys conducted by the Good Childhood Report teams in 2021 and 2022 indicate that the young people in their sample self-report feeling worry about a range of what the report terms 'broader societal issues', including (according to decreasing levels of worry): "*New illnesses/pandemics, Crime, Inequality, [the] Refugee and migrant crisis, Online safety, Homelessness, [and] Unemployment*" (Good Childhood Report 2022, p.19). For some young people there may be specific nuances to how their engagement with concerns around climate change may impact them and their mental health (as explored in **Section 4.3.1**, but also explored further in the **Results** and **Discussion** sections of this thesis). However, from a 'lower-resolution' perspective (that prioritises general trends over nuance), many of the eroding and supportive factors identified in **Section 4.3.2.1** could conceivably function in a roughly similar manner for young people who worry significantly about the other societal issues explored within the Good Childhood Reports:

- **Social Participation/Social Exclusion**: Young people who feel that their family, friends or teachers are minimising their concerns [about the wider societal issues mentioned in the Good Childhood Report 2022] may withdraw and experience a sense of exclusion or isolation. Conversely, social inclusion and participation would involve finding groups that acknowledge such concerns and work together to address them (for example at a community level).
- **Self-management skills/Stress:** The perception that the societal, community, or family response to their concerns is inadequate may engender a stress response in young people who believe that the issue with which they are concerned is going to get worse. Conversely, when competent others can help young people address the issues that are causing them concern, this has the potential to reduce their stress (by fostering a sense that action is being taken) and also to build young people's own competence and self-management skills with regards to addressing the problem causing concern.
- **Emotional Processing/Emotional Negligence:** The dismissal of concerns held by young people about issues important to them is a form of emotional neglect, particularly when done in an insensitive manner by others who are significant to the young person. Conversely, support for young people to explore and feel the challenging emotions that they feel in relation to their concerns may help their processing of such emotions.

- **Self-Esteem/Emotional Abuse:** Similarly, the mocking or deriding of young people when they express concern about issues important to them can be a form of emotional abuse, particularly when the intention/purpose of such actions is to undermine or silence the young person. Conversely, responses from others that recognise, name, and value the positive impulses behind the concerns (such as empathy for others, or values around equity and fairness) may help young people to see their concerns not as deficits or responses to minimise around others, but as reflections of some of their positive character traits – this in turn can help build their self-esteem.
- **Environmental Quality/Environmental Deprivation:** Finally, environments that embody a lack of care/concern towards an issue about which a young person is worried may be seen as a form of environmental deprivation for that young person. Conversely, environments that embody care and concern towards broader societal issues are more likely to be supportive of a young person and their overall wellbeing.

As a slight caveat, one potential criticism of the methodology employed by the Good Childhood Report (2022) in this particular section is that the term 'worried' can be somewhat ambiguous. For each of the broader societal issues listed by the report, it would be possible for a young person to interpret the question 'How worried are you about X' in humanitarian terms (i.e. concern/worry about the wellbeing of others) or in terms of personal threat (concern/worry about how the issue may impact them personally). This is explored in relation to concerns around climate change in **Section 7.1** and **Section 8.1**, since the emotional impact for young people who predominantly hold humanitarian rather than personal concerns around climate change (Factor 1 in the current study) is very different than for those who believe that they are likely to be significantly personally impacted (Factors 2 and 3).

Of course, there are a very large number of other factors that can support or erode a young person's mental health, many of which will be most visible at the microsystemic interpersonal level. Some significant challenges, such as Adverse Childhood Experiences (parental death, parental divorce, separation from parents, parental mental illness, substance misuse, criminality, or violence, maltreatment such as physical abuse, sexual abuse, and neglect, severe illness and poverty) are well-documented in international studies as having significant potential to erode a young person's mental health (Kessler et al. 2010). However, it would be beyond the scope of this

thesis to cover these in detail, other than to note that such experiences will also influene the broader picture of the state of young people's mental health in the UK.

This broader picture is perhaps best captured by the NHS Mental Health of Children and Young People (MHCYP) surveys. Since 2017, four large-scale surveys have been undertaken for the NHS into young people's mental health within the UK. The most recent was published in 2022, which reported the following key findings:

- *"In 2022, 18.0% of children aged 7 to 16 years and 22.0% of young people aged 17 to 24 years had a probable mental disorder.*
- *In children aged 7 to 16 years, rates rose from 1 in 9 (12.1%) in 2017 to 1 in 6 (16.7%) in 2020. Rates of probable mental disorder then remained stable between 2020, 2021 and 2022.*
- *In young people aged 17 to 19 years, rates of a probable mental disorder rose from 1 in 10 (10.1%) in 2017 to 1 in 6 (17.7%) in 2020. Rates were stable between 2020 and 2021, but then increased from 1 in 6 (17.4%) in 2021 to 1 in 4 (25.7%) in 2022.*
- *11 to 16 year olds with a probable mental disorder were less likely to feel safe at school (61.2%) than those unlikely to have a mental disorder (89.2%). They were also less likely to report enjoyment of learning or having a friend they could turn to for support.*
- *1 in 8 (12.6%) 11 to 16 year old social media users reported that they had been bullied online. This was more than 1 in 4 (29.4%) among those with a probable mental disorder.*
- *11 to 16 year old social media users with a probable mental disorder were less likely to report feeling safe online (48.4%) than those unlikely to have a disorder (66.5%).*
- *1 in 5 (19.9%) 7 to 16 year olds lived in households that experienced a reduction in household income in the past year. This was more than 1 in 4 (28.6%) among children with a probable mental disorder."*

(Newlove-Delgado et al. 2022)

The 2022 MHCYP survey suggests that the proportion of young people aged 7-16 or older who are likely to have a mental health condition (such as anxiety or depression) has risen significantly since the first survey in 2017 (up to the current estimate of 18% of this age group). Additionally, it suggests that young people who are likely to have a mental health condition may face significant

additional challenges that could further erode their mental health, including a lack of social support, feeling unsafe at school, experiencing online bullying, and having their family face increased financial pressures. This worrying trend continues throughout the report, which states that young people who are already likely to have a mental health condition being more likely to have problems with sleep (3 or more times over the previous 7 nights), loneliness, and self-harm (Newlove-Delgado et al. 2022).

Thankfully, the survey also revealed that schools were able to fulfil a protective role, at least for some young people. 1 in 4 (25.1%) of 11 to 16 year olds who responded to the survey indicated that they had accessed support from their school for their mental health and well-being in the past year; this rose to 59.8% of young people who the researchers consider are likely to have a mental health condition (Newlove-Delgado et al. 2022). Additionally, 83.0% of respondents said that they knew how to get support if they needed it. Unfortunately however, rates of trust that such support would be appropriate for their needs were lower; 61.1% of young people believed that the support available from schools would be helpful, whilst only 57% stated that they would feel comfortable talking with adults at their school about their challenges with their mental health (ibid.)

Such figures suggest that schools have the potential to fulfil roles that are supportive/ protective of young people's mental health, but can also simultaneously be the source or site of stressors that can erode their mental health. This raises a question: What is a school's expected role towards supporting young people's mental health (and what are their legal responsibilities in this regard)? Government policy in this regard has been developing for over a decade, with the following key developments:

- The 2010-2015 Coalition government published its mental health strategy (for all ages, including Children and Young People) titled '*No Health Without Mental Health*' (Department for Health, 2011) which reaffirmed its commitment to the Targeted Mental Health in Schools (TaMHS) project, with a focus on early intervention (p.40) and improved access to psychological therapies (IAPT) through the children and young people's IAPT programme (p.43). Unfortunately, during this period the NHS reported that between 2010

roughly £50 million was cut in real terms from its child and adolescent mental health services (CAMHS) budgets (Callaghan et al. 2017).

- The Children and Families Act was passed in 2014. Part 3 of this act outlined statutory responsibilities for supporting children and young people in the UK with special educational needs and disabilities (SEND); needs relating to social, emotional, and mental health (SEMH) are explicitly covered within the act and the Department for Education published the '*Special educational needs and disability code of practice: 0 to 25 years*' in 2014, which explicitly outlined how the Children and Families act should be implemented by local authorities, health bodies, schools and colleges. In particular the Code of Practice outlined the requirement for Local Authorities to publish information outlining their 'Local Offer' of the SEND services available in their area (Section 4, p59-77), including support for SEMH, and also outlined regulations for the assessment process for Educational Health and Care Plans (EHCPs), including the assessment of young people's educational needs in relation to their Social, Emotional, and Mental Health (Section 9, p141-206).
- The Coalition Government also appointed the Children and Young People's Mental Health Taskforce, who produced a report titled '*Future in Mind*' (Department for Health, 2015), which proposed "*ways to make it easier for children, young people, parents and carers to access help and support when needed and to improve how children and young people's mental health services are organised, commissioned and provided*" (p.13).
- The 2015-2017 Conservative government commissioned an independent report titled *'The Five Year Forward View for Mental Health'* (Mental Health Task force, 2016), which sought to build upon the foundations of the 'Future in Mind' report and included targets to improve mental health treatment and support for children and young people by 2020/21.
- Alongside this, Public Health England published guidance for schools and local authorities titled '*Promoting children and young people's mental health and wellbeing*' (Lavis & Robson, 2015). This guidance recommended the implementation of a Whole School Approach to supporting young people, families, and staff, that would integrate support for the community's wellbeing into the ethos and leadership vision of the school. This approach proved influential for some educational psychology services; for example, it formed the foundation for the Sandwell Wellbeing Charter Mark (https://fis.sandwell.gov.uk/kb5/sandwell/directory/advice.page?id=bmI555dVkAM).

- In 2017, the Department of Health & Social Care and the Department for Education held a public consultation on '*Transforming children and young people's mental health provision*', publishing a Green Paper which set out recommendations for improving mental health support for children and young people, with a particular focus on support in schools and colleges The Green Paper presented three key proposals:

1. *"We will incentivise every school and college to identify a Designated Senior Lead for Mental Health to oversee the approach to mental health and wellbeing. All children and young people's mental health services should identify a link for schools and colleges. This link will provide rapid advice, consultation and signposting.*

2. *We will fund new Mental Health Support Teams, supervised by NHS children and young people's mental health staff, to provide specific extra capacity for early intervention and ongoing help. Their work will be managed jointly by schools, colleges and the NHS. These teams will be linked to groups of primary and secondary schools and to colleges, providing interventions to support those with mild to moderate needs and supporting the promotion of good mental health and wellbeing.*

3. *As we roll out the new Support Teams, we will trial a four week waiting time for access to specialist NHS children and young people's mental health services."*

(Department of Health & Social Care and Department for Education, 2017, p.7)

- The Government published a response to the Green Paper consultation in July 2018, committing them to the above proposals (Department of Health & Social Care and Department for Education, 2018).
- In 2019 the '*NHS Long Term Plan'* was published, which included the commitment that "*The NHS will work with schools, parents and local councils to embed school and college-based mental health support for children and young people. Mental Health Support Teams will be rolled out to between one-fifth and a quarter of the country by the end of 2023*" (NHS, p.18). The trial/'trailblazer' Mental Health Support Teams were considered broadly successful (Ellins et al. 2021), and despite Covid-19, the initial roll-out of Mental Health Support Teams by the

Department for Health and Department for Education remained on track, with 287 teams being operational by Spring 2022, covering 26% of students in England by 2022 (comprising 19% of educational settings according to NHS statistics: https://www.england.nhs.uk/mental-health/cyp/trailblazers/). The three 'core functions' of the Mental Health Support Teams are:

- To deliver evidence-based interventions for mild-to-moderate mental health issues;
- Support the senior mental health lead (where established) in each school or college to introduce or develop their whole school or college approach to mental health and wellbeing and;
- Give timely advice to school and college staff, and liaise with external specialist services, to help children and young people to get the right support and stay in education.

(Department for Education, 2022, p.4)

- In parallel with establishing Mental Health Support Teams, the Department for Education has been implementing plans to establish a Senior Mental Health Lead in every school by 2025 (as outlined in the Green Paper). Funding was announced in the form of grants for the training of staff to become Senior Mental Health Leads, in 2021, with the aim of "*offering senior mental health lead training to all eligible state-funded schools and colleges by 2025*" (Department for Education, 2021a). Whilst the actual training for the leads is being implemented by a variety of external providers (the DfE has provided a list of approved training providers on their grant information page – Department for Education 2021b), the DfE frames a key role of the Senior Mental Health Leads as "*oversee[ing] your whole school or college approach in the context of wider special educational needs and disability (SEND), pastoral and safeguarding responsibilities*" (ibid), effectively taking responsibility for implementing the Whole School Approach to mental health that was outlined by Public Health England (Lavis & Robson, 2015), and republished as a joint PHE, DfE and Children and Young People's Mental Health Coalition publication (Lavis & Robson, 2021).
- In response to the pressures on educational settings and young people due to Covid-19, the Department for Education (2020) announced the 'Wellbeing for Educational Return' programme, which funded training and resources to help schools and colleges to support the children and young people, teachers and parents within their school community.

- The Department of Health and Social Care also launched a 'COVID-19 mental health and wellbeing recovery action plan', which had the goal to "*prevent, mitigate and respond to the mental health impacts of the pandemic during 2021 to 2022*" (Department of Health and Social Care, 2021, p.5). Chapter 2 of this plan contained a significant focus on support for children, young people, and families, and the plan included £7 million in funding to local authorities as part of the 'Wellbeing for Education Recovery' programme, which was provided in the form of grants designed to provide "*free expert training, support and resources for staff dealing with children and young people experiencing additional pressures from the last year – including trauma, anxiety, or grief*" (https://www.gov.uk/government/news/schools-and-colleges-to-benefit-from-boost-in-expert-mental-health-support).
- In 2022 the Department for Health and Social Care launched a consultation into the development of a new 10-year Mental health and wellbeing plan, including the support of the mental health and wellbeing of children and young people (https://www.gov.uk/government/consultations/mental-health-and-wellbeing-plan-discussion-paper-and-call-for-evidence). This consultation is now closed, but it is expected to influence future national initiatives and policies.

There has not yet been any discussion within the above publications about the potential impact that concerns or anxiety about climate change might have on young people's mental health and wellbeing. However, the purpose of the above initiatives is arguably to provide a framework that can provide support for young people's mental health and wellbeing, regardless of the source of the stressors that might be challenging or eroding it. The hope is that if concerns around climate change or climate anxiety were to become a significant challenge to the wellbeing of a young person or group of young people, effective support would be provided initially through the school/college's Whole School Approach to mental health and wellbeing, with guidance being provided from the setting's Senior Mental Health Lead to staff who work with the young person/people, and additional support/guidance being provided by the area's Mental Health Support Teams as required. Of course, as outlined in **section 4.2.1** it is important for schools and colleges to strike a balance with such support so that distress and anxiety around climate change is not pathologized, but effective support for young people is provided when needed. As part of this, it could be helpful for staff involved in such wellbeing support to consult with the school/college's

sustainability lead and climate education lead once staff have been trained in these roles (see **section 4.1.4.4**); a whole school approach to wellbeing includes an emphasis on pupil voice, enriching curriculum, and a positive ethos and environment, and a joined-up approach to concerns around climate change that can help to support young people to feel empowered to be part of positive changes in their community may be particularly helpful for some young people (see **sections 7.1.1**, **7.4.1** and **8.2**), though of course, other young people may benefit more from an approach that emphasises support for them to manage the challenging emotions that they experience around climate change.

My hope is that Educational Psychologists might be able to play a role in guiding and facilitating the development a range of supportive and empowering approaches towards young people's concerns around climate change. I hope that our capacity to do this will be enhanced through the development of a nuanced understanding of some of the complexities of climate psychology (as outlined in **section 4.3.1**) and an understanding of some of the ways that these may be embodied/expressed by young people (as explored in the **Results** and **Discussion** sections of this thesis). The question of how and when educational psychologists may encounter young people with concerns around climate change or climate anxiety in their work is difficult to answer with certainty, since there is a distinct lack of research on the topic (this thesis is part of the first wave of research within the field of educational psychology to consider how concerns about climate change may impact the young people with whom educational psychologists work). However, the majority of young people with whom educational psychologists work (at least when employed by a local authority service) are likely to have been referred to them by a key member of staff within each of the EP's schools (usually the SENCO, but occasionally the headteacher or another member of staff). Some educational psychologists may also deliver training for school staff (as part of twilight training sessions or school Inset days) or offer drop-in consultations where staff can arrange to speak with them.

Within this context, unless an educational psychologist is proactive in exploring with staff whether any students in their school are struggling with significant concerns about climate change, they are likely only to encounter or even hear about concerned students if a key staff member (or other staff member who has contact with the EP) refers such students to the EP, or seeks advice from the EP about how to support such students. In my own practice, I have yet to have a student

referred for work with me due to their concerns about climate change, but I have worked with two students (so far) who have expressed significant anxiety around climate change whilst we have been undertaking work related to other topics. In both cases, the SENCOs who referred the students were unaware about the students' concerns around climate change, which highlights that such concerns might not necessarily be on the agendas of SENCOs (or other school) staff as something for them to consider in relation to a student's SEMH needs. This is something that can actively be addressed by educational psychologists; for specific recommendations, see **Section 8.3.**

Encouragingly, some Educational Psychology Services have already begun to develop policies, training, and materials around supporting young people with climate/eco-anxiety. For example, Westminster, Kensington & Chelsea Educational Psychology Service have recently produced some PDFs and YouTube videos with recommendations for educational psychologists, parents, and school staff, which can be found on their website (https://services2schools.org.uk/Services/4698). They have also begun to offer workshops for schools around supporting young people with climate anxiety. Their work is excellent, but builds off of existing research, much of which is not focused on the context of young people within the UK, so I hope that the current research (which specifically focuses on the experiences and engagement of young people within the UK) will help further inform their policies, training, and advice.

4.4 Summary of Literature Review

This introduction and literature review has sought to establish both the context in which the current research was undertaken and the research gap that this thesis will seek to fill. Broadly speaking, I hope that it has established the following premises:

1.) Climate change is an issue about which it is reasonable to be concerned (**Section 3**).
2.) Concern amongst people in the UK has risen over time (**Section 4.1.2**).
3.) There are a proportion of young people who are experiencing significant worries around climate change (**Section 4.1.3**). The educational context in which young people learn about climate change should also be considered (**Section 4.1.4**).
4.) It is appropriate to frame some people's concerns as 'Climate Anxiety' (**Section 4.2**) whilst also taking care not to pathologize people for worrying about a concerning situation (**Section 4.2.3**).
5.) Existing scales of climate/eco-anxiety can be relatively reductionist (**Section 4.2.2**) and it may be helpful to move towards richer accounts of how young people may be engaging with the concerns that they hold (**Section 4.3.1**).
6.) A study exploring a range of ways in which young people are engaging with concerns around climate change could use Q methodology to explore young people's perspectives in a manner that is less reductive than existing scales but which retains statistical and qualitative rigour (**Section 4.3**).
7.) Any findings around young people's concerns about climate change should of course be considered within the wider context of legislation and actions within schools to support young people's mental health (**Section 4.3.2**).

The account I will seek to construct through the Q methodological process will not be exhaustive (Q methodology can be used to establish that viewpoints exist, but not the proportion of a population who subscribe to a viewpoint), nor a complete account of every viewpoint that people may hold on a topic. However, I hope that the research will constitute valuable foundational work that adds more to the knowledge base than 'a proportion of young people in the UK are concerned', by providing accounts of young people's experiences and views that are qualitatively and quantitatively distinctive, nuanced, and meaningful. I will then use the account of each position (and follow this up with focus groups) to make some preliminary recommendations for EPs about how we may work with young people and their educational settings in order to ensure that the young people are supported in a way that they will find helpful.

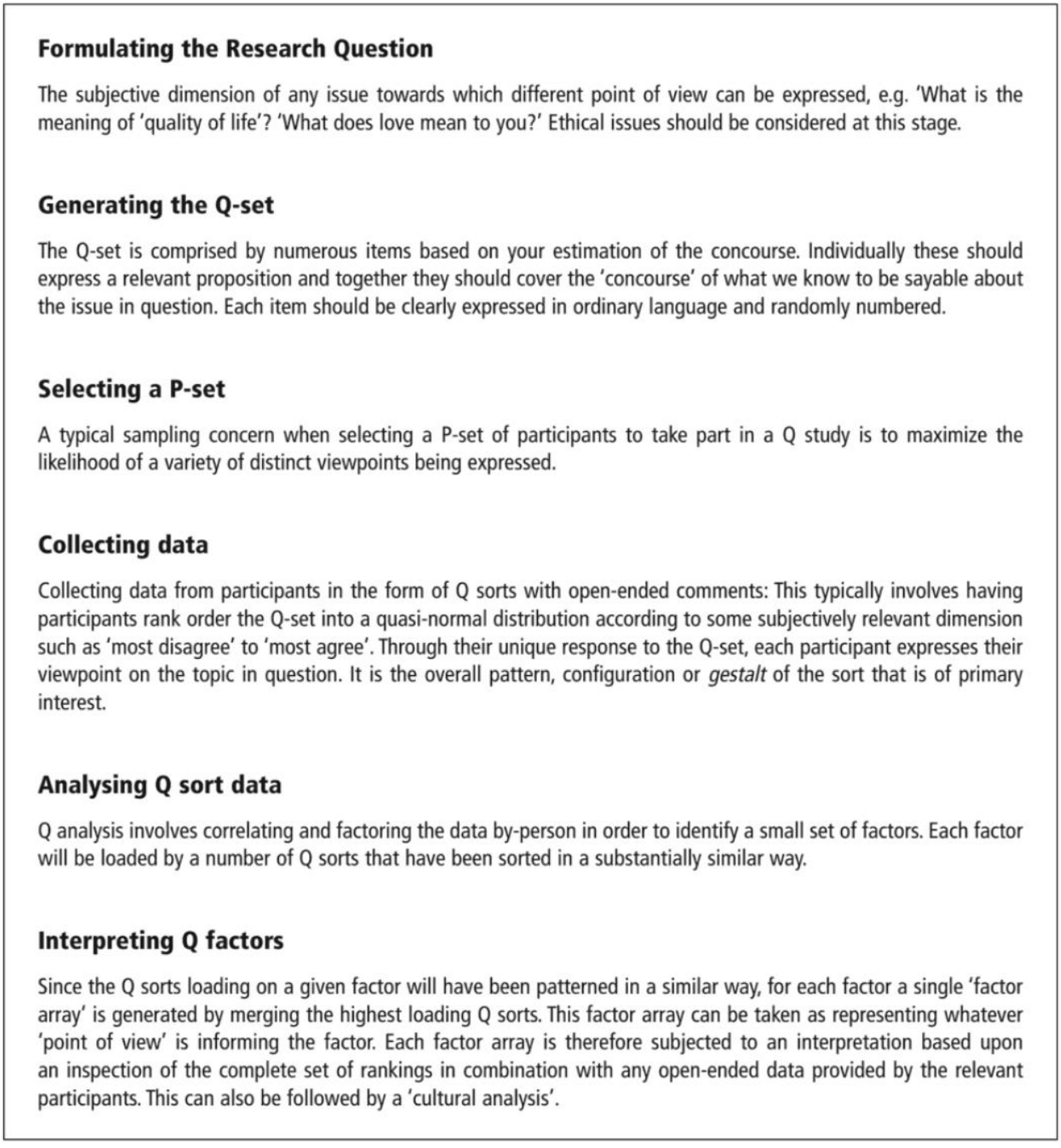
5. Methodology

This chapter will outline the procedure I used to design and implement my research. Firstly I will provide an overview of the research procedure and show the steps that I have taken within the current research (**Section 5.1**). I will then explain my initial planning process (**Section 5.2**), outlining my key research questions (**Section 5.2.1**), how Q methodology was can be used to explore these questions (**Section 5.2.2**), plus ethical considerations and the Ethical Approval Process (**Section 5.2.3**). I will then outline the steps taken to create the statements that were included in the final Q set (**Section 5.3**), which involved drawing from existing literature in climate psychology (**Section 5.3.1**) exploring the applicability of these statements (and generating further statements) through online interviews (**Section 5.3.2**) and refining the number and wording of statements through the use of online pilot studies (**Section 5.3.3**).

To cover the methodology for the main study, I will outline the recruitment procedure (**Section 5.4**), including recruitment and advertising (**Section 5.4.1**) how informed consent was obtained (**Section 5.4.2**), the demographic information which was recorded (**Section 5.4.3**) and how participant data was stored (**Section 5.4.4**). I will then detail the main research procedure (**Section 5.5**) including how the online Q sorts were undertaken (**Section 5.5.1**), how the online Focus Groups were undertaken (**Section 5.5.2**), plus the debriefing and safeguarding procedures (**Section 5.5.3**).

5.1 Overview of the research process and the steps taken by the current study

All research employing Q methodological analysis generally needs to complete the same series of steps in order to ensure that the process is rigorous and methodologically sound. These are summarised by Stenner et al. (2017) in **Figure 12**. **Appendix C1.1** contains a supplementary table (**Table C1.1**) summarising the timeline for when these steps were completed.



Formulating the Research Question

The subjective dimension of any issue towards which different point of view can be expressed, e.g. 'What is the meaning of 'quality of life'? 'What does love mean to you?' Ethical issues should be considered at this stage.

Generating the Q-set

The Q-set is comprised by numerous items based on your estimation of the concourse. Individually these should express a relevant proposition and together they should cover the 'concourse' of what we know to be sayable about the issue in question. Each item should be clearly expressed in ordinary language and randomly numbered.

Selecting a P-set

A typical sampling concern when selecting a P-set of participants to take part in a Q study is to maximize the likelihood of a variety of distinct viewpoints being expressed.

Collecting data

Collecting data from participants in the form of Q sorts with open-ended comments: This typically involves having participants rank order the Q-set into a quasi-normal distribution according to some subjectively relevant dimension such as 'most disagree' to 'most agree'. Through their unique response to the Q-set, each participant expresses their viewpoint on the topic in question. It is the overall pattern, configuration or *gestalt* of the sort that is of primary interest.

Analysing Q sort data

Q analysis involves correlating and factoring the data by-person in order to identify a small set of factors. Each factor will be loaded by a number of Q sorts that have been sorted in a substantially similar way.

Interpreting Q factors

Since the Q sorts loading on a given factor will have been patterned in a similar way, for each factor a single 'factor array' is generated by merging the highest loading Q sorts. This factor array can be taken as representing whatever 'point of view' is informing the factor. Each factor array is therefore subjected to an interpretation based upon an inspection of the complete set of rankings in combination with any open-ended data provided by the relevant participants. This can also be followed by a 'cultural analysis'.

Figure 12: Key steps required for Q methodological analysis (Stenner et al. 2017, p.215)

5.2 Step 1 of Research: Initial Planning and Formulating the Research Questions

5.2.1 The Key Research Questions

Section 4.3 outlined some of the ways that Q methodology can contribute towards existing research within the field of climate psychology. Primarily, Q methodology can facilitate the development of nuanced accounts of a number of ways in which young people engage with the concerning impacts of climate change. My hope is that the method has allowed me to develop descriptions which have been established with rigour yet are able to provide holistic and relatively non-reductive accounts of young people's experiences (see **Section 7**). However, I am not seeking to provide an exhaustive account of a full range or spectrum of young people's positions (further positions almost certainly exist); I am simply seeking to establish the existence of some perspectives that at least some young people hold.

In particular, the research will focus on young people's experiences and viewpoints relating to the concerning impacts of climate change, since I believe it is important to gain a more detailed understanding of the challenging emotions that young people may be grappling with around this area and how this might feel in practice for them. Whilst there will inevitably be overlaps in how young people engage with a whole range of different distressing topics (with general good practice around how educational psychologists might work with young people/schools/families to address many of these), my literature review (**Section 4.3.1**) suggests that there are also some specific nuances to how young people engage with concerns about climate change. It will therefore be useful for educational psychologists to think about these, in order to inform their practice and any educational psychology service policies relating to the area.

My key research questions are therefore:

1.) How are young people in the UK experiencing and engaging with concerns about climate change?

2.) What engagement or support would they like from others (peers, school staff, parents)
[*Follow-up discussion: how can Educational Psychologists and schools best provide support?*]

Question 1 is the main research question and will be explored through the primary research activity: a Q-sort (containing statements drawn from existing literature within climate psychology plus interviews with young people), followed by Q methodological analysis of the completed Q-sorts. The question is specifically phrased in a way that supports the use of Q-sorts; it is built on the assumptions that climate change is a concerning phenomenon (**Section 3**) and that young people may hold a range of concerns about it (**Section 4.1.3**). The purpose of participants sorting statements relating to concerns about climate change is then to allow them to indicate which potential concerns they hold, how this feels, and how they manage/cope with this.

Question 2 is a secondary follow-up question to help inform considerations about how educational psychologists (and others) could practically apply and respond to the conclusions drawn from question 1. In combination, I hope that they will provide some foundational information to help educational psychology services start to consider how they may work with young people who are grappling with concerns around climate change.

5.2.2 The Use of Q Methodology to explore the Research Questions

Supplementary Appendix C1.2 contains a summary of the main procedure commonly employed by Q methodological studies (Q-sorting, plus Q methodological analysis). This procedure is well suited to the construction of detailed holistic accounts of viewpoints/positions that are roughly shared by participants within a sample; one particular advantage is that when participants place statements into the Q-sort grid (**Figure 13**), their agreement/disagreement towards each statement must be considered in relationship to their placement to all other statements – this can help support the construction of hypotheses around how particular views/ideas/feelings about a topic relate with each other. For the current experiment, the question of *how young people in the UK are experiencing and engaging with concerns about climate change* is explored through my analysis of the positions that participants place various statements relating to their engagement with concerns around climate change onto the Q-sort grid.

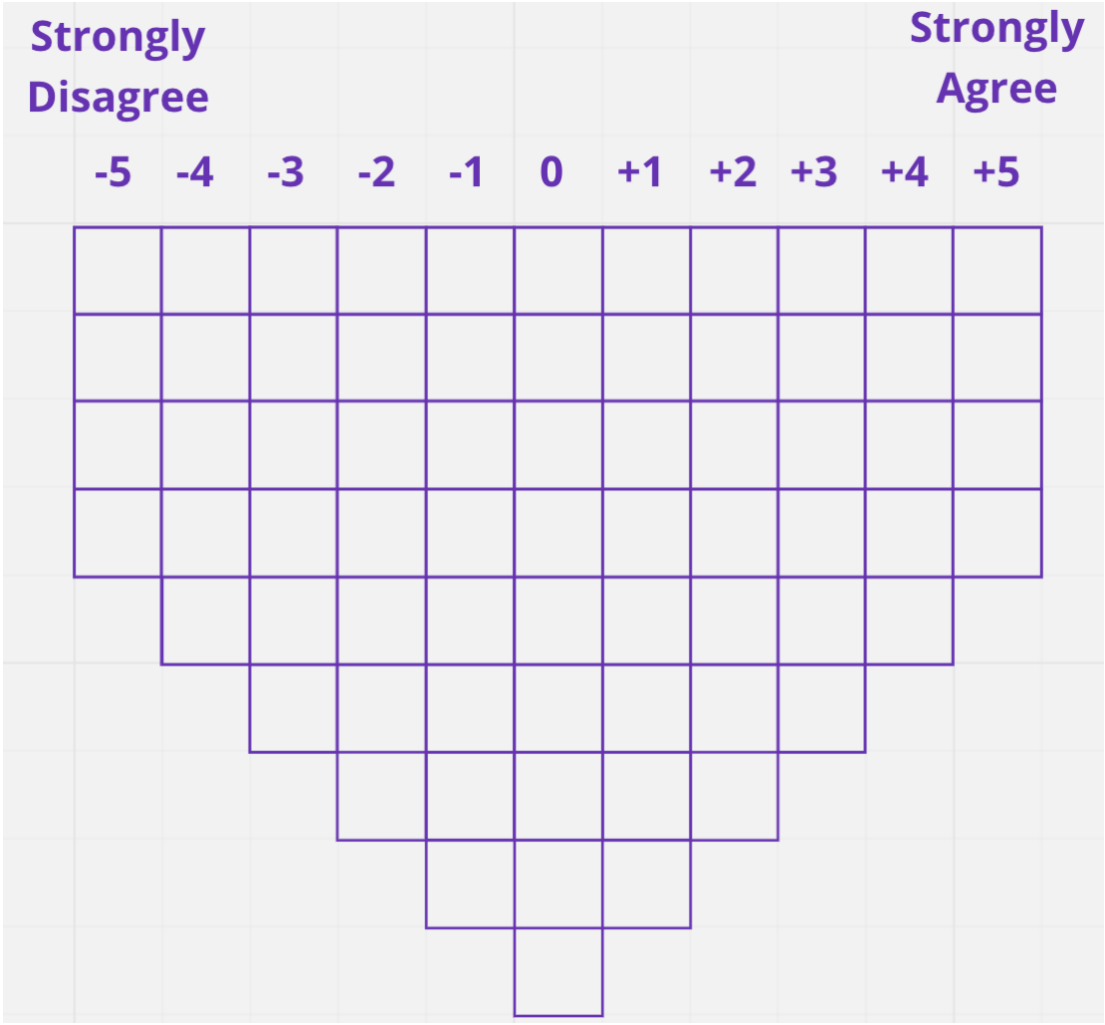


Figure 13: A Q-Sort grid containing 69 spaces for statements, with values assigned to each column from -5 (most strongly disagree) to +5 (most strongly agree).

5.2.3 Ethical approval

Whilst the initial literature review and formulation of research questions began in Summer 2019, ethical approval for the research was applied for in June 2020. My initial plans for the research had involved holding interviews, Q sorts, and focus groups in person with young people in secondary schools and colleges. However, the restrictions to research introduced due to the Covid-19 pandemic from March 2020 meant that all face-to-face research had to be adapted so that it could be undertaken online, so my ethics application was adjusted accordingly. The application is included in **Supplementary Appendix C1.3**., with amendments in **Supplementary Appendix C1.4**.

5.3 Step 2 of Research: Creation of the Q set

A Q Set typically consists of a carefully crafted selection of statements that cover a range of views about a research topic. In contrast with survey questions within R-methodological studies where it is desirable for multiple questions/statements to be designed to measure aspects of the same underlying latent construct, Q-methodological studies aim towards a good overall coverage of the main aspects of the topic area. Watts & Stenner (2012) recommend that researchers aim to make the Q set as a whole "*broadly representative of the opinion domain*" as a whole so that they "*cover all ground within the relevant conceptual space*" and that the set is relatively balanced so that it "*does not appear to be value-laden or biased towards some particular viewpoint or opinion"* (p.58).

The process of developing the Q-set was an iterative and reflective process, in which I refined, reworded, cut, added, and merged statements throughout the process. Firstly I constructed a large set of initial statements by condensing what I felt were the major/key ideas from my reading of the research literature around psychological engagement towards climate change into short sentences (summarised in **Section 4.3.1**). I then used the key themes and ideas from this research as the basis for questions that I asked during semi-structured online interviews with five young people in August 2020, in which I tested how relevant or applicable the young people felt these themes were and also developed new statements on the basis of their comments and descriptions of their experiences (**Section 5.3.2**). Finally, I created an online Q-sort template using an online collaborative whiteboard (see **Section 5.5.1**) and conducted 21 pilot studies in which I cut down and refined (and occasionally added) statements on the basis of the pilot study participant experiences, comments, and post-sort interviews (**Section 5.3.3**). This left me with 69 statements within the final Q-set.

Several important methodological considerations informed the development of the Q-set throughout this process. Firstly, Curt (1994) argues that Q methodological research can become muddled when it mixes different forms of exploration around a topic. Specifically, she distinguishes three different ways that people may engage with a topic:

- "*Representations*" (p.141): how participants think a topic is generally thought about by a particular group (e.g. '*how are concerns about climate change typically thought about by young people?'*)
- "*Understandings*" (p.164): how participants personally experience or feel about a topic (e.g. '*how do [the] young people [in the study] feel about the [potentially] concerning impact of climate change?'*)
- "*Conduct*": what participants think people should do in relation to a topic (e.g. '*how do young people think that school staff should engage with climate change?'*)

By phrasing my research question as "*How are young people in the UK engaging with concerns about climate change?"* I intended to indicate that there are concerning facts about climate change and that young people may potentially engage with such concerns in a range of ways. However, more specifically, I was interested in exploring young people's personal views and experience about climate change, which meant that in Curt's (1994) terminology my statements would probe their "*understandings*", rather than their "*representations*" of how they think that young people generally engage with the topic. When thinking about the concerning impacts of climate change, views about "*conduct"* (i.e. what we should do to address the concerning impacts of climate change, on a large societal/worldwide scale or on a small individual/community scale) are likely to be influenced by people's "*understandings"* (views and experiences) around the topic (and vice-versa if "*conduct"* includes assessments of the actions that it is actually possible to undertake), and the initial statements that I generated included ones that expressed views or preferences around how people/organisations should respond. It was only on further consideration that I realised such statements fell into the "*conduct"* category, at which point I cut these and decided to address questions of "*conduct*" via my second follow-up research question by taking a focus that could explicitly inform the practice of educational psychologists ("*What engagement or support would they [young people] like from others [peers, school staff, parents, educational psychologists]?*"), rather than pursuing more general questions of how young people feel society as a whole should respond to the concerning consequences of climate change.

Secondly, Watts & Stenner (2012, p.59-60) highlight the importance of considering whether to use a *structured* or *unstructured* approach to creating a Q-set. In a *structured* approach the concourse is broken down into particular themes and researchers will usually determine a set number of statements to cover each theme. An *unstructured* approach, in contrast, may still start with the identification of key themes, but researchers will prioritise balanced coverage of the entire concourse rather than allocating a specific number of statements to each theme. The two approaches could arguably be seen as forming a spectrum rather than categorically distinct approaches and I chose to prioritise a more *unstructured* approach, which allowed me to focus on ensuring that my statements covered all of the core areas of the concourse that I wanted the Q-set to explore. This was in-part influenced by my desire to ensure that the research would be relevant to the work of educational psychologists; whilst some themes (e.g. ecological values and moral values) were personally interesting or had relatively extensive coverage in the research literature, I wanted to prioritise themes that were likely to be most directly relevant or influenceable within daily school life, such as young people's emotions, coping strategies, sense of personal agency, and the impact of social influences and support around the young people. Consequently, my Q-set contained a large number of statements relating to these areas, so broadly embodied an unstructured approach.

Thirdly, when crafting the Q-set, I spent time considering how broadly I wanted to cover young people's engagement with concerns about climate change. One option could have been to solely focus on young people's emotional engagement with the topic. However, when undertaking the interviews it quickly became clear that (at least for some people) their emotions about climate change were deeply entwined with their values, thoughts, identities, personalities, and potentially their general form of 'being-in-the-world' (Heidegger, 1927). Thankfully, an ontology grounded in situated cognition does not need to draw sharp distinctions between emotions and other factors in that way that a more cognitivist ontology might (the CBT three-component model for treatment of anxiety divides thoughts, feelings, and behaviours into completely separate entities, e.g. First et al. 2016). Within situated approaches to cognition, beliefs, values, judgements, emotions, psychological defences, and empathy can all be characterised as interrelated processes of embodied coping by the subject engaging with the world (Gallagher, 2017).

5.3.1 Statements drawn from climate psychology literature

One goal of this thesis was for my research to build upon and move beyond existing studies that establish that some young people feel anxious about climate change. I sought to do this by using a carefully thought-out Q-set to facilitate the development of rich and nuanced descriptions of ways that young people in the UK experience and engage with concerns about climate change. Thankfully, due to the excellent range of research emerging within the field of climate psychology, I did not need to start from scratch. **Section 4.3.1** provides examples of the key research literature from which I drew and also shows how some of these ideas were translated into short statements for the Q set (as noted previously, I was unsure whether to include examples of this translation process in Section 4.3.1 or the current section, but opted to keep the example statements and research literature together for ease of reference).

5.3.2 Refining the Q set statements using online interviews

Once I had constructed an initial set of statements, I used online interviews with five young people to check the relevance of the themes and ideas that I had identified within the literature. I also used these interviews to explore whether the young people mentioned any further areas, ideas, or aspects of experience or engagement that I had not yet considered. All young people who participated with the research were aged 11-18, so I ideally wanted the demographics for my interviews to cover the range of ages of participants within my main study. Whilst I was unable to secure any students who were of college age for these initial interviews, participants were ages: 11 (Year 7), 12 (Year 8), 13 (year 9), 13 (Year 9), and 15 (Year 11), which at least meant that perspectives were explored with students whose ages spanned a good range of ages within secondary education.

The form of the interviews themselves was inspired by the phenomenological interview technique outlined by Høffding & Martiny (2016). Further details of this technique are provided in **Supplementary Appendix C2.2**. However, the final technique was more 'phenomenologically inspired' than strictly a full application of the phenomenological

interview method. Primarily, my interview questions and analysis sought to present (as questions) various hypothesis about the structure(s) of young people's experiences in relation to concerns about climate change, to see how well the theories proposed within existing climate psychology literature could potentially translate into the lived experience of young people.

The broad question areas and transcripts of my interviews are in **Supplementary Appendix C2.3**. The interviews were semi-structured; I intentionally adapted the questions during the interview process in order to explore interesting phenomena mentioned by participants. This resulted in many statements from the literature review being refined, plus some new statements being generated when I felt that the interviews touched upon interesting facets or structures of experience that I had not yet found within the literature. See **Supplementary Appendix C2.4** for a summary of statements that were generated.

Statements were not necessarily cut from the Q-set just because one or more young people did not personally share the experience or view mentioned by the statement; Q-sets are generally designed to contain statements with which some participants will disagree. However, statements were generally cut when it emerged that they related to areas that young people found too abstract, confusing, or which generated a muted response amongst all participants (for example: interviewees struggled to understand and relate to a question regarding '*solastalgia*', which is a term created by Albrecht [2005] to refer to distress that some people feel when the natural environment around their home has changed or degraded in a way that they find distressing. The statement regarding solastalgia was therefore cut.). Additionally, some comments from the interviews inspired me to seek out further research literature in an iterative and reflexive process.

5.3.3 Refining the Q set statements using iterative pilot studies

Supplementary Appendix C2.5 contains the initial statements that I constructed from my reading of the climate psychology literature plus the online interviews. Given that I took a '*semi-unstructured*' approach to constructing my initial draft Q-set of statements (in which I had identified various areas I wanted to cover, but had not allocated equal numbers of

statements to each area), it felt appropriate to use an overtly '*crafty strategy*' (Watts & Stenner p.60) to further develop and refine the statements. This became a very involved process, in which I used many pilot study iterations and edited my statements on the basis of each pilot study participants' experiences and comments. This process used the same methodology as my main study.

Supplementary Appendix C2.6 details the changes made to the Q set for each iteration. In total, I conducted 21 pilot study iterations. The majority of these were undertaken with adult participants; 6 were undertaken with friends (the intention for these was to gather initial feedback on the wording of statements and overall experience of the online Q-sorting process), 6 were undertaken with volunteers from the climate psychology alliance (to check that I had adequately covered the main areas within the climate psychology literature), 6 were undertaken with trainee educational psychologists (the intention of these was to gather information on whether trainees felt that I had constructed statements that related to information which educational psychologists would find valuable), and 3 were undertaken with young people aged 11-18 (as some of the final pilot study iterations, to explore how young people might feel about the final online q-sorting process).

5.3.4 Final Q set

The final Q-set that was used in the main study is in **Supplementary Appendix C2.7**. Once I had the final set, I used an online application to randomize the order of the statements (https://onlinerandomtools.com/shuffle-lines) so that participants in the main study would not be influenced by encountering the statements in an order that I had consciously predetermined. **Supplementary Appendix C2.8** contains the final order of statements. When pasted into Miro, each statement occupied its own virtual 'post-it' card (**Figure 14**); these were arranged so that the post-its formed a square with 9 post-its per line, 8 lines deep (with 6 statements on the final line). Many participants worked along each line horizontally, but some picked statements from the main set according to the statements that first caught their attention.

Figure 14: The final Q-set of 69 statements, presented in Miro on squares/virtual 'post-it' notes.

5.4 Step 3 of Research: Selection and Recruitment of Participants

As outlined in **Figure 12** (**Section 5.1**), the final step required before the main study could begin was for a group of participants (the P-set) to be selected and recruited. Watts & Stenner (2012, p.70) recommend that researchers avoid *'opportunity sampling'* (i.e. recruiting whichever participants are easily available) wherever possible, in favour of '*strategic sampling'* of participants who are more likely to hold '*interesting, informative, and relevant viewpoints'* (p.71) relative to the research question. My wording of the research question left the criteria for participants relatively loose; participants simply had to be young people who were aware of climate change as a potentially concerning phenomenon. However, a few factors influenced recruitment:

- Firstly, I was unsure whether all young people would have encountered information about climate change in primary school, so I limited my age range to students who had started secondary school plus students in Further Education up to age 18. Hickman et al. (2021) included participants up to the age of 25 under their category of 'young people'. I would have liked to include young people with SEND up to age 25 (a group with whom educational psychologists may work), but was advised that this could raise potential challenges for getting the project approved by the University Ethics Committee.
- Secondly, the requirement that research be undertaken online rather than in person meant that participants needed access to a computer with: internet, a microphone, a webcam, and enough processing power to run Miro (the online whiteboard). A significant number of students had been required to engage in online learning during the school closures due to covid in 2020-2021, so these criteria were less exclusionary than they might have been a few years earlier.
- Thirdly, I limited participation to young people living in the UK, again because Educational Psychologists are less likely to work with students living overseas (participants did not need to be born in the UK). The requirement for research to be undertaken online increased the potential pool of participants, since it meant that I did not need to travel to work with participants.

Potential participants did not need to be personally concerned about climate change, but I did want to recruit participants who had some awareness of the concerning aspects of climate change, even

if their response to this was to avoid thinking about/engaging with the issue. In practice, '*opportunity*' did play a role in recruitment; I approached schools and educational psychology networks (including those with whom I already had a relationship) and asked whether they would forward my recruitment information to young people. However, this process was also '*strategic*' in the sense that I had predefined criteria for appropriate participants, which I hoped would make the results relevant and of interest to educational psychologists in the UK.

5.4.1 Recruitment and Advertising

Participants were recruited in four phases, outlined in **Table 2**:

Phase	Number of participants recruited	Description
Online interviews	5	Recruitment emails containing my university email address as the contact address were sent to trainees on my doctoral (DEdCPsy) course, educational psychologists in my Local Authority placement, and the Special Educational Needs Coordinators (SENCOs) for two secondary schools with whom I worked (one inner-city school, and one grammar school), with the request that these be cascaded to any relevant young people and organisations. In situations where a young person contacted me directly, I sent a short email back requesting that they pass my email onto their parents, so that their parents could contact me.
Pilot Studies	21	Recruitment emails were sent to friends and contacts I judged would be appropriate/helpful, trainees on my course, educational psychologists in my Local Authority placement, and members of the Climate Psychology Alliance; this time I directly requested that those receiving the emails participated in the pilot studies. I also contacted the five young people (and their parents/carers) who participated in the online interviews; three of them were free to take part in the pilot studies.

Phase	Number of participants recruited	Description
Main online Q sort (and post-sort interview)	32	Recruitment emails were sent to friends and contacts who worked with young people, trainees on my course, educational psychologists in my Local Authority placement, the UK educational psychology email forum (EPNET), members of the Climate Psychology Alliance, and the SENCOs of five secondary schools across the West Midlands. In situations where a young person contacted me directly, I sent a short email back requesting that they pass my email onto their parents, so that their parents could contact me.
Online Focus groups	13	All young people who participated in the online Q sort were asked if they were happy to be contacted about participating in the focus groups; all young people who agreed (plus their parents/carers) were sent an email invite.

Table 2: Phases of recruitment for study

Email was the primary medium for recruitment, though I also sent recruitment leaflets as attachments to emails (see **Supplementary Appendix C3.1**) which some SENCOs printed out and distributed. One parent who was enthusiastic about the project shared the recruitment information via a Facebook group; this resulted in a formal complaint being made by a member of the group to my university, which was thankfully dismissed (**Supplementary Appendix C3.2**). I also delivered an online presentation to one school assembly about my project, in which I shared recruitment information. Once young people started to show an interest, I requested (with the permission of their parent/carer) that they consider passing on the recruitment information to 2 or more other young people who might be interested, including someone they suspect might engage similarly to them, and someone who they suspect might engage differently (a technique sometimes referred to as 'snowballing').

Opinions amongst researchers vary as to criteria for a sufficient number of participants for a Q-methodological study; whilst Stainton-Rogers (1995) recommends 40-60, Brown (1980) emphasises that a study only requires "*Enough subjects to establish the existence of a factor for purposes of comparing one factor with another*" (p.192). Ellingsen et al. (2010) state that it is rare to have more than 50 subjects, whilst Webler et al. (2009) consider 'one to three dozen' people to be sufficient. Watts & Stenner (2012) also point out that general R-methodological guidelines (e.g. Kline, 2014) recommend at least two subjects for every variable. Q methodology inverts the subject-variable relationship so that the Q-set statements are the 'subjects' and the participants act as variables, which would imply that a Q-study should ideally have less than half as many participants than statements. The current study has 69 statements and 32 participants (30 after two participants were removed during analysis – see **Section 6.1**); this was considered sufficient for the Q-methodological analysis. A further 22 young people expressed an interest, but did not get as far as checking consent from their parents and completing their own consent forms.

5.4.2 Information and Consent forms

As a result of recommendations around information governance made by the University of Sheffield, the information sheets and consent forms were provided using a platform for social science research called Gorilla (https://gorilla.sc/). This also had the benefit that it allowed me to embed short videos at the end of the consent form explaining the basics of the Q-sort process, how to access and use Miro (the online whiteboard), plus how to use Google Meet (for the online interviews). In all cases for participants under 18, the information sheet and consent form for parents/carers was sent out first, and participants were only sent their own information sheet and consent form once their parents/carers had provided informed consent. Different information sheets and consent forms were constructed in Gorilla for the online interviews, pilot studies, and main study (with the main study consent also offering the option to consent to participating in the pilot study). The content of these forms is in **Supplementary Appendix C3.3**.

5.4.3 Demographic and survey information collected about participants

Once participants for the main study had read the information sheet and completed the consent form, they had the option to fill in some additional demographic information and to complete some short surveys (contained in full in **Supplementary Appendix C3.4**). The purpose of collecting this information was to provide additional context for the interpretation of factors during the Q methodological analysis. The demographic information collected was: age, gender, ethnicity, and faith/religion (if any). To facilitate self-expression, participants were free to enter their responses as text, rather than being required to select options from drop-down menus. The survey information was intended to measure:

- Relative 'objective' social status (measured via family affluence, using the Family Affluence Scale III [Torsheim et al. 2016], available at: https://www.euthyroid.eu/questionnaires-page/)
- Relative 'subjective' social status (perceived within the school/college context and within wider society, using the MacArthur Scale of Subjective Social Status – Youth Version [Goodman 2001], available at: http://sparqtools.org/mobility-measure/macarthur-scale-of-subjective-social-status-youth-version/#all-survey-questions plus the seven-question Subjective Social Status - school dimensions questionnaire [Sweeting et al. 2010]),
- The category/type of concern that the participant showed/felt within the classification used by the Six Americas scale (shorter 16-question version) segmentation process (Maibach et al. 2011b, available at: http://climatechangecommunication.org/SixAmericasManual.cfm)
- The relative amount of climate anxiety that the participant experiences, according to the Climate Anxiety Scale (Clayton & Karazsia, 2020)

Section 6.4.3 details the ways in which this data informed the final analysis for each factor.

5.4.4 Data Storage

All information from the consent forms plus demographic and survey information was stored on the GDPR-compliant Gorilla servers until it was required for analysis. It was downloaded as an Excel file, which was stored in a password-protected folder in the University of Sheffield U: Drive, which is used as secure storage for university research. Video recordings from the online interviews, Q-sorts, and focus groups were also stored in a password-protected folder in the U: Drive. The completed Q-sorts

were stored within Miro's cloud server; when participants logged into Miro they did not provide a name (they were automatically assigned the tag 'anonymous contributor') and information linking each Q-sort number to a participant's demographic information was stored in a password-protected folder in U: Drive, which meant that the experiment data stored within Miro was anonymous. All data that was inputted into PQMethod was likewise anonymous.

5.5 Step 4 of Research: Main Procedures

The recruitment of participants for the main study plus the main online Q-sorts were undertaken between September 2020 and January 2021. I provided 1:1 support for all Q-sorts via Miro's built-in video conferencing and conducted post-sort interviews immediately after each participant finished. The vast majority of Q-sorts were completed at times when the participants were at home (after school), though 3 Q-sorts were completed with school computers during school time.

5.5.1 Online Q Sort Procedure

Each Q-sort was undertaken using an application called Miro, which is an online collaborative whiteboard. I set up a new whiteboard for each participant; this contained the final 69 statements, space for participants to arrange statements into initial groupings, and a Q-sort grid containing 69 squares (**Figure 9**). Each statement was displayed on a virtual card/post-it; participants could move the card by clicking on it then dragging it to the desired location within the virtual (2-dimensional) space. Participants were sent a link plus instructions (see **Supplementary Appendix C4.1**) via email to their online whiteboard space at least one day in advance so had the opportunity to view the statements prior to starting the Q-sort. When participants clicked on the link, it signed them in as an 'anonymous guest collaborator'; this meant that no identifying information about participants was stored within the Miro application itself. Miro's built-in video-conferencing features allowed participants to choose whether or not to show their faces via webcam and whether to have their microphone on or muted; all participants chose to keep their microphone on, and 25 out of 32 chose to have their webcam on. All participants provided verbal consent to be recorded at the start of their session (in addition to participants and their parents/carers both providing written consent when completing the consent forms).

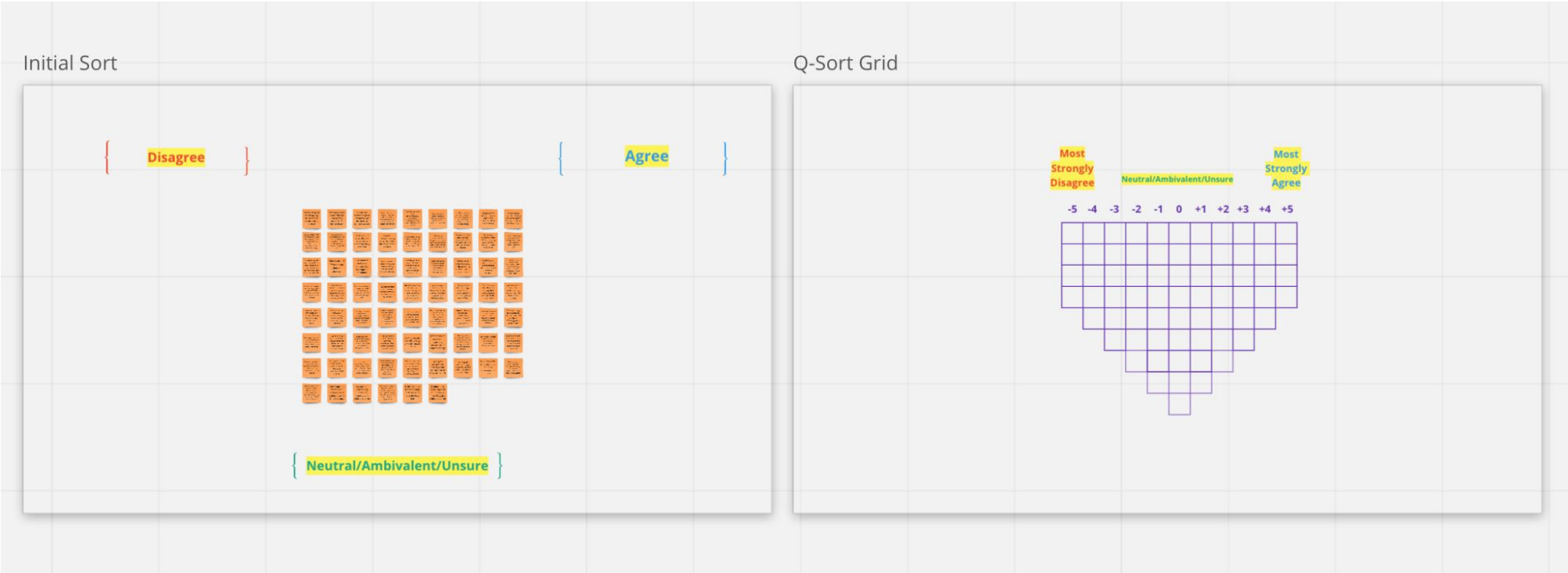


Figure 15: Initial Sorting space (left) and space containing Q-sort grid (right) within the online collaborative whiteboard space.

The view has been 'zoomed out' so that both can be seen;

see Figure 13 for a 'zoomed in' view of the Q-sort grid

and Figure 14 for a 'zoomed in view of the Q-set statements

I used a script (which I read to participants) to explain to participants the Q-sorting procedure at the start of the session (see **Supplementary Appendix C4.2** for the script). Participants were free to ask questions and I lightly adapted the wording of the script (whilst retaining the core content) if they appeared confused or uncertain about the instructions. Once participants were ready to begin, I stopped sharing my screen so that they regained control of their cursor and could start to read and move the statements. All participants were free to ask me procedural questions plus questions about the literal definition of particular words within a statement, but I did not answer any questions about how I intended particular statements to be interpreted by participants.

All participants began by arranging the 69 statements into three separate groups, around the headings: 'agree', 'disagree', and 'neutral/ambivalent/unsure' (see **Figure 16** for an example). Some participants arranged the statements further, e.g. by placing statements with which they most strongly agreed together, but this was not required. When the statements had been fully arranged into groups, I shared my screen and explained the procedure of arranging statements into the Q-sort grid. I also moved the groups of statements over to the grid (**Figure 17**) to make the second stage of sorting (in which statements were sorted by participants into the grid) easier for participants.

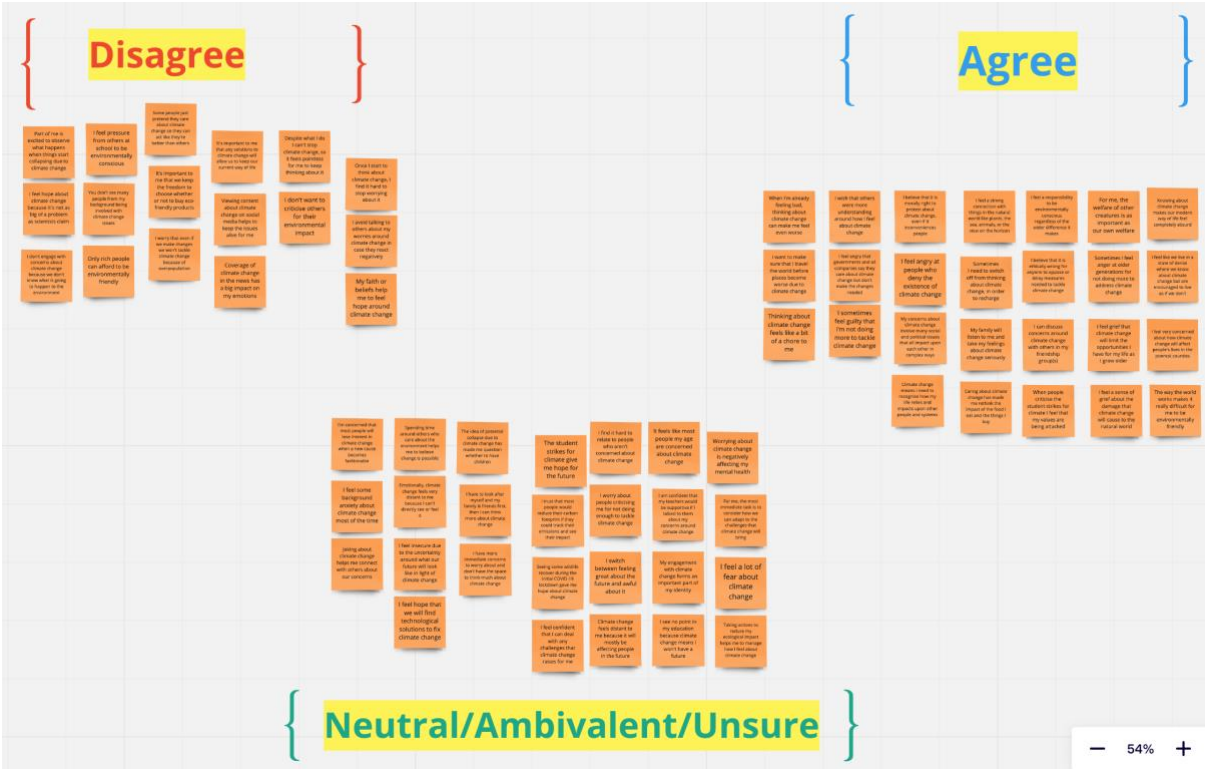


Figure 16: Example of initial process in which the statements have been sorted into three groupings of 'agree', 'disagree', and 'neutral/ambivalent/unsure'. The proportion of statements in each grouping does not need to closely match the proportion of statements in the left, middle, and right-hand sides of the Q-sort grid; this arrangement of statements will occur in the next stage (Figure 17).

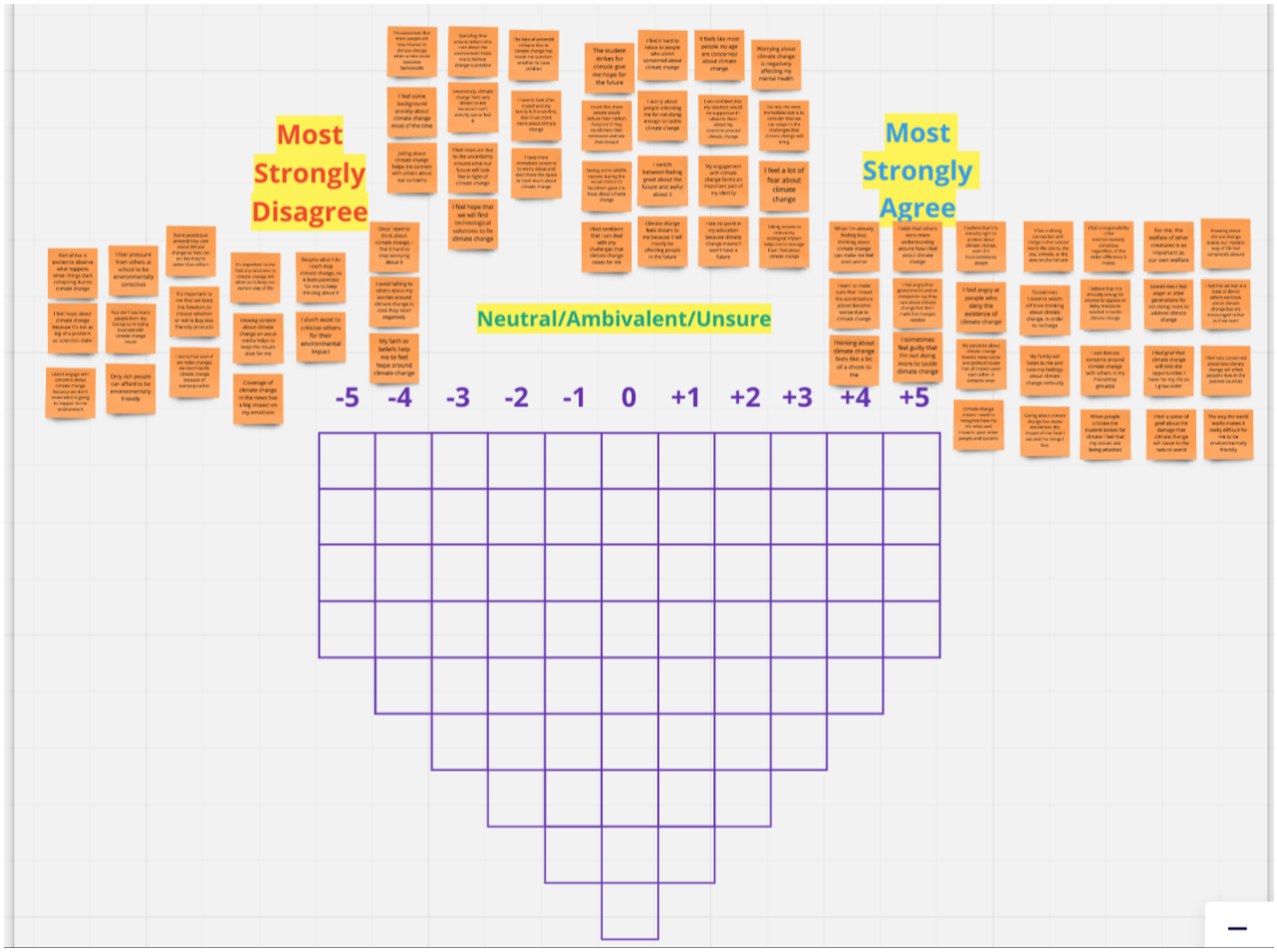


Figure 17: Example of all three groups of statements having been moved over to the grid in order to make it easier for participants to arrange each statement into a space on the grid (the 'agree' statements are on the right, below the 'Most Strongly Agree' label; the 'disagree statements are on the left, below the 'Most Strongly Disagree' label, and the 'Neutral/Ambivalent/Unsure' statements have been placed above the centre of the grid, above their label.

To support participants with the sorting process, I recommended that participants begin by placing the statements that they had arranged into their 'agree' group, then the statements in their 'disagree' group, then finally their 'neutral/ambivalent/unsure' group (though emphasised this was optional). I also emphasised that the '0' column on the grid did not have to contain neutral statements; it just meant 'less strongly agree' than the '+1' column and/or 'less strongly disagree' than the '-1' column and that I would ask participants at the end which column contained their most 'neutral' statements. Finally, I explained that participants were free to change their opinions about statements when sorting them (i.e. they could decide to place a statement that they had originally sorted into their 'disagree' group in a column indicating agreement) and that each column can only contain as many statements as the number of squares in it, which means that most participants generally have to rearrange some statements at the end in order to fit every statement into the grid. **Figure 18** shows an example of a Q-sort that is partially completed, and **Figure 19** shows an example of a completed Q-sort in which all statements have been placed into the grid.

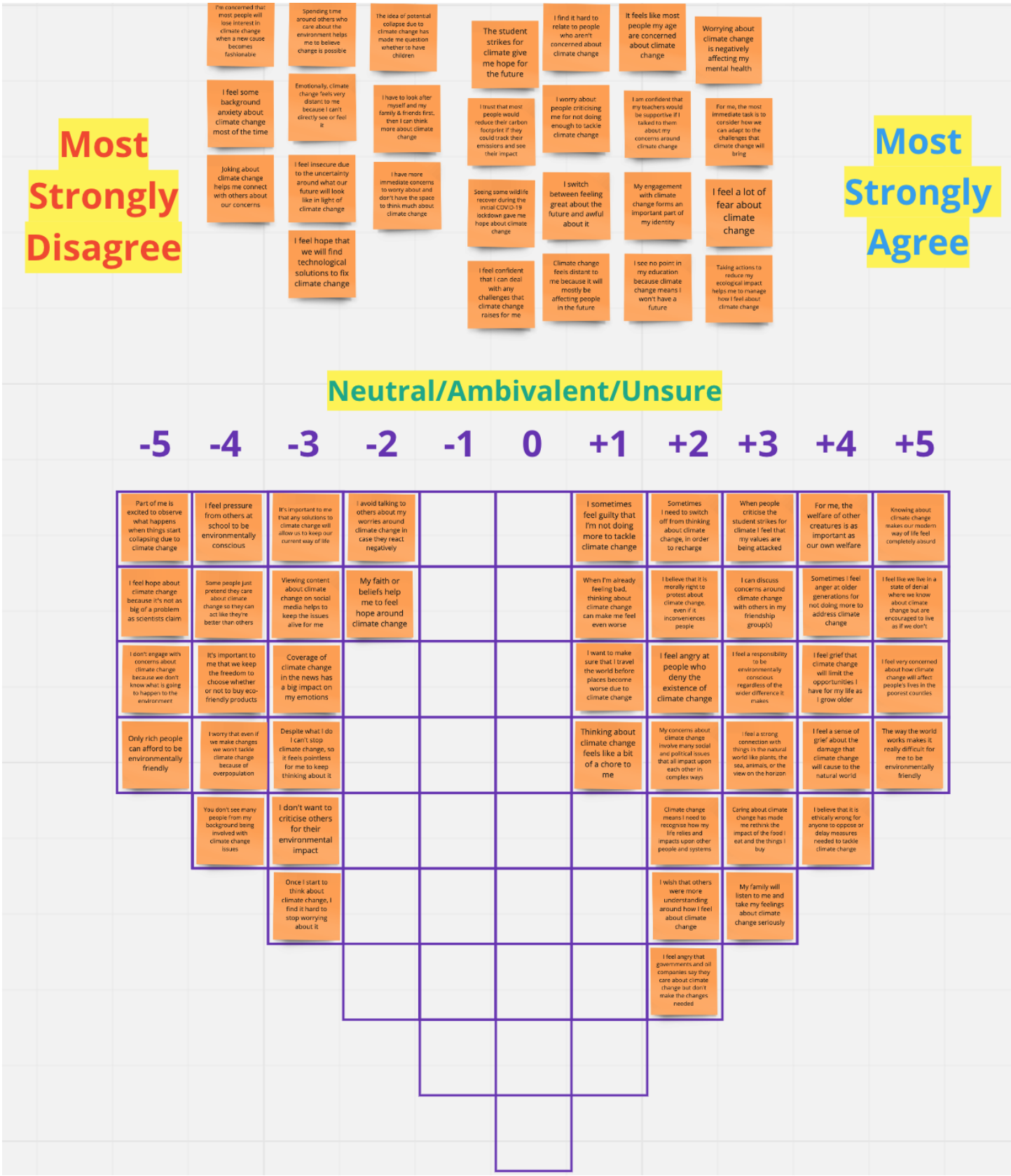


Figure 18: Example of a half-completed Q-sort in which statements with which the participant agrees have been placed into the grid, followed by statements with which the participant disagrees, leaving statements that the participant initially placed in the 'neutral/ambivalent/unsure' group to still be arranged into the grid.

Figure 19: Example of a completed Q-sort in which all 69 statements have been placed into squares on the Q-sort grid

Once participants had placed all statements into the grid, I gave them an opportunity to take another look and consider whether there were any statements that they wanted to rearrange into other columns before the task was complete. Finally, I asked whether they would like to be contacted about participating in the follow-up focus groups, then thanked them, and offered to send them signposting information about organisations they could contact for support if they felt anxious about climate change (as detailed in my ethics form).

5.5.2 Online Focus Groups

Once all participants had completed the Q-sorting process, I undertook a process of Q-methodological analysis as outlined in **Section 6**. This created three 'factors', i.e. paradigmatic viewpoints that emerged via the processing of participants' Q-sorts. None of the factors were identical with an individual participant's responses (nor are they supposed to be), but each factor had at least a few participants whose arrangements were used to generate the factor's overall pattern. I used participants' overall correlation with each factor to guide which focus group they were invited to participate in; the purpose of this was to hold focus groups with participants who would be less likely to hold views antagonistic to others in the group (to help facilitate a collaborative and positive ethos, rather than a debate-style environment) and not to strictly classify each participants' view as 'belonging' to a particular factor, so the criteria for focus group participation was less strict than the criteria for factor generation (0.42 or higher correlation with the factor position, rather than 0.31 for becoming a factor exemplar. This was considered less 'strict' because it allowed for participant responses to correlate more strongly with multiple factors whilst still being assigned to a particular factor).

The focus groups were held in May 2021, 4-8 months after each participant's Q-sort. Not all participants who were invited were able to attend; 5 participants participated in the first focus group (these participants' initial sorts all correlated most strongly with Factor 1), 4 participants in the second group (whose initial sorts correlated with Factor 2), and 2 in the 3rd group (whose initial sorts correlated with Factor 3). All participants took part online, using the Miro collaborative whiteboard space.

At the start of each focus group I introduced everyone and explained that they were welcome to use the video chat and microphone to communicate, but were also welcome to keep these off if they preferred. The majority of participants kept their microphones on, but most turned their webcams off after the initial introduction. I provided a brief explanation of my analysis and results up to this point, then provided a summary of the factor with which the participants had most strongly correlated (See **Supplementary Appendix C4.3** for the descriptions) but I did not immediately tell participants that their responses had correlated relatively strongly with this factor, since I wanted to explore how they related

towards the summary without them having too many preconceptions around how strongly their original responses correlated with it.

The purpose of the focus groups was not to try to verify how closely the description matched participants' views/experiences, but to explore what participants felt would be helpful for someone with the views/experiences presented in the summary, in terms of engagement or support. These groups were therefore used to help investigate the second key question explored by my thesis ('What engagement or support would they like from others?'). I asked each group three questions:

1.) How would you want to support or engage with someone with this perspective?
2.) How would you like your school/college to support or engage with someone with this perspective?
3.) How would you like someone with this perspective's family or community to support/engage with them?

I led participants through these questions using the Nominal Group Technique (Dunham, 1998). I used this technique on the advice of my tutor because it can help facilitate participation from everyone within a focus group and can support their ideas to be heard by others. Firstly, I invited them to individually explore each question and write down some thoughts in their own space on the shared whiteboard (see **Figure 20** for how spaces were delineated on the board). I then copied these into a shared space (**Figure 21**) and invited participants to read out all the responses (I read out the responses for everyone in cases where no-one volunteered).

Once all responses had been heard, I invited each young person to indicate their support for the statements in the shared whiteboard space through the use of 'votes' (I used leaf icons that looked like a tick); each participant had three 'ticks' that they could allocate to the responses to each question, in order to express appreciation/approval/agreement with a particular response or comment. Finally, I invited the group to reflect and offer any further comments on the questions or on each other's responses. All participants appeared supportive of each other and I did not observe any disagreements amongst them. Each of the focus groups lasted around 45 minutes in total.

Figure 20: Example of whiteboard set-up for the start of a focus group with four participants (initials have been changed). A summary of a factor has been provided in the middle of the whiteboard for reference and each participant had their own space in which to answer the questions. Responses were then transferred to the 'Group Board' at the top of the whiteboard space

Figure 21: Example of a completed group board. All participants comments were copied onto the board, participants read them out, then all participants had an opportunity to express appreciation/approval for the comments by using the green leaf icons (each participant had three leaves for each question)

5.5.3 Debrief and safeguarding

At the end of each part of the research that involved online interactions with participants (online interviews, pilot studies, main Q-sorts, focus groups), I undertook a quick debrief process. For this, I asked how they were feeling and whether there was anything in the process that they had found upsetting or distressing. I then offered to send each participant some signposting information to organisations who are specialised in supporting young people with anxiety and/or climate anxiety (see **Supplementary Appendix C4.4** for the signposting information). In total, three participants expressed an interest in this information (one young person from the online interviews, one adult from the pilot studies, and one young person from the main Q-sorts), so I sent it to them immediately after their session.

After this, I asked whether the participant had any questions about the research. Finally, I informed each participant how their data would be anonymised, stored securely, and used within my analysis, and checked that they still consented to their data being used in this way. Once the participant had logged off from the session, I sent them a thank-you email summarising the above information and inviting them to contact me if they had any further concerns or questions. For all participants aged 18 or under, this email was also sent to their parent/carer.

6 Analysis

This section will outline how the completed Q-sorts and survey data were processed and analysed. This involves both quantitative analysis in order to judge the most appropriate number of factors to extract (**Sections 6.1-6.2**) and qualitative analysis in order to construct nuanced and holistic accounts for each factor (**Sections 6.3-6.4**). Such analysis will allow me to order to outline some ways that young people may experience and engage with concerns around climate change (**Section 7**). The analytic process for the focus groups was primarily undertaken within the focus group itself (through the use of the nominal group technique), but the contribution of this analysis to the final construction of factor summaries is outlined in **Section 6.4.2**. Overall demographic and survey information is outlined in **Section 6.1**, whilst demographic and survey information for participants loading onto each factor is presented in **Section 6.4.3**, along with an explanation of how this information contributed towards the final factor interpretations.

6.1 Demographic statistics and survey information about participants

In total, 32 participants undertook the main Q-sort. All participants had the opportunity to ask questions about the procedure throughout the sorting process and all participants agreed to take part in online post-sort interviews directly after they had completed their Q-sort. Unfortunately, it became apparent to me during the post-sort interviews that two of the participants had misunderstood the Q-sorting process. I therefore excluded these participants' results from my analysis, which left 30 Q-sorts for the final analysis.

As detailed in **section 5.4.3**, I collected the following demographic information about participants: age, gender, ethnicity, and faith/religion. It was optional for participants to provide this information, and participants typed their own responses, rather than selecting from a drop-down menu. Participants also completed scales for socio-economic status, the Six Americas segmentation study, and the Climate Anxiety Scale. **Table 3** provides a breakdown of the participant sample (P-set), according to their demographic features, and responses on these scales.

Age	Number of Participants
11	5
12	3
13	3
14	3
15	5
16	5
17	5
18	1

Gender	Number of Participants
Female	19
Male	9
Girl	1
Demi Girl	1

Six Americas Segment	No. Participants
Alarmed	22
Concerned	7
Disengaged	1

Ethnicity	Number of Participants
White British	18
White	3
Irish/British	2
Caucasian	2
White European	1
Nigerian	1
Chinese	1
British / Indian, Asian	1
Left blank	1

Religion	Number of Participants
No	16
Christianity	4
Agnostic	2
Roman Catholic	2
Atheist	2
Islam	1
Hinduism	1
no i dont have a religion I belive in kindness	1
Left blank	1

Family Affluence Scale Total	Number of Participants
5	1
7	3
8	6
9	10
10	6
11	3
13	1

McArthur Subjective Social Status Family*	Number of Participants
6	5
7	17
8	6
9	1

*1 Participant left blank

Subjective Social Status School Dimensions Scale - Peer**	Number of Participants
14-18	4
19-22	4
23-26	8
27-30	4
31-34	4
34-38	4

**2 participants left some questions blank so were excluded

Subjective Social Status School Dimensions Scale - Scholastic*	Number of Participants
2	1
3	2
4	3
5	5
6	6
7	6
8	5
9	1

Table 3: Demographic Breakdown of participants

6.2.1 Step 5 of Research: Analysing Q-sort Data

Once all participant data has been collected and collated, participants' Q-sorts were statistically analysed using Q pattern analysis. The holistic pattern of each participant's arrangement of statements was used to construct a correlation matrix (**Supplementary Appendix D1.1**) that indicated the relative degree of similarity between each participants' Q-sort. A 'by person' factor analysis of the similarities between each participant's Q-sort resulted in the construction of factors, each of which accounted for some *common* (shared) *variance* between a group of Q-sorts. The relative strength of agreement/disagreement towards each statement within each factor was then qualitatively analysed to construct a meaningful account of the position that is shared (to some extent) by each Q-sort that significantly loads onto the factor.

In some cases it can be appropriate for a researcher to have predetermined theoretical reasons for extracting a set number of factors – this is called a *deductive* analytic strategy (Watts & Stenner 2012, 95-96). I did not have any particular reason to predict that a set number of factors would emerge, so my quantitative analysis of how many factors to extract was primarily statistically informed, i.e. it was an *inductive* analytic strategy (ibid). Whilst it is possible to conduct the Q methodological analysis by hand (Brown 1980, p.201-247), I wanted to explore a range of possible factor-analytic solutions and rotations, so chose to use some statistical processing software. I used PQMethod version 2.35 (Schmolck, 2002), primarily because it was free and recommended by Watts & Stenner (2012, p.94).

Once all participant data has been entered into the programme, PQMethod offers a number of choices regarding the factor analytic process. Firstly, two options are available for the statistical extraction process: Centroid Factor Analysis and Principal Component Analysis. Principal Component Analysis offers a single mathematically optimised solution (in which the maximum amount of common variance is explained) but does not allow for factor rotation, nor the exploration of whether the extraction of greater or fewer factors might result in more qualitatively meaningful factors. In contrast, Centroid Factor Analysis permits far greater methodological flexibility in terms of factor extraction and rotation. I wanted to prioritise a qualitatively meaningful solution over a statistically optimised one, so chose Centroid Factor Analysis.

PQMethod offers two methods/algorithms for Centroid Factor Analysis: Brown Centroid and Horst 5.5 Centroid. Neither method was clearly preferable from a theoretical perspective, so I tried using each method to test which was able to produce the most statistically sound results (I also messaged the Q-methodology email forum about the two methods and received an interesting reply from Peter Schmolck himself – see **Supplementary Appendix D1.2**). **Section 6.2.2** outlines a range of results produced by each extraction method (following factor rotation).

PQMethod also offers options for how many factors to extract, allowing for a maximum of 8 factors. Watts & Stenner (2012, p.105-110) outline a range of quantitative criteria that can be used to inform this decision, so I began by exploring how each criteria applied to my data set. **Table 4** summarises the criteria:

Criteria	Description
Kaiser-Guttman	All unrotated factors should have eigenvalues greater than 1
Scree Test	Point of inflection on the Scree Plot
Parallel Analysis	Less than 5% likelihood of eigenvalues being generated by chance
Factor Loadings	At least 2 Q-sorts correlate significantly with each factor at p <.01
Magic Number 7	Start with extracting 7 Factors
Humphrey's Rule	The cross-product of the two highest loading Q-sorts on a factor exceeds twice the standard error

Table 4: Criteria for how many factors to extract

To help me decide how many factors to extract, I worked through each of the criteria listed in **Table 4** in turn:

Kaiser-Guttman Criterion: All unrotated factors should have eigenvalues greater than 1

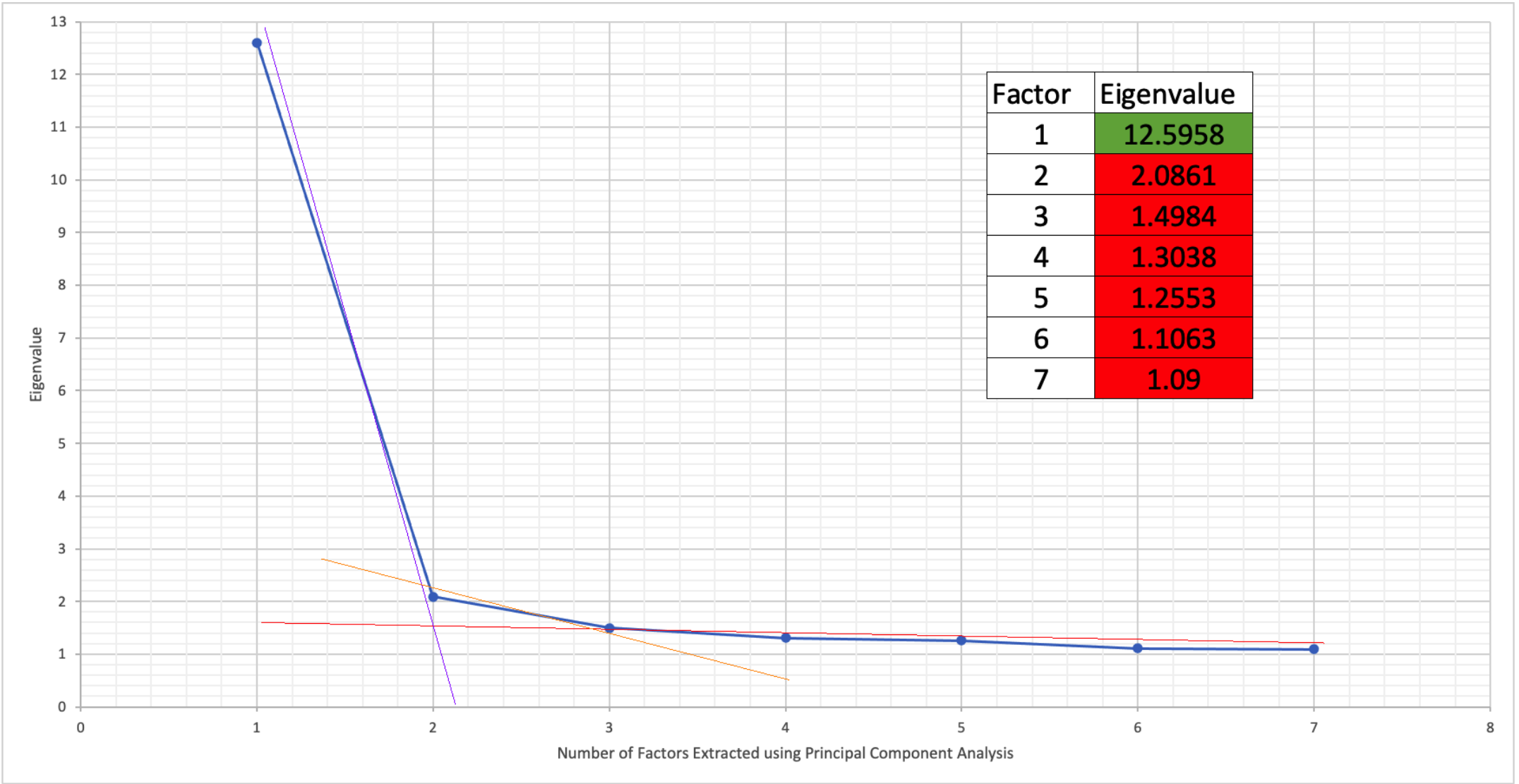
Whilst some researchers question the relevance of eigenvalues to Q methodological analysis (see Schmolck **Appendix D1.3**), Watts & Stenner (2012) note that "*The major plus point for this method is its general acceptance by the factor analytic community*" (p.106). The *Kaiser-Guttman* criterion (Guttman, 1954; Kaiser, 1960) states that all extracted factors must have an eigenvalue of at least 1.00 (if a factor were to have an eigenvalue of less than 1.00, it would explain less variance within the data set than a single Q-sort.). I used the Brown Centroid analysis extraction method because Schmolck stated that with this algorithm "*extraction of additional factors has no influence on the factors already extracted*" (**Supplementary Appendix D1.2**). The first seven factors all had eigenvalues over 1.00 (**Table 5**), so this did not significantly narrow down the number of factors to extract.

Factor	Eigenvalue
1	12.5958
2	2.0861
3	1.4984
4	1.3038
5	1.2553
6	1.1063
7	1.09

Table 5: Eigenvalues for each factor extracted in PQMethod

Scree Test: Point of inflection on the Scree Plot

As with the *Kaiser-Guttman* criterion, the scree test uses eigenvalues of variance explained. However, Watts & Stenner (2012) note that "*it was designed for use only in the context of PCA*" (p.108). I therefore undertook a factor extraction using Principal Component Analysis and created a graph from the eigenvalues derived from this process (**Figure 22**). This graph allowed me to judge where the point of inflection was, at which the addition of further factors are unlikely to capture what Cattell (1966) calls '*nontrivial common variance*' (p.245). As shown in **Figure 22**, several points of inflection (or 'elbows') could arguably be derived, based on stringency of criteria, so the scree test criterion could arguably support the extraction of 2 factors (purple line) or 3 factors (orange line).



Factor	Eigenvalue
1	12.5958
2	2.0861
3	1.4984
4	1.3038
5	1.2553
6	1.1063
7	1.09

Figure 22: Scree Test using eigenvalues from Principal Component Analysis

Parrallel Analysis: Less than 5% likelihood of eigenvalues being generated by chance

Similarly to the scree test, parallel analysis uses eigenvalues derived from a principal component analysis of the data. O'Connor (2000) has provided an SPSS syntax, which I used to run analysis of 1000 random data sets with the same number of cases (*N* = 69) and same number of variables (*N = 30*) as my own. This syntax extracted eigenvalues from the random data sets, which allowed me to compare the eigenvalues derived from my own data with the eigenvalues that would be expected if participants' statement placement in the Q-sorting process were completely random (in this situation, Wilson & Cooper [2008] state that there would be '*no factors present in the data*'[p.867]). As shown in **Table 6**, only the first extracted factor has an eigenvalue that exceeds 95% of the eigenvalues derived from random data, so only one factor has a greater than 95% chance of capturing meaningful common variance between participants' Q-sorts. However, this does not necessarily mean that other factors fail to capture any meaningful common variance, particularly given that the first factor explains a large amount of the common variance between participants' Q-sorts.

		Random Data Eigenvalues	
Factor	Actual EV (from PCA)	Mean EV for 1000 data sets	95th EV Percentile for 1000 data sets
1	12.5958	2.57087	2.801483
2	2.0861	2.322479	2.499609
3	1.4984	2.142401	2.283577
4	1.3038	1.989107	2.113388
5	1.2553	1.861115	1.968539
6	1.1063	1.740845	1.843719
7	1.09	1.629005	1.725595
8	0.9791	1.525142	1.606233
9	0.8532	1.426957	1.50639

Table 6: Parallel Analysis table comparing eigenvalues from Principal Component Analysis of the data with eigenvalues generated from a randomised data set that contains similar number of items (statements) and variables (participants)

Factor Loadings: At least 2 Q-sorts correlate significantly with each factor at *p* <.01

One important principle outlined in both Brown (1980) and Watts & Stenner (2012, p.107-108) is that factors should have at least two Q-sorts that correlate relatively strongly with the factor (which is referred to as 'loading' onto a factor), whilst not correlating strongly with other factors. The criteria for significant factor loading (at $p < .01$) is calculated with the following equation:

Significant factor loading = 2.58 x $(1 \div \sqrt{\text{number of items in Q set}})$

$= 2.58 \times \left(1 \div \sqrt{69}\right)$

$= 2.58 \times (1 \div 8.31 \ldots)$

$= 2.58 \times 0.12 \ldots$

= 0.310595501…

= 0.31

Under the criterion that each factor requires at least two Q-sorts that load significantly at $p < .01$, a three-factor solution would be appropriate (although factors 2 and 3 only have two Q sorts that load onto each, which makes them borderline cases)

Magic Number 7: Start with extracting 7 Factors

In the absence of any compelling reasons to favour a different number of factors, Brown (1980) puts forward an argument for the extraction of seven factors as a ballpark figure from which to start analysis. However, when I tried this (using Brown's Centroid algorithm in PQMethod for extraction), factors 3 and 5 in the unrotated matrix had no Q-sorts that loaded onto them but not also onto other factors (i.e. no unconfounded loadings). This confused me; whilst I found evidence that other researchers in Q methodology do not consider it to be a problem when this happens and simply ignore the 'empty' factors (e.g. Damio, 2018), it was surprising that a factor could be created that contained no variance. I therefore emailed the Q-methodology email forum (**Supplementary Appendix D1.2**) to enquire about this. Peter Schmolck's response reassured me that the empty factors were probably not problematic. However, the fact that two factors were empty meant that the extraction of seven factors in the unrotated matrix would eventually result in the extraction of five meaningful factors (when using Brown's Centroid algorithm, or potentially seven factors when using Horst's Centroid algorithm).

Humphrey's Rule: The cross-product of the two highest loading Q-sorts on a factor should exceed twice the standard error

Another criteria also emphasises the importance of having Q-sorts that correlate highly with the factor is called 'Humphrey's Rule'. Applying this rule, Brown (1980) states that a factor should be considered qualitatively significant '*if the cross-product of its two highest loadings (ignoring the sign) exceeds twice the standard error*' (p.223). The calculation for this is below:

Standard error for study = $1 \div \left(\sqrt{number of\ items\ in\ Q\ set}\right)$

= $1 \div \left(\sqrt{69}\right)$

= $1 \div 8.31\ldots$

= 0.12…

Twice the standard error = 0.24

Under Humphrey's rule only one factor should be extracted, since there is only one factor for which the cross-product of the loading of the two most strongly correlated Q-sorts exceeds 0.24 (Factor 1: 0.8146 x 0.8215 = 0.6692, Factor 2: 0.4789 x 0.4444 = 0.2128, Factor 3: 0.3792 x 0.3488 = 0.1323).

Table 7 summarises the implications for each criterion regarding how many factors to extract:

Criteria	Description	No. Factors to Extract
Kaiser-Guttman	All unrotated factors should have eigenvalues greater than 1	7
Scree Test	Point of inflection on the Scree Plot	2 or 3
Parallel Analysis	Less than 5% likelihood of eigenvalues being generated by chance	1
Factor Loadings	At least 2 Q-sorts correlate significantly with each factor at p <.01	3
Magic Number 7	Start with extracting 7 Factors	7
Humphrey's Rule	The cross-product of the two highest loading Q-sorts on a factor exceeds twice the standard error	1

Table 7: Implications for how many factors to extract

6.2.2 Rotating and comparing different Factor Solutions

Working through each criteria to obtain **Table 7**, I concluded that they did not lead me to an unambiguously preferable factor solution (though the criteria suggested that a solution with 1, 2, 3, or 7 factors might be preferable). I therefore decided not to predetermine the number of factors that should be extracted prior to factor rotation. Factor rotation is a statistically-sound data analysis technique in which the statistical perspective from which the Q-sorts are viewed is adjusted in order to help highlight the variance that is shared by particular clusters of Q-sorts and to allow the final factor dimensions to best capture this shared variance. For the current data set, I experimented with a wide range of factor rotations in order to seek out what I felt to be the most satisfying solution.

PQMethod offers two forms of rotation: manual rotation (using the PQROT programme) and varimax rotation. Whilst manual rotation leaves judgements to the experimenter and can be used to facilitate high factor loadings for particular groupings of Q-sorts, varimax rotation involves statistical adjustment that maximises the amount of common variance that can be accounted for by the extracted factors. Watts & Stenner (2012, p.122-127) present a strong case for using varimax and manual rotations as complementary approaches, so this is what I did in the current study; all solutions that I explored involved varimax rotation, but for factor extractions that looked promising I also experimented with additional manual rotation in order to maximise the factor loadings of key Q-sorts for each factor (and to minimise any confounding results where possible, in which a high-loading Q-sort significantly correlates with two or more factors).

One important consideration that was strongly emphasised by my university tutor (and also mentioned by Watts & Stenner, 2012, p.141 & p.212) was the correlations between factor scores. These are presented within the final PQMethod output for each factor solution. Ideally the correlation values between factor scores should be lower than the value for significant factor loading (which is used to judge which Q-sorts significantly correlate with a factor), which for the current data set is 0.31. Unfortunately, however, whenever there were at least two factors extracted, the correlation between the factors was always greater than 0.31. Qualitatively, this suggests that all factors identified after the first factor share a relative amount of the same perspective as this first factor. Quantitatively, this could potentially point towards a single-factor solution, but my qualitative exploration of solutions

with more than 1 factor suggested that additional factors were indeed able to present valuable new perspectives that were not fully captured within a single-factor solution. I therefore did not adopt a single-factor solution, but instead treated the correlations between factor scores as one criterion for the final factor solution amongst others, with lower correlations being preferable to higher correlation values.

I decided to experiment with extracting and rotating a range of solutions to allow me to work out which was most convincing. The variables that I explored were: Brown vs. Horst 5.5 Centroid algorithms, number of factors (from 1 to 7), varimax vs. varimax & manual rotation, and using a factor loading significance value of 0.31 vs. using a higher factor loading significance value (Watts & Stenner [2012] argue that it is legitimate to impose stricter criteria for factor loading than the minimum value required for significance, '*provided the chosen criteria are applies consistently across all study factors*' [p.131]). I evaluated the effectiveness of each solution on the basis of: whether each factor had at least 2 Q-sorts significantly loading onto it, whether the correlations between factor scores were relatively low (which I counted as less than 0.50), and whether the factors generated appeared qualitatively distinct from each other (I did not engage in a detailed analysis of each factor solution at this stage, but did take a look at the Z-score arrangement for each generated factor). Solutions where the communality estimates did not converge after more than 30 iterations were also avoided.

I have summarised the main variables that I explored in **Table 8** (Brown Centroid) and **Table 9** (Horst 5.5). **Supplementary Appendix D1.3** contains the table data that I collated to show me which Q-sorts loaded onto each factor under each rotated factor solution and also shows the factor loadings for each Q sort for each solution plus the correlations between factor scores. I started compiling **Tables 8** and **9** when I noticed that there appeared to be some trends where when particular Q-sorts loaded onto the same factor, the factor became particularly qualitatively distinctive or interesting. This table was in no way definitive in my analysis, but functioned as another piece of information to consider when exploring appropriate factor solutions, since it helped me to notice when the loading of particular Q-sorts onto a factor tended to correlate with factor descriptions that embodied a particular 'feel'.

Factor solution (Brown)	Limitations	Strengths	Differences between factors
7 Varimax	Lots of confounded sorts between factors 1 and 7, only 1,2,6,7 load, only 1 unconfounded sort on Factor 1	Correlations ok except for between factors 3 and 4 (0.50) Roughly 4 distinct positions	1: concerned, 2: fear, 3: social/adapt, 4: supported and nature connection
7 Varimax at .40	High correlations, only 1 loading on Factor 4 (3)	Fewer confounded Q sorts, factors 4 and 5 nice	1: concerned/supported 2: Fear/anger, 3: Anger/hope/adapt, 4: Guilt, grief, DA, 5: Care and connection
7 Varimax + manual onto 6 and 7	Lots of high correlations between factors (almost all), 2 and 3 a bit similar	Quite nice factor 4	1: Supported, engaged, concerned; 2: fear/anger/grief, 3: similar to 2, 4: Concerned for others, connected, spiritual
7 Varimax + manual at .40	3 factors, high correlations (0.53, 0.54, 0.63)	Bit of a different factor 1	1: Concerned, angry, nature connection, supported, 2: fear/anger, 3: Mostly Angry
6 Varimax	Lots of confounded sorts between factors 1 and 6, only 1, 2, and 6 load, only 1 unconfounded sort on Factor 1, differences between factors not obvious	Correlations between factors low for factors 1 and 2, 0.41/0.42 for factor 3	1: concerned, 2 fear/anger, 3: social, supported, nature connection
6 Varimax + manual rotation onto factor 6	Correlations between factors 1 and 3 a bit high (0.56)	3 factors with distinct loadings	1: Concerned, quite engaged; 2: fear/anger, but also some systemic perspective in there; 3: supported and hopeful

6 Varimax + manual rotation onto factor 4	Correlations between factors 1 and 3 high (0.60), but could be reduced – 14, 28 & 30 add little to Factor 4	3 factors with distinct loadings, could load more if raised threshold to .40	1: Supported, pro-protest, concerned (DA), 2: Fear & Anger, 3: Angry, political, nature connection
5 Varimax	Only factors 1 and 2 load (but 4 could with rotation)	More Q sorts loading onto factor 1, ok-ish correlations between factors 1 and 2 (0.49)	1: caring about the world, but not personally threatened (concerned?), 2: fear/anger
5Varimax +manual	Correlations between factors high for factor 3 (0.61, 0.51)	3 factors with distinct loadings, quite interestingly (meaningfully) distinct factors	1: Nature and person connection, 2: anger & fear, 3: More political?
4 Varimax	Only factors 1, 2, and 4 load (Factor 1 only has one Q sort)	Good Correlations (none above 0.43), Factor 1 could have some more sorts with manual rotation	1: concerned, 2: fear/anger, 3: problem-focused but not emotional. Older.
4Varimax +manual	Factor 1 loads a bit highly with factors 2 and 3 (0.52, 0.54)	Similar-ish factors to 4 varimax?	1: Concerned and supported, 2: anger and fear, 3: political, less emotional? Some cynicism?
3 Varimax	Only factors 1 and 2 load	Lots of loadings for each factor, correlations between factors 0.42	1: Not the same as 5 factor solution 1, nor 7,6,4 factor solution 1. Close-ish to factor 3. 2: fear/anger
2 Varimax	Only factors 1 and 2 load	Lots of loadings for each factor, correlations between factors 0.43	Same as with 3 factors

Table 8: Exploration of Factor Rotation solutions using the Brown Centroid algorithm, and varimax/varimax & manual rotation of factors

Factor solution (Horst)	Limitations	Strengths	Differences between factors
7 Varimax .31	Communality estimates did not converge after 30 iterations, high correlations on 3 and 5 (0.55, 0.51), only 1 factor loading on 3, 4, 5	7 Factors	1: Concerned, supported, 2: Fear/anger, 3: Active, political focus, 4: supported, social influence, 5: Eco and world focus, 6: Eco, focus on impact, 7: Angry, want to adapt
7 Varimax .42	Communality estimates did not converge after 30 iterations, some high correlations (0.67, 0.68), only 1 factor loading on (4), 5	7 factors	1: supported, concerned, 2: fear/anger, 3: political/philosophical, 4: protest/angry/adapt 5: Eco and world focus, 6: Angry, supported, eco, 7: Angry, want to adapt
7 Varimax .31 plus manual rotation	Communality estimates did not converge after 30 iterations, high correlations (0.62,0.59), only 1 factor loading for 6	7 factors	1: concerned, supported, 2: Fear/anger, 3: anger, social, life changes, 4: Anger, guilt, adapt, 5: Eco and world focus, 6: nature connection, concerned about world, 7: Angry, want to adapt
6 Varimax at .31	Communality estimates did not converge after 30 iterations, factors 1, 3 and 4 only have 1 sort each, factor 6 has no unconfounded sorts	Good correlations (0.42, 0.43) [probably due to lack of q sorts loading]	1: thoughtful, concerned about others, 2: anger, fear, 3: Supported, concerned, disconnected from modern world, 4: Angry, concerned due to collapse, 5: nature connection, supported

6 Varimax.42	Communality estimates did not converge after 30 iterations, High correlations (0.62, 0.63), only 1 q sort for factor 6	6 factors	1: quite a philosophical/thoughtful perspective, 2: fear/anger, 3: concerned, supported, 4: angry, eco, adapt, 5: concerned, good citizen, 6: eco/nature connection
5 Varimax .31	No factor 2, factors 3 and 4 1 sort each	Correlations OK 0.47	1: Nature Connection, supported, 2: feel pressure of cc, supported (just Q8), 3: see problems in world (Just Q 28) 4: Fear/anger
5 Varimax .42	High correlations (0.62, 0.70)	5 factors, each with at least 2 loadings, quite interesting factors	1: Supported, nature connection, 2: quite a political perspective, 3: concerned, part of self-identity, 4: Angry, moral, 5: Fear/anger (normally factor 2)
5 Varimax +manual .31	High correlations (0.64, 0.67)	5 Factors	1: Nature Connection, supported, 2: Quite political, 3: Concerned, socially involved, 4: Angry, moral, 5: Fear/anger (normally F2)
4 Varimax .31	Communality estimates did not converge after 30 iterations, only 2 factors	Correlations OK 0.43	1: Concerned/anxious, 2: Hopeful
4 Varimax .42	Communality estimates did not converge after 30 iterations, high correlations (0.68)	New patterns not seen before	1: Philosophical and good citizen, 2: anger, fear, grief, 3: angry, hopeful, looking for solutions, 4: supported, angry, hopeful
4 Varimax +manual .31	Communality estimates did not converge after 30 iterations, high correlations (0.56)	Some interesting new patterns	1: Philosophical and good citizen, 2: Essentially factor 3 from 3 varimax, 3:

			Angry, hopeful, looking for solutions, 4: Quite a moral focus
3 Varimax .31	Only 2 Q sorts on Factor 3	Good Correlations (0.37/0.38), nice factors	1: Supported, concerned, nature connection; 2: fear/anger, 3: Frustrated at the world inherited
3 Varimax 0.42	High Correlations (0.62,0.63)	3 distinct factors	1: Supported, concerned, 2: Anger, grief, fear, 3: Angry, moral, adapt
3 Varimax .31 + Manual 1	High correlations (0.54, 0.55), fear lower on 2	Added 7 and 29 to factors 2 and 3 respectively	1: Supported, concerned, nature connection; 2: anger/fear, 3: Still frustrated at world
3 Varimax .31 + Manual 2	High correlations between 1 and 3 (0.54), losing 14 loses 3 variance from 1 (although adds 1 to 2)	Added 29 to 3 removed 14 from 1	1: Pretty similar to varimax, just slightly lower z scores; 2: fear/anger, 3: fairly similar to varimax
3 Varimax .31 + Manual 3	High correlations between 1 and 3 (0.54)	Added 29 to 3 removed 14 and 17 from 1	1: Similar, nature connection a bit higher; 2: fear/anger; 3: pretty similar
3 Varimax .31 + Manual 4	High correlations between 1 and 3 (0.56)	Added 29 to 3 removed 14, 17, and 30 from 1	1: Focus on feeling supported, connected, then angry; 2: fear/anger, 3: as above
3 Varimax .31 + Manual 5	High correlations between 1 and 3 (0.55)	Added 29 to 3, kept all else the same	1: Supported, concerned, nature connection; 2: fear/anger, 3: Frustrated at the world inherited
2 Varimax .31	Only 2 factors	Correlations OK 0.43	1: Supported, concerned, 2: fear/anger

Table 9: Exploration of Factor Rotation solutions using the Horst 5.5 Centroid algorithm, and varimax/varimax & manual rotation of factors

6.2.3 Selecting a Factor Solution

After extensive exploration of the various potential solutions, I concluded the following:

- Solutions using the Horst 5.5 Centroid algorithm were more convincing than solutions using the Brown Centroid algorithm.
- Solutions using Q-sort factor loading significance values of higher than the minimum of 0.31 often had high correlations between factors (>0.50) and it would be desirable to have lower correlations if possible, even if these are higher than 0.31.

Once solutions where less than 2 Q-sorts significantly loaded onto each factor or where the 'communality estimates did not converge after 30 iterations' (i.e. the algorithm could not produce a statistically legitimate solution) were removed, two potential solutions remained: a two-factor solution or a three-factor solution using Horst extraction and Varimax rotation. Qualitative analysis of the solutions suggested (at least prima facie) that the first two factors had similar arrangements of key statements for each solution (despite the two-factor solution having more Q-sorts loading onto factor 2). However, factor 3 in the three-factor solution appeared qualitatively distinct from factors 1 and 2, and the correlations between each factor score were lower than for the two-factor solution (for the three-factor solution there was 0.3663 correlation between factors 1 and 2, 0.3878 between factors 1 and 3 and 0.3709 between factors 2 and 3, whilst the 2 factor solution had 0.4278 correlation between factors 1 and 2). I therefore concluded that a three-factor solution was preferable.

Once settling upon a three-factor solution, I experimented with many different forms of manual rotation of the solution to see whether I could increase the number of Q-sorts loading onto each of the factors. Five of these iterations are summarised in **Table 9** and further details including factor loadings and communalities are provided in **Supplementary Appendix D1.3**. Unfortunately, none of the manual rotations that I tried produced a result that was a clear improvement upon the varimax rotation; in all cases, using manual rotation to load additional Q-sorts onto factor 3 (then flagging these cases as defining sorts) resulted in the communalities between factors substantially increasing (Additionally, from a qualitative perspective, using manual rotation to allow Q-sort 29 to load onto factor 3 [without confounding on factor 1] did not appear to substantially change the nature of factor 3). I therefore settled on a final 3-factor solution using Horst extraction, varimax rotation, and factor significance of 0.31.

6.2.4 Key Features of the Factor Solution

Once I had selected what I felt to be the best solution available, I chose defining sorts for each factor. My criteria was that the sort must have a loading value of greater than 0.31 on one factor, but less than this on all others. I then used the PQMethod output to explore whether factors based upon these defining sorts could provide an acceptable solution according to key criteria commonly used within Q methodological analysis. **Supplementary Appendix D1.4** contains the initial raw output for the overall solution and **Table 10** summarises the defining sorts for each factor, factor variance, and factor correlations. The final rotated three factor solution accounted for 50% of the total study variance. Watts and Stenner (2012) state that *'anything in the region of 35-40% or above would ordinarily be considered a sound solution'* (p.105), so the amount of variance explained by this solution is more than satisfactory. As noted in **Section 6.2.3**, the correlations between factor scores were greater than the factor significance of 0.31 (the correlation between factors 1 and 2 was 0.3663, the correlation between factors 1 and 3 was 0.3878 and the correlation between factors 2 and 3 was 0.3709.), but the chosen solution had the lowest correlations between factor scores out of all solutions I explored, and I have incorporated considerations of correlations between factor scores into my qualitative analysis of the factors.

Factor No.	Q sorts loading	Total Q sorts	Cumulative Q sorts	Variance explained	Factor Correlation with Factor 1	Factor Correlation with Factor 2	Factor Correlation with Factor 3
1	6,8,**11**,**12**, **13**,14,15, **17**,24,30	10	10	22%	-	0.3663	0.3878
2	9,**10**,**20**	3	13	17%	0.3663	-	0.3709
3	22,28	2	15	11%	0.3878	0.3709	-
Confounded	**1**,2,3,4, 5,**7**,16,**18**, 19,21,23,25, **26**,**27**,**29**	15	30	-	-	-	-
Non-loading	None	0	-	-	-	-	-

Table 10: Q-sorts that load significantly onto each factor (sorts that have a factor loading of greater than 0.60 are presented in **bold** as per Watts & Stenner 2012, p.130), variance explained by each factor, and factor correlations.

6.3.1 Arrangement of Data for Qualitative Analysis: Creation of Factor Arrays

PQMethod generated z-scores for each statement by combining and assigning relative weight to the defining Q-sorts for each factor. These are a standardised value for each statement (for each factor) that indicates the strength of relative agreement or disagreement displayed towards the statement in each factor. Tables of the z-scores are contained in **Supplementary Appendix D2.1** (Note that PQMethod only allows statements to contain 50 characters, so I had to shorten many of my statements during the analysis phase. The statements that appear in the output within the appendix are intended as summarisations of the statements that were used in the Q-sorting process, but they reflect my own intentions for how such statements would be interpreted, which in many cases will be subtly different from how participants will have interpreted the statements).

Watts & Stenner (2012, p.140-141) note that it is common practice within Q methodological studies to convert the z-score table for each statement into factors arrays (indeed, PQMethod's output provides information about each statement's column within the array for each factor). A factor array consists of the viewpoint of a particular factor, arranged into columns so that it resembles the original Q-sort arrangement. This technically results in a loss of information, since it involves converting the continuous data of the z-scores into ordinal data indicating which Q-sort column each statement would be located within. However, presenting the data visually within a Q-sort grid can help support the qualitative interpretation of each factor by scaffolding researchers to take a holistic overview of the relative agreement and disagreement expressed towards each statement.

Tables from the PQMethod output presenting the column position of each statement for each factor are in **Supplementary Appendix D2.2**. **Figures 23-25** below present Q-sort diagrams of the calculated factor arrays, which have been colour-coded to show the relative z-score (within a 0.25 range) within each Q-sort column.

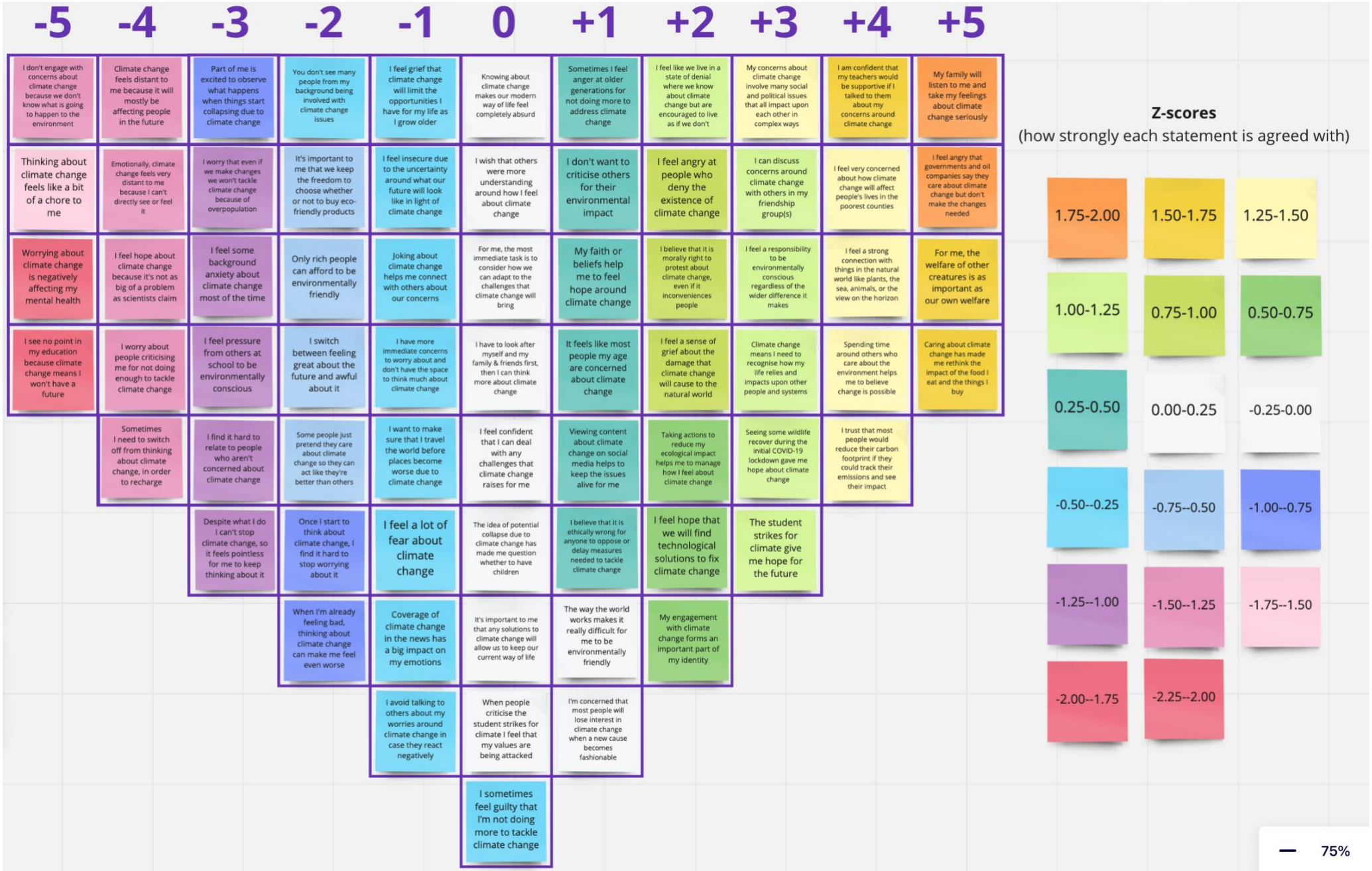


Figure 23: Factor Array for Factor 1 with statements colour coded to indicate their relative z-score

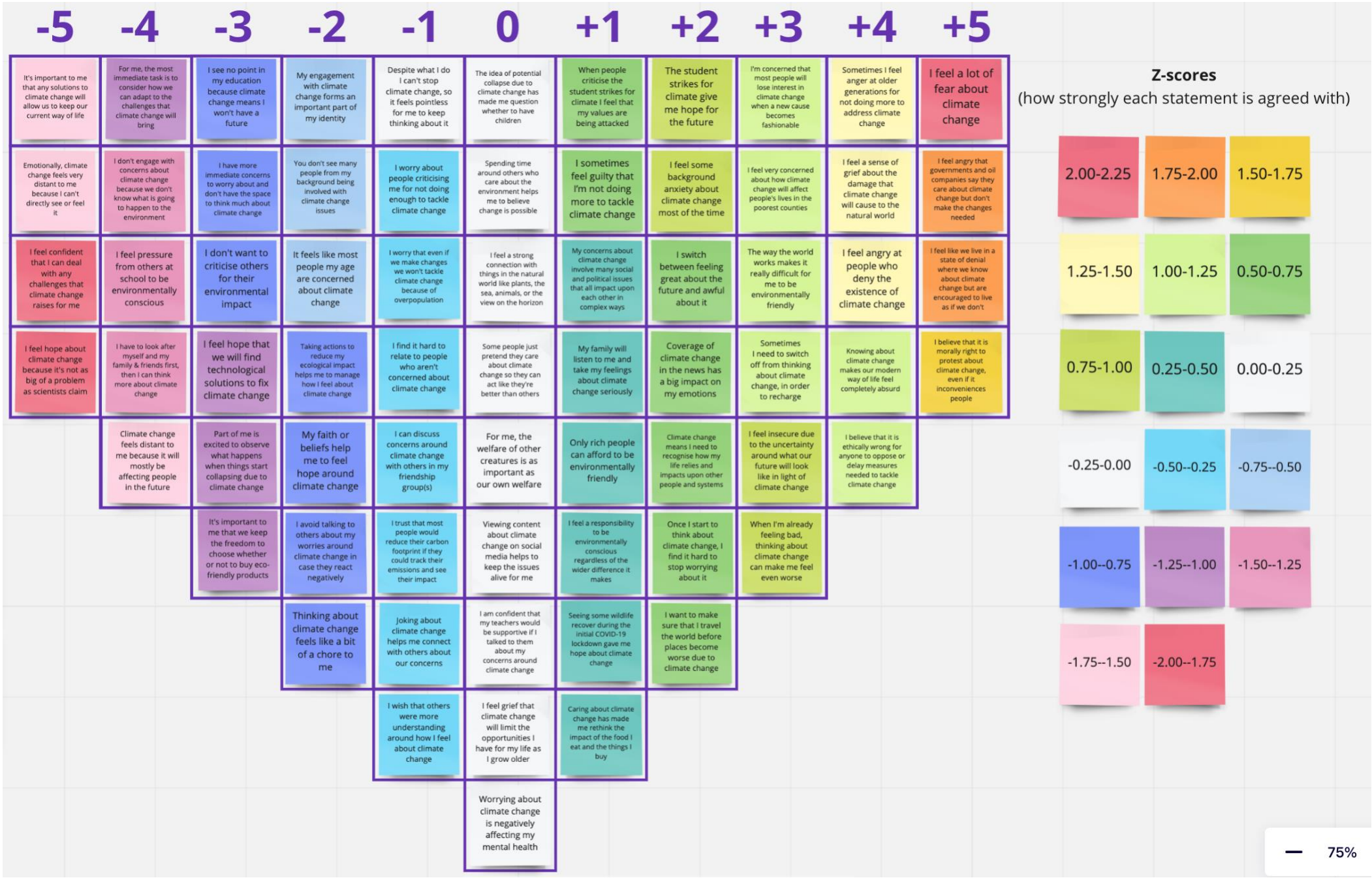


Figure 24: Factor Array for Factor 2 with statements colour coded to indicate their relative z-score

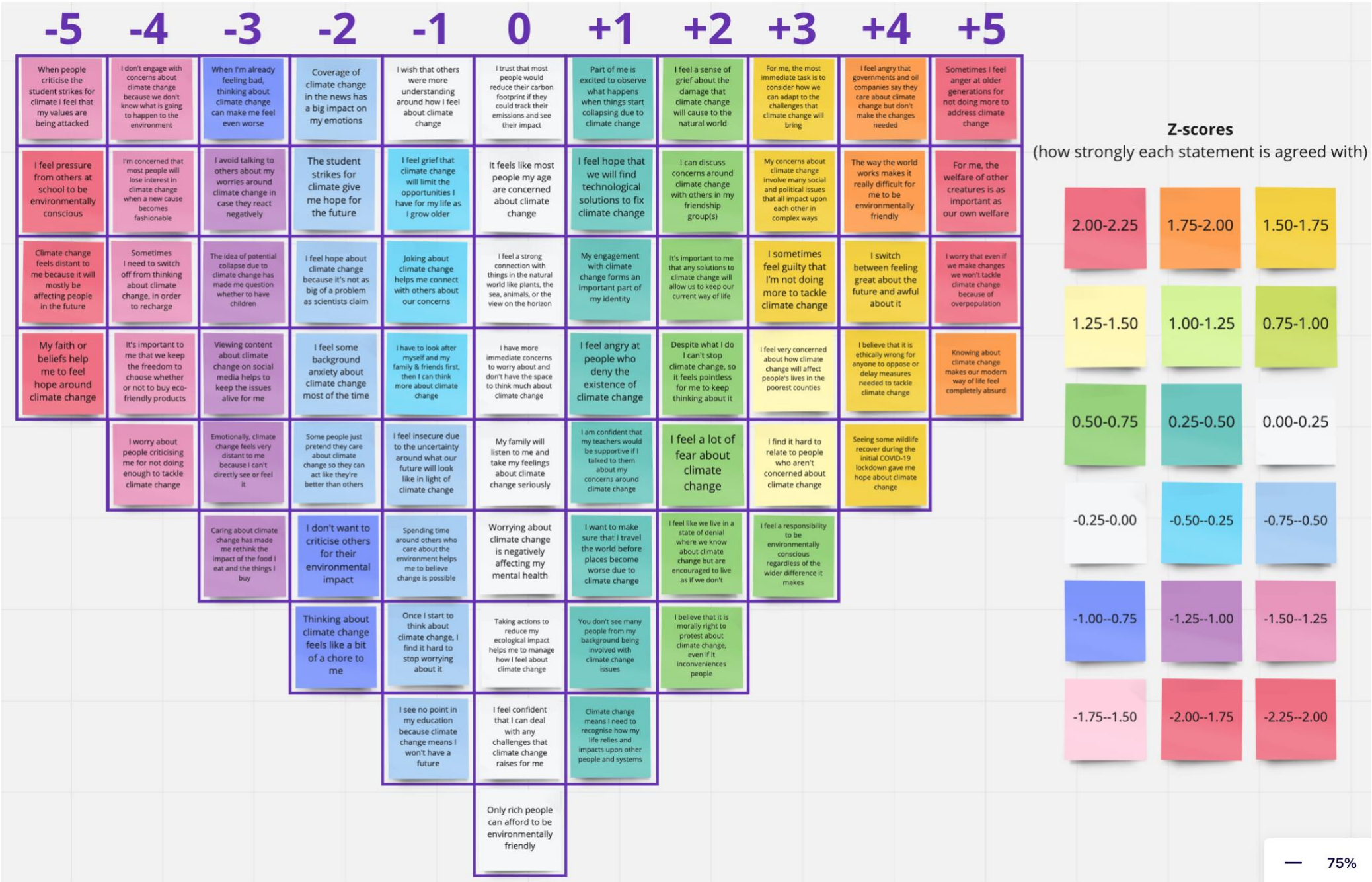


Figure 25: Factor Array for Factor 3 with statements colour coded to indicate their relative z-score

6.3.2 Crib Sheets

In addition to the creation of factor arrays to scaffold holistic interpretation of factors, Watts & Stenner (2012) put forward a strong case for the construction of crib sheets that help to highlight the difference between the views expressed within each factor (p.150-160). They argue that this facilitates the application of abductive logic (see **Section 6.3.3** for an explanation of abduction) to explore why a statement may have a particular relative placement within a factor array. To construct the crib sheets, they recommend that researchers list the items ranked at the extremes of each factor (for my Q-sort grid this is +5 and -5), and the items ranked higher and lower in each factor array in comparison with the other factor arrays. The PQMethod output used to construct the crib sheets is in **Supplementary Appendix D2.3.**

One minor complication of choosing a three-factor solution was that each statement would automatically be ranked highest in one factor array, in the middle for another, and lowest in the third array. Whilst this was not inherently a problem, it did mean that there was some risk of over-interpreting the position of a statement as 'highest' or 'lowest' when the relative placement could just be an artefact of the three-factor structure. To help account for this, I therefore decided to include z-scores in my crib sheets, plus considerations of whether the z-score for each statement's placement within a factor was different to the other factors at a statistically significant level compared with each of the other factors. I also distinguished between significance values of $p < .01$ and $p < .05$ (in terms of distinguishing how significant a higher or lower placement of a statement in one sheet was, when compared with the others) to help further refine the information provided in the crib sheets and support the analysis process. In cases where a statement was located on the same or similar columns in all three factor arrays, I considered whether it was a consensus statement (at $p < .01$ or $p < .05$) according to the z-scores. Statements that I decided not to use in my final summary for each factor are struck through. To support my analysis I used the following colour-coded key for my statements (constructed on the basis of the z-scores for each statement within each factor):

Distinguishing Statements at p <.01 (for both factors)
Distinguishing Statements at p <.05 (for both factors)
Only significantly different from one factor (p < .01 or p < .05) – maybe use, but consider context
Consensus Statements at p <.05 – probably don't use, but consider context
Consensus statement at p <.01 – don't use
Not the lowest or highest loading amongst the 3 factors (according to z-scores) – probably don't use

6.3.2.1 Crib Sheet for Factor 1

Items Ranked at +5

No.	Statement	Z-score	Difference * = sig p < .05
60	My family will listen to me and take my feelings about climate change seriously	1.788	*F2(1): 1.34 *F3(0): 1.65
~~6~~	~~I feel angry that governments and oil companies say they care about climate change but don't make the changes needed~~	~~1.786~~	~~F2(5): -0.09 F3(4): 0.13~~
43	For me, the welfare of other creatures is as important as our own welfare	1.690	*F2(0): -1.71 F3(5): 0.27
22	Caring about climate change has made me rethink the impact of the food I eat and the things I buy	1.576	*F2(1): 1.31 *F3(-3): 2.79

Items ranked higher in Factor 1 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
14	My faith or beliefs help me to feel hope around climate change	1	-2	-5	0.37	*F2: 1.19 *F3: 2.59
15	I feel hope that we will find technological solutions to fix climate change	2	-3	1	0.59	*F2: 1.60 F3: 0.15
21	Taking actions to reduce my ecological impact helps me to manage how I feel about climate change	2	-2	0	0.71	*F2: 1.49 F3: 0.71
23	I feel a responsibility to be environmentally conscious regardless of the wider difference it makes	3	1	3	1.11	F2: 0.72 F3: 0.36
~~24~~	~~I feel very concerned about how climate change will affect people's lives in the poorest counties~~	~~4~~	~~3~~	~~3~~	~~1.39~~	~~F2: 0.29 F3: 0.43~~
25	I feel confident that I can deal with any challenges that climate change raises for me	0	-5	0	-0.04	*F2: 1.89 F3: 0.01

26	I don't want to criticise others for their environmental impact	1	-3	-2	0.39	*F2: 1.33 *F3: 1.16
29	My concerns about climate change involve many social and political issues that all impact upon each other in complex ways	3	0	3	1.25	F2: 0.77 F3: 0.16
31	I trust that most people would reduce their carbon footprint if they could track their emissions and see their impact	4	-1	0	1.27	*F2: 1.72 *F3: 1.04
~~32~~	~~Climate change feels distant to me because it will mostly be affecting people in the future~~	~~-4~~	~~-4~~	~~-5~~	~~-1.25~~	~~F2: 0.26~~ ~~F3: 0.52~~
37	I have to look after myself and my family & friends first, then I can think more about climate change	0	-4	-1	0.04	*F2: 1.54 F3: 0.48
39	Climate change means I need to recognise how my life relies and impacts upon other people and systems	3	2	1	1.07	F2: 0.41 F3: 0.81
~~41~~	~~The idea of potential collapse due to climate change has made me question whether to have children~~	~~0~~	~~0~~	~~-3~~	~~-0.05~~	~~F2: -0.13~~ ~~F3: 0.98~~
44	I feel a strong connection with things in the natural world like plants, the sea, animals, or the view on the horizon	4	0	0	1.30	*F2: 1.29 *F3: 1.19
45	It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products	-2	-3	-4	-0.53	F2: 0.53 F3: 0.91
46	The student strikes for climate give me hope for the future	3	2	-2	1.04	F2: 0.26 *F3: 1.62
49	My engagement with climate change forms an important part of my identity	2	-2	1	0.53	*F2: 1.21 F3: 0.08
~~50~~	~~I avoid talking to others about my worries around climate change in case they react negatively~~	~~-1~~	~~-2~~	~~-3~~	~~-0.45~~	~~F2: 0.39~~ ~~F3: 0.56~~
53	I can discuss concerns around climate change with others in my friendship group(s)	3	-1	2	1.23	*F2: 1.58 F3: 0.60
54	It feels like most people my age are concerned about climate change	1	-2	0	0.33	*F2: 1.07 F3: 0.12
56	Viewing content about climate change on social media helps to keep the issues alive for me	1	0	-3	0.29	F2: 0.32 *F3: 1.43
57	Spending time around others who care about the environment helps me to believe change is possible	4	0	-1	1.29	*F2: 1.26 *F3: 1.80
~~58~~	~~I feel pressure from others at school to be environmentally conscious~~	~~-3~~	~~-4~~	~~-5~~	~~-1.11~~	~~F2: 0.22~~ ~~F3: 0.66~~
61	I am confident that my teachers would be supportive if I talked to them about my concerns around climate change	4	0	1	1.53	*F2: 1.58 *F3: 1.15
~~64~~	~~Joking about climate change helps me connect with others about our concerns~~	~~-1~~	~~-1~~	~~-1~~	~~-0.31~~	~~F2: 0.17~~ ~~F3: 0.06~~
~~68~~	~~I wish that others were more understanding around how I feel about climate change~~	~~0~~	~~-1~~	~~-1~~	~~0.07~~	~~F2: 0.57~~ ~~F3: 0.26~~

Items ranked lower in Factor 1 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
1	Once I start to think about climate change, I find it hard to stop worrying about it	-2	2	-1	-0.76	*F2: -1.39 F3: -0.24
2	I feel some background anxiety about climate change most of the time	-3	2	-2	-1.06	*F2: -1.82 F3: -0.43
3	I sometimes feel guilty that I'm not doing more to tackle climate change	0	1	3	-0.25	F2: -0.76 *F3: -1.28
~~4~~	~~I feel a sense of grief about the damage that climate change will cause to the natural world~~	~~2~~	~~4~~	~~2~~	~~0.84~~	~~F2: -0.60 F3: 0.21~~
5	Sometimes I feel anger at older generations for not doing more to address climate change	1	4	5	0.41	*F2: -1.05 *F3: -1.54
9	I switch between feeling great about the future and awful about it	-2	2	4	-0.62	*F2: -1.32 *F3: -2.07
10	I feel a lot of fear about climate change	-1	5	2	-0.43	*F2: -2.45 *F3: -0.98
~~19~~	~~Part of me is excited to observe what happens when things start collapsing due to climate change~~	~~-3~~	~~-3~~	~~1~~	~~-0.98~~	~~F2: 0.06 F3: -1.45~~
~~20~~	~~I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't~~	~~2~~	~~5~~	~~2~~	~~1.01~~	~~F2: -0.82 F3: 0.47~~
27	Sometimes I need to switch off from thinking about climate change, in order to recharge	-4	3	-4	-1.45	*F2: -2.48 F3: -0.12
33	Despite what I do I can't stop climate change, so it feels pointless for me to keep thinking about it	-3	-1	2	-1.22	*F2: -1.04 *F3: -1.78
~~34~~	~~I worry about people criticising me for not doing enough to tackle climate change~~	~~-4~~	~~-1~~	~~-4~~	~~-1.42~~	~~*F2: -1.17 F3: 0.02~~
35	The way the world works makes it really difficult for me to be environmentally friendly	1	3	4	0.22	*F2: -0.85 *F3: -1.30
36	I want to make sure that I travel the world before places become worse due to climate change	-1	2	1	-0.40	*F2: -1.03 F3: -0.73
38	Knowing about climate change makes our modern way of life feel completely absurd	0	4	5	0.15	*F2: -1.09 *F3: -1.55
~~42~~	~~I feel grief that climate change will limit the opportunities I have for my life as I grow older~~	~~-1~~	~~0~~	~~-1~~	~~-0.29~~	~~F2: -0.24 F3: -0.01~~
48	Only rich people can afford to be environmentally friendly	-2	1	0	-0.61	*F2: -1.01 F3: -0.54
51	I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change	1	4	4	0.26	*F2: -0.96 *F3: -1.07

~~52~~	~~I believe that it is morally right to protest about climate change, even if it inconveniences people~~	~~2~~	~~5~~	~~2~~	~~0.86~~	~~F2: -0.71 F3: 0.35~~
59	You don't see many people from my background being involved with climate change issues	-2	-2	1	-0.47	F2: 0.23 F3 -0.77
62	I find it hard to relate to people who aren't concerned about climate change	-3	-1	3	-1.14	F2: 0.80 *F3: -2.02
63	Some people just pretend they care about climate change so they can act like they're better than others	-2	0	-2	-0.68	F2: -0.67 F3: -0.01
66	I worry that even if we make changes we won't tackle global warming because of overpopulation	-3	-1	5	-1.02	F2: -0.75 *F3: -2.86
~~69~~	~~I feel insecure due to the uncertainty around what our future will look like in light of climate change~~	~~-1~~	~~3~~	~~-1~~	~~-0.30~~	~~*F2: -1.27 F3: 0.14~~

Items Ranked at -5

No.	Statement	Z-score	Difference * = sig p < .05
40	I see no point in my education because climate change means I won't have a future	-2.03	*F2(-3): -1.17 *F3(-1): -1.49
13	Worrying about climate change is negatively affecting my mental health	-1.98	*F2(0): -1.81 *F3(0): -2.03
11	Thinking about climate change feels like a bit of a chore to me	-1.71	*F2(-2): -0.86 *F3(-2): -0.89
~~30~~	~~I don't engage with concerns about climate change because we don't know what is going to happen to the environment~~	~~-1.48~~	~~F2(-4): -0.17 F3(-4): -0.23~~

6.3.2.2 Crib Sheet for Factor 2

Items Ranked at +5

No.	Statement	Z-score	Difference * = sig p < .05
10	I feel a lot of fear about climate change	2.02	*F1(-1): 2.45 *F3(2): 1.47
~~6~~	~~I feel angry that governments and oil companies say they care about climate change but don't make the changes needed~~	~~1.88~~	~~F1(5): 0.09 F3(4): -0.22~~
20	I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't	1.83	+F1(2): 0.82 +F3(2): 1.29
52	I believe that it is morally right to protest about climate change, even if it inconveniences people	1.58	+F1(2): 0.71 +F3(2): 1.06

Items ranked higher in Factor 2 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
1	Once I start to think about climate change, I find it hard to stop worrying about it	-2	2	-1	0.63	*F1: 1.39 *F3: 1.14
2	I feel some background anxiety about climate change most of the time	-3	2	-2	0.76	*F1: 1.82 *F3: 1.39
7	I feel angry at people who deny the existence of climate change	2	4	1	1.39	F1: 0.40 *F3: 0.95
11	Thinking about climate change feels like a bit of a chore to me	-5	-2	-2	-0.85	F1: 0.86 F3: -0.03
12	When I'm already feeling bad, thinking about climate change can make me feel even worse	-2	3	-3	0.86	*F1: 1.76 *F3: 1.82
13	Worrying about climate change is negatively affecting my mental health	-5	0	0	-0.17	F1: 1.81 F3: -0.21
27	Sometimes I need to switch off from thinking about climate change, in order to recharge	-4	3	-4	1.03	*F1: 2.48 *F3: 2.36
34	I worry about people criticising me for not doing enough to tackle climate change	-4	-1	-4	-0.25	*F1: 1.17 *F3: 1.20
36	I want to make sure that I travel the world before places become worse due to climate change	-1	2	1	0.63	*F1: 1.03 F3: 0.30
41	The idea of potential collapse due to climate change has made me question whether to have children	0	0	-3	0.08	F1: 0.13 *F3: 1.11
47	When people criticise the student strikes for climate I feel that my values are being attacked	0	1	-5	0.52	F1: 0.65 *F3: 1.98
51	I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change	1	4	4	1.21	F1: 0.96 F3: -0.12
55	I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable	1	3	-4	1.18	*F1: 1.00 *F3: 2.46
63	Some people just pretend they care about climate change so they can act like they're better than others	-2	0	-2	-0.01	+F1: 0.67 +F3: 0.66
67	Coverage of climate change in the news has a big impact on my emotions	-1	2	-2	0.66	*F1: 1.09 *F3: 1.22
69	I feel insecure due to the uncertainty around what our future will look like in light of climate change	-1	3	-1	0.96	*F1: 1.27 *F3: 1.41

Items ranked lower in Factor 2 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
8	I have more immediate concerns to worry about and don't have the space to think much about climate change	-1	-3	0	-0.93	F1: -0.60 *F3: -1.07
15	I feel hope that we will find technological solutions to fix climate change	2	-3	1	-1.01	*F1: -1.60 *F3: -1.46
17	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change	3	1	4	0.38	F1: -0.68 F3: -0.83
18	For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring	0	-4	3	-1.15	*F1: -1.20 *F3: -2.29
19	Part of me is excited to observe what happens when things start collapsing due to climate change	-3	-3	1	-1.04	F1: 0.06 *F3: -1.51
21	Taking actions to reduce my ecological impact helps me to manage how I feel about climate change	2	-2	0	-0.78	*F1: -1.49 F3: -0.78
23	I feel a responsibility to be environmentally conscious regardless of the wider difference it makes	3	1	3	0.38	F1: -0.72 F3: -0.36
26	I don't want to criticise others for their environmental impact	1	-3	-2	-0.95	*F1: -1.34 F3: -0.18
29	My concerns about climate change involve many social and political issues that all impact upon each other in complex ways	3	1	3	0.48	F1: -0.77 F3: -0.62
31	I trust that most people would reduce their carbon footprint if they could track their emissions and see their impact	4	-1	0	-0.45	*F1: -1.72 F3: -0.68
37	I have to look after myself and my family & friends first, then I can think more about climate change	0	-4	-1	-1.49	*F1: -1.54 F3: -1.05
43	For me, the welfare of other creatures is as important as our own welfare	5	0	5	-0.02	*F1: -1.71 *F3: -1.97
44	I feel a strong connection with things in the natural world like plants, the sea, animals, or the view on the horizon	4	0	0	0.02	*F1: 1.29 F3: 0.17
49	My engagement with climate change forms an important part of my identity	2	-2	1	-0.68	*F1: -1.21 *F3: -1.12
53	I can discuss concerns around climate change with others in my friendship group(s)	3	-1	2	-0.35	*F1: -1.58 F3: -0.98
54	It feels like most people my age are concerned about climate change	1	-2	0	-0.75	*F1: -1.07 F3: -0.96
59	You don't see many people from my background being involved with climate change issues	-2	-2	1	-0.70	F1: -0.23 F3: -1.00
61	I am confident that my teachers would be supportive if I talked to them about my concerns around climate change	4	0	1	-0.05	*F1: -1.58 F3: -0.42

Items Ranked at -5

No.	Statement	Z-score	Difference * = sig p < .05
16	I feel hope about climate change because it's not as big of a problem as scientists claim	-1.98	F1(-4): -0.58 *F3(-2): -1.35
25	I feel confident that I can deal with any challenges that climate change raises for me	-1.92	*F1(0): -1.89 *F3(0): -1.88
~~28~~	~~Emotionally, climate change feels very distant to me because I can't directly see or feel it~~	~~-1.78~~	~~F1(-4): -0.44 F3(-3): -0.63~~
65	It's important to me that any solutions to climate change will allow us to keep our current way of life	-1.69	*F1(0): -1.58 *F3(2): -2.32

6.3.2.3 Crib Sheet for Factor 3

Items Ranked at +5

No.	Statement	Z-score	Difference * = sig p < .05
5	Sometimes I feel anger at older generations for not doing more to address climate change	1.96	*F1(1): 1.54 F2(4): 0.50
43	For me, the welfare of other creatures is as important as our own welfare	1.96	F1(5): 0.27 *F2(0): 1.97
66	I worry that even if we make changes we won't tackle global warming because of overpopulation	1.84	*F1(-3): 2.86 *F2(-1): 2.11
38	Knowing about climate change makes our modern way of life feel completely absurd	1.70	*F1(0): 1.55 F2(4): 0.46

Items ranked higher in Factor 3 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
3	I sometimes feel guilty that I'm not doing more to tackle climate change	0	1	3	1.03	*F1: 1.28 F2: 0.51
8	I have more immediate concerns to worry about and don't have the space to think much about climate change	-1	-3	0	0.14	F1: 0.47 F2: 1.07

9	I switch between feeling great about the future and awful about it	-2	2	4	1.44	*F1: 2.07 F2: 0.75
11	Thinking about climate change feels like a bit of a chore to me	-5	-2	-2	-0.82	*F1: 0.89 F2: 0.03
13	Worrying about climate change is negatively affecting my mental health	-5	0	0	0.05	*F1: 2.03 F2: 0.21
16	I feel hope about climate change because it's not as big of a problem as scientists claim	-4	-5	-2	-0.63	*F1: 0.77 *F2: 1.35
17	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change	3	1	4	1.21	F1: 0.15 F2: 0.83
18	For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring	0	-4	3	1.14	*F1: 1.09 *F2: 2.29
19	Part of me is excited to observe what happens when things start collapsing due to climate change	-3	-3	1	0.47	*F1: 1.45 *F2: 1.51
33	Despite what I do I can't stop climate change, so it feels pointless for me to keep thinking about it	-3	-1	2	0.55	*F1: 1.78 F2: 0.74
35	The way the world works makes it really difficult for me to be environmentally friendly	1	3	4	1.51	*F1: 1.30 F2: 0.45
40	I see no point in my education because climate change means I won't have a future	-5	-3	-1	-0.54	*F1: 1.49 F2: 0.32
51	I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change	1	4	4	1.33	*F1: 1.07 F2: 0.12
59	You don't see many people from my background being involved with climate change issues	-2	-2	1	0.30	F1: 0.77 F2: 1.00
62	I find it hard to relate to people who aren't concerned about climate change	-3	-1	3	0.89	*F1: 2.02 *F2: 1.22
65	It's important to me that any solutions to climate change will allow us to keep our current way of life	0	-5	2	0.63	*F1: 0.74 *F2: 2.32

Items ranked lower in Factor 3 Array than in other arrays

No.	Statement	Rank F1	Rank F2	Rank F3	Z-score	Difference * = sig p < .05
7	I feel angry at people who deny the existence of climate change	2	4	1	0.44	F1: -0.55 F2: -0.95
12	When I'm already feeling bad, thinking about climate change can make me feel even worse	-2	3	-3	-0.96	F1: -0.06 *F2: -1.82
20	I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't	2	5	2	0.54	F1: -0.47 *F2: -1.29

22	Caring about climate change has made me rethink the impact of the food I eat and the things I buy	5	1	-3	-1.21	*F1: -2.79 *F2: -1.48
39	Climate change means I need to recognise how my life relies and impacts upon other people and systems	3	2	1	0.26	F1: -0.81 F2: -0.41
41	The idea of potential collapse due to climate change has made me question whether to have children	0	0	-3	-1.03	*F1: -0.98 *F2: -1.11
45	It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products	-2	-3	-4	-1.44	F1: -0.91 F2: -0.38
46	The student strikes for climate give me hope for the future	3	2	-2	-0.58	*F1: -1.62 *F2: -1.36
55	I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable	1	3	-4	-1.28	*F1: -1.47 *F2: -2.46
56	Viewing content about climate change on social media helps to keep the issues alive for me	1	0	-3	-1.14	*F1: -1.43 *F2: -1.11
57	Spending time around others who care about the environment helps me to believe change is possible	4	0	-1	-0.51	*F1: -1.80 F2: -0.55
60	My family will listen to me and take my feelings about climate change seriously	5	1	0	0.14	*F1: -1.65 F2: -0.31
67	Coverage of climate change in the news has a big impact on my emotions	-1	2	-2	-0.56	F1: -0.13 *F2: -1.22
69	I feel insecure due to the uncertainty around what our future will look like in light of climate change	-1	3	-1	-0.44	F1: -0.14 *F2: -1.41

Items Ranked at -5

No.	Statement	Z-score	Difference * = sig p < .05
14	My faith or beliefs help me to feel hope around climate change	2.21	*F1(1): -2.59 *F2(-2): -1.40
32	Climate change feels distant to me because it will mostly be affecting people in the future	-1.77	F1(-4): -0.51 F2(-4): -0.21
58	I feel pressure from others at school to be environmentally conscious	-1.77	F1(-3): -0.44 F2(-4): -0.66
47	When people criticise the student strikes for climate I feel that my values are being attacked	1.47	*F1(0): -1.33 *F2(1): -1.98

6.3.3 Abduction/Abductive reasoning

Abductive reasoning involves making an observation about a phenomenon (often an unusual phenomenon or '*surprising empirical fact*' Watts & Stenner 2012, p.40) and then drawing upon existing knowledge (practical or theoretical) in order to make a reasonable inference about why the phenomenon has occurred. Charles Peirce formalised the use of abductive logic in philosophy (developing his account over the course of his career, e.g. Peirce 1878, 1882, 1902, and incorporating it into Pragmatist philosophy of science Peirce 1903). Abduction is distinguished from both deductive and inductive reasoning by both the reasoning process itself and the confidence with which conclusions can be drawn:

- In deductive reasoning, the conclusion is derived though logical consideration of the consequences of prior knowledge and/or observed facts, so the conclusion is *necessarily correct* unless the knowledge or facts are inaccurate/mistaken or the reasoning process is flawed.
- In inductive reasoning, a number of observations of specific phenomena are made in order to make conclusions about a general phenomenon or principal. Consequently, the conclusion is *probably correct* on the basis of the collected evidence, but not necessarily correct. Most quantitative psychological experiments utilise inductive reasoning when they use linear statistics to draw conclusions from a data set; in such cases the probability of the conclusion has been quantified (e.g. $p<.05$).
- In abductive reasoning, the conclusion that is drawn is an inference about the possible/likely cause of an observed phenomenon. There may be multiple possible explanations for the phenomenon, so the conclusion is not necessarily correct. Effective abductive reasoning therefore involves consideration of multiple possible causes for a phenomenon (i.e. constructing hypotheses) before deciding (at least provisionally) which one presents the *most likely* explanation for the particular circumstances under consideration (see also Watts & Stenner 2012, p.39-41).

Abductive reasoning is primarily used within Q methodological analysis at the stages of exploratory factor analysis, factor rotation, and factor interpretation. In the factor analysis the statistical derivation of factors provides a possible explanation for the shared variance between various participant Q-sorts; multiple factor solutions are possible and effective factor analysis involves making judgements about the solution that is most likely to adequately explain significant variance

(see also Watts & Stenner, 2012, p.39-40). In factor rotation the multi-dimensional relationship between variables (i.e. participant Q-sorts) constitutes the '*surprising empirical fact*' that can be abductively explained by rotating factors to highlight the similarities and differences between the variables (Watts & Stenner 2012, p.40).

Within the current study, I combined the factor extraction and factor rotation processes into a single large process of abduction in which I tested many potential factor extractions (with and without rotation) before concluding that the 3-factor solution using Horst extraction, varimax rotation, and factor significance of 0.31, was *most likely* to provide the best explanation for the data I had collected (outlined in detail in **Section 6.2**). My process of factor interpretation then employed abductive reasoning to make reasonable inferences about the causes of the particular arrangement of statements for each factor.

The interpretations that I have constructed to explain each arrangement are not the only possible explanations, but I feel confident that they present reasonable (and I believe the most likely) explanations for both the position of particular statements and the overall patterns of agreement and disagreement towards statements for each factor. The crib sheets and factor arrays significantly supported this process by scaffolding my attention towards both the overall pattern and 'feel' of each array and towards individual statements whose placement felt 'out of place' with the accounts that I was constructing for each pattern; this supported my attention to '*oscillate between the individual items, on the one hand, and the whole story or viewpoint, on the other*', as recommended by Watts & Stenner (2012, p.156). The abductive process is perhaps most obvious in **Section 6.4.3**, in which I have explained how the focus group feedback and survey information helped me to rethink my interpretation of Factor 3.

6.4.1 Initial Summary of Each Factor

Watts & Stenner (2012, p.156-7) recommend using their crib sheet method to facilitate thinking around 'first takes' (p.156) for each factor, prior to the final factor summaries. They also recommend considering the importance of how each factor viewpoint that is shared by people might *feel* to those people (p.157-8). The initial factor summaries were presented to participants in each of the focus groups (see **Section 5.5.2** for the focus group procedure and **Appendix C4.3** for the initial factor summaries).

6.4.2 Processing of the Focus Group Feedback

As noted in Dunham's (1998) advice around the use of the nominal group technique, one of the advantages of the technique is that the initial processing/analysis of group responses is undertaken collectively during the focus groups themselves (through the sharing of ideas and then voting on ideas) rather than by a lone researcher after the fact. As such, the online whiteboards at the end of each session themselves already constitute a form of analysed data. I present these boards in **Section 7.4**.

However, whilst the purpose of the online focus groups was to help consideration of my second research question (What engagement or support [around climate change concerns] young people would like [for themselves and for others] from peers, school staff, parents, & educational psychologists), some young people did comment directly on how closely they felt the summary that they had read matched their own viewpoint. This should not be used as confirmation that the factor summary is accurate, since the young people may well have changed their views in the 4-8 months between them completing their Q-sort and them undertaking a focus group. However, whilst all participants in focus groups 1 and 2 agreed quite strongly with the viewpoint shown to them, both participants in focus group 3 took issue with aspects of the third and fourth paragraphs of the factor 3 description, which characterised them as not being concerned if people lose interest in climate change (**55**, -4), not being particularly concerned with their own ecological footprint (**22**, -3), but generally still having high levels of concern around climate change (looking at these two participants' Q-sorts, they did indeed both assign quite neutral values to these statements [both put **55** at 0; one put **22** at 0 and one at +1], and the position of these statements may have been partly skewed by one participant [who did not take part in the focus group] rating them more negatively [**55**, -5; **22**, -4]). Whilst by no means definitive, this informed my 'second draft' of Factor 3, along with reflection upon the survey responses of participants who loaded strongly onto the factor.

6.4.3 Demographic features of Q-sorts that significantly load onto each factor

In their advice around constructing a second draft/take of each factor summary, Watts & Stenner (2012, p.157-8) recommend using demographic and survey information collected to help further contextualise each factor. This information is collated in **Tables D11-13**.

Factor 1									Averages and totals for Factor 1 Participants	Averages and totals for Participant Sample as a whole
Participant Number	11	12	13	14	15	17	24	30	-	-
Age	13	15	12	17	17	17	17	16	15.5	14.33333333
Gender	female	female	male	Male	female	Female	female	Female	6 female, 2 male	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	white	white british	british	White	white british	-	Nigerian, African	White British	3 white British, 2 white, 1 british, 1 Nigerian	23 White British/White/ Caucasian, 2 Irish, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	atheist	nope	no i dont have a religion I belive in kindness	I'm agnostic	no	-	Islam	no religion	5 none, 1 agnostic, 1 Islam	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	8	10	5	9	11	7	8	9	8.375	9
McArthur Subjective Social Status Family	7	6	8	7	6	-	7	6	6.714285714	7.103448276
SSS Peer School Dimensions Scale	26	30	36	24	16	-	32	5	24.14285714	26.25925926
SSS Scholastic School Dimensions	5	4	3	2	6	-	4	7	4.428571429	5.931034483
Six Americas Segment	Alarmed	Alarmed	Alarmed	Concerned	Disengaged	Concerned	Concerned	Concerned	3 Alarmed, 4 Concerned, 1 Disengaged	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale Average Cognitive-Emotional Impairment	1.375	1	2.375	1.375	1.285714286	1.625	1.25	1.875	1.520089286	1.991741071
Climate Anxiety Scale Average Functional Impairment	1.6	1.2	1	1.2	1	1.2	1	2	1.275	1.590833333
Climate Anxiety Scale Average Experience of Climate Change	1	1.333333333	1.666666667	1	1	1	2.333333333	1.666666667	1.375	1.773611111
Climate Anxiety Scale Average Behavioural Engagement	4.166666667	4.5	4.2	2.833333333	3.666666667	4.333333333	3.5	4.666666667	3.983333333	4.077222222
Climate Anxiety Scale Average of all scales	2.035416667	2.008333333	2.310416667	1.602083333	1.738095238	2.039583333	2.020833333	2.552083333	2.038355655	2.358351935
Strength of loading onto factor	0.71	0.74	0.65	0.31	0.49	0.69	0.43	0.50	0.565	-

Table D11: demographic and Survey Information for Factor 1

Factor 2				Averages and totals for Factor 2 Participants	Averages and totals for Participant Sample as a whole
Participant Number	9	10	20	-	-
Age	16	12	15	14.33333333	14.33333333
Gender	demi girl	male	female	1 demi girl, 1 male, 1 female	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	white british	white british	white british	3 white british	18 White British, 3 White, 2 Irish/British, 2 Caucasian, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	no	none	nope	3 none	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	10	10	7	9	9
McArthur Subjective Social Status Family	8	7	6	7	7.103448276
Subjective Social Status School Dimensions Scale - Peer	25	21	14	20	26.25925926
Subjective Social Status School Dimensions Scale - Scholastic	8	5	3	5.333333333	5.931034483
Six Americas Segment	Alarmed	Concerned	Alarmed	2 Alarmed 1 Concerned	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale Average Cognitive-Emotional Impairment	2.75	2.375	1.875	2.333333333	1.991741071
Climate Anxiety Scale Average Functional Impairment	1.8	1.8	2.25	1.95	1.590833333
Climate Anxiety Scale Average Experience of Climate Change	1.666666667	2.333333333	1.333333333	1.777777778	1.773611111
Climate Anxiety Scale Average Behavioural Engagement	4.5	3.5	4.333333333	4.111111111	4.077222222
Climate Anxiety Scale Average of all scales	2.679166667	2.502083333	2.447916667	2.543055556	2.358351935
Strength of loading onto factor	0.33	0.67	0.72	0.573333333	-

Table 12: demographic and Survey Information for Factor 2

Factor 3			Averages and totals for Factor 3 Participants	Averages and totals for Participant Sample as a whole
Participant Number	22	28	-	-
Age	11	15	13	14.33333333
Gender	male	female	1 female, 1 male	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	Irish/British	Chinese	1 Irish/British, 1 Chinese	18 White British, 3 White, 2 Irish/British, 2 Caucasian, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	No	no	2 no	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	10	8	9	9
McArthur Subjective Social Status Family	7	7	7	7.103448276
Subjective Social Status School Dimensions Scale - Peer	36	6	21	26.25925926
Subjective Social Status School Dimensions Scale - Scholastic	7	7	7	5.931034483
Six Americas Segment	Alarmed	Alarmed	2 Alarmed	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale Average Cognitive-Emotional Impairment	2.625	2.875	2.75	1.991741071
Climate Anxiety Scale Average Functional Impairment	2	1.8	1.9	1.590833333
Climate Anxiety Scale Average Experience of Climate Change	1.666666667	3	2.333333333	1.773611111
Climate Anxiety Scale Average Behavioural Engagement	4	4.333333333	4.166666667	4.077222222
Climate Anxiety Scale Average of all scales	2.572916667	3.002083333	2.7875	2.358351935
Strength of loading onto factor	0.41	0.51	0.46	-

Table 13: demographic and Survey Information for Factor 3

Some observations can be made about the demographic information:

- Each factor has participants with a range of different ages; based on current participant responses there are no trends that suggest that a factor may be associated with younger or older participants.
- Likewise, each factor has a mix of genders.
- No clear hypothesis can be made around ethnicity.
- Despite Factor 3's factor array having statement 14 ('My faith or beliefs help me to feel hope around climate change') placed significantly more negatively than Factors 1 and 2 (F3:-5, F1:1, F2:-2), the vast majority of participants whose responses significantly loaded onto any factor did not identify with a religion.
- The Family Affluence Scale was not predictive of any particular viewpoint and interestingly, did not appear to predict participants' subjective views of how affluent their families are.
- Likewise, there was much variation in responses to the Subjective School Status scales and no particular trends emerged.
- Perhaps most interestingly, participants' Six Americas segmentation scale responses did not appear to correlate with the different factor viewpoints (although consideration of these responses did inform my reinterpretation of Factor 3 – see below). The Six Americas segmentation categories also did not appear to correlate well with participants' scores on the Climate Anxiety Scale (with the possible exception of the 'disengaged' participant, who did also score low on the cognitive-emotional and functional impairment scales).
- The Climate Anxiety scale scores are slightly more informative and interesting than the Six America segment categorisations (though again, no definitive conclusions can be drawn):
    - Firstly, given my 'first draft' descriptions of each factor, I would have expected the scores of participants loading onto Factor 1 to be higher for 'behavioural engagement' than for Factors 2 and 3. This is not the case (though of course, young people living with their families may well be relatively restricted in their available options around eco-friendly consumerism).
    - Secondly, I would have predicted that the average '*cognitive-emotional impairment*' and '*functional impairment*' scores would be highest for participants loading onto Factor 2, followed by participants loading onto Factor 1, then finally participants loading onto Factor 3. Interestingly, average cognitive-emotional impairment is highest for participants loading onto Factor 3, followed by Factor 2, then Factor 1, and average functional impairment is highest for participants loading onto Factor 2, closely followed by Factor 3, then Factor 1. Factor 3 participants also score highest on overall anxiety, followed by Factor 2, then Factor 1.

The high scores on the climate anxiety scale for participants loading onto Factor 2 helped increase my confidence that Factor 2 represents a viewpoint of high anxiety. In contrast, the lower anxiety scores and variety of Six America segmentation categories for participants loading onto Factor 1 helped increase my confidence that the factor represents a viewpoint in which people did not feel personally threatened but were generally concerned about the 'state of the world'. I therefore only made (relatively) minor changes to these factor summaries for my second draft. However, the demographic and survey information helped to influence a more significant reinterpretation of Factor 3:

The high scores on the Climate Anxiety scale for participants loading onto Factor 3, plus their designation as 'Alarmed' according to the Six America segmentation scale added some interesting context to my interpretation of the factor. Both participants in the focus group for Factor 3 expressed high levels of concern around climate change and did not like being characterised as being relatively unconcerned about their own ecological footprint, despite originally assigning this statement less positive weight than participants whose views aligned with other factors; this further informed my analysis. When revisiting the crib sheet for Factor 3, I realised that whilst I had emphasised the frustration/anger felt (paragraph 1), I had also interpreted the lack of a sense of connection towards any climate campaigning/activists (paragraph 3) or ecological consumerism (paragraph 4) as indications of disengagement from concerns about climate change, when alternatively they could be interpreted within the context of despair/relative 'doomism'.

As covered in **Section 4.2**, Miceli & Castelfranchi (2005) summarise an idea within psychoanalysis that anxiety is an 'anticipatory emotion' directed towards '*a possible and uncertain danger*' (p.294). Anxious states are highly unpleasant in part due to this uncertainty, which can invoke '*a mixture of fear and hope*' (p.295) about the anticipated threat. Additionally, as noted in **Section 4.3.1**, Weintrobe (2013) argues that the unpleasantness of such uncertain anxious states can lead some people to adopt defensive coping mechanisms to manage them, in which they cling to a naïve optimism that the problem either doesn't exist or will be fixed, or fall into nihilistic hopelessness (aka 'doomism') in which anxiety is replaced by despair (Weintrobe, 2013, p.34-40). When these ideas are combined with the information that participants whose Q-sorts loaded onto factor

3 appear to feel quite anxious about climate change, it raises the possibility that the participants were managing their anxiety in-part by resigning themselves to the idea that the significant negative consequences of climate change are inevitable (rather than the consequences being likely but with there still being some remaining uncertainty and hope that the anxiety-inducing threat can be avoided).

This account has significant potential to be able to make sense of some of the parts of Factor 3's factor array that are hard to explain:

- Firstly, statements explicitly relating to resignation towards the inevitability of climate change are placed quite highly; the statement supporting adaptation 'to the challenges that climate change will bring' was placed significantly higher than for the other statements (18, +3), as was the statement predicting a process of collapse (19, +1, with some excitement also expressed, concerningly), and the statement suggesting that education is pointless 'because we won't have a future' was met with only mild disagreement, compared with significant disagreement in the other factors (40, -1). Additionally, this was the only factor to express agreement with the statement '*Despite what I do I can't stop climate change, so it feels pointless for me to keep thinking about it'* (33, +2) or to express concern that '*we won't tackle global warming because of overpopulation*' (66, +5). Finally, they expressed significant disagreement with the idea that climate change '*will mostly be affecting people in the future*' (32, -5), which within the context provided is more likely to imply that they believe that changes will affect them, rather than that changes will not affect anybody.

- Secondly, the viewpoint expresses a muted response towards climate activism, such as the student strikes for climate (46, -2), information on social media (56, -3), and spending time around people who care about the environment (57, -1). Most significantly, they feel unaffected when people criticise the students strikes (47, -5), and originally expressed a lack of concern about people losing interest in climate activism (55, -4, though this was then challenged in the focus group). One explanation for this could be that they don't like climate activism/activists, but this

does not fit that well with them strongly believing it is ethically wrong to oppose/delay measures to tackle climate change (51, +4) or finding it hard to relate to people who are unconcerned about climate change (62, +3). An alternative could be that they are resigned to the inevitability of climate change, so lack hope in the effectiveness of climate activism; this possibility is further supported by their relative disagreement with most of the other statements exploring sources of hope, such as faith/belief (14, -5), activism (46, -2, mentioned previously), or hope due to denialism/misunderstandings about climate change (16, -2). The only slight source of hope for this factor are technological solutions (15, +1), but discourse around technological fixes can contain the implicit assumption that we will not make sufficient other (systemic) changes, so will have to rely upon a 'Deus Ex-Machina' in the form of an impressive new invention that can rescue us from climate change.

- Thirdly, this viewpoint expresses little concern around making changes to one's ecological footprint (22, -3) nor pressure from others to be environmentally conscious (58, -5). Whilst this could be taken as a rejection of ecological values, participants whose Q-sorts loaded onto Factor 3 also score highest overall on 'behavioural engagement' within the Climate Anxiety scale. An alternative interpretation could therefore be that whilst they don't believe that individual consumer choices will be able to stop climate change (there is precedence for this; a focus on individual consumerist choices is referred to by environmental journalist George Monbiot as 'mico-consumerist bollocks'), they still make changes on the basis of 'care' or 'what's right', as opposed to believing it will result in specific outcomes (Ojala 2012a terms this 'meaning-focused coping' – see **Section 4.3.1**).

The above considerations were sufficient to convince me that Factor 3 was more likely to constitute a position of despair/resignation rather than simple disengagement, so I rewrote the factor description accordingly (**Section 7.1.3**).

7 Results

This section will present my final interpretations of the viewpoints expressed within each factor. **Section 7.1** will present an in-depth account of each of the three factors. **Section 7.2** will present the consensus statements for which there was a relatively similar level of agreement or disagreement amongst all three factors. **Section 7.3** details the creation of a summary poster for the study results. **Section 7.4** will then outline the main findings from each of the focus groups.

7.1 Interpretations for each factor

The interpretations for each factor are below. For additional context about how these interpretations were reached, a short summary, additional statistical information for each factor, and a summary of each factor's key points are provided in **Supplementary Appendix E1**.

7.1.1 Factor 1: Environmental and Humanitarian Concern

The state of the world is important to me; the evidence for the potential impact of climate change upon the environment is very clear (**30**, -5) and learning about climate change has highlighted for me how much we rely upon each other (**39**, +3) and how many of the world's social, political, and environmental challenges impact upon each other (**29**, +3). I am concerned about how climate change will affect people living in poorer countries (**24**, +4) and feel frustrated at governments and oil companies for not yet making the changes required to reduce our impact on them (**6**, +5). I am also motivated by my strong sense of connection to the natural world (**44**, +4) and I consider the welfare of other creatures as important as our own (**43**, +5).

I feel that my concerns come from a healthy place of compassion and do not negatively affect my mental health (**13**, -5). I do not feel much fear about climate change (**10**, -1), nor feel much worry when thinking about it (**1**, -2). I also don't feel much background anxiety around its future impact (**2**, -3) and do not feel the need to distance myself or 'switch off' from thinking about it **(27**, -4).

I feel well supported by others when I need to talk through my concerns about climate change; my family will listen to me and treat my feelings seriously (**60**, +5) and I am confident that my teachers would be supportive if I needed to talk to them (**61**, +4). I also feel comfortable speaking with my friends about climate change (**53**, +3); quite a few people my age seem concerned about climate change (**51**, +1) and we are able to view content on social media that engages with the issues (**56**,

+1). My closeness with my family and friends means that I seek to balance my concerns about climate change with my concerns/support for them and their wellbeing (**37**, +0).

I feel quite hopeful and optimistic about the future, regardless of the challenges posed by climate change. Spending time around others who care around the environment can help to highlight for me how change is possible (**57**, +4) and the student strikes for climate have given me hope for the future (**46**, +3). I have hope that we will develop technology to help us address climate change (**15**, +2), draw some hope from my wider beliefs, faith, or outlook on the world (**14**, +1) and I believe that our modern way of life is valid and meaningful, even if we need to reduce our emissions (**38**, 0). I also feel that my education is important for equipping me with the tools to thrive in whatever scenarios the future may hold (**40**, -5).

It's important to me to be environmentally responsible; I try to reflect upon my own diet and consumption patterns (**22**, +5), plan to avoid excessive overseas travel (**36**, -1), and I don't particularly support the idea that it's difficult to live environmentally friendly life (**35**, +1) or that only rich people can afford to be environmentally responsible (**48**, -2). Taking actions to reduce my ecological impact can help me to manage how I feel about climate change (**21**, +2) and I feel that I am doing enough to help (**3**, 0). Even when it only makes a minor difference, it's important to me to be environmentally conscious (**23**, +3) and to consider the differences that I personally can make, regardless of the larger picture (**33**, -3). My engagement with climate change forms a facet of who I am (**49**, +2) and it's certainly not a chore to think about it (**11**, -5).

It's also important to me to address climate change positively and to not be judgemental of others; I don't want to criticise others for their environmental impact (**26**, +1) and see climate change in practical terms more than as an ethical issue (**51**, +1) or moral challenge (**52**, +2). I don't feel much anger or resentment towards older generations for their previous relative inaction around climate change (**5**, +1) and I feel that I can relate to most people, regardless of whether or not they are concerned about climate change (**68**, -3). I have trust that most people would take actions to reduce their carbon footprint if it were made easier for them to track their emissions and see their impact (**31**, +4) and whilst I would like more products to be ecologically friendly by default, I feel that it's also valuable for people to have the freedom to choose eco-friendly options (**45**, -2). I also reject negative narratives around climate change such as that we won't be able to tackle climate change due to 'overpopulation' (**66**, -3), or that some people just pretend to be environmental just 'for show', rather than because they genuinely care about the environment (**63**, -2).

7.1.2 Factor 2: Fearful of the Future

I feel a lot of fear about climate change (**10**, +5); it can be hard for me to stop worrying when I focus on it (**1**, +2) and when I am already feeling bad, thinking about it can make me feel worse (**3**, +2). I am scared about our systems potentially collapsing (**19**, -3); whilst we obviously shouldn't seek to maintain the unsustainable aspects of our current way of life (**65**, -5), I feel insecure about our future (**69**, +3), often feel a background sense of anxiety around climate change (**2**, +2) and worry that I will not able to deal with the challenges that climate change could raise during my lifetime (**25**, +5) (and have not ruled out that this could influence whether I decide to have children [**41**, 0]).

I feel as though we are living in a state of denial in which we know about climate change but act as if we don't know what's happening (**20**, +5). Scientific research is unambiguous about the scale of the problem and the degree of changes needed (**16**, -5) and we can clearly track the impacts that are occurring (**28**, -5). We need to stop climate change whilst there's still time, rather than just giving up and resigning ourselves to adapting to its impact (**18**, -4). I believe that it is ethically wrong to oppose or delay measures that will help (**51**, +4) and I feel a lot of anger towards climate deniers (**7**, +4), governments and oil companies (**6**, +5), and older generations (**5**, +4) for gaslighting us about the problems we face, criticising the student strikes for climate (**47**, +1), and betting upon technological 'fixes' that don't yet exist (**15**, -3).

Changes are urgently needed and we can't just focus on friends and family first then get around to thinking about climate change later (**37**, -4); if we just focus on our immediate day-to-day concerns then we will never tackle climate change (**8**, -3). We need to focus on the impact of our actions and initiatives (**23**, +1) and the consequences this will have for people's lives (**43**, 0), rather than piecemeal individual actions to make us feel good (**21**, -2). I feel that it is sometimes necessary to call-out others for their negative impacts (**26**, -3) and that it is right to protest for necessary changes, even when it inconveniences people (**52**, +5).

At times my concerns can leave me feeling isolated; whilst some others from my background show concern (**59**, -2), not many people my age are as concerned about climate change as me (**54**, -2) and I don't feel very comfortable discussing my worries around the issue with others in

my friendship group (**53**, -1), nor confident that my teachers would be supportive of my views (**61**, 0). I can also feel quite jaded about the engagement of others; even though concern about climate issues is more 'mainstream' than in the past, people seem to lose interest quickly (**55**, +3), some pay lip-service rather than genuinely care (**63**, 0), some are very critical (**34**, -1), and I suspect that even if people could easily track their emissions and see their impact, their actions would be unlikely to change (**31**, -1).

Sometimes I need to distance myself from the issues; coverage about climate change on the news can have a big effect on my emotions (**67**, +2) and sometimes I just need to switch off in order to recharge my batteries (**27**, +3). I don't want my engagement with climate change to form a major part of my identity (**49**, -2) and I do not feel a particularly strong connection to the natural world (**44**, 0) (though am very concerned with the impact of environmental changes upon our lives). If I am able, I would like to travel the world (possibly by train) before places potentially become worse due to climate change (**36**, +2).

7.1.3 Factor 3: Frustration and Resignation

I feel despair and anger about the state of our planet. It seems inevitable that climate change will affect me and my generation (**32**, -5) and I feel angry at older generations for failing to address the issue (**5**, +5). The way that the world has been set up to encourage high levels of consumption (**35**, +4) plus challenges such as overpopulation (**66**, +5) mean that I don't feel that there's anything I can do to stop climate change (**33**, +2). It's hard to find sources of hope about the future; I draw little reassurance from others undertaking ecological action (**57**, -1), the student strikes for climate (**46**, -2), or religion/faith (**14**, -5), and it seems unlikely that things will be less bad than climate scientists predict (**16**, -2). I'm not concerned about people losing interest in climate change, because I am not convinced that people's concern will help us with the challenges we face (**55**, -4). However, I do hold out some hope for a technological fix that could save us (**15**, +1) and I sometimes switch from feeling awful about the future to feeling more optimistic (**9**, +4).

Given that climate catastrophes seem likely, I feel that we should begin to focus on how to adapt to the challenges that climate change will bring, to lessen the negative impacts (**18**, +3). I

question how relevant my education will become as the world changes (**40**, -1) and when I consider the future, significant parts of our modern way of life feel absurd (**38**, +5). Part of me is interested to observe how things will change if climate catastrophes do start to precipitate collapse (**19**, +1). However, there are also parts of modernity that I value, which I would like to see preserved when adaptations are undertaken (**65**, +2). Additionally, I strongly believe that the welfare of other creatures is as important as our own (**43**, +5) and really valued seeing some wildlife recover during the first COVID-19 lockdown (**17**, +4).

I don't believe that thinking/worrying about climate change will make a difference (**33**, +2) so I tend to focus more on the immediate concerns around me (**8**, 0) and I don't particularly get dragged down by ruminating about climate change when I already feel low (**12**, -3). I don't seek out content about climate change on social media (**56**, -3) nor find news coverage about climate change emotionally engaging (**67**, -2). I am slightly cautious about who I speak with about climate change; I don't have confidence that my family will take my concerns around it seriously (**60**, 0) and I feel that there are not that many people from my background who engage with concerns about climate change (**59**, +1). At the same time, I find it hard to relate to people who are not concerned about climate change at all (**62**, +3); people should at least be aware of what's likely to happen.

I feel that a focus on individual carbon footprints is inadequate to address the scale of the problem; changing the food I eat or the things I buy will not be enough to stop climate change (**22**, -3). I feel quite distant from the student strikes for climate (**47**, -5) and do not feel pressure from others at school to be environmentally conscious (**58**, -5). I'm not going to let concerns about climate change affect important my personal decisions such as whether I have children (**41**, -3). Having said this, I do still sometimes experience a sense of guilt that I might not be doing enough (**3**, +3). However, systemic changes rather than personal changes are much more effective and it is ethically wrong for corporations and governments to oppose or delay measures that could reduce the impact of climate change (**51**, +4). The way the world is currently set up makes it really difficult for people to live low-emission lifestyles (**35**, 4) and legislation should be introduced to make products eco-friendly by default, rather than using the excuse that we should rely upon people to make the 'right' individual consumer choices (**45**, -4).

7.2 Consensus statements

Some statements (termed 'consensus statements') had roughly similar levels of agreement or disagreement across all three factors. I generally did not use these statements to inform the factor interpretations (when the correlation was greater than $p < .05$ across all three factors); the exception to this was that I decided to incorporate statements at the far ends of the factor arrays due to the high level of agreement or disagreement expressed. **Table 14** shows the consensus statements that correlated at $p < .05$ across all three factors:

No.	Statement	Factor 1 Array	Factor 1 z-score	Factor 2 Array	Factor 2 z-score	Factor 3 Array	Factor 3 z-score
64	Joking about climate change helps me connect with others about our concerns	-1	-0.31	-1	-0.48	-1	-0.37
6	I feel angry that governments and oil companies say they care about climate change but don't make the changes needed	5	1.79	5	1.88	4	1.65
30	I don't engage with concerns about climate change because we don't know what is going to happen to the environment	-5	-1.48	-5	-1.31	-4	-1.26
42	I feel grief that climate change will limit the opportunities I have for my life as I grow older	-1	-0.29	0	-0.05	-1	-0.28
24	I feel very concerned about how climate change will affect people's lives in the poorest counties	4	1.39	3	1.10	3	0.96
32	Climate change feels distant to me because it will mostly be affecting people in the future	-4	-1.25	-4	-1.56	-5	-1.77
50	I avoid talking to others about my worries around climate change in case they react negatively	-1	-0.44	-2	-0.83	-3	-1.00
68	I wish that others were more understanding around how I feel about climate change	0	0.07	-1	-0.50	-1	-0.19
28	Emotionally, climate change feels very distant to me because I can't directly see or feel it	-4	-1.33	-5	-1.78	-3	-1.14
58	I feel pressure from others at school to be environmentally conscious	-3	-1.11	-4	-1.33	-5	-1.77
4	I feel a sense of grief about the damage that climate change will cause to the natural world	2	0.84	4	1.44	2	0.63

Table 14: Consensus statements at $p < .05$,
arranged from strongest consensus at the top of the table

Some statements were consensus statements due to being strongly rejected across all three factors. This includes several statements that could be seen as embodying (or being associated with) climate change 'sceptic' or denialist positions, including '*I don't engage with concerns about climate change because we don't know what's going to happen*' (**30**, -5, -4, -4), '*Climate change feels distant to me because it will mostly be affecting people in the future*' (**32**, -4, -4, -5), '*Emotionally, climate change feels very distant to me because I can't directly see or feel it*' (**28**, -4, -5, -3) and '*I feel pressure from others at school to be environmentally conscious*' (**58**, -3, -4, -5):

- Statement **28** was not intended as a denialist statement, but was an attempt to capture Morton's (2016) notion of climate change as a 'hyperobject', i.e. a phenomenon which is challenging to fully comprehend due to a range of complexities. However, the idea that emotional engagement with climate change is hampered by the complex ways in which it is (possibly) intangible was unequivocally rejected across all three factors (and also by most participants not loading onto these factors).
- The idea that climate change will affect people in the future (**32**) was also resoundingly rejected; all post-sort interviews in which this was explored indicated that participants either believed that the effects could currently be seen (and would increase), or that they would begin to be seen within their lifetimes.
- The idea of feeling pressure from others at school to be environmentally conscious (**58**) could possibly have been seen as a 'denialist adjacent' statement because it can be used to frame people concerned about climate change as 'bossy' or 'controlling' (as part of a process of 'do-gooder derogation'). However, it is equally possible that this context might not have affected participants' placement of the statement and that social pressure from their peers might simply not have been part of the experience embodied in any of the three factors (One participant did comment in their post-sort interview: "*I don't feel pressure from others to be environmental; I'm the one encouraging them to think about it*").

Some statements found quite strong agreement across all three factors; these included: '*I feel angry that governments and oil companies say they care about climate change but don't*

make the changes needed' (**6**, 5, 5, 4), '*I feel very concerned about how climate change will affect people's lives in the poorest countries'* (**24**, 4, 3, 3), and '*I feel a sense of grief about the damage that climate change will cause to the natural world'* (**4**, 2, 4, 2):

- It was interesting that anger towards governments and oil companies was high across all factors (and indeed across most participants who did not strongly correlate with just a single factor); anger towards older generations (**5**, 1, 4, 5) and towards climate change deniers (**7**, 2, 4, 1) varied more significantly between factors and the three anger statements could arguably be seen as rough proxies for the relative blame assigned within each factor towards particular groups (i.e. Factor 1 primarily blames governments and oil companies, whilst Factor 3 also sees older generations as culpable, and Factor 2 assigns responsibility to both of these, in addition to climate deniers).
- Statements **24** and **4** both tap into participants' values around which future consequences of climate change they find most concerning; **24** was designed to explore humanitarian concerns, whilst **4** was designed to explore ecological concerns. Thankfully, other statements also explored these concerns from various angles, which allowed me to draw some conclusions around the primary concerns experienced within each factor. For example, Factor 1 expresses both high humanitarian concerns (**39**, +3), (**24,** +4), (**29**, +3) and high ecological concerns (**44**, +4), (**43**, +5), but low concern about being personally affected (**10**, -1), (**69**, -1). In contrast, the humanitarian/societal concerns expressed in Factor 2 appears to be interrelated with concerns about being personally affected (**25**, +5), (**10**, +5), (**69**, +3), (**19**, +3), with less ecological concern being expressed (**43**, 0), (**44**, 0). Factor 3 expresses higher ecological concerns (**43**, +5), (**17**, +4), but lower societal/humanitarian concern (**39**, 1), (**19**, +1) and despite an apparent acceptance of the likelihood of being personally affected by climate change, personal concern appears lower than for Factor 2 (**69**, -1), (**25**, 0), (**42**, -1).

Finally, some statements tended to be placed towards the middle of the factor array for all three factors, indicating mild agreement or disagreement. These included '*Joking about climate change helps me connect with others about our concerns*' (**64**, -1, -1, -1), *'I feel grief*

that climate change will limit the opportunities I have for my life as I grow older' (**42**, -1, 0, -1), '*I avoid talking to others about my worries around climate change in case they react negatively*' (**50**, -1, -2, -3), and '*I wish that others were more understanding around how I feel about climate change*' (**68**, 0, -1, -1).

Given that participants placed the statements that they agreed with most strongly first into the Q-sort grid, followed by the statements they disagreed with most strongly, before placing the final statements, I would interpret these statements as being ones that failed to stimulate a significant emotional response from participants. The failure to elicit a strong response could potentially have been due to factors such as uncertainty around statements (e.g. with regards to statement **42**, will climate change limit young people's opportunities, or simply influence what the opportunities available to them look like?), ambivalence (for **64** people could potentially feel climate change is too serious to joke about, or alternatively that the ramifications are too vague/complex to effectively support 'dark humour' about the topic), or possibly a desire to avoid an attitude of self-pity (which could arguably be seen to be expressed in statements **50** and **68**). Substantial hypotheses/conclusions for the reasons that these statements received a muted response are hard to draw without further information, so these statements were not used to inform the factor interpretations.

7.3 Summary Poster of Results

In addition to the full interpretations for each factor, I constructed shortened versions of each factor summary for use on a summary poster of the research. I presented this online at the Mind and Life Summer Research Institute (conference topic: The Mind, the Human-Earth Connection, and the Climate Crisis) on 6th July 2021. This poster is in **Supplementary Appendix E2**.

7.4 Focus Group Results

The primary purpose of the online focus groups was to help inform my second research question: What engagement or support would young people like around climate change concerns. Participants whose scores correlated strongly with Factor 1 were invited to Focus

Group 1, those who correlated with Factor 2 to Focus Group 2, and Factor 3 with Focus Group 3; the purpose of this was not to classify participants' views as 'belonging' to a particular factor, but to help facilitate the creation of an environment of broad shared understanding between participants. In a similar vein, the focus groups were not used to attempt to verify my interpretations for each factor, but to explore what might be helpful for a person whose views embodied those expressed within each factor. Responses from each of the focus groups are presented below via screenshots from each of their shared spaces on the collaborative whiteboard (Please note that there is a typo on all three focus group boards [**Figures 24-26**] – question 3 contains the word 'some', when it should read 'someone'. None of the focus groups pointed this out, so I hope that it did not affect the participants' understanding of the question).

7.4.1 Focus Group 1 Results

Focus Group 1 reflected upon the perspective expressed by the interpretation of Factor 1 in **Supplementary Appendix C4.3**. All five participants chose to produce one response to each of the three questions; I collated these onto the Group Board (**Figure 18**) and read them out, before each participant used the green leaves to 'vote'/show their support for particular responses (the voting process was relatively loose; whilst each participant had up to three leaves per question to allocate, not all participants used all their leaves).

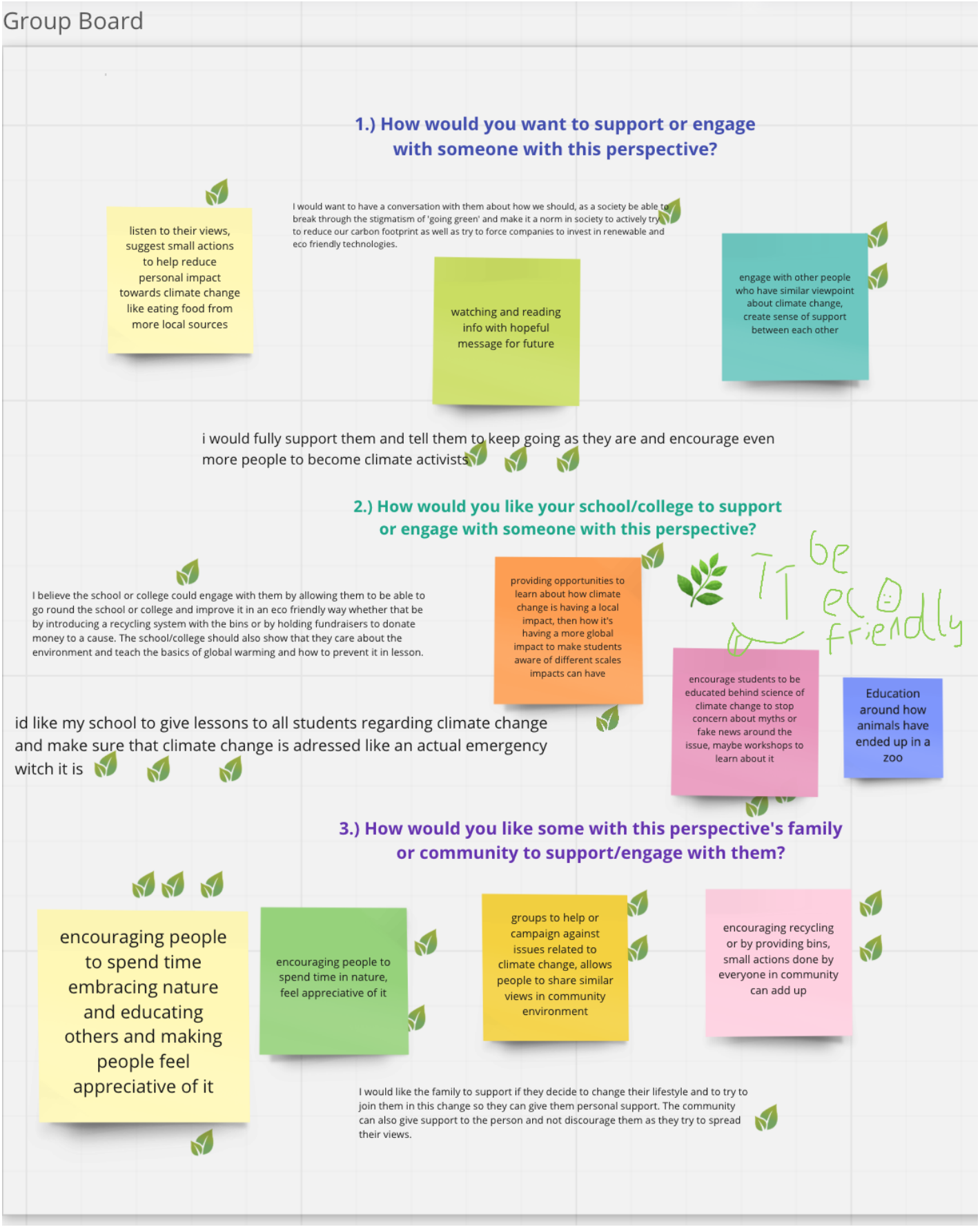


Figure 26: Group Board for Focus Group 1

All participant responses to question 1 (How would you want to support or engage with someone with this [Factor 1] perspective?) were supportive and approving of the Factor 1 viewpoint; indeed the statement with the most votes/support shown began: '*I would fully support them and tell them to keep going as they are'*. There was some focus upon personal actions (possibly reflecting the focus on personal actions within the factor), e.g. '*suggest small actions to help reduce personal impact'*, but slightly greater focus on collective action, e.g. '*make it a norm in society to actively try to reduce our carbon footprint as well as try to force companies to invest in renewable and eco-friendly technologies'* and '*encourage even more people to become climate activists*'. There was also a focus on connection with others, e.g. '*listen to their views'* and '*create sense of support between each other*'.

In terms of school/college support (question 2: How would you like your school/college to support or engage with someone with this perspective?), every suggestion contained at least some focus on education. These included: '*give lessons to all students regarding climate change*', '*teach the basics of global warming and how to prevent it in lesson*', '*providing opportunities to learn about how climate change is having a local impact, then how it's having a more global impact to make students aware of different scales impacts can have*', '*encourage students to be educated behind science of climate change to stop concern about myths or fake news*', and '*education around how animals have ended up in a zoo*'. Changes to the school environment were also suggested: '*allowing them to be able to go round the school or college and improve it in an eco-friendly way*' and some comments suggested that it was important for people to feel that the school was taking climate change seriously: '*the school/college should also show that they care about the environment*' and '*make sure that climate change is adressed like an actual emergency witch it is*' (this last statement received the most votes/support).

For family/community support (question 3: How would you like someone with this perspective's family or community to support/engage with them?), participants focused more upon community support/engagement than family. This may have been related to the factor

description already indicating good support from family. Additionally, looking through the Q-sorts of the focus group participants, all of them indicated that they felt quite supported by their family, which might have reduced the salience of ideas around the need for strong family support around climate change (due to a lack not having personally been experienced in this area). Some suggestions focused on connecting with nature: '*encouraging people to spend time embracing nature*', '*encouraging people to spend time in nature, feel appreciative of it*'. There was some focus on local environmental action: '*encouraging recycling or by providing bins'*, with the justification that '*small actions done by everyone in community can add up'*. There was also an idea of general social support: '*the community can also give support to the person*' and '*allows people to share similar views in community environment*'. Finally, when family was mentioned, both emotional and practical support and collaboration were emphasised: '*I would like the family to support if they decide to change their lifestyle and to try to join them in this change'*.

7.4.2 Focus Group 2 Results

Focus Group 2 reflected upon the perspective expressed by the interpretation of Factor 2 in **Supplementary Appendix C.4.3**. The four participants each produced 1-2 responses for each of the three questions (**Figure 27**).

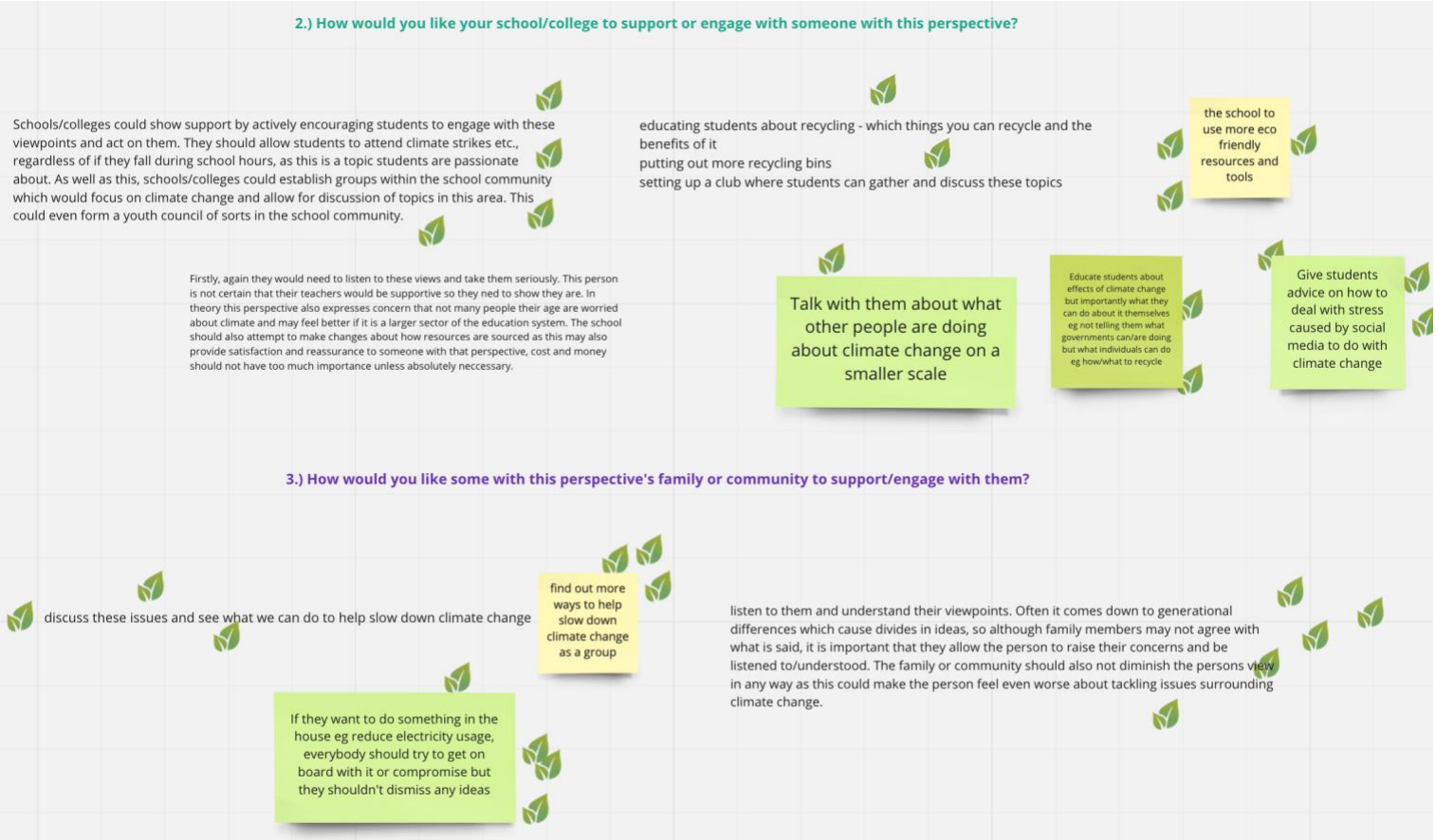


Figure 27: Group Board for Focus Group 2 (Part 2)

Participants suggested a range of ways that they would want to support/engage with young people with the views expressed in Factor 2. For many, a key aspect of support involves taking the time to listen to the person's views: '*it is important for peoples views to be listened to and understood*', '*talk with them about what they feel about it*', '*listen to their views and ask what they wanted to do about it… take the views seriously*'. There were also several suggestions around supporting them to cope with negative emotions, including reassurance: '*If they get stressed at times try and distract them or reassure them'*, '*talking to them and reassuring them*', '*focus on some positive things linked with peoples response to climate change'* and support for emotional processing: '*we should engage with their feelings as this would allow for those people to feel a sense of closure that their feelings are normal*'. There was also some focus on

anger and climate activism: '*encourage them to go on climate strikes and join them in doing so'*, '*exchange knowledge about… climate protests'*, '*attempt to contact those the anger is directed at, even if this only provides satisfaction for the person'*, plus some focus on supporting personal environmental action: '*exchange knowledge about how to be more eco-friendly'*, '*suggest good ecological alternatives'*, '*give them ideas about how to reduce their carbon footprint in a realistic way'*.

For question 2, there was less focus on education about climate change in Focus Group 2 (compared with Focus Group 1). Additionally, when education was measured, the focus was on local/practical action: '*Educate students about effects of climate change but importantly what they can do about it themselves'*, '*educating students about recycling'*, '*Talk with them about what other people are doing about climate change on a smaller scale'*; this appeared to be in response to the distressed expressed within Factor 2 about inadequate government/societal responses. As with Factor 1, there was some focus on actions the school/college could take, including addressing its own environmental impact: '*the school should also attempt to make changes about how resources are sourced*', '*the school to use more eco-friendly resources and tools*', '*putting out more recycling bins'*, and also setting up sources of support such as an eco-club: '*establish groups within the school community which would focus on climate change and allow for discussion of topics in this area. This could even form a youth council of sorts in the school community'*, '*setting up a club where students can gather and discuss these topics'*. Finally, there was also some focus on the school providing emotional support: '*give students advice on how to deal with stress caused by social media to do with climate change*' including support/encouragement for their views: '*this person is not certain that their teachers would be supportive so they ned to show they are'*, '*show support by actively encouraging students to engage with these viewpoints and act on them. They should allow students to attend climate strikes*'.

For question 3, the response that received the most votes/support focused upon the importance of feeling that one's concerns are listened to, understood, and not dismissed/disregarded by one's family:

"listen to them and understand their viewpoints.
Often it comes down to generational differences which cause divides in ideas,
so although family members may not agree with what is said,
it is important that they allow the person to raise their concerns and be listened to/understood.
The family or community should also not diminish the persons view in any way
as this could make the person feel even worse about tackling issues surrounding climate change."

The above response is notable in that it explicitly addresses the (potential) emotional impact upon a young person of having their concerns dismissed/rejected by their family. In contrast, the other responses appeared to assume families would (potentially) be more supportive of young people's concerns, so recommended collective practical actions: '*find out more ways to help slow down climate change as a group*', '*discuss these issues and see what we can do to help slow down climate change'*, though a second response also acknowledged that there could be potential tension between different viewpoints about climate change held within a family: '*If they want to do something in the house eg reduce electricity usage, everybody should try to get on board with it or compromise but they shouldn't dismiss any ideas*'.

7.4.3 Focus Group 3 Results

Focus Group 3 reflected upon the perspective expressed by the interpretation of Factor 3 in **Supplementary Appendix C.4.3**. Only two of the main study participants were able to participate in Focus Group 3, so the voting system was not used, though the participants did briefly discuss their responses with each other once they had been added to the group board. Their responses are shown in **Figure 28**.

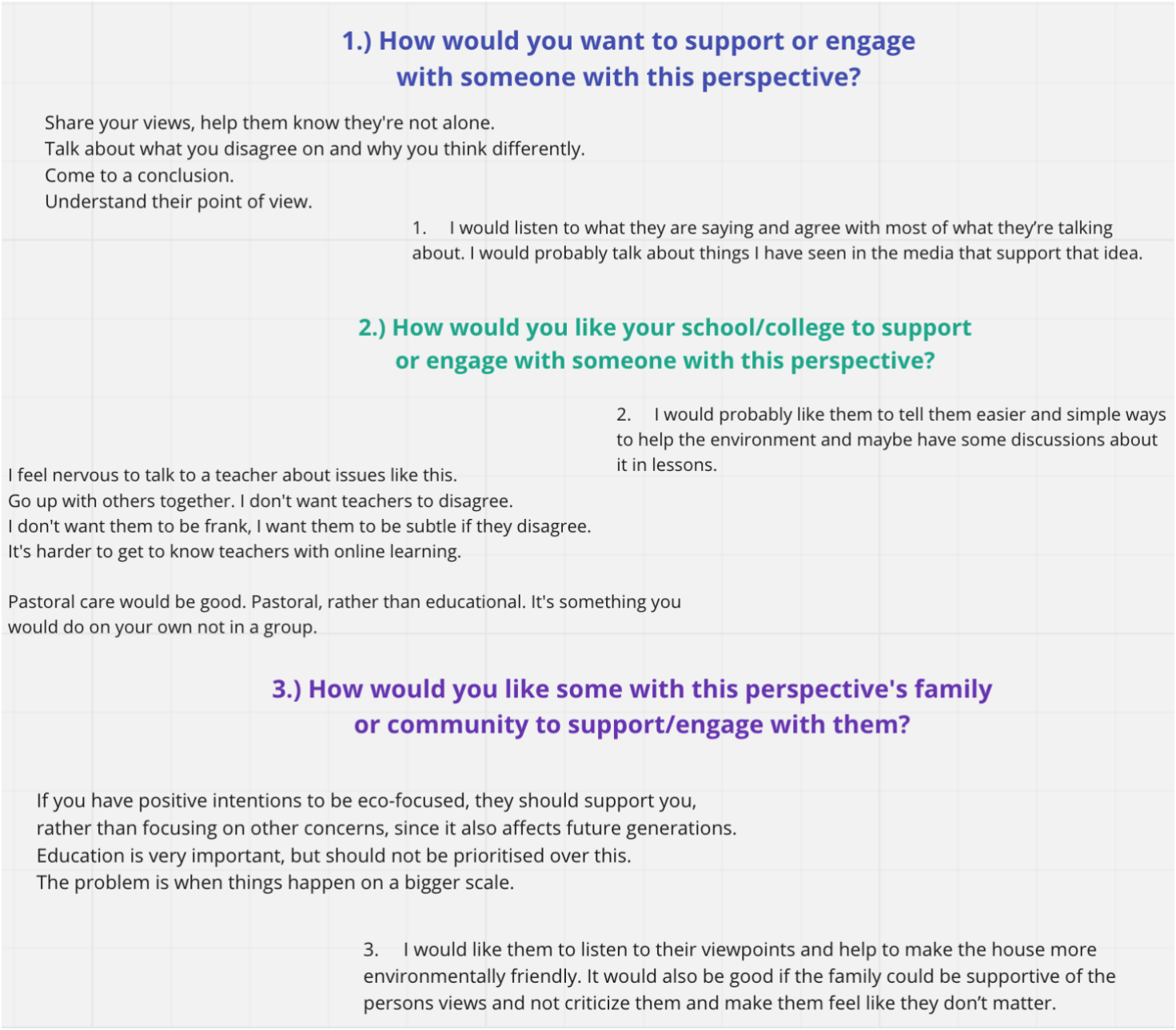


Figure 28: Group Board for Focus Group 3

When responding to question 1 the participants both appeared to interpret the question as exploring what they would do if they met someone who expressed the Factor 3 viewpoint. Given that both participants' Q-sorts loaded relatively strongly onto this viewpoint, it's unsurprising that relative agreement was expressed: '*I would listen to what they are saying and agree with most of what they're talking about*'. At the same time, one participant felt it was important to explore if there were differences between their own views and the factor viewpoint: '*talk about what you disagree on and why you think differently. Come to a conclusion*'. Both participants seemed to feel that supporting and relating with the person

expressing the Factor 3 viewpoint would be important: '*understand their point of view'*, '*help them know they're not alone'*, '*I would probably talk about things I have seen in the media that support that idea'*.

The two participants had quite contrasting responses to question 2. One participant seemed to trust that teachers would be supportive and able to help, so emphasised education, including discussions in class: '*I would probably like them to tell them easier and simple ways to help the environment and maybe have some discussions about it in lessons'*. In contrast, the other participant was uncertain about whether their teacher would be supportive, and appeared to anticipate that they might reject their concerns: '*I feel nervous to talk to a teacher about issues like this… I don't want teachers to disagree. I don't want them to be frank, I want them to be subtle if they disagree*'. The participant expressed some distance in their relationship with teachers, commenting: '*It's harder to get to know teachers with online learning'*. However, they appeared to feel more confident that at least some of their peers might share their concerns, since they suggest that they could '*go up with others together [to speak with the teacher]*'. This participant also felt that 1:1 pastoral care/support in which they could speak about their concerns/worries would be helpful: '*Pastoral care would be good'*.

Both participants focused upon families for question 3. Each appeared to anticipate some potential resistance or rejection from family members. Some of the anticipated resistance was towards practical changes within the home: '*If you have positive intentions to be eco-focused, they should support you, rather than focusing on other concerns'*, *'I would like them to listen to their viewpoints and help to make the house more environmentally friendly'*. However, both participants also asked for support, whilst feeling the need to justify why the support was important; for practical reasons: '*they should support you… since it also affects future generations. Education is very important, but should not be prioritised over this. The problem is when things happen on a bigger scale'* and for emotional reasons: *'It would also be good if the family could be supportive of the persons views and not criticize them and make them feel like they don't matter*'. Both of these comments highlight the potential emotional impact that the support/engagement from family members around climate change can have upon young people.

8 Discussion

This section will explore the implications of my results and how they could be used to inform the practice of Educational Psychologists. I will begin by summarising the similarities and differences between each factor by using *conceptual space diagrams* to help illustrate the relationships between some key variables (**Section 8.1**). I will then summarise what support participants in the focus groups felt would be helpful for each factor (**Section 8.2**), before considering how educational psychologists can support this, with a systemic focus on wellbeing within schools (**Section 8.3**).

8.1 Cross-Factor Comparisons using Conceptual Space Diagrams

Whilst it is almost always helpful during the process of factor interpretation to attend closely to statements ranked highly positively or negatively within a factor array, Watts & Stenner (2012) also emphasise the importance of investigating the placement of statements

when they are ranked higher or lower within a particular factor '*than by any of the other study factors'* (p.153). This makes comparisons between factors important, since it means that the statements become framed as relatively highly positively/negatively ranked *in relation to the other study factors*, rather than in relation to an abstracted 'objective' standard. Of course, it could be argued that his is how many viewpoints/opinions are assessed/evaluated within daily life – for example, the concept of the '*Window of discourse/Overton window*' within political science (Lehman, 2010) is predicated on the idea that at any point there is a limited range of opinions on an issue that will be considered acceptable, but that this range can shift over time, which implies that viewpoints are assessed according to how they relate to the range of opinions within a system of discourse, rather than being considered in a vacuum or measured against an 'objective' standard.

The consequence of this is that, if further factors had been identified in the study (e.g. a factor that embodied a 'denialist' perspective and/or a 'disengaged' perspective within the current study), this would have impacted upon the interpretation of statement positions for Factors 1-3. The analysis of the similarities and differences between the three factor positions (below) should therefore help highlight what makes each factor position distinctive for the current sample of participants, but this does not exclude the possibility that a factor embodying each position would be likely to be considered distinctive in some other ways if it were to emerge within the context of a different sample that contained factors different to the other ones identified in the current study (though I would not want to assert a completely relativist or social constructivist position on such reinterpretations).

Watts & Stenner (2012) recommend the use of *conceptual space diagrams* to assist in illustrating the differences between each factor (p.184-5). Such diagrams are not statistically calculated; they are constructed as pictorial representations of how the viewpoints may relate across two conceptual axes. These diagrams can help provide an overall summary of how all three factors relate across several simplified conceptual variables and can also help highlight potential relationships between high/low scores across particular variables. I have therefore produced some conceptual space diagrams to summarise the factor positions (**Figures 29-31**):

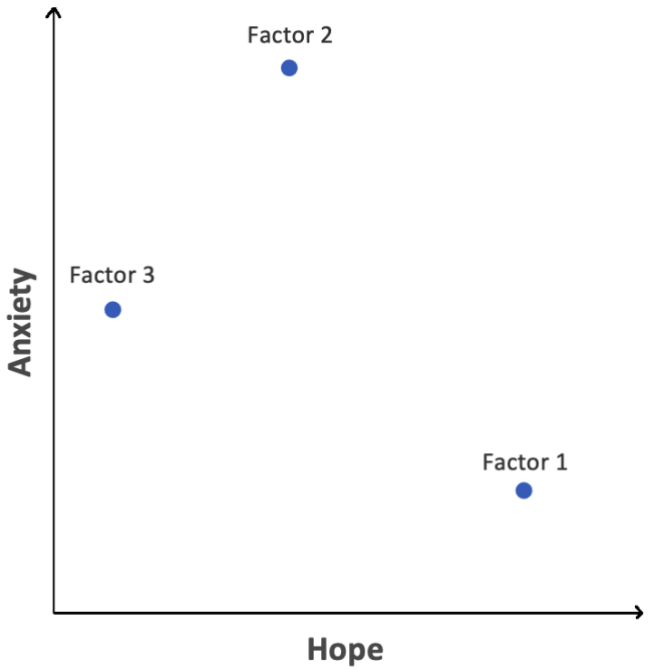


Figure 29: Conceptual Space Diagram of Relative Anxiety and Hope for each Factor

The first conceptual space diagram (**Figure 29**) illustrates the relative anxiety and hope expressed by each factor. In this context, '*hope*' refers to '*hope about tackling/mitigating climate catastrophe*'. **Section 4.2** and **Section 6.4.3** reference an idea from psychoanalytic thought presented by Miceli & Castelfranchi (2005) that anxiety is at its core an 'anticipatory emotion' directed towards '*a possible and uncertain danger*' (p.294), which invokes a highly unpleasant '*mixture of fear and hope*' (p.295) about the potential threat. Weintrobe (2013, p.34-40) argues that in order to reduce/manage such anxiety we can adopt coping mechanisms such as 'splitting' (Klein, 1946), in which we adopt either a naïve optimism that the danger will be solved, or a nihilistic hopelessness that the danger is inevitable. Both coping mechanisms act to reduce feelings of anxiety by reducing the uncertainty; naïve optimism by increasing hope and nihilistic hopelessness by reducing it. In contrast, if neither defensive mechanism is used, fear and hope may remain in more of a balance, making anxiety more likely to persist (Klein [1946] would term this a 'depressive' position [though 'disenchanted' could arguably be substituted for 'depressive'], in contrast with the naïve or hopeless defensive positions, which she would term 'schizophrenic' positions).

Whilst ideas around anxiety and splitting already influenced my final interpretation of Factor 3, I feel that they also potentially hold relevance for Factor 1 and Factor 2. As shown in **Figure 29**, Factor 1 is a position of high hope about our potential to tackle climate change (**33**, -3), (**40**, -5) and low anxiety about the future (**10**, -1), (**13**, -5). Whilst I will remain neutral on the question of whether the optimism could be characterised as naïve (partly due to feeling uncertain myself), it fits well within a framework in which significant hope can counteract the sense of uncertainty that can feed high anxiety (plus Ojala's [2012, a-c] ideas that hope correlates with greater problem-focused coping). In contrast, Factor 2 is in a position of medium hope and very high anxiety about the future. This can be explained by the factor expressing much greater uncertainty about whether climate change will be tackled; there is a sense that it is possible, but that time is rapidly running out (**69**, +3), (**18**, -4), (**37**, -4). This '*mixture of fear and hope*' about a '*possible and uncertain danger*' is what Miceli & Castelfranchi (2005) characterise as the key component of anxiety. Finally, as first explored in **Section 6.4.3**, Factor 3 appears characterised by low hope about our potential to tackle climate change. Whilst intuitively this might result in higher levels of negative emotions, in the case of anxiety, in theory the low hope can reduce uncertainty about the danger (which is now more likely to be seen as inevitable), which can potentially reduce the overall anxiety experienced, transforming the emotion into something more akin to despair or resignation (possibly combined with anger/frustration).

However, this is not quite sufficient on its own to characterise the relationship between the three factor viewpoints, since some other variables also appear to interact with the hope and anxiety relationship within the current study. I have therefore constructed some three-dimensional conceptual space diagrams to help facilitate exploration of these relationships.

One key (set of) variable(s) that may help add nuance to each factor position is *psychological distance from climate change*. As covered in **Section 4.3.1**, Spence et al. (2012) first applied Liberman & Trope's (2008) work on '*Construal level theory'* to investigate whether people's beliefs/narratives that framed climate change as psychologically distant posed a barrier to their meaningful engagement with concerns around climate change. Rather than limit this engagement to environmentally-friendly behaviour (as in the original study), the current study treats the psychological closeness/distance of the concerning aspects of climate change as another facet of participants' overall experience/engagement with such concerns. The key facets of psychological

distance that were identified are: geographical distance, temporal distance, social distance, plus uncertainty/hypotheticality.

Figure 29 suggests that hope about the inevitability of climate catastrophe may have a roughly quadratic relationship with anxiety due to the influence of the uncertainty upon hope (i.e. when climate catastrophes seen as inevitable, hope is lower and anxiety is lower, if they are seen as likely but potentially avoidable if urgent action is taken, hope is middling and anxiety is very high, and if they are seen as less likely, hope is high and anxiety levels are low – the relationship between anxiety and hope as influenced by uncertainty therefore appears to follow an inverted 'U' shape, which is referred to as a quadratic relationship). However, the idea of psychological distance can potentially add interesting nuances to this relationship (though temporal distance will be excluded, due to it being a consensus statement with which all three factors disagreed). Factor 1 expresses significant concern about climate change, but the concern appears to be focused upon the impact of climate change upon 'the poorest countries' (**24**, +4), and also upon the natural world (**44**, +4), (**45**, +5), whilst expressing little/no concern around being personally affected (**25**, 0), (**42**, -1). Consequently, from a personal perspective Factor 1 could be characterised as having relatively high psychological distance due to perceiving significant geographical and social distance. This is despite them scoring low on temporal distance (**32**, -4) and uncertainty (**30**, -5), since all three groups scored relatively low on this. My hypothesis is that the personal distance from climate change expressed by Factor 1 could play a role in their low anxiety around climate catastrophes.

In contrast, whilst Factor 2 expresses some concern about people in 'the poorest countries' (**24**, +3), they also express significant concern around being personally affected and not being able to cope (**25**, -5). This suggests that Factor 2 has low geographical and social distance (plus low temporal distance, since they believe they'll be affected in their lifetime and that changes are required now), so low overall psychological distance. My hypothesis is that this plays a significant role in their high anxiety around climate catastrophes, particularly when it interacts with the sense that catastrophes could be averted but that urgent action is needed.

Finally, whilst Factor 3 also expresses some humanitarian concern (**24**, +3) (and also ecological concerns [**43**, +5], [**17**, +4]), they appear in a manner similar to Factor 2 to believe that they are likely to be personally affected (**33**, +3), (**18**, +2), (**40**, -1) which suggests low geographic distance. It could also suggest low social distance, but a major difference between factors 2 and 3 is that Factor

3 seems to have a significantly greater sense of being able to cope with any challenges due to climate change (**25**, 0), (**69**, -1), including social collapse (**19**, +1). This seems to provide them with a form of social psychological distance, since the negative impacts of climate changed are framed as affecting 'others' rather than the self; consequently Factor 3 appears to have greater psychological distance towards the threat of climate change than Factor 2, despite having lower hope in catastrophes being able to be prevented. My hypothesis is that this plays a significant role in their lower anxiety around climate catastrophes; even though catastrophes are considered to be inevitable, their consequences have become framed in a way that is less anxiety-inducing for this perspective.

The relationship between overall psychological distance for each of the factors (as described above) and the hope & anxiety expressed by each is illustrated by the three-dimensional conceptual space diagram below (**Figure 30**):

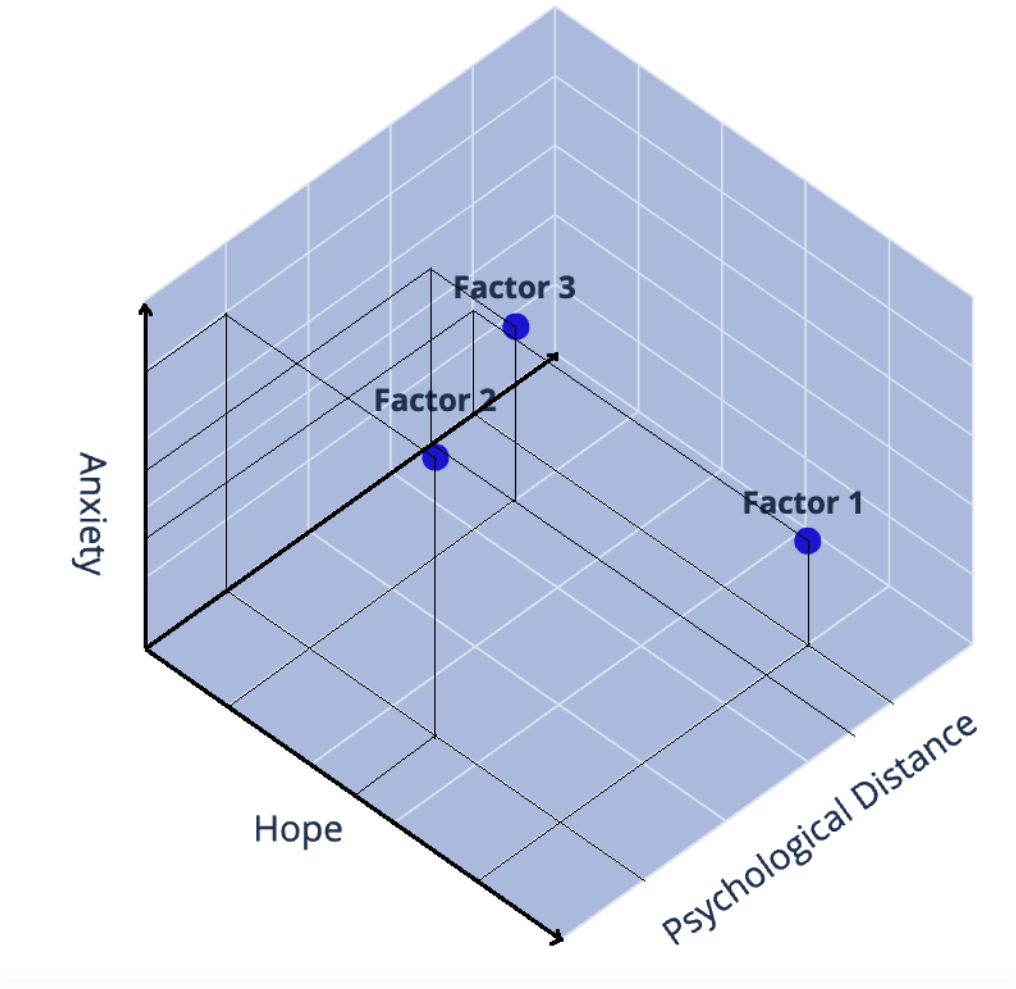


Figure 30: Three-Dimensional Conceptual Space Diagram of relative Anxiety, Hope, and Psychological Distance for each Factor

It is possible that Factor 3's framing of climate change may also be influenced by a process which Leahy et al. (2010) calls 'two-track thinking'. Threadgold (2012) interviewed young people in Australia about climate change and identified a process of compartmentalisation in which participants could simultaneously hold 'apocalyptic visions of the future' (p.12) within their lifetimes, whilst also envisioning positive personal futures (relating to university study and careers) which remained seemingly insulated from their beliefs about the social/economic impact of climate catastrophes. Thurgood characterised this 'disjunction between the individual and the global' (p.8) as consisting of two 'tracks', one containing personal '*narratives of the self*' (Giddens, 2020, p.357) such as narratives around future careers and the other track focusing on wider global/social/environmental concerns, within which 'the critical nature of environmental problems is acknowledged' (Threadgold 2012, p.10).

Factor 3 potentially embodies a process of two-track thinking quite well. In the personal track there is a rejection of the idea that their opportunities will be limited by climate change (**42**, -1), the assertion that climate change will not affect their decision whether or not to have children (**41**, -3), and a rejection that climate change may introduce an element of insecurity to their lives (**69**, -1). Conversely in the global/societal track there's the belief that climate change will have impacts in their lifetime (**32**, -5), the concern that climate change is inevitable due to overpopulation (**66**, +5), and the apparent belief/excitement about collapse (**19**, +1). The two perspectives/narratives/tracks may relate in some ways, but a relative disjuncture between them appears quite apparent.

Whilst **Figures 29 & 230** arguably explore perspectives and coping mechanisms that are 'within-person', microsystemic factors such as social support are also likely to interact upon young people's engagement. This is explored within existing literature; as covered in **Section 4.3.1**, Ojala & Bengtsson (2018) reported that both the family and friends of young people (Swedish teenagers) can influence how they manage negative emotions around climate change. Supportive/solution-orientated communication correlated with young people finding ways of coping grounded in hope, whilst dismissive/'doom-and-gloom oriented' communication correlated with young people seeking to deemphasise the problem. Similarly, Ojala (2015a) reported that when pupils perceived their teachers as accepting of their concerns around climate change they displayed greater hope grounded in constructive responses (problem-focused and meaning-seeking), whilst pupils who perceived their teachers as dismissive were more likely to derive hope through denial/deemphasis of the problem (due to social learning about which social attitudes are considered appropriate plus judgements of whether meaningful support for emotional processing would be provided).

The relationship between perceived social support, anxiety, and hope expressed by each factor is shown in **Figure 31**. Factor 1 indicated that they felt comfortable speaking with family, teachers, and friends around climate change. They also expressed higher levels of hope and lower anxiety. Whilst causal relationships cannot be verified solely on the basis of the current study data, it is conceivable that the social support and hope/anxiety may interact with each other; for example, in the case of Factor 1, a hopeful/optimistic approach towards tackling climate change may be less likely to cause anxiety in others (family/friends/teachers), potentially reducing the likelihood of conversations/interactions regarding climate change feeling negative/unsupportive, whilst their sense of being well-supported may simultaneously support their hopeful/optimistic outlook. In comparison to Factor 1, factors 2 and 3 indicated less confidence that their family, teachers, and peers would be supportive. In both cases, the relative social isolation with regards to their concerns is unlikely to help with their emotional processing; Factor 2 lacks people whom they feel understand their concerns, when they may benefit from support to help them manage their anxiety, whilst Factor 3 is managing anxiety through a process of relative 'doomism'/hopelessness and potential psychological distance (one consequence of which is that it can leave them feeling disconnected from what they perceive of as an absurd world [**38**, +5] that part of them is excited to see collapse [**19**, +1]).

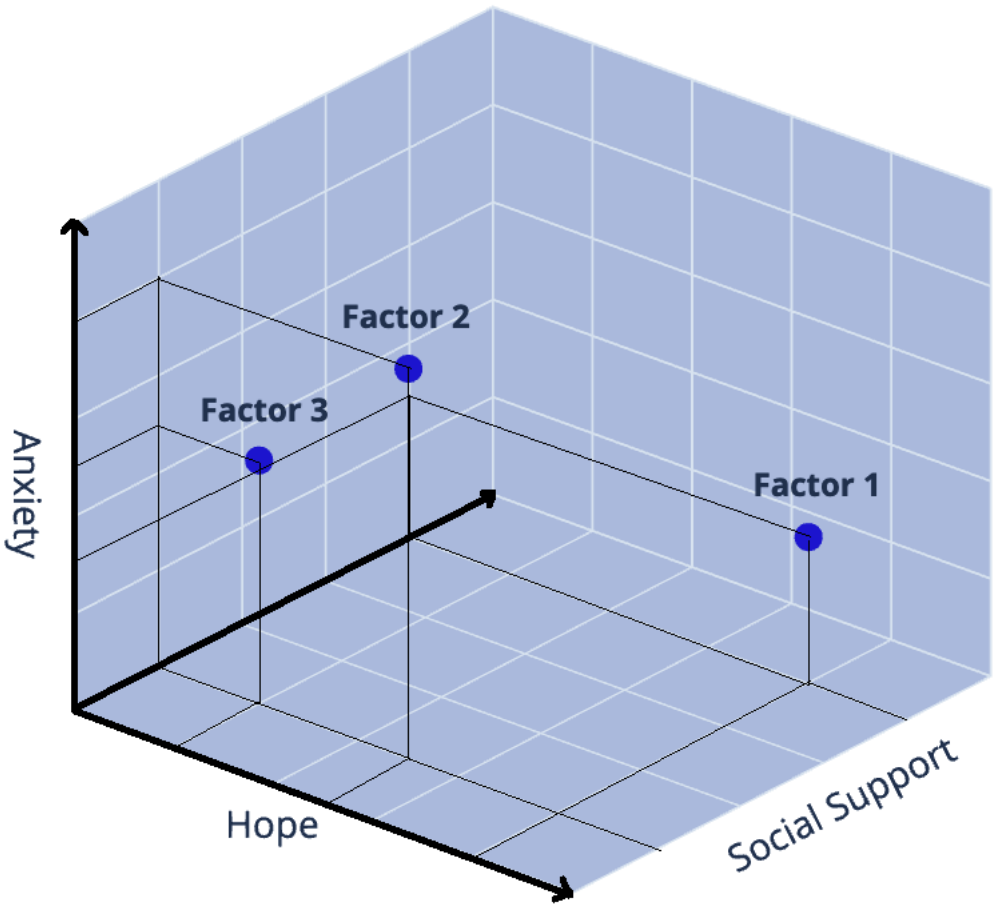


Figure 31: Three-Dimensional Conceptual Space Diagram of relative Anxiety, Hope, and Social Support for each Factor

Two final sets of variables that may be worth mentioning are problem-focused coping vs. meaning-focused coping and a systemic focus for change vs. an individual focus upon making eco-friendly changes as a person/household. For each pair of variables it is debatable whether they would be most appropriately considered separately, or whether they can be framed as occupying a single axis; they certainly seem to relate (so are not independent variables), but simultaneously it's conceivable that a factor/viewpoint could be high on both variables (i.e. it could engage in both problem-focused coping and meaning-focused coping, or potentially neither, and it could emphasise the importance of both systemic changes and personal changes, or potentially neither). However, *conceptual space diagrams* are illustrative rather than direct depictions of data and when Watts & Stenner (2012, p.184) illustrate the use of such diagrams, they are happy to put the variables self vs. other on a single axis (with committed vs. uncommitted) on the other axis, when it would be conceivable for a factor to demonstrate high commitment to self plus high commitment to other (in a relationship), or low commitment to both self and other but high commitment to the relationship (e.g. in an unhappy relationship where the couple stay together because they want to provide a stable home for their children?). This suggests that the positioning of two variables at opposite ends of an axis is justified if it can capture the data, even if other configurations of the variables (e.g. as two separate dimensions) are possible.

In the current study, when factors emphasised problem-focused coping, meaning-focused coping was deemphasised (and vice-versa), and when factors emphasised the importance of personal changes, the importance of systemic changes were deemphasised (and vice-versa). I have therefore decided to display each pair of variables in opposition to each other along a single axis (which I hope aids clarity of interpretation), rather than displaying each variable as a separate dimension (which would require two three-dimensional conceptual space diagrams).

When exploring the coping methods through which young people manage their negative emotions around climate change, Ojala (2012a-c) identified two distinct styles of coping. Applying a theoretical framework developed by Folkman (2008) to questionnaires and interviews undertaken with Swedish teenagers, Ojala (2012a-c) reported that young people manage their anxiety/worry around climate change in several ways:

1. Problem-focused coping, which "*is about addressing and trying to do something about the problem/stressor causing the negative emotions"* (Ojala, 2012b, p.539); for climate anxiety this may (for example) involve reducing one's own (or one's family's) emissions or engaging with climate activism due to the belief that these can make a difference.
2. Meaning-focused coping, which "*can involve finding meaning in a difficult situation, drawing on values and beliefs, and using strategies whereby one acknowledges the threat but re-appraises it in a more positive manner and thereby makes it more manageable*" (Ojala, 2012b, p.540); for climate anxiety this may (for example) involve recycling, spending time appreciating nature (and/or society), or engaging with climate activism not because it will necessarily make a difference, but because 'it's the right thing to do'.

- (Ojala [2012b, p.539-540] also notes a third form of coping called 'emotion-focused' coping, in which negative emotions are dealt with through distraction or denial of the problem. This form of coping has not been included within the current *conceptual space diagram* because denial was low amongst all three factors, and distraction/withdrawal would occupy a separate axis to the problem/meaning focused coping axis, unnecessarily complicating the diagram. Additionally, there is some relationship between emotion-focused coping and meaning-focused coping; both assume that the source of anxiety cannot be solved, but emotion-focused coping prioritises avoidance of negative emotions whilst meaning-focused coping prioritises activation of positive emotions [which may either lessen or exist alongside negative emotions]).

Within the current study, Factor 1 displays high levels of hope/belief that climate change will be tackled and expressed greatest agreement with the statement '*Taking actions to reduce my ecological impact helps me to manage how I feel about climate change*' (**21**, +2), and attaches low judgement to ecological values (**52,** +2), (**62**, -3), therefore showing relatively high levels of problem-focused coping. Factor 2 embodies the belief that action is urgently needed to avert catastrophe(s) and gains least comfort from personal actions (**21**, -2), or supporting/protecting their family/friends (**37**, -4), but also expresses the least desire to be eco-friendly unless it has an impact (**23**, +1) and the least connection with the natural

world (**43**, 0), (**44**, 0), therefore showing low problem-focused coping and low meaning-focused coping (factor 2 also shows the most emotion-focused coping, expressing the greatest need to 'switch off' from thinking about climate change [**27**, +3] and distancing themselves from identifying as someone who engages with climate change concerns [**49**, -2]). Factor 3 embodies the belief that climate catastrophes are inevitable, which means they would believe that problem-focused coping that attempts to stop them will be unsuccessful and feel that *'it's pointless thinking about it'* (**33**, +2). However, they express significant desire to be ecologically responsible '*regardless of the wider difference it makes'* (**23**, +3) and show considerable concern for the natural world (**17**, +4), (**43**, +5), so could be characterised as having low problem-focused coping and higher meaning-focused coping.

In addition to coping styles/strategies, the factors vary in the relative weight that they assign towards large-scale systemic (societal/international) changes to tackle climate change, compared with the importance of small-scale individual (lifestyle/consumer) changes. The weight assigned to each is of particular relevance to problem-focused coping, since it is likely to impact upon whether people favouring this style of coping draw reassurance from their actions as individual (ecologically-friendly) consumers, or as campaigners/activists pushing for large-scale change. Factor 1 assigns significant weight to individual actions (**21**, +2), (**22**, +5), whilst assigning little significance to systemic factors that may make eco-friendly behaviour harder (**35**, +1), (**48**, -2) and attaching little importance to systemic changes (**51**, +1), (**52**, +2), so leans heavily towards personal action. Factor 2 shows some slight interest in individual actions (**22**, +1), but also expresses scepticism about individual changes becoming widely adopted (**31**, -1). Importance is attached to protest (**52**, +5) and climate legislation (**51**, +4), suggesting a focus on larger-scale systemic changes. Factor 3 appears to actively reject the importance of individual actions (**22**, -3), (**58**, -5), instead emphasising how our current system makes eco-friendly behaviour difficult (**35**, +4) or insufficient (**66** +5). Instead, importance is attached to climate legislation (**51**, +4) and adaptation (**18**, +3).

Figure 32 illustrates how an emphasis on problem/meaning focused coping and personal/systemic change interacts for each factor position:

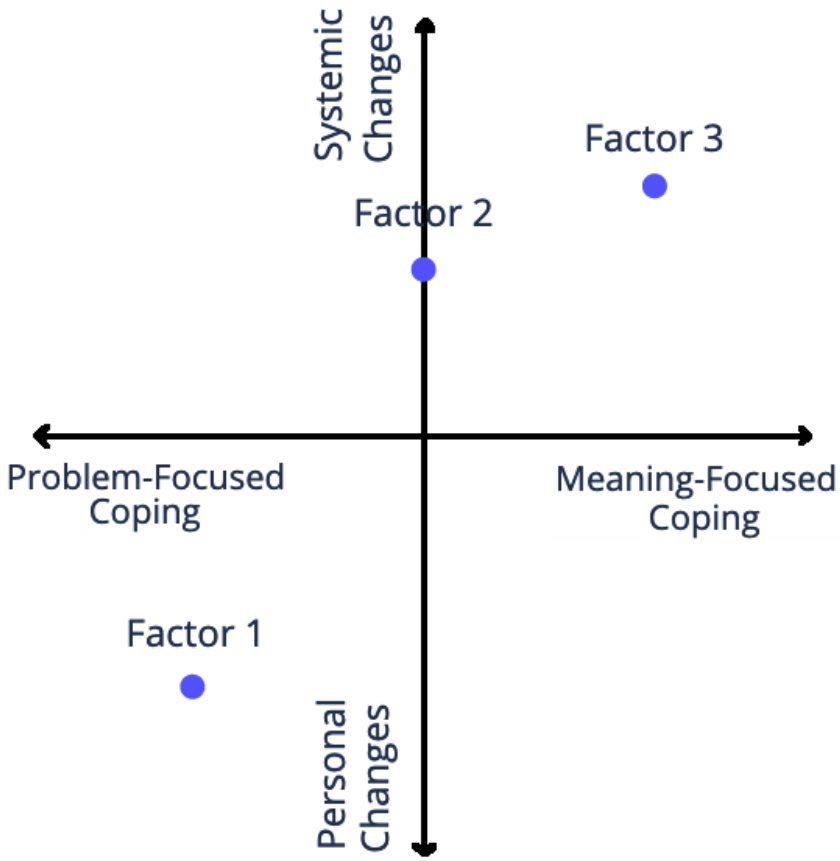


Figure 32: Conceptual Space Diagram for each Factor of relative Problem-Focused Coping vs. Meaning-Focused Coping and relative focus upon Personal Actions/Changes vs. Systemic Actions/Changes

As illustrated above, Factor 1's problem-focused coping is primarily centred upon personal actions. This is likely to be a relatively effective coping strategy for this factor, since they have significant hope that climate catastrophes can be averted, plus changes to one's own life are likely to be far more tangible and easy to track than systemic changes, likely increasing their potential to help Factor 1 feel positive in the face of their concerns about climate change. Factor 2 engages in relatively little problem-focused or meaning-focused coping (so is on the central axis) and assigns more weight to the importance of systemic changes. This strategy is only likely to be effective at reducing their anxiety if large-scale systemic changes occur. Factor 3 prioritises meaning-focused coping and rejects individual action in favour of large-scale systemic action. Their apparent acceptance of the likelihood of climate catastrophes may help reduce their anxiety (as discussed earlier), plus their emphasis on nature and meaning-focused coping may help them experience more positive states that could potentially be more resilient to any future negative consequences of climate change in comparison with Factors 1 and 2.

8.2 What Support did Young People feel would be helpful? (Research Question 2)

Overall, there was considerable overlap between the suggestions provided in each of the three focus groups, though there were some differences of emphasis in each group. In this section I will summarise the main themes that emerged across the groups for each of the three questions that were explored using the nominal group technique. The first question focused on the support that focus group participants would personally want to provide for someone expressing each factor viewpoint:

- The most significant theme (expressed across Focus Groups 1, 2, & 3) was that they would want to make sure they take the time to properly *listen* to them and hear the views that they are expressing. Groups 1 & 3 focused upon *showing support for the views* (and discussing differences, if any, in group 3), whilst 2 & 3 highlighted the importance of *taking their views seriously*.
- All three groups provided some suggestions for emotional support; group 1 focused on empowerment (‘*tell them to keep going as they are’, ‘create a sense of support between each other’*), group 2 on support for processing negative emotions (‘*engage with their feelings’, ‘reassure them’, ‘focus on some positive things’*), and group 3 on reducing isolation (‘*help them know they’re not alone’*).
- Groups 1 & 2 also suggested providing advice around actions that people could take, providing suggestions around information and support for climate activism and also personal actions/changes.

Question 2 focused on the support that each group would like from their school/college for someone expressing each factor viewpoint:

- All three groups included education as a significant theme, with participants expressing that it was important for school to help them both understand climate change and to learn what they can do about it. Groups 2 and 3 focused more on

wanting schools to help them learn what they could do, whilst group 1 focused upon learning more about climate change and helping people avoid '*myths or fake news*'.

- The second major theme was that all three groups wanted environmentally-friendly changes to be made by their schools. Each group touched upon collaboration with peers; group 1 focused on student-led projects, group 2 suggested an eco-club, and group 3 suggested peer support for speaking with teachers about climate change. Group 2 also suggested the formation of a school '*Eco-council'*, which presumably could help support pupil voice around such issues. In groups 1 & 2 it seemed important to participants that schools were genuine and not disingenuous or hypocritical about embracing environmental values; they should '*show that they care about the environment*' and '*attempt to make changes about how resources are sourced*', *walking the walk* as well as *talking the talk*.
- Finally, it was important for pupils to perceive teachers as supportive of their views (this was highlighted in groups 2 & 3, but it's possible that it simply didn't occur to group 1 that their teachers might not be supportive). Group 2 stated: '*this person is not certain that their teachers would be supportive so they ned to show they are'*, whilst one participant in group 3 actively anticipated rejection: '*I feel nervous to talk to a teacher about issues like this… I don't want teachers to disagree'*. Group 3 also suggested that 1:1 pastoral support/care could be helpful.

Question 3 focused on the support that each group would like from their family or community for someone expressing each factor viewpoint. Group 1 primarily focused on the community (though did mention family), whilst groups 2 & 3 primarily focused on families:

- The main theme for groups 2 & 3 was the importance of families listening to young people and not dismissing/rejecting their views. Both groups expressed concern (and implied hurt) around young people having their views minimised, dismissed, or rejected outright. There appeared to be an implied power imbalance in which the family were seen as arbitrating whether the young person's concerns around climate change were valid ('*it is important that they allow the person to raise their concerns and be listened to/understood'* [Focus Group 2]*, 'It would also be good if the family*

could be supportive of the persons views and not criticize them and make them feel like they don't matter' [Focus Group 3]).

- More positively, groups 2 & 3 expressed desires for discussions between families and young people, with the hope that this could lead to collaborative actions or support as a family.
- All 3 groups suggested that practical/local changes could be made in the home.
- Group 1 also emphasised the importance of discussion and actions within the local community, plus time spent in nature.

Across all three areas (personal, school, and family/community support), the most common theme to arise was the importance of young people having their concerns listened to, understood, and respected (comments relating to this theme also often received some of the largest number of 'votes'/expressions of support). Also commonly mentioned were themes around providing young people with emotional support (encouragement, support to process emotions), plus active collaboration/engagement with young people around projects/changes that relate to their concerns. Education, information-sharing, and open discussion around issues were also considered important by multiple participants.

How should Educational Psychologists engage with and apply such information in their practice? The next section (**8.3**) will explore how Educational Psychologists can incorporate insights about the factor perspectives that groups of young people might hold, plus insights from the focus group comments into a systemic approach to thinking about and supporting mental health.

8.3 How Can Educational Psychologists Support Young People with Concerns around Climate Change?

The results of this thesis have highlighted three different ways in which young people may engage with concerns around climate change, but there are also almost certainly other ways that young people may engage that did not emerge from the current sample (for example scepticism/denial and complete disengagement from the topic). Consequently, a narrow or simple one-size-fits-all model of support around this issue is likely to only be helpful for a subset of young people. Additionally, as noted in **section 4.3.2.2**, many young people may experience a range of other concerns and challenges within their lives (both individual/interpersonal and also relating to wider societal concerns), which could also affect their overall resilience and mental health. When considering support for young people with concerns about climate change, it therefore makes sense to think of the impact of young people's forms of engagement within a broader framework that is able to address multiple challenges and protective factors that may promote or deplete mental health. For this section I will therefore return to Macdonald and O'Hara's *'Ten Element Map of Mental Health'* (1998) (outlined in **Section 4.3.2**, with the summary diagram of the model re-presented in **Figure 33** below) and use this as a framework for considering how Educational Psychologists can guide schools into thinking about how they can systemically support their pupils who may be experiencing concerns around climate change.

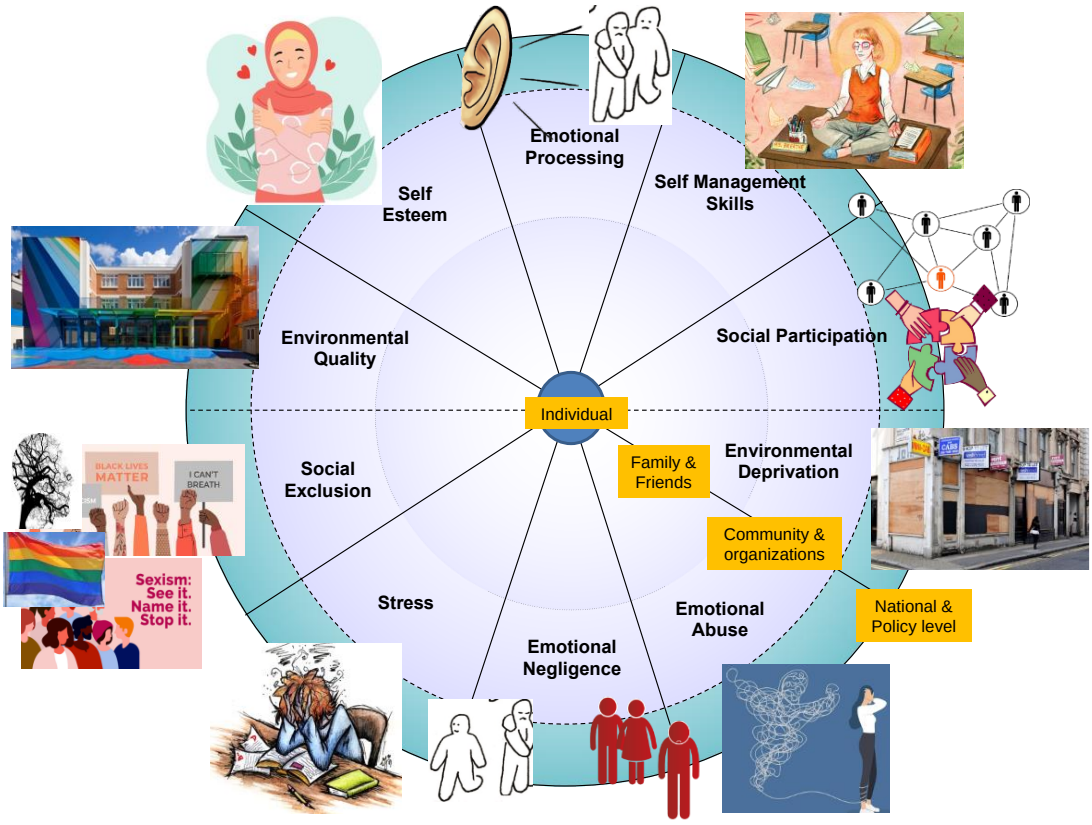


Figure 33: MacDonald and O'Hara's (1998) Map of Ten Elements of Mental Health

Educational psychologists who are asked by a school to help support students with concerns about climate change can use the ten-element map as an initial framework to support their exploration with the school and students (plus their parents/carers if possible) around what the students would find useful or supportive. Of course, this need not be solely a reactive initiative; as reported by Hickman (2019), adults can sometimes assume that young people are not particularly concerned about climate change, only to discover that they experience high anxiety about their futures. In their conversations with schools, educational psychologists may therefore want to consider proposing an open-discussion session in which any students who want to attend are invited to share their beliefs, concerns, and emotions around climate change within a supportive and non-judgemental environment (with the educational psychologist and/or supportive staff-members facilitating). In addition to hopefully helping students feel that their voices will be heard on the topic, such discussions should also help to provide useful information and context around how students within the school feel about climate change, which can feed into further interventions and action-plans.

One area that the current research cannot yet fully address is how stable each form of engagement (i.e. each factor position) is for each young person or group of young people over time, nor what proportion of young people may fall into a particular position. This is not indicative of a fault in the methodology; as outlined in **section 5.2.2** (plus Watts & Stenner 2012, p.72 and Brown 1980, p.192), Q methodology is simply designed to establish the existence of factor positions that may be adopted by people (and is a robust method for doing this); it is not designed to establish the proportion of a population that are likely to adopt a particular factor position. Additionally, Q methodology is also not designed to establish whether people who adopt a particular factor position at one point in time will continue to adopt the same position in the longer-term (or even later the same day), or whether they are more likely to shift to another position (or switch back and forth between positions) relatively quickly (though from a statistical perspective, r-methodological designs are also only able to explore this if administered multiple times over a longitudinal study).

The topic of whether young people's engagement with concerns around climate change remains relatively stable over time has now been discussed on multiple occasions by the Climate Psychology special interest group for Educational Psychologists; whilst a range of

opinions have been expressed, the general trend seemed to be that members of the group personally felt that they could identify with each factor (from the current study, which I presented to the group) as a position or mindset that they would sometimes fall into (several Educational Psychologists self-reported having a general tendency towards falling into a particular factor), but people generally self-reported that they tended to switch between the different factor positions over time, depending upon a range of personal and contextual factors.

Further research would be required even to raise the above idea to the status of a tentative hypothesis. However, I would argue that regardless of how stable young people's forms of engagement are, the broad-based systemic approaches one outlined below offer sensible strategies, since they provide a context for a range of ways in which educational psychologists and schools can provide support for young people. If young people's forms of engagement with climate concerns are stable over time, then it is important that the approach taken can be helpful for young people engaging in each of the identified ways (plus other ways yet to be identified); similarly, if young people switch between different forms of engagement, it is still helpful for Educational Psychologists to adopt/promote an approach that can recognise each form of engagement and provide support that is appropriately tailored. If young people do switch between different forms of engagement, this raises additional questions around the kind of factors that might encourage such switches, plus a thornier question around whether particular forms of engagement are 'healthier'/more desirable than others, but such questions are far beyond the scope of the current experimental research.

In the rest of this section I will provide a brief summary of each of the five dimensions of the Ten-Element Map when thought of in relation to climate change and climate psychology (this was first introduced in **section 4.3.2.1**). This will be followed by any relevant research or ideas already present in climate psychology (the .1 suffix to the title of each sub-section, e.g. 8.3.1.**1**), and then how young people whose perspective may be close to each of the three factors may be impacted by issues relevant to the dimension (the .2 suffix, e.g. 8.3.1.**2**). I will then provide suggestions for how educational psychologists can work with schools to help support young people whose engagement/views align closely to each factor position (e.g. 8.3.1.**3**).

8.3.1 Environmental Quality and Environmental Deprivation

The dimension of *environmental quality* ←→ *environmental deprivation* includes not just the state of the physical environment, but young people's *lived experience* of the implications/ meaning of the environment. Consequently, the presence of pro-environmental features (such as recycling bins in a school) may be experienced by students as a form of 'environmental care' (a protective factor), regardless of how physically pleasant or unpleasant they are (of course, if the recycling bins are199 neglected/left to become very dirty and smelly, or if it were revealed that the contents of the bins had been sent to a landfill site, then this could become perceived as embodying a lack of environmental care, i.e. an example of environmental deprivation).

Section 4.1.4.4 provides details of the Department for Education's Sustainability and Climate Change Strategy; this policy will require schools to adopt some significant environmentally-friendly initiatives (e.g. carbon emissions reporting by the school, ending the use of single-use plastic, and the development of climate action plans). The way in which these initiatives are implemented and communicated by the school SLT and sustainability lead could significantly influence whether such changes are experienced by students, teachers, and the wider school community as a form of environmental care (e.g. if a consultative and collaborative approach is taken that feels empowering and authentic to people in the school community who are concerned about environmental issues), or whether they become experienced as a form of environmental deprivation (e.g. if a top-down and poorly-communicated approach is taken that leaves students, teachers, or parents feeling that they are being 'done-to' by the school SLT or that their actions/'freedoms' are being restricted without consultation or consent). Educational Psychologists could certainly play a role in helping support the consultative and collaborative process in order to help increase the likelihood of the majority of the school community experiencing such changes as positive.

8.3.1.1 Relevant ideas from climate psychology

There is a growing body of evidence that time spent in nature is a protective factor for mental health (e.g. Van den Berg et al. 2016, Pouso et al. 2021). Specifically focusing on school environments, Tiplady & Menter (2021) have presented evidence for how forest schools can support wellbeing for a range of students by helping them 'take what they need' from the space (e.g. time out, peacefulness, connection to nature, a sense of adventure, etc.). In addition to

forest school areas providing an enriching environment (e.g. McNally, 2022), for schools in which some young people are highly concerned about climate change, the development and/or maintenance of such spaces may also be perceived by students as a form of 'environmental care'. Such spaces therefore have the potential to support student wellbeing not just because of the qualities of the space itself, but also due to the ethos that such a space may be seen as representing.

On the other hand, as noted in the previous section, there may be a risk that some members of the schools community (students, staff, or parents/carers) experience pro-environmental changes made within the school (such as those required by the Department for Education's Sustainability and Climate Change Strategy over the next 7 years) as a form of environmental deprivation. One reason for this is that some of these people may perceive pro-environmental changes as unnecessary and therefore may see such changes as an authoritarian imposition upon their lives.

Klein (2015, p.33-95) tracks this mindset back to neoliberal free-market narratives that first emerged in the 1980s, which have been progressively pushed by oil companies and libertarian think-tanks over the past four decades (Oreskes & Conway, 2011). This mindset emphasises deregulation and personal (and corporate) economic freedom, which is unfortunately incompatible with the enactment of a sustained and adequate governmental response to climate change, since this would require much stronger environmental regulation and substantial government investment into pro-environmental initiatives.[1] Research into motivated cognition (as a cognitive bias) suggests that people whose ideology is in opposition to the changes needed to address climate change are far more likely to either downplay the risks of climate change or deny it outright (Luo & Zhao, 2021). Zhao & Luo (2021) suggest that one way to try to address this is to attempt to frame both risks and solutions regarding climate change in ways that will feel less threatening to such people – for example, by emphasising the economic opportunities and benefits that can come from pro-environmental initiatives and change.

[1] In Klein's words (taking a macrosystemic perspective): "*So my mind keep coming back to the question: what is wrong with us? What is really preventing us from putting out the fire that is threatening to burn down our collective house? I think the answer is far more simple than many have led us to believe: we have not done the things that are necessary to lower emissions because those things fundamentally conflict with deregulated capitalism, the reigning ideology for the entire period we have been struggling to find our way out of the crisis.*" (Klein, 2015, p.18)

8.3.1.2 How students with outlooks similar to each Factor may be impacted by this dimension

Factor 1 emphasised the benefits that students gain from feeling connected with nature and both emphasised the importance of care for wildlife. Factor 1 also emphasised problem-focused coping (Ojala 2012a-c, see **section 8.1** for an in-depth exploration), in which negative emotions can be managed by taking tangible small-scale actions to address the problem – this provides an opportunity for such students to potentially derive further benefits from actively being involved with co-creating and maintaining pro-environmental changes to the school environment. Students whose outlook aligns with Factor 1 are therefore potentially most likely (out of the three factors) to derive benefits from being meaningfully involved in pro-environmental changes to the school's overall environment.

In comparison, as explored through the conceptual space diagram **Figure 32** (**section 8.1**) Factor 3 attached much less emphasis on small-scale and personal changes, since these were viewed as inadequate to address the challenges posed by climate change. However, Factor 3 did endorse the importance of care for wildlife, and did advocate for larger systemic change – consequently, students who adopt this position might (potentially) be receptive to the idea presented in the Sustainability and Climate Change Strategy that each school ground forms part of a whole-country '*National Education Nature Park*' (though admittedly, there is a risk that they could dismiss this as marketing rather than as a substantial nationwide strategy). Additionally, Factor 3 displayed the strongest endorsement for a focus on adaptation to climate changes (over prevention, which was framed as a 'lost cause'); the Sustainability and Climate Change Strategy also has some focus on this, explicitly requiring that any new school buildings should be designed to withstand a 2 degree average temperature increase – students who hold this position may potentially find some comfort in the enactment of such policies, which arguably promote meaningful action even if some of the negative consequences of climate change will not be avoided.

Factor 2 displays both low problem-focused coping and low meaning-focused coping and prioritises larger-scale systemic change (and protest) over individual changes. However, in the focus groups, students whose views had previously correlated with this factor still expressed a strong desire for environmentally-friendly changes to be made to their school environment. This Factor (along with Factor 3) felt relatively isolated in their concerns and showed little trust that their peers or school staff would be open or supportive. They may therefore gain the greatest

benefit not from the environmentally-friendly changes themselves, but from a process in which such changes are discussed and implemented in a collaborative manner that provides space for students (and staff) to share their views whilst working towards positive change in the school.

8.3.1.3 How educational psychologists can incorporate considerations about this dimension whilst working with schools to help support young people who occupy each factor position

The way in which a school uses its school grounds and environment and the degree to which decisions about this environment are made collaboratively by staff, students, and the wider school community arguably comprises part of the school's 'hidden curriculum' (Jackson, 1968). This term refers not to what is explicitly taught within the school curriculum, but the way in which members of the school community interact and relate with each other and the ethos that is embodied by the school and its decision-making process. Weare and Gray (2003) argue that the development of pro-social values and emotional skills is both "taught" explicitly in lessons and "caught" through social learning within the school environment. Educational Psychologists have an opportunity to support schools with the process of reflecting on how pro-environmental changes to the school environment could be discussed and how the way in which such changes are implemented (e.g. more collaboratively or hierarchically) may have a significant impact on how they are perceived by the school community.

Additionally, educational psychologists who are aware of the Factor positions that may be held by some students in the school are in a position to support the school to consider how such changes may benefit each group (e.g. Factor 1 expresses the greatest desire to participate in such changes, Factor 2 may benefit most from space being made to discuss their ecological anxieties as part of the process, and Factor 3 may benefit from discussions that connect local changes with larger-scale national changes and that also consider changes geared towards adaptation rather than prevention). They may also be in a position to help support discussions and meetings with school staff and/or the wider school community, particularly when they are able to connect pro-environmental changes back to the climate concerns/anxiety that students within the school may experience.

8.3.2 Self-esteem and Emotional Abuse

The dimension of *self-esteem* ←→ *emotional abuse* refers to whether people feel valued and worthwhile or as if they are derided by others. This dimension emerged as significant for many young people in both the main study and the focus groups; as summarised in **section 8.2**, the most significant theme expressed across all three focus groups was that it was important to young people to feel that their families, school staff, and peers listened to their views and took them seriously.

In relation to concerns about climate change, this dimension also shares some conceptual space with the *emotional processing* ← → *emotional neglect* dimension, since both dimensions highlight emotional engagement with the topic. However, the *self-esteem* ←→ *emotional abuse* dimension has a more relational focus, since it primarily concerns how others respond to young people expressing concern around climate change. Judgement or derision of young people's concerns around climate change constitutes a form of emotional abuse (whether occurring on a microsystemic, mesosystemic, or macrosystemic level), whilst approaches that are accepting of young people who express significant concern, which avoid problematising or pathologizing them for expressing concerns, are more likely to help support young people's development of a positive sense of self-esteem.

8.3.2.1 Relevant ideas from climate psychology

Caroline Hickman has repeatedly emphasised the importance of listening to young people's concerns (e.g. 2019, 2020); one theme that has emerged in her recent work (e.g. Hickman et al. 2021) is the idea of 'moral injury', i.e. that what is distressing for young people is not just climate change itself, but the attitudes displayed by adults and people in power. Hickman argues that part of healthy childhood development involves children being able to trust that adults will protect them, uphold a sense of justice, and have their best interests at heart. However, when young people learn more about climate change, they are faced with a situation in which these assumptions (arguably a form of social contract) may appear to be being broken. Hickman et al. (2021) argue that their results suggest that this sense of moral violation forms part of (at least some) young people's distress around climate change.

From this perspective, it is easy to see how a sense of 'moral injury' may be intensified when trusted adults are dismissive or refuse to listen to concerns that are expressed by young people. In more extreme (yet still potentially everyday) scenarios, this may take the form of 'do-gooder derogation' (Minson & Monin, 2012), in which young people who have concerns about climate change are mocked or derided for expressing such concerns – this is an example of emotional abuse. However, negative responses can also be much subtler, such as when trusted adults are dismissive or uninterested in the concerns raised by young people (e.g. Ojala, 2015a and Ojala & Bengtsson, 2018); this may become emotional negligence (**section 8.3.3**) rather than emotional abuse, but neither approach is likely to help foster positive self-esteem amongst young people who have expressed significant concerns to trusted adults.

Interestingly, as covered in **section 4.2.1**, various research in climate psychology has found climate concern and anxiety to be connected with a range of pro-social and empathic traits. For example, Corner et al. (2014) found that people who express concern around climate change are also more likely to identify with values such as "*altruism, forgiveness, and loyalty*" (p.412) and Kahan (2012) reported that (amongst American samples) participants who scored higher on scales measuring egalitarian and community-minded values were more likely to report concern about climate change than participants who scored higher on individualistic and hierarchical values. Hickman (2020) makes the argument that concerns about climate change have their foundations in concerns for others and the planet ("*people would not feel the anxiety or distress [around climate change] if they did not connect with and care about the planet, people and other species*" p.416) and that we should therefore *"reframe eco-anxiety and change our perception by thinking of it as eco-empathy, eco-compassion or eco-caring*" (p.416). This re-framing of concerns about climate change in positive terms is much more likely to help support the self-esteem of young people who experience significant concern and to help them see their concerns as a reflection of character strengths rather than as a character flaw or something pathological. McBride et al. (2021) also argue that such a framing also better captures the nature of concerns around climate change, positing that:

> "*eco-anxiety is better understood as a societal problem of accountability and empathy, rather than of individual pathology".*
>
> (McBride et al. 2021, p.80)

8.3.2.2 How students with outlooks similar to each Factor may be impacted by this dimension

Factor 1 emphasised humanitarian concern for others and ecological concern for wildlife and the planet; there are clear links here between this mindset and Hickman's (2020) framing of concerns about climate change as *eco-empathy*. This factor also expressed hope (and a relative belief/confidence) that the changes needed to address climate change would be made, and emphasised the importance of education in helping them prepare. In the focus group, young people whose position correlated with Factor 1 suggested that they would like support in school to focus on empowerment (offering suggestions such as: '*tell them [young people] to keep going as they are'*), and Factor 1 most strongly emphasised the importance of taking personal actions to reduce environmental impact. It may therefore be most helpful for support for such students to explore the positive values behind their engagement with climate change, whilst supporting such students to propose small-scale projects (either within school, or as homework tasks) that provide them opportunities to make local changes and measure/see results.

Factor 2 expressed much higher levels of anxiety, with significantly more fear around being personally affected by climate change and being unable to cope with this. Additionally, this Factor expressed the least confidence that their peers or school staff would be supportive of their concerns. This group might therefore benefit the most from support that emphasises that they will be accepted by their school community regardless of the concerns that they express and that 'do-gooder derogation' towards themselves or others concerned about climate change (or other causes) is unjustified and unacceptable. An approach that helps people who engage in this way explore their strengths and qualities and helps them to consider the ways in which they already manage to cope with challenges may also be helpful.

Whilst Factor 3 still experienced concern around climate change, they were also the group most likely to distance themselves from others who were concerned and to potentially hold attitudes that could be classed as 'do-gooder derogation'. However, in contrast with climate denialists, it appeared that such attitudes came from a belief that it is already too late to prevent climate change, which was connected with a sense of despair and resignation (as opposed to anxiety). This group also seemed to experience relative isolation (and young people in the focus group associated with this group expressed a desire for support that could help to reduce this). For this group, it might be important to help them connect with others who hold similar views, whilst also encouraging such groups to work together on positive projects (that may focus on

adaptation to climate change, rather than prevention). This group also expressed significant concern and compassion towards animals that will be affected by climate change; responses that recognise this and/or help nurture such sentiments may also be supportive for self-esteem.

Regardless of how they engage with concerns around climate change, all focus groups emphasised the importance of feeling listened to by the adults in their lives and having their perspectives respected. Other potential sources of self-esteem include taking pride in achievements or projects; all three focus groups suggested that the would find it beneficial to undertake projects to develop their school (and to collaboratively make eco-friendly changes at home). Arguably, such projects may be beneficial for young people regardless of whether they tend towards more problem-focused coping (yet believe their changes meaningfully contribute towards larger-scale change) or meaning-focused coping (in which the projects are seen as valuable in their own right, regardless of wider outcomes).

8.3.2.3 How educational psychologists can incorporate considerations about this dimension whilst working with schools to help support young people who occupy each factor position

An awareness of the process of *do-gooder derogation* will be helpful for educational psychologists, since negative views towards young people who express care/concern can be quite insidious (for example, the Conservative Party's 'Anti-woke' discourse could be seen as an example of do-gooder derogation that is propagated at the mesosytemic level through media reporting of such discourse). It will also be helpful for educational psychologists to hold in mind the risk of narratives of climate anxiety being used to pathologize young people who express concerns; an awareness of pro-social values and attributes than can accompany significant concerns around climate change can be a helpful safeguard against treating such concerns as inherently problematic (though it is important to simultaneously recognise that some young people may experience significant distress and require support for this). As with the *environmental quality* dimension, an approach that can facilitate connection, collaboration, and empowerment through small-scale local projects is likely to be helpful; for Factor 1 this may emphasise reduction of waste/emissions, for Factor 2 this may focus more on the development of skills and nurturing of senses of belonging and competence, and for Factor 3 this may emphasise connection with others and a focus on projects that prioritise adaptation to future challenges rather than prevention.

8.3.3 Emotional Processing and Emotional Negligence

The dimension of *emotional processing* ←→ *emotional negligence* focuses on developing awareness of one's emotions and the ability to express them within an accepting environment. Emotional processing theory (Foa & Kozak, 1986) has its origins in clinical theorising around aversion therapy; the basic principle was that repeated exposure (either imaginal or 'in vivo') to the source of a fear within a safe environment allows patients to habituate and process the original traumatic source of the current fear. Ongoing developments to this theory (e.g. Foa et al. 2006) also emphasise the role of supportive conditions, reflection, and meaning in building a patient's resilience as they engage with memories or emotions that they find distressing.

This approach has links to Emotion Coaching (Gottman et al. 1996), which further emphasises the role of parents or other supportive adults in engaging in '*meta-emotional talk'* (p.243) to help to coach children and young people to be able to name difficult emotions that they are feeling and turn towards such emotions within a supportive environment in which the trusted adult engages in '*scaffolding-praising'* (p.246) to help the child to reflect upon how they want to engage with such emotions as part of the process of emotional regulation (p.246-7). More recent emotion coaching models now propose a 4-step structure (Greenberg 2004) in which the trusted adult recognises and empathises with the child's situation and feelings (step 1), labels the feelings and validates them (step 2), sets limits on behaviour if needed (step 3), and collaboratively problem-solves with the child (step 4) (Gilbert et al. 2021). In following such steps, the trusted adult can help the child to process their challenging emotions. In contrast, approaches from adults that ignore, dismiss, or seek to minimise the negative emotions experienced by the child are seen by emotion coaching practitioners as forms of emotional negligence (some responses may overlap with the previous negative dimension of emotional abuse, if judgement or criticism of the child is also involved).

8.3.3.1 Relevant ideas from climate psychology

As covered in detail in **section 4.3.1**, Spence et al.'s (2012) have undertaken some influential work around people's '*Psychological distance from climate change'*. Using Liberman &

Trope's (2008) work on *Construal level theory*, Spence et al. (2012) posited that people may psychologically frame climate change in a way that allows it to feel psychologically distant. The main forms of psychological distance that they explored were: geographical distance (climate change will affect places far away but not here), temporal distance (climate change won't happen for a long time), social distance (climate change will affect people from other countries whom I have never met), and uncertainty (climate change might not happen, or there is still a debate around it).

From the perspective of Emotional Processing Theory or Emotion Coaching, the process of psychologically distancing oneself from challenging emotions around climate change could be considered a form of emotional neglect. Engagement with climate change as a significantly concerning phenomenon will cause some people to feel anxiety and/or a range of other negative emotions; from the perspective of Emotional Processing Theory or Emotion Coaching, emotional processing of such emotions would involve acknowledging them, naming them and then considering how to engage with them. The opposite response to this involves finding a way to either distract, downplay, or distance oneself from such emotions; framing climate change in a way that allows it to be psychologically distant allows the emotional impact of concerns around climate change to also be distant, which lessens the intensity of such emotions and makes it easier to ignore or neglect them.

It appears that exposure to adults who choose to frame climate change in a way that makes it psychologically distant may also affect how young people engage in emotional processing (or emotional neglect) with regards to climate change. Ojala's (2015) work provides empirical evidence that students who perceived their teachers as accepting or supportive of their concerns around climate change were more likely to develop a problem-focused or meaning-focused sense of hope (see **section 8.1**), whilst pupils who perceived their teachers as dismissive were more likely to demonstrate hope based in denial of climate change. This suggests that when teachers engage in emotional neglect through psychological distancing, their students are also more likely to engage in emotional neglect.

Similarly, Ojala & Bengtsson (2018) reported that young people with parents/carers and friends who were supportive and solution-oriented towards climate change were more likely to demonstrate meaning or problem-focused coping, whilst young people whose

parents/carers and friends were dismissive were more likely to deny or deemphasise the problem. As with the previous study, this suggests that when young people encounter emotional engagement and processing by parents/carers and friends around climate change, they are more likely themselves to adopt coping styles that are grounded in emotional processing, whilst if they encounter emotional neglect around challenging emotions regarding climate change, they too are likely to favour a coping style toward climate change that is founded in the neglect of challenging emotions.

8.3.3.2 How students with outlooks similar to each Factor may be impacted by this dimension

Factor 1 expressed lower levels of anxiety and other negative emotions around climate change (compared with Factors 2 and 3), possibly because they believe that the negative impacts climate change can (and will) be avoided. In some ways Factor 1 engaged in little psychological distancing, rejecting both temporal distance (i.e. it will mostly affect people in the future) and uncertainty (around whether climate change is happening), but these forms of distancing were rejected by all three factors. They engaged in more social distancing, but this was expressed as humanitarian concern (plus concern for wildlife), which itself could be a source of challenging emotions (in circumstances where people and/or animals are impacted by climate change). This factor also expressed the least need to 'switch off' from climate change. It's possible that their negative emotions were less overwhelming, which meant that they have less need to push away such emotions. Additionally, Factor 1 felt that they had the most social support for emotional processing, indicating that they trusted their teachers and their families to be supportive of any concerns that they may express and that they also have friends and peers who are concerned about climate change. This factor therefore appears to already be the most likely to engage in emotional processing of their concerns around climate change, rather than emotional neglect through psychological distancing or avoidance.

Factor 2 displayed the least psychological distancing based on beliefs, expressing low temporal distance, very low uncertainty, and the worry that they would be personally affected by climate change and be unable to cope with this. However, out of the three factors, they expressed the greatest need to 'switch off' from thinking about concerns around climate change, possibly due to them experiencing the most anxiety and other negative emotions around the topic. They also expressed ambivalence around whether they

felt able to seek support from their family, friends, or teachers. Consequently, this factor may be at risk of pushing away their emotions (engaging in emotional neglect) due to their intensity and the lack of support that they anticipate from others for emotional processing.

Factor 3 seemed to believe that they would be personally impacted by climate change, but showed higher social distance from negative emotions relating to this than Factor 2, since they had a greater belief that they would be able to cope with this impact. They expressed much less need to 'switch off' from thinking about climate change than Factor 2, possibly due to them experiencing less anxiety around the topic. However, they expressed similar ambivalence around being able to speak with family, friends, or teachers about their concerns, which is potentially a risk factor for them coping with challenging emotions through emotional avoidance rather than processing.

8.3.3.3 How educational psychologists can incorporate considerations about this dimension whilst working with schools to help support young people who occupy each factor position

A significant number of Educational Psychologists will have some experience with Emotion Coaching (for example, it has been a feature of SEMH support within all four Educational Psychology services in which I have worked or shadowed EPs, through national initiatives such as the Emotional Literacy Support Assistant training, the Sandwell Wellbeing Charter Mark, and the Trauma-Informed Attachment Aware Schools project). They are therefore well-placed to support school staff with the use of emotion coaching techniques through training and consultation. Additionally, the theory provided by emotion coaching may offer a helpful framework for training around support for young people who are concerned about climate change; on a macrosystemic level, the position expressed by some conservative newspapers and commentators is that adults should avoid talking about climate change so as not to 'feed' young people's anxiety (see: Benoit, et al. 2022, Han & Ahn, 2020, p.16; Smith, 2020, p.29-43). It is unclear how common this position/attitude might be amongst school staff, but the framework of emotion coaching helps to make it clear how such avoidance can promote emotional negligence towards climate change concerns, whilst open discussion within a supportive environment can help to support emotional processing and overall emotional literacy. All three focus groups expressed a desire for increased climate education in school, plus an environment in which their views and concerns would be

listened to; this suggests that young people whose views align with any of the factors have a desire for an open environment in which the impact of climate change (and the emotions associated with this) can be explored.

When Educational Psychologists advocate for the use of emotion coaching to support the processing of challenging emotions relating to climate change, it will be helpful for them to hold an understanding of how young people whose views align with each factor may engage in subtly different forms of emotional engagement and emotional distancing. Young people who believe that climate change can still be avoided but must be addressed very urgently (Factor 2) may experience the highest levels of anxiety and other negative emotions, yet this factor also expressed ambivalence around whether they would be able to seek support from others (plus Focus Group 2 explicitly requested support for the processing of negative emotions). It will therefore be important to emphasise the importance of creating a school environment in which such concerns can be discussed openly and non-judgementally.

One potential risk for Factor 1 is that their negative emotions could become more pronounced if the negative effects of climate change are not avoided. This may be a particular threat given that they expressed high humanitarian concern (since a many low-income countries are likely to be both the first countries to be impacted due to their geographical location and features and also the most severely affected due to their economic and political systems – see the University of Notre Dame's measures of vulnerability and risk for further information: https://gain.nd.edu/our-work/country-index/). In such scenarios, it will be important for this factor to seek increased support for processing of their negative emotions from the social systems and trusted adults around them.

Factor 3 appeared to gain some confidence from the belief that they would be able to cope with the challenges posed by climate change. Whilst this potentially shows a strong level of self-confidence or self-belief, it will be important to check how stable this sense of confidence is. If it is relatively fragile then it could potentially be impacted by events that make climate change feel more personally threatening to such individuals, at which point, they might benefit from additional support for their processing of challenging emotions.

8.3.4 Self-management and stress

The dimension of *self-management* ←→ *stress* is most commonly thought of in terms of young people's ability to manage the day-to-day challenges and demands that are placed upon them. As mentioned in **section 4.3.2**, Koolhas et al. (2011) define stress as a phenomena that arises in "*conditions where an environmental demand exceeds the natural regulatory capacity of an organism, in particular situations that include unpredictability and uncontrollability*" (p.1291). This is a deliberately broad definition, since it was intended to include stress experienced by any biological organism. More specifically, for young people the school environment may simultaneously place demands upon them (e.g. Kouzma & Kennedy [2004] reported that the most significant self-reported stressors amongst Australian High School students were: "*examinations and outcomes, too much to do, worry over [the] future, making choices over career, studying for examinations, [the] amount to learn, [the] need to do well imposed by others, and self-imposed need to do well*". [p.314]) whilst also (hopefully) supporting young people to develop appropriate self-management skills so that they are able to cope with these demands (e.g. Fantuzzo & Rohrbeck, 1992). In a review of such support, Canoe et al. [1994] highlight that there may in some cases be a disjunction between 'received support' and 'perceived support', but that both can play a protective roll against the stressors experienced by students in school.

As noted in Kouzma & Kennedy's (2004) findings, many sources of stress for students are directed towards future goals and anticipated events in the future, such as exams and grades, careers, and academic success. Stress relating to future events may be referred to as '*anticipatory stress*'; in such cases, the uncertainty posed by the future event forms part of what makes it stressful (Monat et al. 1972). Folkman (1984) proposed that people engage in '*control appraisals'* in which they assess whether their personal coping resources will be able of meeting anticipated demands; Peacock and Wong (1996) reported that such control appraisals are a strong predictor of both the stress experienced by individuals and the effectiveness of the coping methods that they use to manage their stress (stronger than an internal locus of control or an optimistic orientation). The perception of young people in this study that climate change poses a future threat means that (from the perspective of this dimension), climate change may act as a source of anticipatory stress for them.

8.3.4.1 Relevant ideas from climate psychology

Ojala's (2012a-c) work on coping (see **section 8.1**) draws from a theoretical framework developed by Folkman (2008) around how young people appraise and cope with stress. Folkman's (2008) framework builds upon her earlier work around '*control appraisals'*; essentially, a person's appraisal of the degree to which they can control/influence a problem is likely to influence the coping mechanisms that they use to manage the stress caused by the event (anticipated or current). People are more likely to engage in *problem-focused coping* if they conclude from their *control appraisal* of the situation that they will be able to manage, solve, or influence the problem through their actions.

However, as highlighted by Ojala (2012b), many people hold little hope that they will be able to meaningfully influence the progression of climate change (i.e. their *control appraisal* is that they cannot meaningfully control/influence the problem). In such situations, some people may still engage in problem-focused coping (for example, by focusing on adaptations that might lessen the impact of climate changes upon their own lives), but many adopt other styles of coping such as *meaning-focused coping* or *emotion-focused coping*. Emotion-focused coping conceptually overlaps with the process of '*emotional negligence'* from the previous dimension of the Ten Element Map; essentially it involves either finding ways to ignore the problem and the stressful emotions it generates, or re-framing the situation so that it is no longer perceived as a threat – for climate change this may involve climate denialism or other forms of psychological distancing (see **section 8.3.3**). In contrast, meaning-focused coping is a control appraisal strategy that allows the stressor to remain threatening, but seeks out other sources of meaning and positive emotion (for example through values and beliefs) so that the stressor is seen as existing alongside other sources of value that allows people to "*re-appraise[s] it in a more positive manner and thereby make[s] it more manageable*" (Ojala, 2012b, p.540).

8.3.4.2 How students with outlooks similar to each Factor may be impacted by this dimension

As noted in **section 8.**1, out of the three factors, Factor 1 considered problem-focused styles of coping to be most helpful. In particular, this factor was most supportive of the value of personal/individual changes. This could be informed by a control appraisal process (implicit or explicit) that has judged that the individual reduction of carbon emissions will be able to substantially reduce the threat posed by climate change (perhaps under the assumption that

once enough people make ecologically friendly changes, most people will then follow suit, and that this will be sufficient to tackle climate change). Of course, there is also room here for other alternative interpretations; for example, people whose views align with this factor position might not believe that the reduction of individual emissions will be sufficient to manage or control climate change, but they may hold values that mean that they feel it is important to 'do the right thing' by reducing their emissions regardless of the bigger picture (perhaps due to a sense of either social responsibility or connection/responsibility to the natural world) – in such cases this would embody more of a meaning-focused coping style rather than problem-focused coping.

In contrast, Factor 2 expresses much lower interest in actions that could be considered more individualised and problem-focused approach to coping. However, they show much more support for protests (such as the student strikes for climate) and large scale legislative changes. This could arguably still be interpreted as a form of problem-focused coping, but at a collective level rather than a personal level, though this would depend upon a person's involvement in such collective action (if they do not take part in actions that support such changes, it would be inappropriate to frame this as a form of problem-focused coping). However, this factor also expressed the most anxiety and negative emotions, along with the greatest need to 'switch off' or distance themselves – this would suggest that at least some of the time they can feel overwhelmed by negative emotions regarding climate change and sometimes use emotion-focused coping techniques to help manage such emotions.

Factor 3 seems to explicitly reject both individualised and collective problem-focused coping techniques that are explicitly aimed at reducing emissions or ecological impact in order to tackle climate change; it is relatively likely that this is because they believe that climate change is inevitable, which means that such actions are doomed to failure, if evaluated according to their stated goal. However, this factor also expressed the most support for meaning-focused coping techniques and high concern for the natural world. Additionally, it is possible that this factor engaged in a slightly different form of problem-focused coping that was directed towards adaptation rather than prevention, showing a higher confidence that they would personally be able to cope with challenging situations that arise (however, this confidence could alternatively arguably be framed as a form of emotion-focused coping if it is grounded in a fantasy rather than a reasonable appraisal of the reality of the situation – this will depend upon what the reality of the situation turns out to be)

8.3.4.3 How educational psychologists can incorporate considerations about this dimension whilst working with schools to help support young people who occupy each factor position

As with previous dimensions, it will be helpful for Educational Psychologists to have a foundation of psychological theory and research that they can use to inform how they work with schools. In the case of this dimension, an understanding of stress, appraisal processes, and forms of coping that young people (and adults) might engage in will be invaluable, since it will help it could help to make sense of why some members of a school community might find it really helpful/ supportive/comforting to see people within the school make individual or collective changes, whilst others might gain little from problem-focused coping techniques, or even view them as an unhelpful distraction from coping techniques that they find more meaningful. The framework of coping techniques can also be used as a tool to help encourage empathy between groups with different approaches - this may particularly be the case for people who engage in emotion-focused coping techniques such as downplaying or denying the risks posed by climate change; whilst such approaches will often feed into a process of emotional neglect, the framework of coping techniques helps to highlight how these approaches will in many cases have developed in response to (or at least have been influenced by) the stress caused by the potential threats posed by climate change. This realisation has the potential to help build empathy or find connections between people who may assert very different views on the topic (though it is also important to be clear about the scientific evidence when facilitating or mediating such discussions so as to avoid fuelling misinformation).

It is likely that most schools will derive benefit from broad and inclusive approaches to supporting people with concerns about climate change, which incorporate a combination of practical actions/initiatives, skills development, and reflection upon the values and aspects of life that feel inherently meaningful, regardless of any threats posed by climate change. Practical actions/initiatives could include collaborative projects within the school/wider community, aimed at either reducing environmental impact, increasing resilience and adaptation, or both. Skills development will involve the consideration of which skills will be required within a changing world (which of course is also affected by many changes unrelated to climate change); the Department for Education's Sustainability and Climate Change Strategy (**section 4.1.4.4**) will form a starting place for this. Finally, reflections that support meaning-focused coping will be different for each school (and each group within the school), but the process of engaging in such reflections can often be as important as the reflections themselves.

8.3.5 Social participation and social exclusion

The dimension of *social participation* ←→ *social exclusion* emphasises positive relationships that are based on respect for difference and diversity, within contexts in which social rights co-exist with social responsibilities. The positive element of social participation emphasises not just inclusivity but also active collaboration and communication between people in which everyone who is involved is valued and encouraged to share their perspectives. As noted by Popper (1945) in his '*paradox of tolerance'*, for an environment to be maximally open, supportive, and *tolerant*, it is necessary for it to be *intolerant* of people or viewpoints that themselves are intolerant or exclude others. Within an environment that encourages social participation, all participants therefore hold a responsibility to each other to be respectful and supportive; this does not mean that they need to agree with each other's perspectives, but simply that they are respectful of others if they disagree (on matters of opinion). The negative element of social exclusion refers not only to active exclusion of others, but also to situations where a group of people are neglected or their roles/opinions treated as 'lesser' - cultural racism provides an example of the latter phenomenon; in situations where the cultural trends, values or output of a particular racial group (or groups) are viewed as inherently inferior to the dominant group (or groups) within a society (Mukhopadhyay and Chua, 2008).

8.3.5.1 Relevant ideas from climate psychology

When a school is engaging with students' concerns around climate change, the promotion of social participation would involve listening to students and *working with* them collaboratively, rather than having the senior leadership devise policies that are *done to* the students to benefit them. The benefits of this process are highlighted by Public Health England in their Whole School Approach to supporting student mental health (see **section 4.3.2.2**):

"Involving students in decisions that impact on them can benefit their emotional health and wellbeing by helping them to feel part of the school and wider community and to have some control over their lives. At an individual level, benefits include helping students to gain belief in their own capabilities, including building their knowledge and skills to make healthy choices and developing their independence. Collectively, students benefit through having opportunities to influence decisions, to express their views and to develop strong social networks."

(Lavis & Robson 2021, p.14)

The ability and willingness of a school to work in this way will significantly depend upon their Senior Leadership Team. In a statement for the UK National Association for Environmental Education, Agomber et al. (2022) argue that it is the leadership team who have the best opportunity to set the tone and vision for all other actions and policies in the school regarding the environment and climate change. This is a matter of school values, policy, strategy, funding, and resource allocation, which will require clear communication and discussion with the rest of the school community to ensure that changes and initiatives are a collaborative endeavour.

With regards to tackling social exclusion, it will be helpful for schools to once again bear in mind the phenomenon of *do-gooder derogation* (Minson & Monin, 2012), which can be used to silence or marginalise young people who express concerns around climate change. The risk of this may depend upon the existing school culture and values; Heinämaa (2019) would argue that these constitute a form of normativity within a school system, and do-gooder derogation is most likely to occur if the 'good' acts or opinions are perceived (consciously or unconsciously) to challenge the existing normativity. This concept of normativity also raises the possibility of there being some settings in which pro-environmental values and concern about climate change have become a core part of the school culture; in such settings there then becomes the risk that people who are *not* concerned about climate change could become socially excluded (or even face emotional abuse as outlined in **section 8.3.3**). In either case, it will be important for the school to challenge any processes that exclude or marginalise students or result in social isolation.

8.3.5.2 How students with outlooks similar to each Factor may be impacted by this dimension

Factor 1 felt that they could reliably access social support from their teachers, friends, and family; this factor appeared to have the least fear of social exclusion or isolation. They also emphasised the importance of taking local actions, indicating that this form of problem-focused coping helped them to manage their challenging emotions around climate change, and Focus Group 1 stated that they wanted to be supported in a way that would empower

them to take practical environmental actions. This factor expressed the least criticism of other actors for their perpetuation of/failure to meaningfully tackle climate change. Overall, this factor may benefit from a collaborative approach that allows them to be part of making environmentally-friendly changes within their school environment.

In contrast, Factor 2 expressed much less confidence that their teachers or peers would be supportive of their concerns; this group expressed the highest levels of anxiety and negative emotion, so it appears that there is a risk of them feeling isolated in level of concern. Focus Group 2 indicated that they felt that it was important for schools to listen to young people's concerns, and to provide support for them to help them process their negative emotions. Additionally, this factor expressed the most criticism and anger towards groups such as climate deniers, governments and oil companies, and older generations, viewing the failures of such groups in moral terms. Overall, this factor may benefit from an approach that provides a supportive space for them to voice their concerns, negative emotions, and anger, with opportunities for them to become involved in collaborative environmental projects within the school should they find this beneficial.

Factor 3 also expressed some ambivalence around whether their peers or teachers would be open to their views or concerns. Due to their resignation (and beliefs) around it being too late to prevent climate change this factor was relatively uninterested in initiatives aimed at preventing climate change, but was more supportive with regards to projects focused on adaptation to changes in the climate. Focus group 3 indicated that it would be helpful for the school to provide support that would help them to feel less isolated in their concerns around climate change. This factor expressed some ambivalence towards both climate activism and people who are unconcerned about climate change; it's possible that this reflects some uncomfortableness around how polarising some discussions around climate change can become. Overall, this group may benefit from opportunities to connect with others around their concerns within supportive and non-confrontational settings, plus the opportunity to participate in projects that may help the school or local community to adapt to the potential impacts of climate change (Sayers et al. 2021 conclude that this includes the risk of flooding for many communities within the UK).

8.3.5.3 How educational psychologists can incorporate considerations about this dimension whilst working with schools to help support young people who occupy each factor position

The themes raised by the dimension of social participation and social exclusion stretch far beyond how schools support and include people with concerns about climate change. Efforts/work aimed at such support and inclusion are most likely to be effective within school environments that are already broadly inclusive and support participation of all students and groups within the school, whilst such efforts are much less likely to be effective if members of the school community already feel marginalised. Dymoke & Harrison (2008) provide an example of this with regards to initiatives to promote pupil voice in schools - they argue that school staff are generally less likely to engage with pupil voice initiatives when they themselves feel disempowered or silenced by their school's senior leadership team. The consequence of this is that staff support of and receptivity towards such pupil voice initiatives is often impacted by the wider school culture, which includes factors such as whether the relationship between school senior leadership teams and other school staff is more collaborative or hierarchical in nature.

In situations where schools could do more to encourage social participation, the wider school culture can be challenging to shift (particularly in environments where leaders, teachers, and students feel under a lot of pressure/stress). However, research by Anderson & Graham (2016) found that *"both students and staff identified positive associations between having a say at school, being recognised (cared for, respected, and valued), and wellbeing"* (p.348), which supports the idea that social participation plays a supportive role in promoting wellbeing. Rudduck and Flutter (2004) also argue that students participation in school decision-making can be an active tool for student development, helping students to develop their identities and voice, and helping them to develop boundaries and confidence. Research on the positive impacts of initiatives to promote pupil voice has led Lavis & Robson (2015, 2021) to include the promotion of pupil voice as one of their key components of a Whole School Approach to supporting young people's wellbeing. In situations where EPs find that a school leadership team are open to discussions around how student voice and collaborative participation could be supported in their setting (including the voicing of concerns around climate change and the promotion of collaborative projects within the school), such conversations therefore hold a lot of potential for the promotion of overall wellbeing within a school community.

As with previous dimensions, knowledge of different ways that young people may engage with concerns around climate change can be helpful for educational psychologists to bear in mind. As covered in the previous section, Factor 1 values the importance of taking local actions, which may promote a sense of empowerment and help them manage challenging emotions around climate change. Factor 2 may benefit most from a reflective space in which they can openly express and explore their anxieties and negative emotions around climate change without fear of judgement from others. Factor 3 may also benefit from both initiatives, but may gain more from projects that focus on adaptation rather than prevention of climate change, and spaces in which they can share and find connections with others. However, no individual person's overall form of engagement will fit perfectly into the patterns identified by a single factor, so an approach that begins by simply inviting students to share what they feel would be helpful for them may be most helpful for many settings.

8.4 Future Directions: the Development of a Whole School Approach to Supporting Young People with Concerns around Climate Change

This thesis initially contained a short section that proposed that it would be helpful for Educational Psychologists who are interested about engaging in work to support young people with their concerns around climate change to consider developing a Whole School Approach towards the topic. This proposal was influenced by Lavis and Robson's (2015 & 2021) Whole School Approach to supporting mental health, plus my work with the Sandwell Wellbeing Charter Mark project, which incorporated Lavis & Robson's framework as part of the basis for action research projects that used whole-school audits and action plans to help schools to further develop their support for wellbeing within the school community. During the process of making corrections to my thesis I became aware that a whole school approach to supporting young people with concerns around climate change has already been developed by Gibb (2016) for the United Nations Educational Scientific and Cultural Organisation (UNESCO), This whole school approach can be accessed at: https://unesdoc.unesco.org/ark:/48223/pf0000246740. The approach shares many themes with the mental health framework outlined by Lavis and Robson (2015), emphasising governance, teaching and learning, engagement with the school community and collaboratively-made changes to the school environment. I therefore do not feel that my previous proposal (sketched as an outline in a table) is able to significantly add to this already-established approach, so have removed it from the thesis. However, I may undertake further work in the future exploring how this existing approach could be further developed.

9 Evaluation

Overall, I believe that my thesis research succeeds well in its primary aim of identifying and exploring a number of ways in which young people in the UK experience and engage with concerns around climate change. The secondary aim of exploring what support they would like was also tackled; whilst there is much more work that could be done in this area, I hope that the information from the focus groups provides an initial starting point. However, if I were to repeat the thesis research, there are parts that I would do differently, plus some parts that went well that I would repeat. I have therefore outlined below what I consider to be the limitations and strengths of the current study, starting with the limitations:

Introduction

Having attended multiple Phenomenology Summer Schools, research workshops, and conferences on embodied cognition, I was highly motivated to provide an ontological and epistemological model that I consider to be justified and self-consistent. However, this model only had relatively minor impact upon my research (influencing some statements, the interview technique, plus some interpretations of statements), so was possibly superfluous. In this final edit, I have moved the references to my ontology and epistemology to **Supplementary Appendix A**, to account for this.

Literature Review

Whilst I hope that the literature review is quite thorough, it is also very long, and covers a lot of different areas. This may make the progression of the review towards my justification for the need for the research project harder to follow than it might otherwise have been.

Methodology

The implementation of the research was impacted significantly by the Covid-19 pandemic and the requirement to move research online. It would have been preferable to have undertaken the research in-person, rather than virtually, i.e. undertaken the initial interviews, the pilot studies, the main Q-sorts and post-sort interviews face-to-face, rather than online. The overall diversity of the sample was quite low; demographic data suggests that roughly 5/6ths of the sample were white and middle-class. The requirements for consent around online research (in the context of Covid) meant that young people had to approach their parents and ask them to complete the online consent form. Many young people dropped-out of the research at this stage and this seemed to form a selection pressure where the young people most likely to participate were ones with supportive/motivated parents. This was exacerbated through the snowballing recruitment technique and a disproportionate proportion of participants had family who were either school staff or educational psychologists.

Whilst I feel that the research stands up on its own merits, it could have been further enhanced with additional contextual information. Firstly, it could have been useful to have undertaken further initial interviews to inform the development of Q-sort statements, since the majority of statements were still primarily inspired by theory rather than experiences highlighted by participants in the interviews. Secondly, whilst the survey information proved useful for my reinterpretation of Factor 3, the demographic information that I chose to collect (age, gender, ethnicity, faith/religion, and socio-economic status) did not prove as useful as I had hoped that it would. This was particularly a challenge since the sample size was too small to facilitate meaningful generalisations about such elements. Thirdly, it would have been preferable for Focus Group 3 to have consisted of more than 2 participants.

Finally, some of the Q-sort statements did not work as well as hoped. I have summarised these in **Table 15**, below.

No.	Statement	Limitations
6	I feel angry that governments and oil companies say they care about climate change but don't make the changes needed	It would have been better to split this statement in two, to explore anger towards government inaction and anger towards oil companies separately.
9	I switch between feeling great about the future and awful about it	This statement was an imperfect interpretation of Klein's (1946) account of splitting, so requires rewording if used to explore this concept.
10	I feel a lot of fear about climate change	Whilst the psychoanalytic literature distinguishes fear and anxiety, participants may not necessarily draw a distinction.
17	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change	This was a narrative/experience quite specific to a time and situation, so would probably not be useful to include in future studies.
21	Taking actions to reduce my ecological impact helps me to manage how I feel about climate change	Whilst it is valuable to have statements exploring problem-focused coping (Ojala, 2012a), these statements blur the lines between an 'understanding' (personal experience) and 'conduct' (what is done) and also make the assumption that young people have relative autonomy over their consumer choices (if their money comes from their family, this may hold quite a strong influence over their choices).
22	Caring about climate change has made me rethink the impact of the food I eat and the things I buy	
24	I feel very concerned about how climate change will affect people's lives in the poorest counties	It would have been better to have had separate statements exploring humanitarian concern and psychological distance due to perceived geographical distance.
28	Emotionally, climate change feels very distant to me because I can't directly see or feel it	This statement did not necessarily capture the key facets of Morton's (2012) ideas around climate change as a 'hyperobject'.
29	My concerns about climate change involve many social and political issues that all impact upon each other in complex ways	This statement was not a particularly effective translation of Levin et al.'s (2009) ideas around climate change being a 'super-wicked problem'.
36	I want to make sure that I travel the world before places become worse due to climate change	This statement did not distinguish between high-emission travelling (e.g. by plane) and lower-emission travelling (e.g. by train).
40	I see no point in my education because climate change means I won't have a future	This statement incorporated two ideas: the irrelevance of education to the future, and the idea that the future will be significantly different and making existing knowledge meaningless. It would have been better divided into two separate statements.
42	I feel grief that climate change will limit the opportunities I have for my life as I grow older	This statement received generally neutral responses from all 3 factors – this might be because it contains too many unknowns to express agreement/disagreement towards.

45	It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products	It's possible that a rejection of this statement could be interpreted as either saying that all products should be eco-friendly, or no products should be eco-friendly, which makes the statement too ambiguous.
54	It feels like most people my age are concerned about climate change	This statement may blur the lines of Curt's (1994) distinction between an 'understanding' (personal experience) and a 'representation' (of how others engage with climate change).
55	I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable	This statement was developed in a particular time (2019) when the student strikes for climate were popular and steadily growing in number; at this time, climate change was 'fashionable'. The relevance of the statement for future studies may depend on the general social/political landscape at the time.
56	Viewing content about climate change on social media helps to keep the issues alive for me	This statement doesn't distinguish between people who use social media and do/don't choose to view statement about climate change, and people who don't use social media.
59	You don't see many people from my background being involved with climate change issues	This statement was meant to specifically explore demographic factors such as race and class and whether they impact upon particular patterns of engagement with climate change, but the statement ended up being to all-inclusive and vague to do this.
60	My family will listen to me and take my feelings about climate change seriously	There could have been multiple statements regarding family, e.g. one about listening and one about collaborative changes.
64	Joking about climate change helps me connect with others about our concerns	This statement provoked a muted response of mild disagreement from all factors, so was not particularly insightful and can probably just be cut.
67	Coverage of climate change in the news has a big impact on my emotions	This statement could have benefitted from a means of clarifying whether people seek out/watch-if-on/avoid news coverage about climate change.
68	I wish that others were more understanding around how I feel about climate change	This statement received a muted response from all three factors. The term 'others' may need to be more specific.
69	I feel insecure due to the uncertainty around what our future will look like in light of climate change	This statement didn't really capture the concept of 'ontological insecurity' as presented by Giddens (2020).

Table 15: Limitations of particular statements from the final Q-set

Analysis

Overall, I feel that the analysis was thorough and well-justified. However, whilst the 3-factor solution was chosen on reasonable grounds, the analysis process may arguably have been stronger if the various criteria for selecting the number of factors had unambiguously pointed towards a single solution. It would also have been preferable if the overall correlations between factor scores had been lower than the factor significance value of 0.31.

Results and Discussion

I feel that the results section is strong and there are not any particular changes that I would make to it. As for the discussion section, whilst I have tried to make the *conceptual space diagrams* multi-faceted, they could arguably be seen as an oversimplification of the already rich summaries and comparisons that have been made between factors within the results section (though a section on the comparisons between factors has been cut in this version due to post-viva corrections). Additionally, the proposal for the whole-school approach to supporting students with concerns around climate change that were originally included in the thesis (pre-corrections) was only preliminary and it turns out that the idea replicates work that has already been undertaken by UNESCO, so the original (brief) framework that was proposed has now been cut from the thesis.

Additionally, from the perspective of the write-up, I struggled to fit the content into the word limit, so relegated significant material into the appendices and put most of my clarifications, observations, qualifications, and connections to other work/ideas as either footnotes or appendices. My viva examiners then requested that the content of these appendices and footnotes be reintegrated into the main text; this required a lot of editing, and has made the main body of the thesis substantially longer than initially intended.

I hope that the strengths of the study predominantly speak for themselves. However, I feel that the research was strong in several areas. Firstly, the process of developing the Q-set statements (through research, interviews, and many pilot studies) involved a lot of thought, editing, and reflection, lasting around 4 months. Secondly, given that the research had to be

online (due to Covid-19 restrictions), the use of the Miro collaborative whiteboard was an inventive and effective way of implementing the Q-sorts.

The thesis also contained some innovations. Within the analysis section, the comparison of Brown and Horst 5.5 extractions in table form (**Section 6.2.2**) facilitated a detailed consideration of most major extraction options available for the data set via PQMethod and is not something I have seen undertaken in other theses that use Q methodology. Also within the analysis, the use of z-scores within the crib sheets (**Section 6.3.2**) facilitated more fine-grained comparisons between factors and provided additional support for the conclusions drawn. The use of three-dimensional *conceptual space diagrams* (**Section 8.1**) is also innovative (I have only previously seen two-dimensional conceptual space diagrams be used).

Thank-you for taking the time to read my thesis! You can access an interactive presentation of my research on Miro (at least until I stop paying for Miro) at: https://miro.com/app/board/uXjVO6PIOnE=/?share_link_id=961247705288

If you would like to contact me about the research, please email either: rob.lee.email@gmail.com (personal email) or r.lee.5@birmingham.ac.uk (work email until Feb 2026 - preferred).

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Supplementary Appendix A: Ontology and Epistemology

Supplementary Appendix A1: the Positionality of this research

Whilst the topic of this research is intertwined with climate change, the focus of the thesis is psychological rather than meteorological. Consequently, the research topic is not climate change itself, nor upon the likely impacts of climate change. Rather, my focus is on how/whether young people engage with climate change when framed as a concerning or threatening phenomenon, with the hope that the work can inform how schools and educational psychologists can work with and/or support young people who experience a range of challenging emotions and responses to the topic.

However, there will inevitably be a complex, varied, and non-linear relationship between: research in climate science, the information that young people have encountered about climate change, and young people's relationship and engagement with such information. I will therefore use this *Supplementary Appendix* to sketch a brief outline of the position that this thesis takes on climate change (**Appendix A 1.1**), risk perceptions (**Appendix A1.2**), and the language used to speak about Climate Change (**Appendix A1.3**). I will also detail the ontological and epistemological position from which my research was undertaken (**Appendix A2**), in order to help clarify the theoretical base from which I engage with a mixture of broadly positivist research (climate change research), psychodynamic positions (which characterise a lot of climate psychology), systemic approaches to mental health, Q methodology, and more phenomenological perspectives.

Supplementary Appendix A1.1 Epistemological Position on Climate Change Research

In conducting an exploratory piece of research (which used Q-methodology) it would be possible for me to explore how some young people engage with concerns about climate change whilst remaining agnostic about whether climate change itself is a problem, in the same way it would be possible to research people's beliefs in a conspiracy theory without explicitly outlining why such beliefs are false. However, I believe it would be disingenuous for me to 'bracket' my epistemological position on climate change when I consider climate change to be a real and significant problem that is likely to cause increasing problems over the coming decades.

Additionally, the realism of climate change is relevant to the second (much more modest) component of my research. My secondary research questions explore the implications of the Q methodological analysis for applied Educational Psychology (EP) practice. If I held that young people's concerns about climate change were fuelled by false information (or that the situation is less serious than warranted by their degree of concern), it would be reasonable to recommend that school responses include supporting young people to gradually challenge the beliefs that concern them (for example, using Cognitive Behavioural Therapeutic techniques). However, if I hold that climate change is a real problem, it would be unethical, unprofessional, and potentially ineffective for me to make such recommendations (assuming that their concerns are broadly grounded in a reasonable appraisal of the situation).

This thesis therefore explicitly makes the assumption that the reliability and validity of climate research has long been established, and that there is overwhelming scientific evidence for the existence of anthropogenic climate change (i.e. climate change that is primarily driven by greenhouse gas emissions as a result of human industry). My assumption is that this should be the default starting position for scientific researchers, particularly since the alternative would have to involve a decades-long conspiracy involving worldwide coordination of misinformation by an ever-expanding roster of scientists spanning multiple research disciplines. However, This assumption is important, in part, because of the challenge posed by climate misinformation. As covered exhaustively by Orsekes & Conway (2011), there has been a protracted campaign of misinformation about climate change over

the past four decades by a combination of oil companies and conservative think-tanks such as the global warming policy foundation.

Research into climate change continues to develop and more data is continuously being collected. However, there is overwhelming consensus on the overall causal mechanisms of climate change and the broad environmental implications (with models of projected environmental impact continuing to become more refined every year):

1.) International consensus amongst climate researchers about anthropogenic climate change was first published in 1979 and since then there have not been any challenges to this consensus that have been made in good faith on the basis of credible research (Ripple et al. 2020).

2.) Five assessment reports have been published by the Intergovernmental Panel on Climate Change (IPCC: 1990, 1995, 2001, 2007, 2014), with the sixth due in 2022 (now delayed to 2023), all of which clearly state that the evidence for anthropogenic climate change is overwhelming.

3.) The consensus amongst researchers around anthropogenic climate change that appears to be between 97% (97-98%: Anderegg et al. 2010, 97.1%: Cook et al. 2013) and 99.99% (Powell, 2015). The slight difference between estimates appears to be due to methodological differences in how the consensus is counted. Lynas et al. (2021) report that out of the 88,125 climate-related papers published since 2012 that they sampled, only 28 appear to be implicitly or explicitly 'sceptical' of anthropogenic global warming; additionally, they report that the same few themes involving 'natural fluctuations' appear common to such papers, when such themes have not been considered credible for decades by most researchers.

4.) The American Association for the Advancement of Science (one of the world's largest scientific bodies) releasing a consensus statement that: "*the evidence linking rising levels of greenhouse gases and global warming is as strong as the link between smoking and lung cancer"* (Fisher, 2014).

5.) Not only does climate science research outline clear causal models for global warming, but models of climate change have consistently made testable predictions and have been gradually refined over decades on the basis of detailed observations of the environment (Orsekes, 2018).

After a review of such research, it feels justified to assert that the weight of the cumulative evidence presented within climate science research for anthropogenic global warming is far stronger than any evidence that we are currently able to present within applied psychology. Much debate exists within the field of climate science, but it is at the level of 'what is the best way to combine ice sheet melt modelling with long-term climatic modelling?' (e.g. Barthel et al. 2020), rather than 'is anthropogenic global warming happening?'; a parallel could be drawn between climate science and evolutionary biology: debates exist amongst researchers about the relative importance of mutation vs. natural selection, factors during development, and microevolution vs. macroevolution (Zhang, 2015), but the question 'is evolution happening?' is not one that is asked by credible scientists. Given such considerations, I am happy to assert a (post-)positivist approach towards the realism of climate change research (considered within the ontological and epistemological framework outlined in **Appendix A2**) and to hold the position that: climate change is a very concerning phenomenon and it is reasonable to be concerned.

Supplementary Appendix A1.2 Position on Young People's Risk Perceptions around Climate Change

Once concern that emerged early in the research project is that whilst this thesis asserts that the ample scientific evidence around climate change means that it is reasonable to be concerned, most people will not have directly engaged with the original scientific evidence. Framed another way, there is a significant difference between the current state of climate science research and the average non-specialist's understanding of climate change. Consequently I am working on the assumption that my own understanding of climate research (and yours) is far from comprehensive and may not completely reflect the current state of the evidence. This includes not just the geological data, but also the practical implications of such data – for example, I do not have a clear picture of the timescales involved for significant changes to occur, nor what this will look like on a day-to-day basis in the UK over the next few decades.

This poses a particular epistemological challenge: If it is reasonable to be concerned about X on the basis of scientific evidence but someone is concerned about X due to a much more basic understanding of the topic, where is the limit to how large the disjunct can be between scientific evidence and personal understanding before the concern ceases to be reasonable? Thankfully, the research literature on how people pragmatically engage in everyday risk perception offers a way to address this by suggesting that most people's assessments of potential risks in their lives are based upon limited information and fuelled by various cognitive and affective biases (e.g. Sjöberg, 2000). Consequently, this thesis holds that concerns held by non-specialists regarding climate change should therefore be assessed by similar criteria to other non-specialist judgements regarding potential/future risk (i.e. whether they are broadly commensurate with potential threats highlighted by current research), rather than by specialist-level criteria regarding their scientific accuracy.

This particular challenge has also been explicitly considered in one of the first large-scale reports by the American Psychology Association (APA)'s 'Task Force on the Interface Between Psychology and Global Climate Change' (2011). Early in the report they posit that:

"*The understanding of climate change, both in its causes and in its likely effects, by the average citizen across different regions of the world is limited.*"

(Swim et al. 2011, p.33)

Furthermore, Hornsey et al. (2016) have produced empirical support for this statement through their meta-analysis of 171 studies to explore the role of knowledge in climate change risk perception amongst non-specialists. Their analysis estimated that accurate knowledge about climate change can only explain around 6.5% of the variance in people's concerns (Hornsey et al. 2016). Additionally, it would be a mistake to assume that all forms of knowledge around climate change will have equivalent impacts upon risk perception; for example, Guy et al. (2014) make the case that a clear understanding that humans are driving climate change is a the most important prerequisite for accepting the need for us to reduce our carbon emissions, whilst knowledge of more technical issues (e.g. the impact of other greenhouse gasses beyond carbon dioxide and methane) may be less relevant. To further complicate the picture, research by Shi et al. (2016) suggests that for most individuals, their estimation of how much they know about climate change does not correlate very strongly with their actual understanding of the topic. In light of such research, a simple scale that measures a person's overall knowledge around climate change is probably an inadequate basis upon which to form judgements about the reasonableness of a young person's concerns about climate change.

Turning to the literature around risk perceptions, the APA task force argue that:

"Evidence from cognitive, social, and clinical psychology indicates that risk perceptions, in a broad range of domains, are influenced by associative and affect-driven processes as much or more than by analytic processes."

(Swim et al. 2011, p.37)

As indicated by the APA task force, it appears to be well established within the literature around risk perceptions that emotions play at least as significant role in judgements of risk as explicit knowledge (e.g. Finucane, 2012). Within the field of climate psychology, this is also borne out in van der Linden's (2015) 'Climate Change Risk Perception Model', which estimates that around 22% of the variance in risk perceptions about climate change can be explained by 'negative affect', but only 9.3 % by knowledge about climate change. Whilst this could be seen to undermine the claim that concerns about climate change are rational, Van der Linden

(2015, 2017) also presents evidence that such variance is similar to the amount of variance that negative affect/emotions can account for when people make judgements about other potential risks.

Whist it would be possible on the basis of such information to assert that almost all risk perceptions are relatively irrational, I do not believe that this is a helpful position for a psychologist to take. In the case of concerns about climate change, many climate scientists themselves express high climate anxiety (e.g. Randall & Hoggett (2019) also read letters by climate scientists at: https://www.isthishowyoufeel.com/this-is-how-scientists-feel.html), which strongly suggests that it is reasonable to be concerned. There may be some cases where a young person experiences concern about climate change on the basis of mistaken or distorted beliefs (for example, if someone believes that the world is literally destined to end in 10 years due to climate change), in which case it will be helpful to help them to learn a more accurate account of the risks involved. However, for the vast majority of cases outside of such examples, this thesis holds that the concerns of young people around climate change should be treated as reasonable by default if their concerns are broadly proportionate to the risks modelled within current climate research, regardless of the depth of their knowledge around the topic.

In contrast, I hold that the concerns of a young person who feels worried due to their beliefs in a conspiracy theory are not 'rational enough' if their concerns are substantially intertwined with beliefs that are not rational. I highlight this not solely as a theoretical point, but also a practical one that embodies my positionality; in this thesis I will treat young people's concerns about climate change as justified and reasonable. There is a trend within some conservative media articles to dismiss young people's concerns about climate change and to regard those who are anxious about it as either having been manipulated, being naïve, or having a condition that needs to be 'treated away' (e.g. outlined in: Benoit, et al. 2022, Han & Ahn, 2020, p.16; Smith, 2020, p.29-43); whilst this is clearly patronising towards young people, I want to be clear that the problem with such articles is not just a lack of respect, but that their core assumption that climate change concern amongst young people is unjustified or irrational is itself incorrect, based on inaccurate assumptions about both the nature of the threat and the processes through which mist personal judgements of risk are made.

Supplementary Appendix A1.3 Position on the use of Language when referring to 'Climate Change'

Another concern that arose early in the project is that the term 'climate change' is often used in very vague and non-specific ways (including within the current study) and that people using the term may have very different understandings of what it means. Of course, it could be argued that this is the case for a large number of terms that are used by educational psychologists, school staff, parents, and young people (e.g. autism, ADHD, dyslexia, social emotional and mental health difficulties, special educational needs, etc.). However, given that the term 'climate change' has been integral to all stages of the research, it is helpful to try to provide some clarity about how it is being used.

At its core, '*climate change*' refers primarily to '*increases in global temperature as a result of greenhouse gas emissions*' (Molina et al. 2014). However, climate change is an inherently systemic phenomenon, so this definition is incomplete without consideration of the systemic consequences of such increases in global temperature. According to the American Association for the Advancement of Science (AAAS) Climate Science Panel, the key environmental changes that will result from global temperature increases include:

- Increased ice sheet, glacier, and sea ice melting (resulting in rising sea levels),
- Ocean acidification (from CO2 absorption, threatening marine ecosystems),
- Increases in extreme weather (floods, heatwaves, and droughts),
- Increases in the frequency and severity of natural wildfires,
- Disruptions to local ecosystems (increasing the rate of extinction for at-risk species),
- Increased spread of infectious diseases.

(Molina et al. 2014)

The Advancement of Science (AAAS) Climate Science Panel does not directly address the potential political, economic, and social consequences of such environmental changes. Whilst such impact is harder to model, as mentioned in the **Section 3 Foreword**, some researchers have studied this for particular communities that have already experienced such ecological changes (e.g. Bennett et al. 2015, McCubbin et al. 2015) and some researchers are working to

try to predict the relative risk and preparedness for each country (on the basis of ecological, economic, and political factors: https://gain.nd.edu/our-work/country-index/). Whilst the complexity of social, economic, and political factors makes the human impact of climate change very hard to predict, there appears to be general consensus that climate changes are best framed as 'stressors' that add pressure to existing environmental, social, economic, and political challenges (e.g. Jackson et al. 2021, Phan et al. 2019, Freduah et al. 2018). Consequently, I consider that when the term 'climate change' is used technically, it is likely to refer to global temperature increase, the ecological impact of temperature increases, and the resulting stressors that this places on social, economic, and political systems.

However, the majority of people using the term 'climate change' are unlikely to be focused upon a precise and technical usage of the term. Additionally, the boundaries of what is included as part of the term, or implied by it, are likely to vary between people. For everyday use of the term 'climate change' by non-specialists, I therefore hold that it is most useful to adopt a 'use theory of meaning' (Wittgenstein, 1953).

The use theory of meaning assumes that understanding of terms used within conversation is scaffolded by context and pragmatics, significantly reducing the need for formal precision. This stands in contrast with Wittgenstein's earlier attempt to establish a 'correspondence theory of truth' (e.g. Wittgenstein's picture theory of language, 1922). Within a 'correspondence theory', correct use of the term 'climate change' would generally require the speaker to be clear upon precisely to what they refer when they use the term, so that sentences using the term 'climate change' can be used to construct representations or linguistic/mental models of states of affairs within the world (which may be true or false, depending upon the correspondence of the representation/model to the actual state of affairs in the world). However, the 'use theory of meaning' assumes that "*the meaning of a word [comes from] its use in the language*" (Wittgenstein, 1953, §43). When people speak about climate change, they do so whilst embedded in a specific context which itself plays a key role in establishing the intent and meaning of what is being communicated by the speaker – in Wittgenstein's terms "*the speaking of language is part of an activity, or of a life-form*" (1953, §23). This activity, life-form, and context can form a (permeable, impromptu, and temporary) paradigm that scaffolds the understanding of both speakers and listeners, reducing the need for a high level of precision in language use in the majority of cases.

From this perspective, it is justified to make the pragmatic assumption that when non-specialists speak about concerns around climate change, they are primarily focusing upon the environmental changes that may significantly impact either on their own lives or the lives of others (which may include other species). Consequently, this allows for the assumption that the term 'climate change' can be used in meaningful communication without a singular definition being established between speakers and listeners, similar to Wittgenstein's account of how we do not need to define the word 'game' to speak about games (Wittgenstein asserts that: "*even if we don't have a definition, we can still use the word [game] successfully"* [1953, §66]).

Within the current study the participants and I communicated about climate change in the context of interviews, Q sorts, and focus groups that explored their concerns about the topic. However, a broader context for these exchanges was already pre-established through the participants agreeing to taking part and by the fact that I had decided that the topic of young people's engagement with concerns about climate change was sufficiently important to merit doctoral research. Additionally, the contents of my information sheet had already established that the research activities would not involve debating the existence of climate change or testing young people's knowledge about it but would focus on how they engage with concerns about it. This context helped to scaffold the situation so that when the participants spoke about 'climate change' they did not need to formally define it, clarify the limits of what they were speaking about, nor explain why it was something about which they might be concerned.

Supplementary Appendix A2 Ontology and Epistemology in relation to Positionality

My thesis requires an ontological and epistemological framework that is be able to accommodate the positionality outlined in the previous sections. This stance holds that:

1. Climate science research is reliable and accurate, can accurately measure changes in climate, and is able to produce mathematical models that make justified predictions about how climate change is likely to progress (**Appendix A1.1**).

2. My participants' (and my own) understanding of climate change is likely to be relatively limited and to contain some inaccuracies, but this is no different from the knowledge that most people hold about the vast majority of topics involving the physical world. My participants should be treated as 'understanding' about climate change unless they hold beliefs that can be shown to be substantially inaccurate or irrational (**Appendix A1.2**).

3. The concerns that my participants hold about the threats posed by climate change should be treated as reasonable/'rational enough' unless they are substantially intertwined with beliefs that are not rational (**Appendix A1.2**).

4. Most people will use the term 'climate change' broadly (influenced by the ways that it is used within public discourse and the context in which they are speaking) rather than in an analytically precise manner, but the context of most discussions means that this is unlikely to pose a major impediment to productive discourse around the subject (**Appendix A1.3**).

Whilst almost all ontological and epistemological positions are able to account for the presence of 'subjective' views about an 'objective' reality, assumptions 2 - 4 are not a natural fit for a positivist framework (e.g. Comte, 1856), plus frameworks subscribing to some variety of direct realism do not fit well with Q methodological research, which generally explores a variety of subjects' perspectives upon a topic rather than seeking a single 'correct' perspective. From the opposite angle, assumption 1 likewise does not naturally fit comfortably into a social constructionist framework (Berger & Luckmann, 1966), since it leans closer towards a positivist/realist approach to climate change.[2]

[2] However, I have taken care to present climate science as operating within a very well justified scientific paradigm, as opposed to making a straightforwardly positivist claim about the ontological status of such research.

In contrast, a critical realist framework (Bhaskar, 1975) can reasonably accommodate all of the above statements. This would also have the benefit of being considered an acceptable position by many educational psychologists (Kelly, 2008, p.24-26) and Bhaskar (2010) himself has argued that his framework can accommodate interdisciplinary approaches to climate change research. Unfortunately however, to subscribe to a critical realist perspective would feel intellectually disingenuous since I believe that Bhaskar (1975) does not offer a satisfactory explanation for how critical realism can justify its own philosophical position. Critical realism appears to rely on the claim that ontological facts (underlying causal mechanisms or structures) about the world cannot be known for certain and that we can only gradually intuit increasingly accurate information about the world through scientific exploration and careful interpretation. However, from what I can see, the theory then fails to apply these ideas to itself (i.e. the critical realist model is presented an ontological fact but does not present a satisfactory explanation about how we can come to know such a fact). In doing so, it falls foul to the classic epistemological fallacy outlined within phenomenology of adopting an unjustifiable '*view from nowhere'* (Zahavi 2018, p.27, see **Appendix A3.3**). Without sufficient justification for its own model, it is hard to see how the model can form a satisfactory ground for exploratory research.

Rather than adopt this approach, I have opted to ground my positionality (and key ontological and epistemological assumptions) for the current research within a wider theoretical framework which has informed my thinking as an educational psychology student over the past three (now four) years. This framework is often referred to as the '*4E View of Cognition*' (Menary, 2010) in reference to its foundational assertion that all knowledge and cognition is '*enactive, embodied, extended, and embedded*' (p.459). More recently, it has been dubbed '*situated cognition*' by Roth & Jornet [2013], which also broadly links it with the philosophical pragmatism of Dewey (1925, also see: Morgan, 2014). Crucially, this framework of situated cognition presents a non-dualistic account of knowledge in which the subject and object are interlinked within the knowing process (with each providing necessary conditions for experience) and the account itself *begins from* the knowing process rather than an objectivistic view from nowhere. This allows it to accommodate post-positivist assumptions about the reliability of scientific research into the physical world (e.g. assumption 1), whilst also accommodating more constructivist

assumptions about the knowledge of individuals (e.g. assumptions 2 & 3), and more social constructionist assumptions about their use of language (e.g. assumption 4). Specifically, such an approach can address each assumption in the following ways:

Assumption 1.) An enactive approach to knowledge supports the idea that the discipline of climate science has developed effective methodologies for measuring and modelling aspects of the environment, which offer a reliable and comprehensive 'grasp' of how the climate is changing. Whilst from a phenomenological perspective 'objectivist' knowledge (abstracted from the perspective of any subject) of climate change is impossible, a 'naturalised' phenomenological approach permits an epistemology in which climate science can produce research that both identifies and makes predictions about intersubjectively-verifiable aspects of the 'objective' world. This position is broadly compatible with pragmatist philosophy of science (e.g. Dewey, 1938) and allows me to hold assumption 1 (from above).

Assumption 2.) From a phenomenological perspective, knowledge of the world generally involves 'perspectival incompleteness' (Gallagher & Zahavi, 2020, p.9) in which the object of perception is 'known' through our active engagement with it without a full understanding of the object being necessary.[3] Consequently, as with many other topics, young people can be said to 'know' about climate change without needing a full grasp of every aspect of it, but further learning about climate change will afford increased knowledge or 'grasp' (in enactive terms) of the phenomenon. Incorrect beliefs about climate change are those that climate science research indicates do not identify aspects of the phenomenon (this helps justify assumption 2).

Assumption 3.) From an enactive (and also phenomenological) perspective, '*Sense-making*' (engaging with objects and experiences in the world as inherently meaningful and as part of a wider web of meaning according to what is relevant within our own 'lifeworld') is not a process that is added-on or applied to cognition following basic sensory experiences, but is a

[3] This is a phenomenological concept that has been incorporated into O'Regan and Noë's sensorimotor enactive account (2001), autopoietic enactivism (Thompson, 2010, Ch.10) ecological accounts of cognition (Chemero, 2011), and into the broader account of situated cognition (Robbins & Aydede, 2009)

foundational biological process that enacted within the process of engagement by autonomous agents with their environment (Di Paolo, 2005) and is a fundamental characteristic of all experience (Weber & Varela, 2002). All cognition is dependent upon the process of "*sense-making in precarious conditions"* (Thompson, 2017, p.328) and risk-perceptions about climate change should be considered part of our fundamental orientation of '*care*' (broadly: our concern about the world that inevitably emerges through our relatedness towards it - Heidegger, 1927) towards our continued existence in the world. Concern about potential threats posed by climate change are therefore inherently reasonable *by default* and only become more or less 'rational' on the basis of the accuracy of the beliefs associated with this core concern (which themselves constitute further sense-making)[4] – this helps ground assumption 3.

Assumption 4.) Using the 'situated cognition' framework, intelligent behaviour, including language use, is *'situated'* because it "*arises from the dynamic coupling between intelligent subject and its environment rather than only from the agent's mind*" (Roth & Jornet, 2013, p.464). This includes the social environment, and within a social context "*language is not a system of correspondences between symbols and elements in the world, but a means for humans to coordinate their situated actions with others [and for agents to stimulate their own minds]*" (Ibid. p.468). a key enactive concept is that the interactional and situational context in which a conversation occurs can exert its own influence on each speakers' *sense-making* within the conversation, through which "*meaning is generated and transformed in the interplay between the unfolding interaction process and the individuals engaged in it*" (De Jaegher & Di Paolo, 2007, p.485). Both the interactional process and the fact that "*language embodies implicit rules for its own use*" (Roth & Jornet, 2013, p.468) mean that the situational context of the discussion significantly scaffolds meaningful conversation, to the extent that "*competent speakers can situationally generate statements on a topic even though they have never thought about this topic before*" (Ibid. p.468). Consequently, people are able to hold meaningful and insightful conversations about climate change without needing to define or clearly demarcate the topic[5] (supporting assumption 4).

[4] Note that this account is intertwined with an ontology of the self that is asserted within enactive thought (and 'naturalised' phenomenological thought) – this ontology is explored further in **Appendix A3 Section 3.**
[5] This account is explicitly compatible with Wittgenstein's (1953) *use theory of language* as outlined in the previous section, but develops it further through enactivist accounts of *participatory sense-making* (De Jaegher

A phenomenological epistemology on its own could also potentially be compatible with a Q methodological focus upon constructing holistic accounts of how young people might engage with concerns around climate change.[6] However, for the construction of my Q set (of statements for young people to sort), it was also important for me that I was able to incorporate insights from existing research within climate psychology, much of which appears to operate within the 'natural attitude'[7] (most commonly by taking a simple realist approach towards climate change). Whilst this would potentially be problematic for a Husserlian transcendental phenomenological analysis (1913), Zahavi (2010, 2019) and Gallagher (2003) have argued that it is important for applied phenomenological insights and research findings within natural science to be able to inform each other through a process of '*mutual enlightenment*' (Gallagher, 1997). Zahavi (2010) argues that such work would take the form of a '*naturalised phenomenology*'. The purpose of such engagement would not be to "*make phenomenology part of, or at least an extension of natural science*" (p.14), but rather, Zahavi (2010) proposes that: *"naturalised phenomenology [should be] the kind of phenomenology that engages in meaningful and productive exchange with empirical science"* (p.14).

The current research attempts such a '*meaningful and productive exchange*' in part by using an interview process that is inspired by the 'phenomenological interview technique' (Høffding & Martiny, 2016) to explore whether the young people interviewed felt that existing insights/theories from phenomenology, sociology, psychiatry, and climate psychology were able to capture the nuances and structure of their experiences of their engagement with concerns around climate change. Insights gained from these interviews

& Di Paolo, 2007), plus broader understandings of language from accounts of *situated cognition* (e.g. Roth & Jornet, 2013).

[6] This view is not entirely uncontroversial, due to the variety of ways in which phenomenological analysis has been interpreted (for example within Interpretative Phenomenological Analysis, which claims that phenomenology "*is concerned with an individual's personal perception or account of an object or event, as opposed to an attempt to produce an objective statement of the object or event itself*" [Smith & Shineborne, 2012]. However, see Zahavi [2019] for an account of why IPA lacks important features that would normally be required of a phenomenological analysis as envisioned by Husserl). **Appendix A3 Section 1** provides an explanation of how I understand phenomenology within this this (and in particular how phenomenological analysis is not synonymous with introspection).

[7] See **Appendix A3 Section 1** for an explanation of the natural attitude and why Husserl (1913) argued that it should be avoided within transcendental phenomenological analysis.

were then used to refine the overall set of statements that were used within the Q methodological analysis.

Whilst this process felt fruitful from a research perspective, the contribution of phenomenological insights to the overall Q set ended up feeling quite 'watered down' (as did the analysis process, since Gallagher & Zahavi's [2012] phenomenological method was only used as inspiration for the 'tier 2' analysis, rather than being implemented in full) and the epistemological stance of the research remained slightly broad and unclear. Consequently, the final epistemological and ontological grounding for the research was adopted from enactive and embodied approaches to cognition (Varela et al. 1991).[8] These approaches seen to develop/build "*on aspects of Merleau-Ponty's Phenomenology of Perception"* (Gallagher & Zahavi 2020, p.104) that sought to integrate phenomenological insights about the structure of knowledge and experience with interdisciplinary theoretical and empirical research. I have referred to this approach in the main body of the thesis as '*situated cognition*', using Roth & Jornet's [2013] umbrella term for accounts of knowledge and cognition that are fundamentally '*enactive, embodied, extended, and embedded*' (Menary, 2010, p.449).

Is a 4E cognition framework compatible with Q methodology? I would argue that it's not only compatible with the Q methodological framework as envisioned by Stevenson, but also actively shares and addresses some of the concerns that he expressed about the study of subjectivity. Both approaches try to avoid a dualist account of subjectivity in which experience is seen as fundamentally separated from the 'objective' world – for Stevenson, this was motivated by William James' radical empiricist epistemology (1902/2003), which helps to make his approach compatible with phenomenological accounts of intentionality (**Appendix A3, Section 3**) and enactive approaches to cognition (**Appendix A3 Section 4**) that emphasise the embodied and situated nature of experience.

William Stevenson (the pioneer of Q Methodology) addressed questions around the ontological status of subjective views or experience throughout his career, but devotes

[8] A more detailed outline of this position plus an argument for the compatibility of this approach with phenomenology is explored in **Appendix A3 Sections 3** and **4**

particular attention to such issues in some of his earlier work such as *The Study of Behavior: Q-Technique and its methodology* (Stevenson, 1953). Watts & Stenner (2012) put his thought in context by explaining that it was written at a time when there was a risk of researchers operating within the behaviourist paradigm would reject Q methodology's study of subjectivity as part of their wider "*rejection of all mental or mentalist terminology'* (p.25) within psychological research. In response to this, Stevenson (1953) argued that Q methodology was the study of '*operant subjectivity'*, a term which explicitly drew parallels between his approach and behaviourist research that studied '*operant behaviour*'. Watts & Stenner (2012) argue that Stevenson specifically used the term '*operant*' here to emphasise that he considers subjective perspectives to be an engaged *activity* (Thompson [2010] would phrase this as subjective perspectives being *enacted*) as opposed to something that happens within an unknowable or unmeasurable 'mental' realm:

"In using the qualifier 'operant', [Stevenson is] making a very direct statement:
subjectivity is not to be understood as a mental concept
and hence as an aspect of mind or consciousness.
It is not some isolated 'mind-stuff' that exists inside us,
or that is somehow separate from the real world of objects.
On the contrary, subjectivity is a behaviour or 'activity' and it is an activity
that is best understood relative to its impact upon the immediate environment"

(Watts & Stenner, p.25-26)

The account of subjectivity presented here appears to be highly compatible with enactive and situated accounts of *cognition* as a *behaviour* that "*arises from the dynamic coupling between intelligent subject and its environment*" (Roth & Jornet, 2013, p.464). The compatibility arises from Stevenson's concerns around avoiding 'internalist' accounts of subjectivity, as part of his rejection what Good (2010) calls "*the Cartesian separation of inner and outer*" (p.233), which itself was inspired by William James' (1912/2003) rejection of dualist ways of thinking. This is also a key feature of phenomenological accounts of intentionality plus approaches taken by situated cognition accounts in general:

"The mind is not initially and taken on its own a self-enclosed sphere that has to await a causal impact from elsewhere in order to become world-related. It is misleading to regard the world as somehow outside or external to us, as it is to conceive of consciousness as somehow located within an interior sphere"

(Zahavi, 2018, p.23)

In another helpful parallel, Stevenson's engagement with thinkers such as Pierce, Dewey, and James means that he appears to hold a broadly pragmatist position towards philosophy of science, which itself is again compatible with accounts of knowledge permitted through a situated cognition framework. Good (2010) argues that Stevenson's account of 'objectivity':

"might be seen as corresponding to the third of Allan Megill's four senses of objectivity - an interactional or dialectical sense which holds that objects are constituted as objects in the course of an interplay between subject and object (Megill, 1994)"

(Good, 2010, p.233)

This account of 'objectivity' appears particularly compatible with ecological and embodied accounts of objective knowledge, such as Chemero's (broadly pragmatist) account of cognition. Chemero (2011) argues that each interaction between agent and environment will 'afford' (and constrain) particular possibilities for knowledge of the world, and what can be 'grasped' in cognition will depend upon both the sensorimotor capacities of the agent and the features of the environment. Within such an account (of 'affordances'), the 'objective world' is only constituted as such through the interactional process, which makes it nonsensical to try to construct an objectivist '*view from nowhere'* (Zahavi 2018, p.27).

This brief account suggests that Stevenson's account of operant subjectivity is compatible with key assumptions made by approaches within the situated cognition framework due to the importance that each place upon accounts of knowledge that fall into the trap of Cartesian dualist assumptions that frame the mental (i.e. 'subjective experience' plus any processes that underpin this) as being fundamentally separated from the 'objective' world.

In contrast, I would argue that critical realist perspectives that situate the 'objective world' as separated from subjective experience (yet imperfectly inferred through it) are potentially more at risk of locating a participants' views or experience to the realm of "*isolated 'mind-stuff' that exists inside us"* (Watts & Stenner, p.26). However, it is also worth noting that Watts & Stenner (2012) state that Stevenson's views changed over time and that "*Stevenson situated Q methodology, and subjectivity, in far more than one theoretical framework over the course of his career"* (p.27). For the purposes of my current research I feel that this is not concerning, since it does not change the fact that approaches grounded in situated cognition can be compatible *with at least one* approach to Q methodology.

One further consideration highlighted by Watts & Stenner (2012) is that whilst Stevenson "*generally used [Q methodology] for constructivist purposes*" (p.42) in which individuals' subjective constructions were explored, research in the UK and Europe now predominantly uses Q to identify and explore *"the predominant social viewpoints and knowledge structures relative to a chosen subject matter"* (Ibid. p.42), which situates much of this research within a more social constructionist approach. This raises the question of what my current research seeks to obtain through the use of Q methodology.

Watts & Stenner (2012) state that "*[Social] Constructionists typically use Q to reveal the dominant viewpoints extant in a particular data set. This method allows them to identify the key bodies of knowledge relative to a particular subject matter and to render those knowledge structures empirically observable"* (p.43). The current research uses Q methodology to construct factors that highlight key ways in which young people engage with concerns around climate change. Each of the identified factors are statistical constructions (although judgement calls had to be made to facilitate these constructions), rather than the viewpoint of any one individual, and I am happy to make the assumption that public discourses and narratives around climate change will have influenced participants' responses (situated cognition is able to incorporate narrative influences into its broad explanatory framework; for example, this has been done in Hutto's account of '*the narrative self',* 2012).

However, simultaneously, my focus is primarily on patterns concerning how young people *engage* with concerns about climate change, rather than centring upon the discourse that influences how they engage (though this discourse is also considered in various statements within the Q-set). Consequently, my research leans closer towards taking a constructivist rather than full social constructionist approach. This is also a slightly better 'fit' for the epistemology presented above; whilst social constructionist approaches are (sometimes unfairly) criticised for taking a heavily relativistic approach to truth (e.g. Boghossian, 2007), approaches within situated cognition generally tend to highlight some limits to what might constitute a reasonable account of a situation, due to the boundaries imposed through biology (e.g. Maturana & Varela, 1987), affordances yielded within the subject-object relationship (e.g. Chemero, 2011), and phenomenologically 'essential' structures of experience (e.g. Husserl, 1913). Such considerations mean that the situated co-construction of knowledge within the interaction between agent and environment will always have some boundaries, which provide limits for the range of accounts that can be considered 'true' or correct whilst also allowing for socially constructed narratives and practices to significantly impact what will be known or 'grasped' within a particular situation.

Supplementary Appendix A3 Key Phenomenological and Enactivist assumptions that ground the ontology and epistemology

Supplementary **Appendices A1** and **A2** cover the ways in which a 4E approach to cognition grounds my research. However, whilst outlining how the approach grounds my research, I became aware that it may also be necessary to provide some of the fundamental details of the philosophical positions that ground the 4E approach itself. Appendix A3 Sections 1-4 therefore provide accounts of some of the fundamental perspectives held within phenomenology (**Section 1**), naturalised phenomenology (**Section 2**), work on intentionality (**Section 3**) and work within enactivism (**Section 4**). I hope that these sections help to make further sense of the positions outlined in **Appendices A1** and **A2**.

Supplementary Appendix A3 Section 1. The Phenomenological Epoché and Reduction

Arguably the core purpose of applied phenomenological research is to begin with a careful analysis of experience[9] in order to construct an "*understanding and proper description of the experiential structure of our mental/embodied life*" (Gallagher & Zahavi, 2012, p.9). Key to this is the idea that all experiences (e.g. "*all perceptions, memories, imaginings, judgements, etc*." ibid. p.7) have an 'intentional structure': they are inevitably *about* something in the *world*[10] which means that phenomenologists "*deny the self-contained nature of the mind and argue that it is intrinsically world involved*" (Zahavi, 2018, p.29). Consequently, phenomenological analysis must explore the "*intersection between mind and world"* (ibid. p.30), which means that "*mind and world must be explored simultaneously*" (ibid.p.27).

An important caveat to this is that the *world* explored by phenomenology is the world as lived, rather than the world posited by 'objectivism' (and critical realism) which holds the view that "*reality is what it is completely independently of any experiencer*" (ibid. p.29).

[9] e.g. experiences of emotions, knowledge, moral intuitions, temporality, and normative assumptions around climate change – firstly exploring "*the things themselves*" in detail in Husserl's [1931, p.6] language, rather than (for example) beginning by exploring the neurological basis for such emotions, intuitions, etc.
[10] Here the term 'world' refers to the world *as experienced*, so can include objects from the social/cultural world such as the *atmosphere* of a particular place, plus objects that are being imagined.

Gallagher and Zahavi (2012) argue that this naturalistic assumption permeates much of cognitive science, stating that:

> "*The ordinary sciences… operate on the basis of a tacit belief in the existence of a mind-, experience-, and theory-independent reality. Reality is assumed to be out there, waiting to be discovered and investigated. And the aim of science is to acquire a strict and objectively valid knowledge of this given realm".*
>
> (p.24)

Husserl felt that realist ontological assumptions of this sort permeate our everyday life to the extent that he termed them the "*natural attitude"* (1913, p.170)[11]. He did not argue that the natural attitude is false, but rather that it is an ontology that needs to be logically established as legitimate rather than implicitly assumed by default within scientific research (ibid. p.187). Furthermore, he argued that this "*dogmatic attitude towards reality"* can impede careful analysis of the structure of experience because it can result in us "*taking the world for granted, thereby ignoring the contribution of consciousness [to experience]"* (Gallagher & Zahavi 2012, p.25).

In order to avoid the adoption of a realist ontology that might inhibit nuanced analysis of the structure of experience, Husserl (1913) developed a procedure that he called the '*phenomenological epoché'* in which "*we put out of action the general positing which belongs to the essence of the natural attitude"* (p.190). This 'bracketing' of any implicit realist assumptions about the world is intended to help '*lead back'* (*re-ducere*) our focus to an analysis of the way in which the world manifests in experience, a process which Husserl terms the '*phenomenal reduction*' (1931, p.56). Gallagher and Zahavi (2012) summarise the purpose of this as follows:

[11] It is worth emphasising that he felt that such assumptions are most commonly implicit rather than made explicitly (although they can be explicitly found within Platonic Idealism, Cartesian Dualism, and Kantian Transcendental Idealism, and many religious texts), and may be contained within quite subtle orientations towards experience, such as a sense that "*the reality of the object is... located behind its appearance, as if the appearance in some way or other hides the real object"* (Gallagher & Zahavi 2012, p.24).

"*once we adopt the phenomenological attitude [through enaction of the phenomenological epoché and reduction], we are no longer primarily interested in what things are – in their weight, size, chemical composition, etc. – but rather in how they appear, and thus as correlates of our experience".*

(Gallagher and Zahavi 2012, p.27)

Supplementary Appendix A3 Section 2. Naturalising Phenomenology

Whilst Zahavi (2019) holds that the above processes may facilitate a careful philosophical phenomenological analysis of the "*intersection, interrelation, or correlation*" between world and mind (p.10), he also argues that it is debatable as to what the phenomenological epoché actually offers qualitative researchers in psychology and the social sciences. According to his analysis of Husserl's body of work as a whole, when Husserl spoke about the process of a *phenomenological-psychological reduction* (as a methodology for qualitative psychological researchers to employ), he generally framed it in one of two ways:

1.) As a methodology to refine the psychologists' focus on the "*psychic in its pure and proper essentialnes*s" (Husserl 1931, p.87)

2.) As a stepping stone to 'real' phenomenology in which "*a concretely executed psychology could lead to a transcendental philosophy*" (Husserl, 1936, p.206)

Regarding the first possibility, Zahavi (2019) points out that plenty of qualitive research has been able to undertake detailed analysis of experience without needing to employ the phenomenological epoché. As for the second point, Zahavi does not deny the possibility, but questions whether a transcendental phenomenological attitude needs to be the end goal of all qualitative research.

As an alternative to this, Zahavi (2019) argues that "*there are other features of philosophical phenomenology that are far more relevant to the qualitative researcher*" (p.13). In particular, he argues that phenomenological explorations of the "*lifeworld, intentionality,*

empathy, pre-reflective experience, and the lived body" (p.9) may prove particularly insightful for qualitative research; whilst descriptions of such features are derived from transcendental phenomenological analyses (which employed the phenomenological epoché), this need not entail that qualitative researchers themselves need to adopt the epoché in order to find such accounts useful in their own research.

In an exploration of ways in which cognitive scientists have engaged with phenomenological insights, Gallagher (2003) uses the term '*front-loaded phenomenology*' to refer to research that incorporates "*phenomenological insights into the design of experiments [research]"* to facilitate a "*dialectical movement between previous insights gained in phenomenology and [research] that will specify or extend these insights*" (p.7). However, he is also clear that this should be a process of '*mutual enlightenment*' (Gallagher, 1997) in which "*the experiments [research] do not simply presuppose the phenomenological description. Rather, they test and verify that description*" (p.10). When this process is done well, phenomenology can provide practical insights to research that operates within a naturalistic framework, whilst such research itself can also provide evidence to support or critique specific proposals derived from phenomenological analysis:

> *Phenomenology can question and elucidate basic theoretical assumptions made by empirical science, just as it might aid in the development of new experimental paradigms. Empirical science can present phenomenology with concrete findings that it simply cannot ignore, but must be able to accommodate; evidence that might force it to refine or revise its own analysis".*
>
> (Zahavi 2010, p.14-15)

Supplementary Appendix A3 Section 3. Ontological Commitments Presented by a Phenomenological Analysis of Intentionality

Whilst psychological research can draw upon phenomenological insights without subscribing to the epistemological requirements of the phenomenological epoché, some of these phenomenological insights might themselves present particular ontological

commitments. Perhaps the most significant of these comes from phenomenological accounts of the intentional structure of experience. Husserl's analysis of intentionality holds that consciousness is "*intrinsically world involved*" (Zahavi, 2018, p.29).and that the mind's *"self-transcending character*" (Ibid. p.23) is an inherent part of how it is structured. This account is explicitly in conflict with a Cartesian view of the mind as separate to the world, or as having an optional or occasional causal relationship with the world:

"The mind is nor initially and taken on its own a self-enclosed sphere
that has to await a causal impact from elsewhere in order to become world-related.
It is misleading to regard the world as somehow outside or external to us,
as it is to conceive of consciousness as somehow located within an interior sphere"

(Zahavi, 2018, p.23)

This account already presents an ontology that is potentially in conflict with 'cognitivist' approaches to the mind found within psychology, in cases where such approaches carry dualist assumptions into a computational accounts of cognition (Dreyfus, 1976). However, Heidegger's analysis of intentionality within Being and Time (1927) develops the account further by arguing that our descriptions of experience as 'inside' the mind and the world as 'outside' presents a problematic internalist ontology. Heidegger makes this point in the following way:

"*In directing itself toward… and in grasping something, Dasein [Heidegger's term for the 'subject'] does not first go outside of the inner sphere in which it is initially encapsulated, but, rather, in its primary kind of Being [mode of existence], it is always already "outside" together with some being [as the 'object' of awareness] encountered in the world…"*

(Heidegger 1927, p.28)

Heidegger's account of intentional experience seeks to begin from the "*intersection between mind and world, neither of which can be understood in separation from each other*"

(Zahavi, 2018, p.30). This interdependence between mind and world is also explored by Merleau-Ponty within *The Phenomenology of Perception* (1945), in which he asserts:

"The world is inseparable from the subject,
but from a subject who is nothing but a project of the world;
and the subject is inseparable from the world,
but from a world that it itself projects."

(Merleau-Ponty, 1945, p.454)

Within Zahavi's (2018) explanations of these passages, what is being asserted through such accounts has both epistemological and ontological elements because any ontological accounts of 'subject' or 'world' cannot transcend the intentional relationship between them – to do so would produce "*a view from nowhere*" (p.27). Consequently, within this intentional relationship:

"We are what we are as a function of our world-involvement, and the world understood as the fundamental context of meaning is also only what it is because of our involvement with it. To ask what one is without the other is like asking what a background is in itself, independently of the foreground"

(Zahavi, 2018, p.30)

The relationship between our intentional relationship with the world and our scientific exploration of it is one that is ignored by most research projects. However, it came to be a topic that biologists and theorists Maturana and Varela (1987) explicitly sought to address. They sought to provide an ontological account of living organisms that could accommodate phenomenological accounts of the intentional relationship such organisms and the world (their environment). This account came out of their earlier work around the ontology of living organisms, which they argued were necessarily *autopoietic* in nature. The concept of autopoiesis was developed by Maturana & Varela (1976) as a system-level description of the "*self-maintaining chemistry of living cells"* (p.141). Varela generalised this in later work

(1991) to produce a systemic account of autopoiesis, which is summarised by Thompson (2010) as follows:

"*For a system to be autopoietic, (i) the system must have a semipermeable boundary; (ii) the boundary must be produced by a network of reactions that takes place within the boundary; and (iii) the network of reactions must include reactions that regenerate the components of the system.*"

(Thompson 2010, p.101)

Varela (1991) emphasises that the continued maintenance of each living autopoietic system necessarily requires it to engage with the world beyond its boundary in order to take in energy or nutrients and dispose of waste. Furthermore, even at the level of a bacterial cell, the maintenance of its autopoietic system entails that particular aspects of the cell's environment will be encountered as beneficial to the organism (such as sucrose), and others as harmful (such as ethanol). Thompson (2010, p.152) argues that this process constitutes a very basic form of '*sense-making'*, in which the organism's environment acquires meaning through the autopoietic organism's necessary engagement with the environment. In later work Thompson (2017, Ch.10) calls this "*sense-making in precarious conditions"* (p.328) because the living organism's continued existence is dependent upon its ongoing engagement with its environment. Furthermore, he argues that these processes do not just occur at the cellular level, but operate similarly at the level of the organism as a whole, a level which Maturana and Varela (1987) refer to as a 'second order' autopoietic system (Ch.4, p.87). In Thompson's (2017) terms:

"*Living isn't just sense-making; it's sense-making in precarious conditions… break open a cell and its metabolic constituents diffuse back into the molecular soup; take an ant out of a colony and it eventually dies; remove a person from a relationship and she or he may cease to flourish"*

(Thompson 2017, p.329)

Thompson argues that the ontological account provided through autopoietic enactive sense-making forms a foundation for "*a deep continuity [between] life and mind*"

(Thompson 2010, p.128 & Ch.6) which is compatible with (and informed by) phenomenological accounts of intentionality (Ch.2). As such, enactivist cognitive science has proven to be a rich ground for 'mutual illumination' between naturalised phenomenological insights and empirical and theoretical research within cognitive science.

Supplementary Appendix A3 Section 4. Epistemological Commitments made by Enactive and Embodied Approaches to Cognition

The ontological account of the autopoeitic subject and their relationship of precarious sense-making to the world forms the foundation for (autopoietic) enactive and embodied approaches to cognition. However, these approaches also hold further epistemological commitments that build from this ontology, and also connect with other non-cognitivist accounts of mind (for which I've used the umbrella term 'situated cognition' from Roth & Jornet [2013]). Below are some of these epistemological commitments, which provide a framework to support the account of situated cognition within the main body of the thesis:

1.) 'Knowing' is not a passive internal process – this would constitute 'the myth of the given', which is "*the idea that experience is a pure reception of the world, and that cognition is a purely receptive attitude*" (Gallagher & Zahavi, 2020, p.26). Rather, knowing is an active process of sense-making in which action and experience are inseparable: "*All doing is knowing and all knowing is doing*" (Maturana & Varella, 1987, p.26)

2.) Knowing occurs through the dynamic interaction between an agent and her environment; as such experience occurs through the 'coupling' of agent and environment (building upon previous 'coupling' throughout life), with each structuring the experience (McGann et al. 2013)[12]

3.) Each interaction between agent and environment will 'afford' (and constrain) particular possibilities for knowledge, experience, and action; what can be 'grasped' in cognition will

[12] McGann et al. (2013) emphasise that the idea of 'coupling' takes its definition from work in dynamic systems theory, in which careful measurement of the "*mutual influences between variables and parameters of the coupled systems makes coupling an operational, empirically observable phenomenon*" (p.204).

depend upon both the sensorimotor capacities of the agent and the features of the environment (Chemero, 2011)[13]

4.) "*Everything said is said by someone*" (Marutana & Varella, 1987, p.27); there is no such thing as an objectivist "view from nowhere" (Zahavi, 2018, p.27), and knowledge becomes meaningful in the context of the life of the knower, which means that it becomes part of their sense-making processes.

5.) The above ontological and epistemological statements must also reflexively apply to themselves in order to be consistent; therefore enactive and embodied approaches to cognition are themselves accounts that are able to 'grasp' aspects of the relationship between subject and world whilst being held by an autopoetic subject that is themselves embodied within the world and engaged in a process of sense-making (Maturana & Varella 1987, Ch.10). The position can thus 'ground' itself as justifiable, outlining a 'middle way' that does not rely upon realist or relativist assumptions (Varella et al. 1991).

[13] Chemero's (2011) writing on affordances operates primarily from a pragmatic rather than enactivist perspective, but he highlights the compatibility of his embodied approach with 'phenomenological realism' and enactivism in section 9.4, and the theory of affordances has become incorporated into some enactivist approaches to cognition (e.g. Hutto & Myin, 2017)

Supplementary Appendix B: Parallel Considerations about Segmentation Work in Climate Change Communication

Alongside psychological and psychoanalytic work around climate anxiety and climate psychology, substantial research has been undertaken into 'climate change communication'. This highly-interdisciplinary field explores how to effectively increase public understanding around climate change, how to frame the issue in a way that increases public support for mitigation, and which kinds of messages connect effectively with various audiences (Moser, 2010). In recent years, there has also been increasing focus on how speaking about climate change can trigger various *psychological defences*[14] and how climate change communication can try to avoid or tackle this (Moser, 2016). One influential innovation within this field has been the use of '*audience segmentation*' to divide a surveyed population into *segments*, each with their own distinct profiles (with the idea being that different segments may respond better to different '*messaging strategies*').

Appendix B1.1 outlines two influential projects that have used audience segmentation (Yale's 'Six Americas' project [Maibach et al. 2009] and Kuthe et al.'s 2019 k.i.d.Z. project). One of the advantages of segmentation studies such as these is their explicit recognition that within any population there will be a range of emotions and responses relating to concerns around climate change. However, there are also potential methodological disadvantages to dividing a sample into distinct 'groups'. Firstly, whilst the climate and eco-anxiety scales retain total 'scores' for each subscale to facilitate relative comparison between participants,[15] participant scores from the segmentation studies will result in them being classified into a category with its own qualitatively distinctive description. For 'edge cases' (i.e. scores close to the boundary between two categories), this can emphasise differences and minimise similarities between participants who have provided relatively similar responses to the survey.[16]

[14] E.g. Moser (2016) identifies five categories of defences: '*Maintaining psychological distance to the issue*' (p.354), '*Loss aversion/sense of doom/fear/ catastrophism lead to issue avoidance, rationalization of inaction, transfer of responsibility to others/to future*' (p.354), '*Dealing with cognitive dissonance through doubt of science, confirmation bias/motivated reasoning, downplaying of problem, diminishment of solutions, avoidance of issue, rationalization of inaction, transfer of responsibility to others (e.g., technological fixes, and government), apathy*' (p.355), 'Dealing with social dissonance through active denial, self- defence, playing to in-group/out-group dynamics, and attack on others' (p.355), and '*Resistance to change who we are, how we see ourselves through avoidance, denial, helplessness, reinforcement of existing identity, or attack on others*' (p.355).

[15] Technically, the total scores that they generate is ordinal, rather than interval, but some researchers argue that the data from Likert scales can still function relatively well when treated as interval (e.g. Wu & Leung, 2017, although they recommend the use of 11-point Likert scales), to allow for meaningful comparison between participant scores.

[16] Q methodological analysis likewise creates 'segments' ('factors' in Q), but the purpose of constructing these is to *identify viewpoints* that exist, rather than to separate any particular participant response into a distinctive category. If a participant within a Q methodological study wanted to know which factor their viewpoint corresponded most closely

Secondly, for studies where the segments are generated on a solely statistical basis prior to being analysed and described, there is a risk of theory/descriptions being developed to explain phenomena that may be quirks/artifacts of the statistical processes used, rather than meaningfully distinctive categories. Detenber & Rosenthal (2020) caution that "*although many segmentation analyses follow a more inductive process, where segments emerge from the data, the results need to have theoretical relevance*" (p.224) and Hine et al. (2014) explicitly caution that the process of analysis can become a reductionist and arbitary process when driven primarily by statistical modelling that only considers the qualitative significance of each segment as an afterthought.

Appendix B1.2 outlines the ways in which the above issue affects the Six Americas scale and Kuthe et al.'s (2019) typology. Unless a deductive process is used in which segment names and features are predetermined by theoretical considerations, the description and naming of segments will pose a challenge for any audience segmentation studies.[17] However, the use of Q methodology can arguably mitigate some of these challenges. In support of this, Hine et al. (2014) note that "*Q methodology is advocated by some researchers given that it combines the strengths of both qualitative and quantitative methods*" (p.454).

In particular, the Q methodological analysis can both structure and scaffold the process of interpreting and describing each segment (segments are termed 'factors' in Q methodology) because the relative arrangement of statements for each factor is meant to be analysed as a *gestalt* (a whole) rather than being reduced to a few *atomised* variables (Stephenson, 1936). For example, Watts & Stenner (2012, Ch.7) outline a procedure for attempting to describe/account for the '*entire item configuration'* (i.e. pattern of responses) for each factor, with a focus upon methodological holism. The abductive process they recommend is outlined in **section 6.3.3** and the combination of a holistic overview of the relative valuation of variables with an abductive reasoning process can help to support the development of rich descriptions for each factor, incorporating many more variables than most segmentation studies.[18] Consequently, I hope that the current research can also fill a gap in the literature around audience segmentation research for climate communication by embodying a technique that mitigates some of the challenges faced by existing studies.

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with, they would have the option of either looking through each qualitative description and deciding for themselves, or asking the researcher how strongly their response quantitatively correlated with each factor position (or both).

[17] The challenge of deductive approaches is ensuring that the theoretical framework provided is sufficient to account for the data provided by participants. Hine et al. (2014) note that most audience segmentation studies use inductive approaches, but they mention that Kahan et al.'s (2011) study provides a (relatively rare) example of a segmentation study where the segments were determined deductively on the basis of prior theoretical commitments (derived from Douglas & Wildavsky's 1982 Cultural Theory of Risk).

[18] The naming process for factors in Q methodology remains challenging, but this too can at least be supported by the richer descriptions offered by Q methodology and its focus on holistic understandings of the position of each factor.

Supplementary Appendix B1.1 Segmentation Studies Measuring Concern about Climate Change

'Audience segmentation' of people's responses to climate change (plus work recommending particular 'messaging strategies' to reach people within each segment) draws from the work pioneered by Smith (1956), who introduced 'market segmentation' as a marketing approach for businesses. Kotler & Zaltman (1971) applied the approach to political surveying and introduced the idea that what they termed 'social marketing' could be used to help identify the trends within different segments in order to develop more targeted approached to modifying social behaviour. Researchers such as Lefebvre & Flora (1988) applied the approach to public health initiatives, where they have been used extensively to inform health messaging (e.g. around HIV prevention campaigns: Noar et al. 2009).

The Yale Climate Communication Project's 'Six Americas' programme (Maibach et al. 2009) was the first high-profile research project to use the technique within the field (Hine et al. 2014) and their 'Six Americas' audience segmentation survey tool has proven highly influential for segmentation research within climate change communication (Detenber & Rosenthal, 2020). The researchers constructed a 36-question survey, then used latent class analysis on the responses (n = 2,164) to derive six statistically distinct approaches to climate change, which they named '*Alarmed*', '*Concerned*', '*Cautious*', '*Disengaged*', '*Doubtful*', and '*Dismissive*' (**Figure B1.1**),[19] with the idea that each group "*could be considered as potential targets for global warming public engagement campaigns*" (Maibach et al. 2011a, p.2). The scale was initially intended to measure four key variables: "*global warming beliefs", "global warming issue involvement", "global warming and energy efficiency and conservation behaviours*", and "*preferred societal response to global warming*" (ibid. p.8). However, in later work the researchers concluded that it measured two key dimensions: "*attitudinal valence",* defined as: "*the inclination to accept or reject the science of*

[19] Maibach et al. (2011a) appear to have used latent class analysis rather than factor analysis because three of their questions (out of 36) used categorical rather than continuous variables. Interestingly, in their later 15-question version of the scale, Maibach et al. (2011b) use only continuous variables, which suggests that factor analysis could equally have been used (Collins & Lanza, 2009 p.7), although this would presumably result in factors generated from responses to each approach, which would group sets of questions together (e.g. a factor composed of questions relating to being 'alarmed', another composed of questions relating to being 'cautious' etc.), generating a scale in which people would have a separate score for each of the identified factors, which might be more reflective of their positions but would be less 'clean' in terms of dividing approaches into clear segments. Additionally, Maibach et al. (2011a) state that they explored 5, 6 and 7 segment models and had to make qualitative judgements between them to decide upon a 6-segment model: "*The three models had similar fit statistics… We examined the profile data for all three models and determined that the six-segment solution offered the highest face validity. Although the seven-segment solution had slightly lower fit statistics (which indicates a better model fit), the difference was small and the six segments described above were more interpretable"* (p.8). As with the Climate Anxiety and Eco-Anxiety scales, this highlights how r-methodological analysis often uses qualitative considerations even when presenting itself as a quantitative approach.

climate change" and "i*ssue involvement*", defined as: "*the amount of thought devoted to the issue and attitudinal certainty*" (Leiserowitz et al. 2021, p.100). As shown in **Figure B1.1**, the 'alarmed' have the strongest belief in climate change and the most concerned, down to the 'dismissive' who have the least. The 'alarmed' and 'concerned' segments both feel certain of their position and feel strongly about it (demonstrating issue polarisation), whilst the 'concerned' and 'doubtful' feel less strongly about their positions and the 'cautious' and 'disengaged' dedicate the least thought and feel the least certainty about their position:

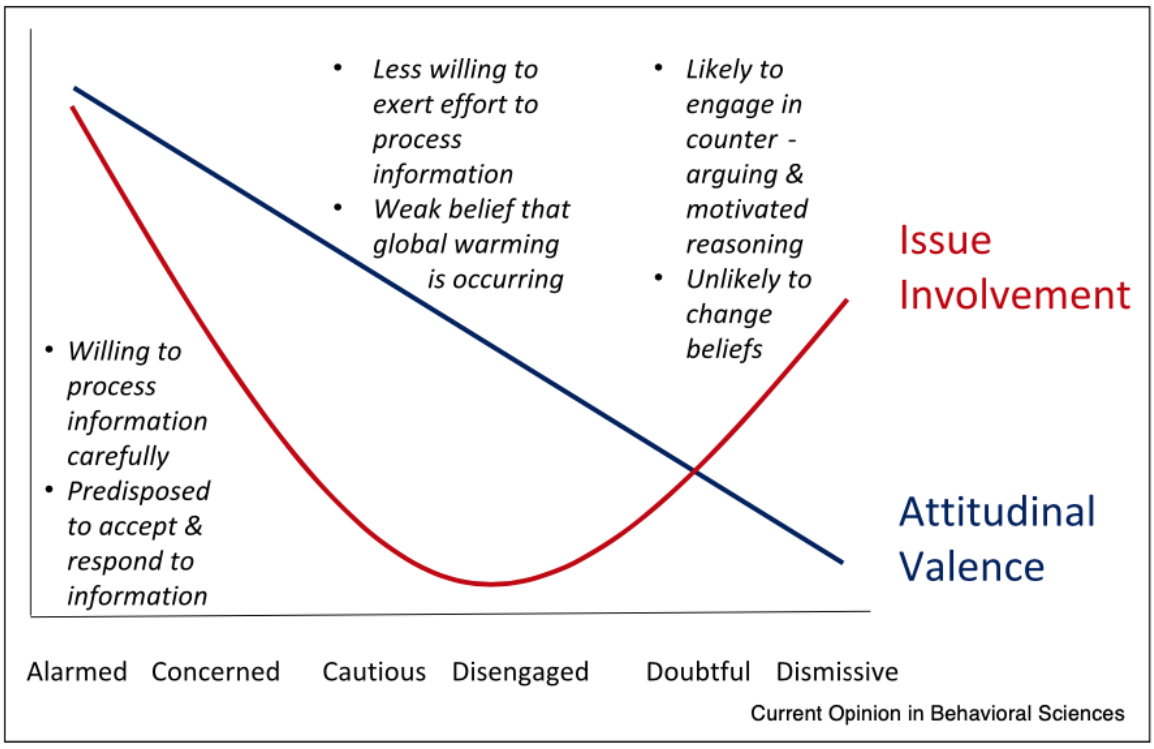


Figure B1.1: Trends in *attitudinal valence* and *issue involvement* amongst each of the 'Six Americas' segments (alarmed, concerned, cautious, disengaged, doubtful, and dismissive)

Leiserowitz et al. 2021, p.100

The Yale Climate Communications research team have continued to use this tool as part of a longitudinal analysis of American attitudes towards climate change, which have now "*been tracked twice a year using nationally representative surveys for over a decade*" (Leiserowitz et al. 2021, p.97). The survey tool has also been used by researchers to generate segmentations of audiences in India (Leiserowitz et al. 2013), Singapore (Detenber et al. 2016), Germany (Metag et al. 2017), and Australia (Morrison et al. 2018). The segmentation approach appears to have had a particular increase in popularity during the first few years after the Six Americas scale was released; Hine et al.'s (2014) review of such studies identified that over 25 large-scale studies had been completed by the end of 2013, some of which used the Six Americas survey tool, but many of which created their own scales. More recently, Detenber & Rosenthal (2020) reported that use is ongoing, but variations on the original Six Americas scale appear to predominate.

Almost all segmentation studies appear to have been undertaken with adults (Hine et al. 2017). However, Kuthe et al. (2019) created a survey that was completed by 760 teenagers (aged 13-16) in Germany and Austria who were due to take part in a school-led climate change project.[20] The survey was designed to measure '*climate change awareness'*, which the researchers divided into subscales measuring '*attitude', 'personal concern* [for oneself, family, or community]*', 'knowledge', 'multiplicative action* [speaking about climate change issues with others]', and *'climate-friendly behaviour'* (p.173-175). Whilst the scale was not standardised, the five areas were theoretically driven by Teksoz et al.'s (2012) environmental literacy survey. Hierarchical cluster analysis identified four different groups on the basis of their subscale responses (also see **Figure B1.2**):

- **Disengaged:** low knowledge, uninterested attitude, low concern, little climate-friendly behaviour, few multiplicative actions
- **Paralysed:** some knowledge, uninterested attitude, high personal concern, very little climate-friendly behaviour, very few multiplicative actions
- **Charitable:** high knowledge, relative interest, low personal concern, high climate-friendly behaviour, many multiplicative actions
- **Concerned Activist:** some knowledge, high interest, high personal concern, high climate-friendly behaviour, many multiplicative actions

	The Paralyzed	The Charitables	The Disengaged	The Concerned Activists
N (% of the Sample)	103 (14%)	305 (40%)	194 (25%)	158 (21%)
Attitude: Interest, Responsibility, Locus of Control	−0.30	0.11	**−0.42**	**0.51**
Personal Concern	0.84	−0.24	**−0.88**	**1.00**
Multiplicative Actions	**−0.65**	0.21	−0.56	**0.71**
Climate-friendly Behavior	**−0.44**	0.20	−0.32	**0.31**
Knowledge	−0.05	**0.21**	**−0.36**	0.07

N = 760, the lowest and highest scores per scale above are highlighted in bold.

Figure B1.2: Deviations from the mean for each identified segment on each subscale of the Climate Change Awareness scale by Kuthe et al. (2019, p.177)

[20] The project was called k.i.d.Z.21-Austria (Kuthe et al. 2017 explain: "*k.i.d.Z. is an acronym for "kompetent in die Zukunft" or "competent into the future*" in English" p.174). If it were a project that the young people had actively sought out and signed up for, there would be significant selection bias. Kuthe et al. 2017 appear well aware of this and address it in their paper: "*we have to allow for the possibility that there may have been a positive selection bias within the sample. This is because the teenagers participating in these projects have teachers who are more aware of climate change, as they are taking part in the project voluntarily and perhaps devote greater attention to this topic in school than other teachers*" (p.179). To me, this comment suggests that it was a school-led project, rather than one that the teenagers actively signed up for, making the likely influence of selection bias much smaller.

One particular strength of Kuthe et al.'s (2019) model is that it explores not just concerns and attitudes, but also behavioural engagement with concerns around climate change.[21] This is helpful because it highlights that even when someone experiences potentially high climate anxiety (as is possibly the case for the 'concerned activists' and 'paralysed' groups), their emotional and behavioural responses to such concern/anxiety can be very different.[22] Another strength is that the questionnaire itself was used as a pre- and post- test survey for participants in the k.i.d.Z.21 project, which allowed for an analysis of how the project impacted upon the climate literacy of the teenagers participating in it, further illustrating the usefulness of the tool (Kuthe et al. 2020).[23] It is worth noting, however, that the focus of the tool is educational rather than psychological or therapeutic in nature, which places it in quite a different sphere to measures of climate/eco-anxiety; whilst it explores 'attitudes' towards climate change,[24] and young people's beliefs that they or their family will be personally affected, no questions on the scale directly explore young people's emotional engagement with or feelings towards climate change.

[21] It also explores knowledge, but this may unfortunately be a relative weak-point in the study, since it is questionable whether the questions used to explore knowledge actually explore key information about climate change per se, or whether they simply explore some common myths/misconceptions about climate change (Questions: "*1. Due to climate change, temperature will rise in all areas in the world an equal amount." "2. The melting of the glaciers will stop immediately if worldwide CO_2 emissions come to a halt."" 3. Winter tourism in the alps is not affected by climate change thanks to the use of snow guns." "4. Climate change is mainly human induced."* Kuthe et al. 2019, p.175). Additionally, these questions were marked correct/incorrect, then coded onto a Likert scale (1=incorrect, 6=correct), so are not true continuous variables, despite being treated as if they are for the purpose of the analysis.

[22] The study suggests this trend can also occur the opposite way around; despite the 'disengaged' and 'charitables' groups both having low personal concern, the 'charitables' report engaging in significantly more climate-friendly behaviour and speaking about climate change more with others than the disengaged group. This could suggest that whilst concern and behavioural response may well interact with each other (in a dynamic, rather than linear process), neither factor is necessary or sufficient to determine the other.

[23] The post-intervention research explored how the scores of students for each of the environmental literacy subtests changed from the start to the end of the study. As such, Kuthe et al. (2020) did not explore whether students classified into one subgroup at the start would be classified into a different segment at the end, but rather focused upon what they classified as the 'weaknesses' of each group (i.e. low scores in one or more of the subscales), and analysed whether the project helped to address these. They found that students who previously were categorised as 'disengaged' self-reported increases in 'personal concern' and 'multiplicative behaviour', the students previously categorised as 'paralysed' self-reported increases in 'climate-friendly behaviour' and 'multiplicative behaviour', and the students classified as 'charitable' self-reported increases in 'personal concern'. Kuthe et al. (2020) also acknowledge the limitations of their knowledge subscale when exploring why no group's 'knowledge' score increased significantly, stating: *"One reason might be the construction of the items capturing the knowledge about climate change and its causes and effects. Perhaps the items were not sufficiently valid or selective to make the change evident*" (p.384).

[24] Kuthe et al.'s (2019) 'Attitude' subscale consists of the following questions, each on a 1-6 Likert scale: *"1. How interested are you in the topic "climate change"?", "2. It is my responsibility to act in a climate-friendly manner.", "3. I am able to contribute to reducing the degree of climate change.", "4. If the international community cooperates, global warming can be limited to + 2–4 °c.", "5. I would like to reduce my carbon emissions."* (p.175).

Supplementary Appendix B1.2 Challenges with naming and describing segments

There are a number of theoretical and descriptive challenges faced by segmentation studies. One of the most significant challenges (Noted by Hine et al., 2014 and Detenber & Rosenthal, 2020) arises when researchers need to provide qualitatively distinct names and descriptions for segments which have been generated on the basis of statistical processes rather than existing theory. As summarised by Hine et al. (2014):

> *"Once a segmentation solution has been generated, researchers often name and interpret segments based on their average score (or standardized) score on one or two of the most salient profiling variables included in the analysis (often focusing on the peaks and valleys in the score profile). Given that segments are usually created using clustering techniques that take patterns of scores across a large number of variables into account, it can be challenging to generate labels that are intuitively meaningful, and also faithfully represent the complex combination of variable scores upon which the segments are formed."*
>
> (Hine et al. 2014, p.454)

How do the Six Americas scale and Kuthe et al.'s (2019) typology deal with this challenge? Whilst the key dimensions of interest (on which participants were measured through their survey responses) were chosen in advance based on theoretical considerations (with questions constructed that hopefully related to these dimensions), the researchers then took an atheoretical turn by applying statistical analyses to the results which sought to generate factors (primarily) on the basis of statistical modelling rather than theory (although see footnote 123). These factors then appear to have been named on the basis of face validity, without theoretical justification for the names being provided.

Whilst Maibach et al. (2011a) identify four key variables that they have used to name and describe each segment of the Six Americas scale (and Leiserowitz et al. 2021 simplify this into a two-dimensional axis), their Latent Class Analysis appears to have processed each of the 36 questions as a separate variable, prior to the researchers using their main profiling variables to label and

describe each segment.[25] Maibach et al. (2011a) provide descriptions for each named segment and the descriptions appear to correspond to key questions in their survey.[26] However, these descriptions themselves raise the question of whether the labels they have assigned to groups capture the profile of those groups. For example, no distinction is made in levels of worry between the 'Alarmed' group and 'Concerned' group (despite question 15 being: "How worried are you about global warming?"), so the main differences appears to be personal changes that people make to their lives and each participant's 'issue involvement' (both of which could be significantly influenced by contextual factors such as: income, locus of control, other life pressures, belief that personal changes will make a wider difference, etc.) and they do not make a case to justify that these changes are primarily affected by levels of alarm/concern. Hine et al.'s (2014) criticism of factor descriptions and naming conventions for segmentation studies therefore appears justified in this case.

In contrast, Kuthe et al.'s (2019) typography has a slightly different problem. Their hierarchical cluster analysis was used to divide groups of students on the basis of high or low scores within each of the scales they identified and they immediately justify the naming of each group on the basis of their high and lower scores. However, they constructed their own questionnaire and did not standardise the scale (e.g. through factor analysis, to confirm that the questions within each subscale really do measure an underlying variable), so the relationship of the questions to the construct of each subscale (and to the overall construct of environmental literacy) was judged on face validity. See footnote 126 for an example of how the relationship between the questions used in the scale and the subscale construct of 'knowledge about climate change' is questionable.

[25] The SPSS code provided by Maibach et al. (2011b) appears to support this conclusion; the code appears to assign scores/points to each of the six segments on the basis of every one of the 36 questions, with different weights being given to the total score for each segment and the 'highest scoring' segment being used to categorise each participant. From what I can tell, even though the profiling variables are named in the scale, these variables themselves do not comprise part of the calculation process.

[26] To illustrate this, I have indicated which questions Maibach et al.'s (2011a) descriptions of the 'alarmed' and 'concerned' groups appear to relate to: Alarmed: "*The Alarmed are the segment most engaged in the issue of global warming [Q16-21]. They are very convinced it is happening* [Q1], *human-caused* [Q2], *and a serious and urgent threat* [Q4-7]. *The Alarmed are already making changes in their own lives [Q23-25, Q28-31] and support an aggressive national response [Q32-36]*" (p.2). Concerned: "*The Concerned are also convinced that global warming is a serious problem [Q4-7], but while they support a vigorous national response [Q32-36], they are distinctly less involved in the issue [Q16-21], and less likely than the Alarmed to be taking personal action [Q23-25, Q28-31]*" (p.2).

Supplementary Appendix B1.3 Comparison of Factor Distinctions with Existing Segmentation Studies

As detailed in the previous sections, there are a number of existing climate 'segmentation studies' that place participants into discrete categories on the basis of their survey responses. Engaging with a critique of such methods proposed by Hine et al. (2014) I argued that a Q methodological study exploring how people engage with climate change could both generate segments ('factors' in Q methodology) and scaffold the process of interpreting and describing each segment, making the descriptions produced by the process more meaningful and holistic than those generated through more commonly used statistical methodologies (such as latent class analysis or hierarchical cluster analysis). I believe that the factor descriptions developed within this thesis have achieved this aim.

How do the factors generated by the current study compare with the segments generated in existing segmentation studies? As covered in **Appendix B1.1**, the Yale Climate Communication Project's 'Six Americas' programme (Maibach et al. 2009) was the first high-profile project to apply audience segmentation to engagement around climate change and remains one of the most influential within the field. This research generated a six-segment analysis; they named these segments: '*Alarmed*', '*Concerned*', '*Cautious*', '*Disengaged*', '*Doubtful*', and '*Dismissive*'. In their recent analysis on the segments, the team (Leiserowitz et al., 2021) stated that the segments are distinguishable on the basis of "*attitudinal valence",* defined as: "*the inclination to accept or reject the science of climate change*" and "i*ssue involvement*", defined as: "*the amount of thought devoted to the issue and attitudinal certainty*" (p.100, **Figure B1.3**):

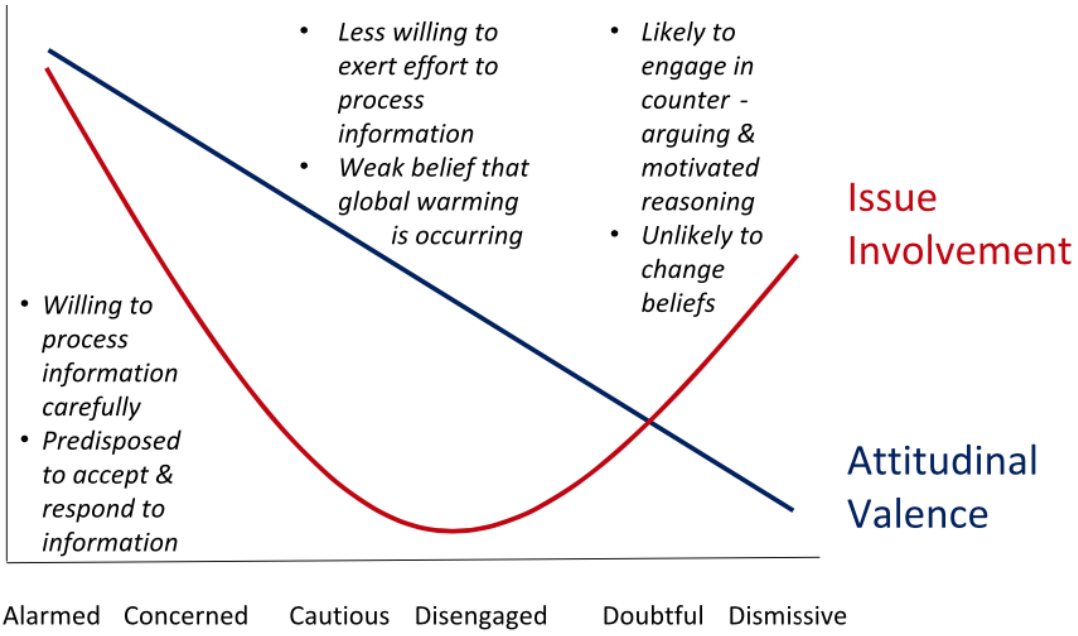
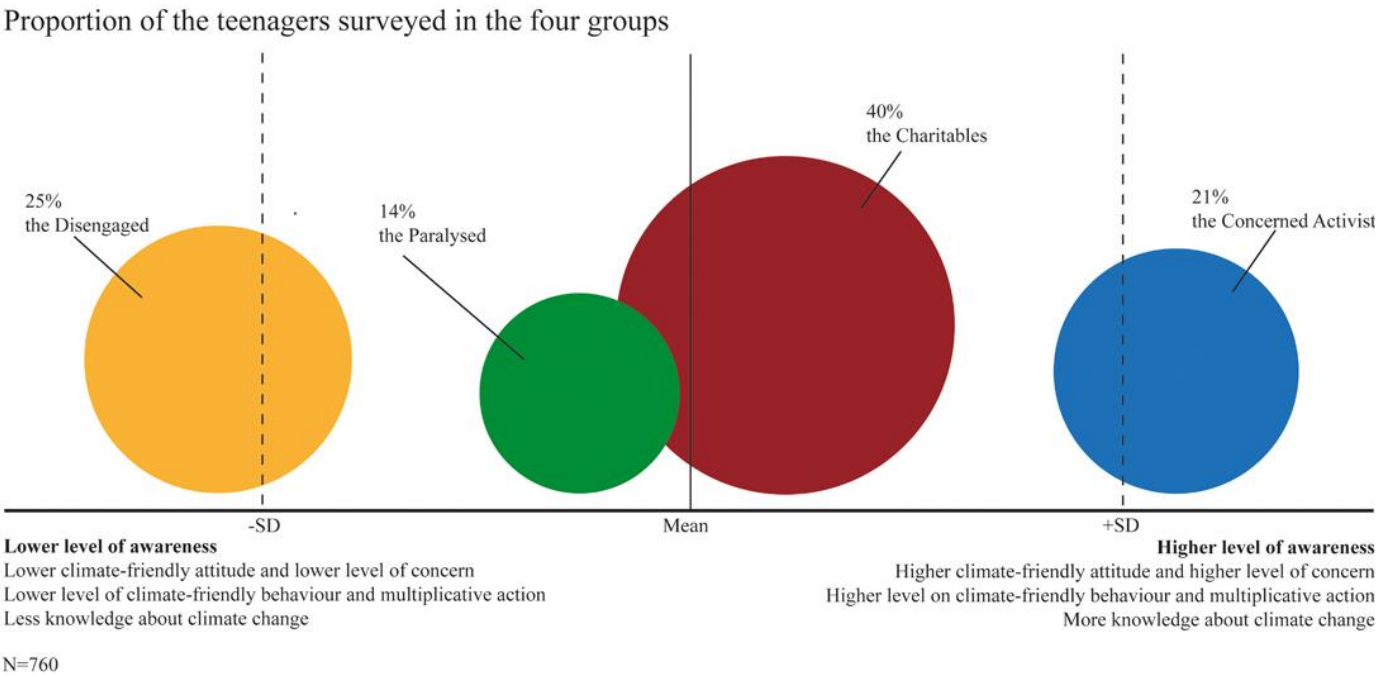


Figure B1.3: Trends in *attitudinal valence* and *issue involvement* amongst each of the 'Six Americas' segments (alarmed, concerned, cautious, disengaged, doubtful, and dismissive) Leiserowitz et al. 2021, p.100

Participants in the current study undertook the Six Americas scale as one of the surveys prior to undertaking the main Q-sort. All participants whose responses loaded onto Factor 3 scored 'alarmed'; two participants who loaded onto Factor 2 scored 'alarmed' and one 'concerned'; plus three participants who loaded onto Factor 1 scored 'alarmed', four 'concerned', and one 'disengaged'. This would suggest that Factor 3 may have the greatest association with the 'alarmed' segment, whilst factors 2 and 1 may also associate with elements of the 'concerned' (or in the case of Factor 1, 'disengaged') segments. However, one flaw with this comparison is that all young people seemed to express high belief in climate change, i.e. high '*attitude valence'*. Consequently, the factors are likely only to vary in terms of 'i*ssue involvement*', i.e. *'the amount of thought devoted to the issue and attitudinal certainty'*. Factor 2 appeared to engage in the most thought and rumination around climate change, whilst Factor 1 appeared to engage in the most conversation and problem-focused coping; this doesn't fit well with an analysis in which Factor 3 is most associated with the 'alarmed' position. However, whilst the overall description of Factor 3 does not fit the label of 'alarmed', this factor does express the most belief in the inevitability of climate catastrophe(s), which could potentially equate to '*attitudinal certainty'*.

Overall, there does not appear to be a particularly good fit between the two analyses. However, this needn't necessarily be a critique of either segmentation scheme; the Six Americas scale is usually undertaken with adults in the USA, for whom levels of climate change denialism are generally high (28% in 2021 survey data by Howe et al.) and the current study did not seek to explicitly explore the amount of thought that students devote to climate change. The current study's segmentation draws distinctions between anticipated outcomes/impacts due to climate change (i.e. Factor 1 holds high hope in tackling climate change; Factor 2 is anxious about catastrophes(s); Factor 3 is resigned to them), explores emotions experienced, and considers support and coping mechanisms (problem and meaning-focused coping, social support from others); these are all dimensions which could potentially be used to enrich the Six Americas segmentation model. However, the main purpose of the model is to inform communication strategies for helping different groups accept that climate change is happening and that action should be taken; consequently, the Six Americas model may be better suited to informing considerations of how to support the development of a scientifically-grounded level of concern around climate change, whilst the current Q-methodological study may be better suited to informing considerations of how to support people who already have higher levels of concern.

Supplementary Appendix B1.1 also outlines Kuthe et al.'s (2019) k.i.d.Z. project. This project arguably has greater relevance to the current study, since it was undertaken with young people (aged 13-16). The subscales measured '*attitude', 'personal concern* [for oneself, family, or community]*', 'knowledge', 'multiplicative action* [speaking about climate change issues with others]', and *'climate-friendly behaviour'* (p.173-175). **Figure B1.4** presents the four segments that were generated:



- **Disengaged:** low knowledge, uninterested attitude, low concern, little climate-friendly behaviour, few multiplicative actions
- **Paralysed:** some knowledge, uninterested attitude, high personal concern, very little climate-friendly behaviour, very few multiplicative actions
- **Charitable:** high knowledge, relative interest, low personal concern, high climate-friendly behaviour, many multiplicative actions
- **Concerned Activist:** some knowledge, high interest, high personal concern, high climate-friendly behaviour, many multiplicative actions

Figure B1.4: Segments/Typology generated by Kuthe et al. (2019) indicating different ways that a sample of 760 young people from Germany and Austria engaged with climate change

Participants in the current study did not undertake any climate/carbon literacy tests (the low sample size meant that generalisations about knowledge would have been inappropriate), so this cannot be compared with Kuthe et al.'s (2019) typology. However, it did explore rough equivalents of interest/attitude (various engagement questions), personal concern, 'climate-friendly behaviour' (or at least attitudes towards personal changes), and to some extent 'multiplicative actions' (though in the current study this focused more on talking about climate change for support rather

than encouraging engagement with climate change by others). Using Kuthe et al.'s (2019) subscales, Factor 1 could be said to have high interest, low personal concern, high climate-friendly behaviour and high multiplicative actions; this factor is therefore closest to '*the Charitables'*. Factor 2 would have high interest, high personal concern, relatively little climate-friendly behaviour, and very few multiplicative actions, so would be closest to '*the Paralysed'*. Factor 3 would have medium interest (**33**, +2), low personal concern, relatively little climate-friendly behaviour, and very few multiplicative actions, so might be placed in the *'Disengaged'* category.

As detailed in **Section 6.4.3**, I had initially interpreted Factor 3 as comparatively 'disengaged', due to its seemingly ambivalent attitude, low personal concern and low importance attached to personal environmental changes. It was only during my reinterpretation that I identified reasons for this that suggested relative despair/resignation, rather than disengagement. It would be interesting to see whether some of the *'Disengaged'* participants in Kuthe et al.'s (2019) study might also have become categorised differently if presented with a set of questions that explored variables such as hope, psychological distance, and a focus on systemic changes.

It would have also been interesting to see whether my Q-methodological study might have potentially generated a factor analogous to '*the Concerned Activist'*, if I had used a different sample. The main difference (besides 'knowledge') between the '*Concerned Activist'* and *'Charitables'* is the relative level of personal concern, and it is certainly conceivable that a group of participants could have completed Q-sorts that were similar to Factor 1 (Charitables) but with greater personal concern (or similar to Factor 2 *[Paralysed]*, but with more social support, plus greater emphasis on personal actions).

Overall, there is much greater compatibility between Kuthe et al.'s (2019) typology and the factors derived from the current study. The factors remain much more multifaceted, but the patterns of engagement appear roughly analogous. It could be argued that information about the knowledge about climate change possessed by participants loading onto each factor could enrich the current study (though the sample size would have to be much larger, which is usually a poor fit for Q-methodological studies). From the other angle, Kuthe et al.'s (2019) typology could be enriched through consideration of 'hope', personal and systemic focuses, plus a possible revision of the 'multiplicative actions' subscale to account not just for whether young people speak to others about climate change, but also how they anticipate the others will engage.

Supplementary Appendix C: Additional Information about Methodology

Supplementary Appendix C1.1 Timeline for how Research was completed

Table C1.1 (below) outlines the timeline for how these steps were completed for the current research. The methodology for the first four steps are covered in detail in **Sections 5.2-5.5** (steps 4-6 are also covered in the **Analysis**, and the final interpretation is detailed in the **Results**).

Date	Action	Steps in the Research Process
June 2019 - December 2019	Initial literature review	Step 1: Formulating the Research Question
December 2019 – March 2020	Development of key research questions and planning of methodology	
March 2020	Research proposal submitted	
April 2020	Ethics form submitted	
May - June 2020	Reviewed literature to compile initial set of statements to be explored	Step 2: Generating the Q-set
July 2020	Complete phenomenological interviews with young people to explore and expand initial statements	
August - September 2020	Refine Q-set through pilot studies (21 in total)	
September 2020	Recruitment of participants	Step 3: Selecting a P-set
September 2020 – January 2021	Online Q-sorts with participants	Step 4: Collecting Data
January – February 2021	Data input of participant Q sorts into PQMethod	Step 5: Analysing Q-sort Data
March – April 2021	Analysis of data in PQMethod	
May 2021	Interpretation of factors generated within PQMethod	Step 6: Interpreting Q factors
May 2021	Online focus groups with groups young people to explore what engagement or support they would like using narrative group technique	Step 4: Collecting further Data (research question 2)

June 2021	Interpretation/summarisation of participant responses within online focus groups	Steps 5 & 6: Analysing and interpreting data (question 2)
June 2021	Poster presentation of results at Mind and Life Summer Research Institute (online)	Writing-up and presenting results
July 2021	Presentation of research to Doctorate in Child and Educational Psychology Trainees, University of Sheffield (online and in-person)	
August 2021	Share results at Phenomenology Summer School, University of Copenhagen (online)	
August - September 2021	Write-up research journey and introduction for thesis	
September 2021 – March 2022	Start EP work full-time, write-up literature review for thesis	
February 2022	Share results with Birmingham EPS via 'Psychology Kitchen' blog	
April – May 2022	Heavily edit introduction and literature review for thesis	
June 2022	Write-up methodology and analysis for thesis	
July 2022	Presentation of results to Children and Technology Lab, University of Sussex (online)	
July - August 2022	Write-up results, discussion, and evaluation for thesis	
September-October 2022	Submit first draft of thesis	
November / December 2022	Viva (planned)	
December 2022 – February 2023	Corrections (planned)	
February 2023	Graduate (planned)	

Table C1.1: Timeline for the research project

Supplementary Appendix C1.2 Brief Summary of Q Methodological Analysis

This section provides an overview of the procedure and purpose of Q methodological analysis. Each Q methodological study involves a Q-sorting procedure, followed by Q pattern analysis (Watts & Stenner, 2005, p.68). The Q-sorting procedure involves a group of participants (called the P-set) who are required to undertake a card-sorting activity in which they arrange (on average 40-80) cards containing statements (the Q-set) into a grid that is roughly shaped to resemble a normal distribution curve (**Figure 7**). Each column on the grid has a value assigned (in this case, from -5 to 0 to +5); higher/more positive values indicate greater agreement, whilst more negative/lower values indicate greater disagreement (values closer to zero generally indicate less strong agreement/disagreement but the 'mid-point' between agree/disagree need not be located in the zero column). There are an equal number of statement cards as spaces on the grid, so participants must arrange each statement card according to how strongly they agree or disagree with it when considered in relation to all other statements.

Once all participants have completed a Q-sort, the results are statistically analysed using Q pattern analysis. This is an inverted factor analytic technique in which the holistic pattern of each participant's arrangement of statements is correlated with the patterns of all other participant arrangements in order to generate a number of factors comprising of a complete pattern of responses. This 'by person' factor analysis facilitates different forms of research to the 'by variable' factor analytic technique promoted within psychology by Spearman (1904) because it generates correlation statistics for how closely each participant's gestalt pattern of responses correlates with the holistic pattern of responses for each factor (in Q-methodology), as opposed to correlation statistics for how the complete sample's scores/responses to a particular question/variable correlate with their scores/responses to other questions/variables (in R-methodology).[27]

[27] 'By variable' factor analytic techniques were dubbed 'R-methodology' by Stephenson (1935) due to their use of the *Pearson's r* correlation statistic. In contrast with this, Stephenson named the 'by person' factor analytic technique 'Q-methodology', providing a quick way of distinguishing between these types of analysis.

Crucially, the factors generated by Q methodological analysis will not necessarily strongly correlate with any single individual participant's gestalt pattern of responses; participant responses are simply used to establish the existence of particular holistic viewpoints that some people may share on a subject. In a similar vein, due to the small number of participants in most studies, Q methodology is not suitable for estimating the proportion of people who share a particular viewpoint (Watts & Stenner 2012, p.72). However, a methodical qualitative analysis of each factor has the potential to produce rich and holistic descriptions of the viewpoints/positions that people may hold, particularly since the analysis allows for the relative ratings of agreement or disagreement for each statement to be considered within the context of the patters of agreement and disagreement towards all other statements within each factor (the combination of quantitative and qualitative analysis has led Stenner & Stainton Rogers (2004) to describe the process as "*qualiquantological"*). This process can be particularly useful for highlighting commonalities and differences between particular shared viewpoints that can be minimised or overlooked in survey or interview-based research.

I also conducted follow-up focus groups using the nominal group technique in order to support exploration of what engagement or support young people would like from others (which is research question 2 – see **Section 5.2.1**), in order to help inform how educational psychology services might work with or help support young people that are grappling with difficult emotions relating to the concerning effects of climate change. This is not a standard part of Q methodological analysis, but was undertaken to help inform considerations about how the findings of the analysis could be applied to our psychological practice.

Supplementary Appendix C1.3 Ethics Application form submitted to University of Sheffield Ethics Research Board

Application 034192

Section A: Applicant details

Date application started:
Fri 17 April 2020 at 12:48

First name:
Robert

Last name:
Lee

Email:
rlee11@sheffield.ac.uk

Programme name:
EDUR136 Doctor of Educational and Child Psychology (DEdCPsy)

Module name:
Thesis

Last updated:
09/06/2020

Department:
School of Education

Applying as:
Postgraduate research

Research project title:
How do young people in the UK engage with concerns around climate change?

Has your research project undergone academic review, in accordance with the appropriate process?
Yes

Similar applications:
None

Section B: Basic information

Supervisor Name:
Martin Hughes

Proposed project duration

Start date (of data collection):
Fri 3 July 2020
Anticipated end date (of project)
Tue 11 May 2021

3: Project code (where applicable)
Project code
- not entered -

Email
m.j.hughes@sheffield.ac.uk

Suitability

Takes place outside UK?
No

Involves NHS?
No

Health and/or social care human-interventional study?
No

ESRC funded?
No

Likely to lead to publication in a peer-reviewed journal?
Yes

Led by another UK institution?
No

Involves human tissue?
No

Clinical trial or a medical device study?
No

Involves social care services provided by a local authority?
No

Is social care research requiring review via the University Research Ethics Procedure
No

Involves adults who lack the capacity to consent?
No

Involves research on groups that are on the Home Office list of 'Proscribed terrorist groups or organisations?
No

Indicators of risk

Involves potentially vulnerable participants?
Yes

Involves potentially highly sensitive topics?
Yes

Section C: Summary of research

1. Aims & Objectives

Young people in the UK appear to have been concerned about climate change for a number of years. In 2013, UNICEF UK found that 74% of 11-16 year-olds reported they were 'worried about how climate change will affect the future of the planet and believe the world will have changed as a result of climate change by the time they are adults' (UNICEF/IPSOS Mori 2013). More recently, from a survey of almost 2400 young people, the Good Childhood Report 2019 reported that 77% of young people aged 10-17 are at least 'a little worried' about climate change, with 25% of children 'quite worried', and 16% 'very worried' (It's also likely that in 2020 young people's concerns around climate change may be influenced by their concerns and experiences relating to COVID-19, but it is not yet clear how this will influence their concerns).

Climate psychologists and therapists such as Weintrobe (2013) and Bednarek (2019), and groups such as the Climate Psychology Alliance (Hoggett et al. 2019) are very clear that concern about climate change (CCC) should not be interpreted as a solely negative condition to be treated away, and argue that the experience of at least some concern and anxiety is a reasonable response for someone with a relatively informed understanding of the current and future impacts of climate change. Additionally, Corner et al. (2014) found that those who identify with self-transcendent values (defined as 'altruism, forgiveness, and loyalty' in Corner et al. [2014] p.412) were also more likely to report CCC, which suggests that such concern may be associated with some values that are often considered desirable within society.

However, for some people this concern can become harder to cope with and contain. Some people experience high levels of distress connected with ecological anxiety and anticipatory grief of future impacts of climate change (Cunsolo & Ellis, 2018) and this includes some children and young people (Hickman, 2019). At the same time, other young people may be unconcerned, or engage differently with concerns about climate change: some may be actively engaging in climate activism (Fisher, 2016), others may be concerned but inactive (Corner et al. 2015), ambivalently concerned (Threadgold, 2012) aware but unconcerned (Kuthe et al. 2019), uninformed (Leiserowitz et al. 2011a) or sceptical of climate change (Ojala 2015). If educational psychologists and other school professionals would like to support or work with young people around their concerns about climate change, it is therefore important for them not to assume that everyone shares similar concerns or engages with their sense of concern in a similar way.

Hine et al. (2014) reported that over 25 segmentation studies (in which a population is surveyed and then divided into segments on the basis of their emotions and opinions on a topic) have been conducted around the world on approaches to climate change. However, only a few, such as Kuthe et al. (2019) have been conducted with young people, and there do not appear to have been any such segmentation studies on climate change conducted with young people in the UK – this constitutes a gap in the research that I intend to fill. Additionally, Hine et al. (2014, p.434) identify potential limitations with existing segmentation studies, particularly with regards to the categorisation and labelling of segments, because the distinctions between segments are usually statistically generated (and some researchers appear to pre- choose the number of segments to be generated), and the cut-off points between segments often do not appear to correspond to qualitatively distinct differences in views. In contrast to such limitations, Watts & Stenner (2012, p.149- 155) argue that the use of Q methodology can help mitigate such challenges because the interpretation, description, and naming of factors in Q research is scaffolded by the Q methodological process itself. This process can help the researcher to take a holistic overview and to describe the opinions of each generated factor in detail (which in some ways is analogous to a segment, but is calculated from many different dimensions rather than just a few key subscales), and to identify ways in which each factor is similar and different to others.

Q methodology (an online Q sort, followed by Q methodological analysis) allows for both the generation of meaningfully distinct factors (each of which should constitute a unique viewpoint or approach) and the identification of participants (who completed the online Q sort) whose views align strongly with the views exemplified by each factor. This therefore should allow me to identify participants who hold relatively similar views, and then to conduct online focus groups with them. In these online focus groups I will outline the main factors identified through the Q methodological analysis with participants, check which factor(s) they identify with (as a way of checking the validity of the generated factors), and then further explore their views and engagement with concerns around climate change.

I will also use these online focus groups to explore what kind of engagement each group of young people would like from the staff at their school/college, their parents, and from educational professionals such as EPs around these issues (for example, such engagement could involve: discussion/exploration of issues, formal educational sessions, working together on projects, emotional support provided if needed [either through staff, parents, or peer groups], and/or consideration of appropriate school/college policy and practice in light of any concerns) with a focus upon what kind of engagement the young people would consider useful. I hope to recruit participants from a range of backgrounds and with a range of views and patterns of engagement, so it's important that these groups do not problematise any particular person or group of people's engagement with concerns around climate change, and particularly that they do not treat concerns about climate change as something to be treated away by an intervention. At the same time, I will also pay attention to any anxiety or distress that is expressed, and if judged appropriate I will signpost any participants who are experiencing significant anxiety towards support services for anxiety provided by their school/college (or, if this is not appropriate, to local support services for young people in the community).

The end product will be an in-depth analysis of a variety of ways in which young people engage with concerns around climate change, and an analysis and summary of the engagement from their schools/colleges, parents/carers, and educational professionals such as EPs that young people feel would be helpful. I will use these analyses to make some preliminary recommendations for how EPs could work with young people and their educational settings around their concerns about climate change. I also hope that this research will then inform future work (which is beyond the scope of the current project) in which I explore the range of ways in which people engage with concerns around climate change within a whole school community (including school staff and parents). Ultimately, I hope that this work could inform a whole-school approach to engaging with people's concerns around climate change, in a similar vein to Weare's (2015) and Public Health England's (Lavis & Robson, 2015) whole-school approaches to wellbeing.

In summary, my research aims are therefore:

1. Construct a set of statements for a Q sort exploring engagement with concerns about climate change.
2. Undertake the Q sort (online) with young people of secondary school and college age and use their responses to undertake a Q methodological analysis that identifies a range of ways in which young people in the school engage with concerns around climate change.
3. Conduct online focus groups with young people identified as having similar patterns of engagement with concerns around climate change, in which I explore whether and how they would like their school/college staff, parents/carers, and educational professionals such as EPs to engage with them around their concerns.
4. Thematically analyse the consultations with each focus group.
5. Evaluate the Q sort statements, Q sort process, online focus groups, and recommendations.
6. Use insights from the research process to make some preliminary recommendations for how EPs can work with young people, their school/college staff, and their parents/carers around concerns that the young people have about climate change.

My overall research objective is therefore to gain a greater insight into how young people of secondary school and college age (11-18) engage with concerns around climate change, and to explore, analyse and report what engagement with their concerns (if any) they would like from their school/college staff, their parents/carers, and from Educational Psychologists.

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2. Methodology

Firstly, I will construct a set of 40-60 statements to be used for a Q sort. These statements will explore a range of ways that people might engage with concerns around climate change. They will be theoretically informed from existing literature on climate psychology, including the recent qualitative research from researchers at the Climate Psychology Alliance (Hoggett et al. 2019), research exploring how people experience 'psychological distance' towards climate change (Spence et al. 2012), psychoanalytic perspectives on people's engagement with climate change (Tollermarche, 2018; Weintrobe, 2013), and theoretical work such as Albrecht's 'earth emotions' (2019) and Morton's work on climate change as a 'hyperobject' (Morton, 2013). Stephenson (1952, p.223) [the founder of Q methodology] states that this is a well-established starting point for construction of a 'Q set' (i.e. the statements for a Q sort).

To check whether young people feel able to engage and think about the statements that I construct, I will conduct three online interviews with young people aged 11-18 using Google Meet (The identification of participants and recruitment process is outlined in Section D, Q1 & Q2 Consent from the young people's parents/carers will be managed by using Gorilla https://research.sc/participant/login/dynamic/7491A154-E358-4FFC-9C78-4C6997884510 – for the details on this, see section D, Q3). Lo Iacono et al. (2016) state that commonly used 'Voice over Internet Protocol' (online video conferencing) services such as Skype and Facetime are both sufficiently private and secure to use for online research (they also explore some considerations around how to use Voice over Internet Protocol technology in an ethical manner, which I will outline in section D Q5, part ii). However, following discussion with [the learning technologist for the School of Education], it appears that the University of Sheffield would like researchers to 'keep within the university's [digital] ecosystem', so I will use Google Meet to conduct the online interviews, and will use Google Meet's in-built recording feature to securely record the interviews. The use of Google Meet should still meet the data privacy and security requirements for the project, whilst also ensuring ease of access for participants. The recordings will be stored on a password-protected server (again, following discussions with [the learning technologist], we have established that I do not need to use the university X: Drive, but will use my university U:Drive, via the University of Sheffield VPN. For further details, see section E, Q4).

The interviews will use the phenomenological interview technique outlined by Høffding & Martiny, (2016), using 'front- loaded' (i.e. theory-driven) phenomenologically informed questions (as recommended by Gallagher 2003) to explore whether the statements generated from the research literature have experiential validity for the young people interviewed. I will transcribe the recorded interviews, removing any details that could be used to identify the young person, so that the transcriptions are completely anonymous. Analysis of the transcriptions will be primarily 'confirmatory' (i.e. an analysis of whether particular statements generated by the climate psychology research should be used in the final Q set), but may also involve some 'exploratory' analysis (in which responses and comments in the interviews lead to the construction of new statements for the Q set).

Once I am satisfied with the draft statements for the Q sort, I will run a pilot study, in which I will invite participants to undertake a draft online Q sort. I will then undertake a semi-structured interview with them, exploring their experience of undertaking the draft Q sort. I hope to undertake the pilot study with at least 10 participants (for the identification process for potential participants for the pilot study, see section D Q1; for the recruitment process for the pilot study see section D Q2, and for the consent procedure see section D Q3). The purpose of the pilot study is to identify any statements that people consistently misunderstand or struggle to place (so that I can remove or modify such statements), and to explore people's overall experience of the Q sort process (i.e. whether they feel that they are able to

rate the statements in relation to one another, and whether their completed Q sort allows them to adequately express how they engage with concerns about climate change). This will be an iterative process, where I may modify the Q sort statements multiple times throughout the pilot study, refining the statements for each subsequent Q sort undertaken (whilst taking care not to assume that one person's experience of undertaking the Q sort is representative of all people's experience). I will continue this until I am satisfied that the Q sort is fit for purpose.

For the pilot study I will use an online collaborative whiteboard service called Miro (www.miro.com – I have checked with [the relevant person in my department], who has confirmed that this is fit for purpose and secure to use). Miro allows me to create a virtual whiteboard containing post-its and I will write one Q sort statement on each post-it and arrange the statements randomly at the bottom of the screen. I will then draw a Q sort grid on the screen (see: https://www.researchgate.net/figure/The-Q-sort-response-grid_fig1_284791262). I can then invite participants to be 'Anonymous Guest Editors' of the Miro whiteboard by sending them a link. This allows them to be able to use their web browser to view and edit the board collaboratively with me in real-time (so that I can see where they move the Q statements), without them requiring a Miro account. It also allows us to use a secure (SSL secured) in-browser video- chat, so that I can see the participant (provided they have provided consent for this in the consent form, and also click to give the web page permission to access their webcam) and they can see me. This will allow me to explain the Q sort task to participants (and to check that they understand), to observe them move the Q statements onto the Q sort grid, and then to conduct a post-sort interview with the participant directly after they have completed the Q sort via the video chat, whilst also still having their Q sort on screen as a reference point for questions.

The post-sort interview will take the form of a semi-structured interview, where I ask participants about their experience of the Q sort, whether there were any statements that they didn't understand/felt were poorly worded, whether there were any statements that they felt were missing from the Q set, and why they placed particular statements at key places (such as strongly agree or strongly disagree) on the Q sort grid. I will record the Q sorts using the Mac OS Catalina built- in screen recording software (https://support.apple.com/en-gb/HT208721) that saves the screen recording to my laptop desktop (the laptop is password protected, and the recording cannot be accessed by Apple or other companies whilst it is on the desktop). I will then immediately transfer the recording to a password protected folder on my university U: Drive (accessed remotely via the University of Sheffield VPN), and delete it from my laptop desktop (for more information on data storage, see Section E, Q4).

For the main study (which is likely to begin in late August/early September 2020) I will recruit participants in the same way as for the initial Google Meet interviews (for details on identification of potential participants for the main study see section D Q1, for details on recruitment of potential participants for the main study see section D Q2, and for details about consent from young people's parents/carers and the young people themselves, see section D Q3). Prior to the main study I will send participants a link to some questions on Gorilla for them to complete. The first page of this link on Gorilla will contain an information sheet and consent form for young people to sign themselves (this is in addition to the legal consent already provided by their parents/carers). The subsequent questions on Gorilla will explore: some key demographic information (to help put responses to the Q sort in context and to explore potential trends), relative 'objective' social status (measured via family affluence), relative 'subjective' social status (as perceived within the school/college context and within wider society), and wider social values.

The demographic information that I will request is: age, gender, ethnicity, and school. This information (plus participant responses on the other scales) will be stored securely on the Gorilla server, and then exported into an SPSS Data File (.sav), which will be saved in a password protected folder (a separate password-protected folder to the key containing the association between each participant name and number) on the University of Sheffield U: Drive.

Qualitative research by Lorenzoni et al. (2007) suggests that people who are concerned with their own economic hardship sometimes cite this as a reason for being less open to engaging with concerns about climate change, and quantitative research by Pampel (2014) suggests that for people living in affluent countries such as the UK, higher socioeconomic status correlates with increased concern about the environment. It is therefore worthwhile to explore whether participants relative socioeconomic status correlates with any particular patterns of response on the Q sort. To do this, I will use the well-validated six-question Family Affluence Scale III (Torsheim et al. 2016, available at: https://www.euthyroid.eu/questionnaires-page/) which is judged to provide a reasonable estimate of a young person's family's relative economic wealth, plus the two-question MacArthur Scale of Subjective Social Status – Youth Version (Goodman 2001, available at: http://sparqtools.org/mobility-measure/macarthur-scale-of-subjective-social-status-youth-version/#all-survey-questions) and the seven-question Subjective Social Status - school dimensions questionnaire (Sweeting et al. 2010, question format displayed at: https://www.researchgate.net/figure/fig2_44801646 with the remaining questions listed in the journal article).

In addition to the socioeconomic status scales, I will also include a scale exploring young people's general values towards society. Kahan et al. (2012) found a strong positive correlation between egalitarian and communitarian worldviews and increased climate change concern, so it will be informative to see how such values correlate with the views that young people express in their Q sorts. To do this, I will use the twelve-question (short version) Cultural Cognition Worldview Scale (Kahan 2012, available at: http://www.sjdm.org/dmidi/files/Cultural%20Cognition%20Worldview%20Scale.docx).

(I have checked with [the relevant person in my department] about whether it is acceptable to use the above scales, and he has stated that it is acceptable to use existing established scales if the questions and scoring procedures have already been outlined in published research. This is the case for the scales I will use; The Family Affluence Scale III questions are detailed in full in Hobza et al. (2017); the MacArthur Scale of Subjective Social Status – Youth Version questions are detailed in Goodman (2001), the Subjective Social Status - school dimensions questionnaire questions are outlined in Sweeting et al. (2010), and the Cultural Cognition Worldview Scale questions are detailed in Kahan (2012). However, out of courtesy, I will also email the lead researchers for each scale and request that I can use them in my study.)

Once participants have completed the preliminary scales (I will set an alert on Gorilla to email me to inform me when a participant has completed the scales), I will email them (and CC their parents into all emails) to arrange a time for them to complete the main online Q sort. Using the same procedure as for the pilot study, once a time has been arranged, I will send a link to participants inviting them to be 'Anonymous Guest Editors' of a Miro whiteboard containing the online Q sort. I will use the secure (SSL secured) in-browser video-chat to verbally confirm that they consent to participate and also for their online Q sort to be recorded (to which they will have already consented via Gorilla when answering the pre- Q sort questions, and to which their parents/carers will already have legally consented to via Gorilla), and to reiterate that they can withdraw consent at any time. I will then use the in-browser video chat to explain the online Q sort task to participants (and to check that they understand).

In total, I will require 30-60 participants. Once enough online Q sorts have been completed, I will undertake a Q methodological analysis using the Q analysis software: PQMethod. The procedure for using this software to undertake a Q methodological analysis is outlined in detail in Watts & Stenner (2012), and I will follow the steps outlined in their book (Appendix 2, p.195-218). The end product of this analysis should be the generation of a number of Q factors, each of which represents a statistically and conceptually distinct way in which young people engage with concerns around climate change.

The analysis will also allow me to identify participants whose responses align relatively strongly with each Q factor. I will therefore select 4-6 participants who align most strongly with each factor, in order to conduct an online focus group for each set of students. All young people and their parents/carers will already have indicated whether they consent to be part of an online focus group in their consent form (on Gorilla) for the main study. I will therefore contact consenting young people again through the email addresses provided, making sure that their parents are CCd in to keep them informed, and will arrange a date and time for each focus group using a Doodle Poll (https://doodle.com/free-poll – participants do not need a Doodle account in order to participate in this poll).

The online focus groups will be conducted using Google Meet (as recommended by [the learning technologist in our department] to keep the experiment within the university digital infrastructure) in a similar manner to the initial phenomenological interviews. At the start of each focus group, I will read out the information sheet for all participants, and then invite them to provide verbal consent to participate, for the focus group to be recorded (using the record feature on Google Meet – I will not use this unless all participants in a group have consented to the recording, both in their original consent form, and verbally), and for the recording to be transcribed into anonymous responses (these three questions are all contained in the original consent form on Gorilla, both for parents/carers and for the young people). I will also emphasise to all participants that they have the right to withdraw at any point in the study, and to ask for their responses and data to be withdrawn at any point in the study.

Each online focus group will begin by exploring how the young people in the group relate to and engage with concerns about climate change. I will summarise the key facets of some of the major factors identified in the Q analysis, and then invite young people to consider the ways in which they feel similarly or differently to each of the positions outlined. To some extent this will act as an exploration of the accuracy of the Q analysis, because if young people in each group don't relate to the factor with which the Q analysis indicated they should be most closely aligned with, then the analysis is not very accurate. The focus groups will then explore what engagement around concerns about climate change the young people in the group would like from staff in school, parents/carers and educational professionals such as educational psychologists. Finally, the session will end by me thanking the young people and explaining how their responses will be anonymised (with all identifying comments removed) and transcribed, analysed and then fed back to the school as a report, in addition to being written up for my doctoral thesis. I will also offer to email any interested young people a copy of the final report (and will CC in their parents if I send them a copy).

The video recording for each focus group will be saved in a password protected folder in the University of Sheffield U: Drive (this drive can store up to 10GB; if I require more space I will email it-servicedesk@sheffield.ac.uk). The recordings from each focus group will be transcribed (and the transcriptions anonymised), and then thematically analysed using Braun & Clarke's (2006) methodology, to pick out key themes for each focus group. This analysis will be fed back to any interested schools/colleges and organisations, plus participants and their parents, as part of an overall report which will also contain a summary of the ways in which young people in the study engage with concerns around climate change. I will then evaluate the process, and write it up for my doctoral thesis.

In summary, my method (without detailing recruitment and consent procedures) is:

1. Construct Q sort statements
2. Conduct 3 video interviews with young people to test the experiential validity of the Q sort statements
3. Conduct pilot study online Q sorts with 10 participants to test that the Q set is fit for purpose
4. Conduct online Q sorts with 30-60 young people aged 11-18
5. Conduct a Q methodological analysis of the completed Q sorts using PQMethod
6. Conduct focus groups with students whose responses closely align to each factor (4-6 students per factor)
7. Thematically analyse the focus group responses
8. Produce a report containing the identified factors and thematically analysed focus group responses
9. Evaluate the process and write it up for my doctoral thesis

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3. Personal Safety

Have you completed your departmental risk assessment procedures, if appropriate?
Not applicable

Raises personal safety issues?
No

For the procedure as outlined, I will interact with all participants via online methods (Email, Google Meet, and Miro). I will conduct the online sessions from my room, in which I am also currently conducting my EP casework as a trainee (whilst working from home). The building in which my room is located is owned by the Birmingham Buddhist Centre; it is a multi- occupancy residential building, regular fire safety and electrical checks are undertaken by the maintenance manager, and the building conforms to all legal health and safety requirements. I therefore believe that there are no additional threats to my physical safety posed by the research.

In terms of my mental wellbeing, the topic of climate change concern is potentially distressing. However, I have been engaging with this topic for over a decade, and am aware of the aspects of the topic that I personally find challenging. Additionally, therapists such as Bednarek (2019) and Weintrobe (2013) report higher overall wellbeing amongst clients who openly address their feelings about disturbing topics such as climate change, compared with those who avoid such topics. To mitigate the impact that engagement with concerns about climate change could have on me, I will be in regular contact with my research supervisor and my personal supervisor, and will discuss any concerns or difficult emotional experiences that I have with them, as part of my regular supervision sessions.

In addition to this, whilst I may meet young people during the research who are potentially upset or distressed by the research topic, part of my training as an educational psychologist involves placement work where I regularly work with young people experiencing distress and challenging situations. Consequently, my training has procedures in place where I can speak about challenging situations to my placement supervisor and/or personal tutor, and I have received CPD training in how to escalate any safeguarding concerns that I may have around a young person's wellbeing or mental health. I therefore believe that my training (and my former training as a teacher) will help me to manage my mental and emotional wellbeing if I encounter any challenging situations during the research, and that the research is likely to pose fewer challenges to my mental wellbeing than the placement work that I will be undertaking over the same period of time as my research.

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Section D: About the participants

1. Potential Participants

My potential participants will be identified in four phases. In the first phase, I am looking for a minimum of three young people aged 11-18 who are happy to speak with me in an online interview via Google Meet about how they engage with concerns around climate change. When I have spoken about and presented my research proposal to educational psychologists and trainee educational psychologists, several people have already spoken to me and identified young people who might be interested in undertaking an online interview with me, and who would be appropriate for the research. However, if needed, I will also approach schools and organisations containing young people who are actively engaging with concerns around climate change, to see if further potential participants can be identified.

In the second phase (my pilot study), I am looking for a minimum of 10 people who are happy to undertake an online draft Q sort analysis via Miro and then speak with me online (via the secure in-built video conferencing software that is part of Miro) about whether they felt that the statements I had used for the Q sort were easy to understand and allowed them to express how they engage with concerns around climate change. I will offer the initial three participants who undertook the online interview the opportunity to participate (provided they and their parents/carers indicated in their initial consent form that they consent to being contacted about this), but all other potential participants will be adults who do not consider themselves to be vulnerable (see section D Q2 for details on how adults identified as potential participants will be provided with information during the recruitment process to help them decide whether they are potentially vulnerable adults). I have identified two groups of professionals to approach for potential additional participants: members of the Climate Psychology Alliance (an organisation for psychologists and therapists who are interested in the psychology of climate change and how to work with people around this: https://www.climatepsychologyalliance.org/), and year 2 trainees from the Doctorate of Child and Educational Psychology course at Sheffield (these trainees have already been involved in in-depth seminar discussions about the research and have good knowledge of the purpose of the research and how it hopes to inform future EP work with young people and schools around people's concerns about climate change, which makes them good candidates for the pilot study, since the purpose of the pilot is to help me to refine the Q sort statements). I will ensure that all potential participants from the Climate Psychology Alliance and the Doctorate of Child and Educational Psychology course are over the age of 18.

In the third phase (the final Q sort), I require 30-60 young people aged 11-18 who are prepared to undertake the final Q sort analysis via Miro and then speak with me online (via the secure in-built video conferencing software that is part of Miro) to conduct a brief post-sort interview. I will ask the Climate Psychology Alliance to inform any secondary schools that have approached them about my research, so that if the schools contact me, some of their students could become potential participants. I will also approach organisations containing young people who are actively engaging with concerns around climate change (such as the UK Student Climate Network: https://ukscn.org/), and ask if they could inform potential participants about my research. Finally, I will ask young people who undertake the Q sort if they know of any other young people aged 11-18 who engage with concerns around climate change in the same way or differently to them; this snowballing technique will hopefully identify further potential participants, who will hopefully engage with concerns about climate change in a range of different ways.

The fourth phase of the research is the online focus groups via Google Meet. The potential participants for this phase are young people who participated in the third phase of the project, and who consented to (and whose parents/carers consented to them) participating in the focus groups. Each participant's responses on their Q sort will determine the focus group for which they could be a potential participant; participants with similar patterns of responses in their Q sorts will potentially participate in focus groups with each other. The common thread between all of my potential participants is that they will all hopefully show some kind of meaningful engagement with concerns around climate change. This does not mean that they are all climate change activists, however; I would like to explore the views of a range of participants, including those who are clear that they are not concerned about climate change.

When considering potential participants, I have debated whether it would be appropriate to approach climate denialist groups (such as The Global Warming Policy Foundation group: https://www.thegwpf.org/ Stoknes [2015] uses the term 'denialist' to refer to such groups because he argues [and documents how] they do not conform to the academic rigor of scientific scepticism, but employ rhetorical devices to make it appear as if they are maintaining such rigor) to see if they can contact any potential participants (young people aged 11-18) who are involved with their group. However, as Oreskes & Conway (2011) document, such groups are not engaging in good faith scientific endeavour, but a deliberate campaign of misinformation and propagation of misleading summaries of scientific research. I am therefore cautious about giving them a platform that might further spread misinformation. Research by Ojala (2015) suggests that a range of young people may already feel sceptical about information they receive about climate change, without belonging to a climate denialist group, and my strategy of asking young people to identify other young people with different views to their own is likely to be sufficient to identify potential participants who are sceptical about climate change.

References

Oreskes, N., & Conway, E. M. (2011). Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming. Bloomsbury Publishing USA.

Ojala, M. (2015). Climate change scepticism among adolescents. Journal of Youth Studies, 18(9), 1135-1153.

Stoknes, P. E. (2015). What we think about when we try not to think about global warming: Toward a new psychology of climate action. Chelsea Green Publishing.

2. Recruiting Potential Participants

As with identification of participants, recruitment of participants will consist of four phases. In the first phase of recruitment (for the online interviews via Google Meet) I will begin by using recruitment emails. These will initially be sent to educational professionals and parents who have already expressed an interest in the project (who have indicated that their children might be interested in participating). I will also approach secondary schools with which I work by sending emails to key contacts within each school to be forwarded to the school's senior leadership team (SLT). These emails will request permission from the school's SLT for a key contact in each school (such as the school SENCO or other DBS-checked member of staff) to be able to send out a recruitment email to students. If I get permission, I will send an email to the key contact in the school to be sent out to students in the school that will contain information about the experiment. Provided I obtain permission from the school SLT, I will also request that the key staff member posts my recruitment information to the school website, and if students are back attending secondary school by this point, to post recruitment posters on the school notice boards.

If I do not manage to recruit enough participants via my existing contacts and the schools with which I work, then I will also send emails approaching organisations whose members are likely to have thought about and hold strong views around climate change (such as the UK Student Climate Network: https://ukscn.org/). These emails will request that they send out my recruitment email to any young people aged 11-18 on their mailing list who might be interested in participating in the research. Additionally, once I have at least one participant who has undertaken the interview, I will begin using snowballing techniques (in which I ask the participant to identify 2+ other young people aged 11-18 who might like to participate, including someone who engages similarly with concerns around climate change and someone who engages differently, if possible, since I would like to interview young people who hold a range of meaningful views around concern about climate change) to identify and approach additional participants. It is important not to be intrusive when doing this, so if the young person is able to think of others who might be interested, then I will send the young person that I interviewed a recruitment email and ask them to forward this to the other young people whom they think might be interested – in this way, I will not obtain any young people's email addresses through the snowballing technique until they email me in response to the recruitment email.

The recruitment emails, flyers, and website messages will direct any interested young people to speak with their parents about the project, and then to email me back to my University of Sheffield email address, with their parents CC'd into the email (this has been suggested to me by my supervisor, Martin Hughes, as a way of checking that the young people have indeed consulted with their parents/carers, and that their parents/carers are aware that they need to provide consent in order for their child to participate). I will then email their parents/carers the information sheet for the research, plus a link to the information sheet (which leads into the consent form) that are accessed online via Gorilla (https://research.sc/participant/login/dynamic/7491A154-E358-4FFC-9C78-4C6997884510 - the University of Sheffield School of Education licence for Gorilla is managed by XXXX and he has confirmed that I can use Gorilla through the University licence for the duration of the project). This email will invite both the parents/carers and the young people to ask me any questions they have about the project, and to read the information sheet in full, so that any consent that they provide is well-informed.

The second phase of recruitment will be for the pilot study, in which I will invite participants to undertake the draft online Q sort and then to undertake a post-sort online interview exploring their experience of undertaking the draft Q sort. The consent form for the participants who undertook the initial online interviews via Google Meet will ask whether the participants would also like to be contacted about participating in the pilot study draft Q sort. If they and their parents consent to being contacted about this, then I will email these young people (with their parents CCd into the email) to invite them to undertake the pilot study Q sort. The pilot study draft Q sort will have its own section on the information sheet and consent form on Gorilla (https://research.sc/participant/login/dynamic/7491A154-E358-4FFC-9C78- 4C6997884510) and this must be read and completed by the young person's parents/carers. Once this is completed, I will also send a link to an information sheet and consent form for the young person themselves. Once consent has been obtained from both the young person's parents/carers and the young person, I will arrange a time for them to participate in the draft online Q sort.

Ideally, I would like 10 participants to undertake the pilot study. I will therefore recruit my other participants by emailing the mailing list for the Climate Psychology Alliance (https://www.climatepsychologyalliance.org/), inviting all climate psychologists to participate. If any express an interest, I will check that they are over 18 and will email them an information sheet. I will also explicitly ask them whether there is any particular reason why they would consider themselves to be someone at increased risk of distress or harm as a result of participation (I will do this because under the Care Act 2014 there are no simple criteria to indicate that someone is potentially a 'vulnerable adult', since the risk depends upon their situation. I will therefore explore whether the situation of undertaking a Q sort and post-sort interview about how they engage with concerns around climate change could pose greater risk to them as participants than others). If they do not consider themselves to be vulnerable with regards to the research, and if I judge that they are able to provide informed consent (according to the principles of the Mental Capacity Act 2005), then I will then email them a link to the information sheet (which leads into the consent form) for adult participants on Gorilla (https://research.sc/participant/login/dynamic/1A6B1422-5A83-4254-827D-60B926193C16).

If I am not able to recruit enough pilot study participants through the Climate Psychology Alliance, then I will invite year 2 trainees from the Doctorate of Child and Educational Psychology course to participate. All trainees are over 18, and I will follow the same procedure as outlined for members of the Climate Psychology Alliance, sending them a recruitment email, and if they respond, checking that they do not consider themselves vulnerable with regards to the research prior to sending them a link to the information sheet and consent form for adult participants on Gorilla (https://research.sc/participant/login/dynamic/1A6B1422-5A83-4254-827D-60B926193C16). One complication of using educational psychology trainees in the pilot study is that I am friends/acquaintances with them, which might make them feel slightly pressurised to agree to participate. To address this, when I approach them for recruitment I will do so via mass email into which they are BCC'd (to reduce pressure due to social embarrassment) and I will make it very clear that no-one should feel pressurised to participate and that there will be absolutely no negative consequences for not wanting to participate.

The third phase of recruitment is for the main study (which is likely to begin in late August/early September 2020). Participants for this will be aged 11-18 and I will recruit them in the same way as for the initial Google Meet interviews – through asking key staff members in secondary schools & colleges to send out emails advertising the research (once permission has been granted by their SLT), through contacting organisations with members who are likely to hold strong views around climate change (such as the UK Student Climate Network: https://ukscn.org/) and asking them to advertise the research, and through snowballing techniques, in which I ask participants to identify other young people who hold similar and different views around concern about climate change.

Additionally, if students are physically attending school (in September 2020), then I will ask a key staff member at the school to inform students in person (at a socially safe distance), either in class or in assembly if assemblies are being held. I will ask the key staff members to ask participants who express an interest to speak about the research with their parents, and provided their parents are happy for them to participate, to email me and to CC in their parents. Once I receive this, I will email their parents a link to an information sheet and consent form on Gorilla (https://research.sc/participant/login/dynamic/F56B1D1F-2226-4177-9793-1544D0FB15AD), with instructions that the information sheet and consent form must be read and signed by the young person's parents/carers.

The final phase of recruitment will be for the online focus groups conducted using Google Meet. The parents/carers of young people participating in the study will have already been invited to consent to their children being contacted and invited to participate in the online focus groups in the initial consent form, and the young people will also already have been invited to consent to being contacted about this in their own consent form. I will therefore email young people who have consented to being contacted and whose parents have consented to them being contacted (and will CC in their parents) to see whether they would still like to participate in the online focus group. If they

confirm that they would like to participate (and if parents do not email to withdraw consent for their participation), I will email them a link to a Doodle Poll (https://doodle.com/free-poll), to organise a time for them to participate in the online focus group session.

2.1. Advertising methods

Will the study be advertised using the volunteer lists for staff or students maintained by CiCS?
No - not entered –

3. Consent

Will informed consent be obtained from the participants? (i.e. the proposed process)
Yes

For the initial interviews via Google Meet and for the main study, all of my potential participants will be aged 11-18. Additionally up to three of my participants in my pilot study (those who completed the initial interviews) will also be aged 11-18. Participants under the age of 18 cannot legally provide consent to participate in the research, and the University of Sheffield's Ethics Policy Governing Research Involving Human Participants, Personal Data and Human Tissue (Version 7.5) states that participants under 18 are potentially vulnerable because their competence to exercise informed consent is in doubt.

I will therefore need to obtain informed consent from the young people's parents/carers in order for them to participate. I have been in contact with Ferenc Igali about this, and he has recommended that I do not use signed and scanned consent forms (which would also potentially raise issues around data security), but instead use Gorilla (https://gorilla.sc/) to obtain consent from participants' parents. Once young people have emailed me in response to my recruitment email, I will email back and request that they speak to their parents/carers and then (with their parents'/carers' permission) send me their parents'/carers' email address (that is if they have not already done so; the recruitment email will have already asked them to speak to their parents/carers and to CC them in when they email me to express an interest in the study). After this, I will email their parents/carers with the information sheet, plus a link to Gorilla that will contain the information sheet, followed by the consent form (https://research.sc/participant/login/dynamic/7491A154-E358-4FFC- 9C78-4C6997884510).

The consent form will consist of multiple tick-boxes ([the relevant person in my department] has confirmed with me that tick boxes rather than signatures are sufficient to indicate consent) to allow parents/carers to consent to their child's participation in each part of the study separately. The consent form that parents/carers need to complete in order for their child to undertake the initial online interview via Google Meet will also contain consent for their child to be contacted about participating in the pilot study (the draft online Q sort), and consent for their child to actually participate in the study if they wish (and for their participation to be recorded and stored in a similar manner to the online interview). It will also request consent for the young person's online interview to be recorded, and for the recording to be stored until November 2021 in a password protected folder in the University of Sheffield U: Drive before it is deleted. The consent form that parents/carers need to complete in order for their child to undertake the main study will require parents/carers to consent to their young people completing the demographics, socio-economic status, and values questionnaires via Gorilla, and for this data to be securely stored on the GDPR-compliant Gorilla servers until it is downloaded as an SPSS file and stored on a password-protected folder in the University of Sheffield U: Drive. It will also request consent for the young person's online Q sort to be recorded (emphasising that the recording will include the use of Miro's secure in- browser video-conferencing, through which the post-sort interview will be conducted), and for the recording to be stored until November 2021 in a password protected folder in the University of Sheffield U: Drive before it is deleted. Finally, it will request consent for the young person to be contacted about participating in an online focus group (via Google Meet), for them to participate in the online focus group, for their participation to be recorded, for the recording to be stored until August 2024 (three years after completion of the research) in a password protected folder in the University of Sheffield U: Drive before it is deleted (note: if the University of Sheffield intends to delete my U: drive before this date, I will request alternative secure storage from the University of Sheffield), and for their participation to be transcribed in a way that ensures anonymity (any personal or identifying details or comments will be removed).

Whilst parental/carer consent is legally necessary, I do not consider it to be sufficient on its own, because I would also like to obtain informed consent from the young people participating in the study themselves (the University of Sheffield Research Ethics Policy Note 2 also asserts the principle that young people should also provide their own consent in addition to their parental/carer consent). At each stage, after their parents/carers have provided consent via Gorilla, I will therefore email the young people a link to an information sheet and consent form on Gorilla (https://research.sc/participant/login/dynamic/253A6217-805A-4FE0-855C-FAF3E8F0473B for the initial video interviews, and https://research.sc/participant/login/dynamic/B08518DF-4570-43E5-ABDD-C17FE0F51701 for the main study), and ask the young people to complete a consent form for themselves (in addition to the consent already provided by their parents/carers). A risk here is that some young people will receive information about my research through their secondary school or college (or an organisation of which they are a member), and are both protected by and potentially influenced by research gatekeepers such as the key staff member who will send out information about the study (participants recruited from relevant organisations could also be influenced by key people in the organisation). The concern here is that the key staff member (or organisation member) could use their authority within the school/organisational structure to encourage young people to participate, and that participants may not fully comprehend what they are becoming involved with, in terms of both the activities that they undertake and the data and videos that are generated. I will address this by making it clear in all communication (to key staff, to key contacts in relevant organisations, to the young people who are potential participants, and to their parents/carers) what will be involved, how the young people's data will be used, that their participation is completely voluntary, that there is no positive or negative consequence connected with deciding to participate or not to participate, and that all participants can withdraw from the study at any time and can also ask for the data generated by their responses to be withdrawn.

Crucially, I will treat consent as an ongoing process that does not end once the consent forms have been signed by the parents/carers and by the young people. As part of this, before the online interviews, pilot study Q sort, main study Q sort, and focus groups, I will re-read through the consent form with the young people, and check that they still want to consent to participate, whilst emphasising that they can withdraw from the study at any time without negative consequences. This places trust on the young people to make their own decisions about consent (in addition to their parents'/carers' decision about consent). I trust the young people who engage with the study to be able to make an informed decision about their participation, to be able to discuss their potential participation with their parents (this needs to happen in order for their parents to consent to their participation), and to be able to understand their right to withdraw their

participation if they change their mind. In this respect, I agree with Rudduck and Flutter (2004), who argue that 'Out of school many young people find themselves involved in complex relationships and situations, and carry tough responsibilities... in contrast, the structures of secondary schooling offer, on the whole, less responsibility and autonomy than many young people are accustomed to' (Rudduck and Flutter, 2004 p.1).

As well as consent for young people aged 11-18 to participate in the study, my pilot study online Q sort requires adults from the Climate Psychology Alliance and the University of Sheffield Doctorate of Educational and Child Psychology to consent to their own participation in the draft online Q sort. As noted in section D Q2, I will ask potential participants who have expressed an interest if there is any particular reason why they would consider themselves to be someone at increased risk of distress or harm as a result of participation (and also judge their capacity to consent in light of this using the principles outlined in the Mental Capacity Act 2005). The University of Sheffield's Research Ethics Policy Note no. 6 emphasises that "It is important to be aware that prospective participants may be vulnerable, but not to assume that they are particularly vulnerable." (Note no.6, p.4) and I will bear this in mind, with also noting that "there may be significant variation in degrees of vulnerability" (ibid.). If I am in any way concerned about the potential vulnerability of any of my adult participants, I will email my research supervisor and request a supervision session with him to talk about my concerns, prior to allowing the adult participant to undertake the draft online Q sort.

Crucially, as recommended in the University of Sheffield Research Ethics Policy Note 2, I will do everything I can throughout the research to ensure full transparency around the purpose of the research and potential outcomes (for example, I do not want to give young people the impression that the research will have more impact than it is likely to have). I will try to ensure that all consent provided is well informed consent, and will encourage participants and their parents/carers to read through the information form fully. I will ensure that my recruitment processes are not coercive in any way and that there is no pressure placed upon young people to consent to participate (including pressure from school staff, organisations, parents, or peers), and I will emphasise the right to withdraw from the study at any time.

References

Rudduck, J., & Flutter, J. (2004). How to improve your school (Vol. 1). Bloomsbury Publishing.

4. Payment

Will financial/in kind payments be offered to participants?
No

5. Potential Harm to Participants

What is the potential for physical and/or psychological harm/distress to the participants?

The core activities undertaken by participants within the research are all undertaken online. Lo Iacono et al. (2016) note that one risk with online interviews is that participants can accidentally reveal personal and sensitive information about themselves if they do not consider which part of their home or environment could be showing in the background during their online interview. I would characterise this potential harm as low (embarrassment, accidental reveal of personal information), and justified by the potential benefits to the research (Lo Iacono et al. 2016 document that the use of Voice over Internet Protocal technologies such as Skype [or Google Meet] can help to support the building of rapport more effectively than phone interviews, provided that both participants have an uninterrupted internet connection).

The online questionnaire (delivered via Gorilla) used in the main study invites participants to share potentially sensitive information about some demographic details (age, gender, ethnicity, and school), socioeconomic status according to relative family affluence, subjective status relative to peers and society, and social and economic values. It's possible that some participants will not have thought about themselves in these terms before, and that this could cause some mild disturbance. I would characterise this potential harm as low (reflection upon sensitive topics), and justified by the potential benefits to the research (this information is likely to prove very useful when interpreting factors and looking for trends during the Q methodological analysis process, and is likely to make the research richer and more informative).

The use of Miro for participants to undertake the online Q sort and post-sort interview does not obviously pose any additional risks beyond those posed by the online interviews. The focus groups undertaken via Google Meet could potentially result in conflict between participants (although each focus group will contain participants with similar responses on the Q sort to each other, so is likely to contain participants with similar views, which may reduce the likelihood of conflict between each other. I would characterise this potential harm as low (online verbal conflict with others), and justified by the potential benefits to the research (the focus groups will be helpful because they allow participants to collectively explore what form of engagement they would like from school/college staff, parents/carers, other young people, and educational professionals – this information should prove useful for informing how educational psychologists can work with young people around concerns about climate change).

The physical activities involved in participating in the research are each relatively low risk (Google Meet interviews, online questionnaires via Gorilla, online Q sorts via Miro, and online focus groups via Google Meet). However, it is possible that the topic of concern around climate change could be distressing for some young people – for example, Hickman's (2019) qualitative research documents the concern and distress that some young people feel about climate change. However, Hickman (2019) is also careful to emphasise that the concern and distress is already there, and that speaking about concerns about climate change does not create the concern; it simply provides an opportunity to share it. Consequently, I would characterise this potential harm as medium/low (discussion and engagement with topics that some participants will find distressing), and justified by the research (the purpose of which is to help inform how educational psychologists and others can work with young people around these potentially distressing issues).

Additionally, some opinions around climate change could be considered by some people to be potentially controversial political opinions, possibly due to the fact that many proposed plans to tackle climate change require public investment and regulations on corporations to be imposed by national governments (e.g. Bush, 2020), and as Klein (2013) notes, such plans "fundamentally conflict with deregulated capitalism, the reigning ideology for the entire period we have been struggling to find a way out of this crisis" (p.18). However, research by

McCright & Dunlap (2011) suggests that the issue may be particularly politically controversial within political debates in the United States of America, and Corner et al. (2014) suggest that in many counties outside the USA a lot of people and groups do not appear to associate concerns about climate with any particular position on the liberal-conservative political spectrum. With regards to the UK, last year IPSOS Mori reported that concern in Britain about Climate Change had reached record levels, and that "Climate Change is also now firmly in the top five [national concerns], with concerns running at three times the level of a couple of years ago" (IPSOS Mori, 2019). Consequently, it is far from a given that concerns expressed in the UK around climate change will be considered to be particularly controversial political opinions. Additionally, my research supervisor has checked this with Antony Williams the Programme Director for Doctorate in Educational and Child Psychology in the School of Education at the University of Sheffield, and he has confirmed that concerns around climate change is unlikely to fall under the definition of a 'highly sensitive topic'. I would therefore characterise this risk as medium/low (discussion of potentially sensitive or controversial topics) and justified by the research (which seeks to explore and engage positively with young people about the topic of concerns around climate change).

There is a very small chance that during the course of the initial interviews, post-sort interviews, or focus groups, participants could reveal that they have taken part in illegal activities, or intend to take part in illegal activities (for example, being part of Extinction Rebellion protests that involve being arrested). This is relatively unlikely, and I am not seeking to recruit participants engaging in illegal activism. Additionally, if a participant were to have already engaged in a protest that involved being arrested, then the police and authorities would already be aware of this illegal activity. I have read through the University of Sheffield Ethics Policy Note 12 on research that uncovers illegal activities, and will follow the following policy: if the activity can be considered non-violent direct action (i.e. there is no intention of violence towards people or animals) and does not involve intentional property damage, then I will not report it. However, I will inform participants that I cannot maintain their confidentiality if they speak about having undertaken or planning to undertake an action involving violence towards people or animals or intentional property damage. I would characterise this risk as medium/low (risk of discussion of illegal actions or planned illegal actions) and justified by the research (which is not investigating such actions, but might risk discussion of them on account of the topic of the research).

References

Bush, M. J. (2020). How to End the Climate Crisis. In Climate Change and Renewable Energy (pp. 421-475). Palgrave Macmillan, Cham.
Corner, A., Markowitz, E., & Pidgeon, N. (2014). Public engagement with climate change: the role of human values. Wiley Interdisciplinary Reviews: Climate Change, 5(3), 411-422.

Hickman, C. (2019). Children and Climate Change: Exploring Children's Feelings about Climate Change Using Free Association Narrative Interview Methodology. in Hoggett, P. (Ed.). (2019). Climate Psychology: On Indifference to Disaster. Springer.

Ipsos MORI (2019) What Worries the World - December 2019. Ipsos MORI. Retrieved 2 March 2020, from https://www.ipsos.com/ipsos-mori/en-uk/what-worries-world-december-2019.

Lo Iacono, V., Symonds, P., & Brown, D. H. (2016). Skype as a tool for qualitative research interviews. Sociological Research Online, 21(2), 1-15.

McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. Global environmental change, 21(4), 1163-1172.

How will this be managed to ensure appropriate protection and well-being of the participants?

The risk that participants could inadvertently reveal personal or sensitive information about themselves during the video interviews due to items displayed in their background can be managed by warning participants of this possibility in advance in my emails arranging the online interview, and then again to warn participants of this possibility at the start of the interview, and to check that they have understood what I mean.

To mitigate the risk that the questionnaire on Gorilla could cause participants to reflect upon potentially uncomfortable topics can be mitigated by including a link at the end of the questionnaires signposting participants to support if they feel triggered or distressed by the questionnaires. At the end of the questionnaires I will also put a note inviting participants to email me if they have any further questions around why I am collecting the data in the questionnaire, or what the data will be used for.

To mitigate the risk of participant conflict during the online focus groups, I will act as a facilitator and mediator for the online focus groups. I have one year's experience of conducting many focus groups for the Sandwell Wellbeing Charter Mark project (plus experience as a post-16 teacher and TEFL teacher), so I feel confident and experienced in facilitating, mediating, and moderating focus groups. At the end of the focus groups, I will also signpost students to supportive services, if it appears that they have been triggered or feel distressed due to conflict in the focus groups.

The risk that participants may find the topic of concerns around climate change potentially distressing is probably the most significant risk of the research (and is also the main reason that the research is being undertaken). To mitigate this risk, I will ask participants how they are feeling at the end of the online interviews, online Q sort, and online focus groups (and will also ask them how they are feeling during these activities if they appear distressed when undertaking the activity). If any participants appear to feel triggered or distressed by the topic I will signpost them to supportive services, and check whether they have anyone supportive to talk to either at home or at their school or college. I will also monitor participants during the online interviews, post-sort online interviews, and online focus groups, and adjust my questions or offer participants a break if they appear triggered or distressed during the interview/focus group. I will also offer to send them a summary of my results, to show what their participation has contributed towards.

I will manage the risk that discussion of concerns around climate change is itself a politically sensitive topic by focusing conversations upon local actions at the school/college, family, and community level, rather than at a wider political level. The potentially political nature of the topic could increase the chance of conflict within the online focus groups; if conflict due to differences in political opinions arises, I will act as a mediator and moderator to manage and defuse the conflict in the same way that I would with other conflicts within the focus groups.

I will manage the risk that participants could disclose information about illegal activity they have undertaken or that they plan to undertake by informing them at the start of each discussion that I cannot maintain confidentiality if they disclose activity or plans involving violence towards people or animals or intentional property damage. If they do disclose activity or plans involving these, I will report my concerns to the designated safeguarding lead of the young person's school or college, and will inform the young person that I am going to do this. I will also signpost them to support services for young people at risk of radicalisation. I will then ask them whether they would like to continue the interview, or whether they would like to stop or withdraw their participation from the study.

Section E: About the data

1. Data Processing

Will you be processing (i.e. collecting, recording, storing, or otherwise using) personal data as part of this project? (Personal data is any information relating to an identified or identifiable living person).
Yes

Which organisation(s) will act as Data Controller?
University of Sheffield only

2. Legal basis for processing of personal data

The University considers that for the vast majority of research, 'a task in the public interest' (6(1)(e)) will be the most appropriate legal basis. If, following discussion with the UREC, you wish to use an alternative legal basis, please provide details of the legal basis, and the reasons for applying it, below:
No alternative; 'a task in the public interest' (6(1)(e)) will be the legal basis for processing personal data.

Will you be processing (i.e. collecting, recording, storing, or otherwise using) 'Special Category' personal data?
Yes

The University considers the most appropriate condition to be that 'processing is necessary for archiving purposes in the public interest, scientific research purposes or statistical purposes' (9(2)(j)) . If, following discussion with the UREC, you wish to use an alternative condition, please provide details of the condition, and the reasons for applying it, below:
No alternative; 'processing is necessary for archiving purposes in the public interest, scientific research purposes or statistical purposes' (9(2)(j)) will be the legal basis for processing Special Category data.

3. Data Confidentiality

What measures will be put in place to ensure confidentiality of personal data, where appropriate?

A fair amount of personal data will be collected from participants, although most of this is in the form of video recordings of interviews and focus groups with participants. The personal data that will be collected for all participants is: name, email address of participants, email address of their parents/carers (except for adult participants who undertake the pilot study), and how they were contacted (i.e. via school, a relevant organisation, existing professional contacts [such as other TEPs/EPs with whom I work], or snowballing). This will simply be used to keep in contact with participants throughout the study, and will be collated into a Microsoft Excel spreadsheet to allow me to track my interactions with each participant. I will use this spreadsheet to assign each participant a number, and will use this number in place of their name for all transcriptions and analyses of Q sorts. This spreadsheet will be stored in a password protected folder on the University of Sheffield U: Drive, and the folder in which it is stored will be a separate one to the ones in which the videos, transcriptions, questionnaire responses, and Q sort responses are stored, to make it difficult for anyone without the passwords to link the anonymised transcriptions and responses to an identifiable participant.

The initial online video interviews via Google Meet will be recorded, and these will contain video footage of participants and the personal views of the participants in relation to concern about climate change. The comments and responses of participants in these videos will be used to test and refine the Q sort statements that I will use in the main study. I will transcribe the content of these videos, removing identifiable details and replacing participant names with their participant numbers. The transcriptions will then be stored in a separate password protected folder to the videos (both will be stored on the University of Sheffield U: Drive).

The pilot study online Q sorts and post sort interviews will also be recorded, and these will also contain video footage of participants and the personal views of the participants in relation to their concerns about climate change. The responses in these videos (particularly in the post-sort interviews) will be used to further refine the Q sort statements and the Q set as a whole. As with the online interview videos, I will transcribe the content of these videos, removing identifiable details and replacing participant names with their participant numbers. The transcriptions will then be stored in a separate password protected folder to the videos, again both on the University of Sheffield U: Drive.

The online questionnaires via Gorilla for the main study will collect: demographic details (age, gender, ethnicity, and school) and will provide measures of socioeconomic status according to relative family affluence, subjective status relative to peers and society, and social and economic values. This information will be used to inform the methodological analysis of the Q sorts and to explore whether there are any correlations between the key variables measured by the online questionnaires and particular factors that emerge from the Q sorts. Whilst the data gathered by the online questionnaires is personal and potentially sensitive, it will not be tied to participants' names or email addresses, but rather will be linked to each participant number. Without the key spreadsheet that links the participant number to their name, the data that is gathered cannot therefore be traced to the participant who provided the data. The online questionnaire data will initially be stored on Gorilla (which Ferenc Igali has confirmed is secure, GDPR compliant, and has a data sharing agreement with the

University of Sheffield), and later will be downloaded into an SPSS file for analysis. This SPSS file will be stored in a separate password protected folder on the University of Sheffield U: Drive to the key spreadsheet that would allow for identification of participants.

The main study online Q sorts and post sort interviews will be recorded, and these will also contain video footage of participants and the personal views of the participants in relation to their concerns about climate change. The online Q sort actions undertaken by participants recorded in these videos, and particularly responses in the post-sort interviews, will help to inform the Q methodological analysis. I will also use these videos to take screenshots of the final completed Q sort for each participant, so that I can transfer this information to PQMethod (the Q methodological analysis software). I will take notes from the recordings of the online Q sorts and post-sort interviews, which will be used to inform the Q methodological analysis. These notes will use the participant number rather than their name, and any identifying characteristics will be removed. The online Q sort videos and screenshots will be kept in one password protected folder on the University of Sheffield U: Drive, and the notes will be kept in another password protected folder on the University of Sheffield U: Drive (otherwise it could be possible to identify participant numbers from the notes from their videos). Additionally, the participants' completed Q sorts will be stored on Miro and only accessible to me (it will not be possible to identify who completed the Q sort, since each participant undertakes the sort on Miro as an 'Anonymous Guest Collaborator'); I will delete these once I have taken a screenshot of their completed Q sort.

Finally, the online focus groups will be recorded, and these too will also contain video footage of participants and the personal views of the participants in relation to their concerns about climate change and the engagement that they would like from school staff, parents/carers, peers, and educational professionals. I will transcribe these online focus groups, using participant numbers rather than names, and removing any comments that contain identifying details from the transcripts. The videos of the online focus groups will be kept in one password protected folder on the University of Sheffield U: Drive, and the notes will be kept in another password protected folder on the University of Sheffield U: Drive.

I hope to work with a range of young people aged 11-18, not just from a single school or college, but from a range of schools and colleges across the UK. This will make it harder to identify any particular young person on the basis of their transcripts from videos. In the final write-up of the Q methodological analysis and thematic analysis of the focus groups, I may include illustrative quotes from participants, but given that I hope to have 30-60 participants (plus 3 participants undertaking video interviews and 10 participants undertaking the pilot study), it would be unlikely for someone to be able to identify a participant by their quote (and I will not use quotes that contain identifying details). Consequently, with regards to the transcripts and report, I believe that I can offer participants aged 11-18 a relatively high degree of confidentiality. For the pilot study, I intend to recruit adult participants from the Climate Psychology Alliance and year 2 TEPs from the University of Sheffield Doctorate of Child and Educational Psychology. There are fewer members of each of these organisations, which could potentially make it easier to identify someone on the basis of their comments. However, the transcripts from the pilot study will only be used to inform my refinement of the final statements that I will use in the main Q sort, and I will not use quotes from adult participants of the pilot study for my final report because the report is about the views of young people aged 11-18, and the quotes would not be from people in this age bracket.

The consent forms for participants aged 11-18 will therefore ask their parents/carers (and will also ask the young people themselves once their parents have provided permission) whether they consent to their children being recorded for the purposes of the study, whether they consent to these recordings being transcribed with all identifying comments removed, and whether they consent to the being used for my final report and for future publications. For participants undertaking the main study, the consent forms will also ask their parents/carers (and will also ask the young people themselves once their parents have provided permission) whether they consent to their children undertaking the questionnaires, and for their responses to be stored without being connected to the young person's name or any identifying details, and for this anonymised data to be used in future publications. They will also ask whether screenshots of the young person's completed online Q sort can be stored for use in future publications. The consent forms for adult participants will ask whether they consent to their activity on the online draft Q sort and responses in the post sort interview to be transcribed with identifying details removed and for these transcriptions to be stored for use in future publications.

4. Data Storage and Security

In general terms, who will have access to the data generated at each stage of the research, and in what form

Following consultation with Ferenc Igali and Hadrian Cawthorne around data security, I have decided to store all data on the University of Sheffield U: Drive, in password protected folders. This is considered by both to be more secure than using the University of Sheffield Google Drive with which each student is provided. I will use a password manager (Last Pass: https://www.lastpass.com/), since these are considered more secure and reliable than trying to remember many passwords or writing down each password on a piece of paper. I will not be able to directly access the University of Sheffield computers for the majority of my research, because I live in Birmingham. I will therefore need to access the U: Drive via a Virtual Private Network (VPN) – Hadrian Cawthorne has walked me through how to set this up on my computer. The VPN connects to the University of Sheffield servers securely, and once I am logged in, it allows me to access my private University of Sheffield U: Drive securely using a U: Drive ID and password that I have set up. I will use Gorilla to temporarily store the participant and parent/carer consent forms, plus the participant questionnaire responses. Gorilla are GDPR compliant and have a data sharing agreement with the University of Sheffield. I will also download all data from Gorilla and transfer it to the University of Sheffield U: Drive, then delete the data from Gorilla; this will be done as soon as possible and certainly prior to the completion of the research project in July 2021.

The only person who might require access to data generated by the research whilst the project is ongoing is my research supervisor, Martin Hughes. If I share data with him, it will be in pseudomymised form, as transcripts of the video recordings, with names and identifying details of participants removed, or as an SPSS or Excel file containing the questionnaire responses or Q sort responses, both of which will not contain participant names, but will use participant numbers. I do not anticipate needing to share any video recordings with Martin Hughes (and if I were to need to do this, I would submit a request to the ethics board to be able to do so).

At the end of my third year of my doctorate, I will present my research to my tutors plus other trainees from Doctorate of Child and Educational Psychology in years 1-3. The data presented at this point will be completely anonymised, since I will hopefully be presenting my overall conclusions to the group (these conclusions will consist of the factors identified by the Q sort, which are not the product of any single participant response, plus a thematic analysis of participant responses from each focus group, which again cannot be tied to any

single participant). Additionally, I hope to produce a report from my data that I will offer to send to participants once the research is complete. Similarly to the research presentation, this report will summarise the factors identified by the Q sort and the themes from each focus group, and will not focus upon the responses of any single participant. Finally, if my research works well, I hope to publish it. Again the journal article that I intend to write will summarise the factors identified by the Q sort and the themes from each focus group, and will not focus upon the responses of any single participant.

What steps will be taken to ensure the security of data processed during the project, including any identifiable personal data, other than those already described earlier in this form?

No personal data from participants will be transferred outside of the EEA. The University of Sheffield servers are located within the EEA, and all personal data will remain on these (in password protected folders) until it is deleted. Gorilla have a data sharing agreement with the University of Sheffield; they are GDPR compliant and their servers are within the EEA so they can securely store participant (and parent/carer) consent and questionnaire responses until these are downloaded and saved into the University of Sheffield U: Drive and then deleted from Gorilla.

Will all identifiable personal data be destroyed once the project has ended?
Yes

Please outline when this will take place (this should take into account regulatory and funder requirements).
All identifiable personal data (all videos containing participants, plus the spreadsheet with their contact details) will be deleted within a maximum of three years after completion of the research, by August 2024. I will store this data on the University of Sheffield secure servers (in password protected folders) until it is deleted (as noted previously, if the University of Sheffield intends to delete my U: drive before this date, I will request alternative secure storage from the University of Sheffield. If they cannot provide this, then I will delete all personal data).

Section F: Supporting documentation

Information & Consent

Participant information sheets relevant to project?
Yes

https://research.sc/participant/login/dynamic/1A6B1422-5A83-4254-827D-60B926193C16
https://research.sc/participant/login/dynamic/253A6217-805A-4FE0-855C-FAF3E8F0473B
https://research.sc/participant/login/dynamic/7491A154-E358-4FFC-9C78-4C6997884510

Consent forms relevant to project?
Yes

https://research.sc/participant/login/dynamic/B08518DF-4570-43E5-ABDD-C17FE0F51701
https://research.sc/participant/login/dynamic/F56B1D1F-2226-4177-9793-

Additional Documentation
Document 1080331 (Version 1) All versions
Original Research Proposal

Section G: Declaration

Signed by:
Robert Lee

Date signed:
Tue 9 June 2020 at 18:13

Supplementary Appendix C1.4 Changes made to Ethics Form

Compulsory changes required

Approved providing the following, compulsory requirements are met:

- In the information to participants and parents the support services participants would be referred to if distressed should be specified and links be provided.

- More participant friendly information sheets should be developed. At present these are quite jargony and are unlikely to be appropriate and/or accessible to all participants. Remember these templates are there simply as guides to the areas that must be covered.

- The reviewers question whether the demographic data that is currently specified is really necessary. For example - why do you want to know ethnicity? Given this topic wouldn't faith allegiance be more useful?

1.) In the information to participants and parents the support services participants would be referred to if distressed should be specified and links be provided.

Signposting should be specific to the young person's situation and emotional needs.

If they are nervous but not to the extent of feeling highly anxious, I will mention the following topic-specific services for young people:

Force of Nature offer free online workshops helping young people to further explore challenging emotions that they face around climate change, and to consider how to manage their emotions through engaged action in the world. This is motivated by the theory of problem-focused coping, i.e. that taking small local actions can help people to manage and cope with their wider worries about the environment (Koger et al. 2011). These are available for young people aged 12-24, and young people will be placed with others in a similar age bracket (12-14, 15-17, 18-20, 21-25). Young people can find out more information and can sign up for an online workshop at: https://www.forceofnature.xyz/

(Koger, S. M., Leslie, K. E., & Hayes, E. D. (2011). Climate change: Psychological solutions and strategies for change. *Ecopsychology*, *3*(4), 227-235.)

Dr Patrick Kennedy Williams is a clinical psychologist, who delivers workshops helping people to process climate anxiety: https://www.climatepsychologists.com/who-we-are
If there is an upcoming workshop open to young people, I will signpost young people experiencing some eco anxiety towards it.

Climate Psychology Alliance therapeutic support (up to 3 free sessions, including for young people): https://www.climatepsychologyalliance.org/support/indsupport In all cases, this support will be provided by trained counsellors and psychotherapists.

The Therapeutic Support will focus on:

- Supporting people to face the unthinkable and uncertainty of the climate crisis
- Validating emotional responses to the climate crisis - such as helplessness, grief, anger, despair, anxiety and fear
- Helping individuals, families and groups develop emotional resilience
- Contributing to sustainable communities and preparing for change
- Helping to understand our complex individual and cultural responses

If the young person is experiencing anxiety or very challenging emotions, I will signpost them towards a range of supportive services, depending upon what they feel might best suit their needs:

If they feel that they would benefit from group support sessions with other young people via Zoom, I will signpost them towards No Limits: https://nolimitshelp.org.uk/get-help/virtual-services/ (Youth Workers are available to talk and organise sessions Monday: 10am-5pm, Tuesday: 10am –5pm, Wednesday: 1.30pm –8pm, Thursday: 10am –8pm, Friday: 10am-5pm, Saturday: 10am –1.30pm [closed Sunday], by phoning: 02380 224 224 or emailing: enquiries@nolimitshelp.org.uk)

If they feel they may benefit from sharing their concerns with other young people in an online community and accessing online-message based counselling services, I will signpost them towards Kooth: https://www.kooth.com/ (Counsellors available Monday-Friday 12:00-22:00, Saturday-Sunday 18:00-22:00, requires young people to create an account).

If they feel that they would benefit from speaking to a counsellor and would like a choice between phoning or using web-based chat, I will signpost them towards Childline: https://www.childline.org.uk/get-support/ 0800 1111 (Counsellors available Monday-Friday 09:00-24:00, requires young people to create an account if they want to use web-based chat, but not if they phone. Calls do not appear on phone bill; support available for young people using British Sign Language)

If they would like to speak to someone straight away, I will signpost them to the Samaritans https://www.samaritans.org/ Phone number: 116 123, who have volunteers ready to answer the phone 24 hours a day, 7 days a week. The Samaritans also offer an email service with a 24 hour response time by emailing: jo@samaritans.org and also offer face-to-face support at drop-in branches (COVID-19 restrictions permitting): https://www.samaritans.org/branches/

If the young person is not comfortable to speak or communicate with a counsellor, Samaritans also offer a web-based and mobile phone self-help app: https://www.samaritans.org/how-we-can-help/contact-samaritan/self-help/

If the young person is not yet sure what support they would like, or would like to explore what local support is available in their area, I will signpost them to The Mix: https://www.themix.org.uk/get-support/speak-to-our-team 0808 808 4994 (Helpline open 16:00-23:00 7 days a week, email service open 24 hours a day with a 24 hour response time: https://www.themix.org.uk/get-support/speak-to-our-team/email-us Web-based chat open 16:00-23:00 7 days a week [same web link as above], or they can browse local services via The Mix website: https://www.themix.org.uk/get-support/find-local-services)

If the young person is in crisis (for example: having suicidal thoughts), I will signpost them towards the following services depending upon their preferences:

If the young person is in crisis and would like to speak to someone on the phone, I will signpost them to the Samaritans https://www.samaritans.org/ (Phone number: 116 123, available 24/7)

If the young person is in crisis but doesn't want to speak on the phone, I will signpost them to The Mix Crisis Text Line: https://www.themix.org.uk/get-support/speak-to-our-team/crisis-messenger (open 24/7, text THEMIX to 85258)

Alternatively, if the young person would like to access local urgent mental health services, I will signpost them to the NHS Urgent Mental Health Helpline service, which will connect them to a local crisis service for young people: https://www.nhs.uk/service-search/mental-health/find-an-urgent-mental-health-helpline

If the young person is feeling suicidal, I will signpost them to Papyrus: https://papyrus-uk.org/ (phone number: 0800 068 4141, email pat@papyrus-uk.org available Monday-Friday 09:00-22:00, Saturday-Sunday [and bank holidays] 14:00-22:00)

If the young person needs emergency help, I will signpost them to phone 999. For non-emergency police support, I will signpost them to phone 101 or to visit: https://www.police.uk/

2.) More participant friendly information sheets should be developed. At present these are quite jargony and are unlikely to be appropriate and/or accessible to all participants. Remember these templates are there simply as guides to the areas that must be covered.

Participant Information Sheet for Initial Video Interview

(note: this has also been edited online and is accessible here: https://research.sc/participant/login/dynamic/0B4B0B00-EDDA-4B1D-B03A-0C716AC998A4)

You are being invited to take part in a study called:

How do young people engage with concerns around climate change?

Please read this information sheet before deciding whether to take part and discuss it with your parents. You can also email me (Rob Lee, the researcher) at rlee11@sheffield.ac.uk to ask for more information.

1. What is the aim of the project?

The project will explore how young people such as yourself engage with worries or concerns around climate change. However, you do not need to be worried or concerned to take part, because the project will explore a range of people's experiences. I will also explore what engagement (if any) you would like around such concerns from your school or college staff, parents/carers, friends, and from Educational Psychologists.

You have been invited to take part in the initial study. For this, I will interview you online about your concerns about climate change using Google Meet.

2. Why have I been chosen?

You have been chosen because someone you know thought you might be interested in the study and forwarded you the information about it, to which you responded. The only requirements to take part are that you are aged 11-18, live in the UK, and that your parents/carers consent to you taking part.

3. Do I have to take part?

No, it is completely up to you. You can stop taking part at any time, and you do not even have to give a reason.

4. What will the research involve?

Online Video Interview

I will email you (in all email exchanges I will copy your parents/carers into the email) to arrange an **online video interview** using Google Meet (which will be recorded if you consent to this). You will not need to download any software to use Google Meet; you can access it through a web browser once I send you a

link. The interview will explore how you experience any concerns relating to climate change. I will use the responses from you and other people to help inform the main study.

Once you have completed the interview, I will also invite you to recommend any other young people who you think would like to participate in the study. This is completely voluntary and you do not need to recommend anyone.

Additional Research Opportunity: Pilot Study Card Sort

If you would like to take part in additional research, I will also email you to invite you to take part in the pilot study. This will involve an activity called a **Card Sort** using a web-based application called **Miro**, which is a collaborative online whiteboard. You will not need to download any software to use Miro, and do not need to create an account to use it.

The Miro board will contain the set of statements relating to young people's experiences of concerns around climate change. You will need to arrange the statements about climate change concern into groups, with a 'strongly disagree' group on one side of the screen and a 'strongly agree' group on the other side. Once you have completed the card sort, I will use Miro's video chat function to ask you some questions about how you found the activity and how you think other young people would find it.

5. Will I be recorded, and how will my work be used?

Yes, if you and your parents/carers consent, I will use Google Meet to record the interview. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

I will use the recording to take notes about what you say in the interview. I will not use your name, and will remove any details that could be used to identify you. The recording will not be seen by anyone else, but my notes could be seen by my research supervisor.

If you also take part in the pilot study, with consent I will record your online card sort task and post-sort interview, and will use this to make notes on the card sorting task. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

6. What are the possible risks of taking part?

There are no serious risks in taking part. However, if you experience significant distress whilst speaking about your concerns around climate change, I will send you and your parents/carers information about supportive organisations that you can speak to.

7. What will I gain from taking part?

There is no reward for taking part. However, I will offer to send you a copy of the final research report.

8. What if something goes wrong?

[Please note that my current research supervisor, Martin Hughes is leaving at the end of August, so Lorraine Campbell will be my new research supervisor. I have therefore used Lorraine's name in the information sheet, at Martin's request]

If the research project stops earlier than expected, I will send you a clear explanation and I will ask whether you would like the recordings to be deleted earlier than scheduled.

If you feel something has gone wrong or would like to raise an issue/complaint, please do not hesitate to contact me: rlee11@sheffield.ac.uk

If you want to complain but do not want to contact me, please contact my research supervisor Dr Lorraine Campbell: L.N.Campbell@sheffield.ac.uk

If your complaint relates to how your personal data has been handled, please read the information about how to raise a complaint here: University's Privacy Notice

9. Will my taking part in this project be kept confidential?

Everything you say will be completely confidential and you will not be identified in any reports when I write up the findings of the research. If I use a quote from you in my research, I will not use your name, and will email you to ask whether you would like to choose a fake name to be used.

However, if you tell me something that suggests you are in danger (or pose a serious danger to others), then I have to share this with the designated safeguarding lead at your school or college. I will tell you if I have to do this.

10. What will happen to the results/findings?

I am undertaking this research as part of my training to become an educational psychologist. At the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, which will be made available in the White Rose thesis library.

I will also produce a shorter report, which I will send to anyone who has expressed an interest in the research (including yourself, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

11. Who is organising and funding the research?

My training is funded by the Department for Education. This research is part of the requirements for my training.

12. Who has ethically reviewed the project?

This project has been approved by the University of Sheffield School of Education's Ethics Committee.

13. What is the legal basis for processing my personal data?

The legal basis for processing your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice. The University of Sheffield (the 'Data Controller') is responsible for looking after your information and using it properly.

14. Contact for further information

If you have any questions about the study, please contact me (Rob Lee).

Email: rlee11@sheffield.ac.uk

Thank you for taking the time to read this!

Participant Consent Form

Email Address

Please enter your email address to allow me to identify who has completed the consent form:

Consent form questions

I have read and understood the project information sheet

Yes No

I have been given the opportunity to ask questions about the project (by email)

Yes No

I agree to take part in the online interview using Google Meet.

Yes No

I agree for my online interview to be recorded and then converted into written text in which my name and all identifying details have been removed.

Yes No

I understand that my taking part is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

Additional Consent to take part in the Pilot Study

I agree to be emailed about the pilot study (with my parents/carers copied into the email).

Yes No

I agree to take part in the online card sort for the pilot study.

Yes No

I agree to take part in the online interview after the card sort.

Yes No

I agree for these activities to be recorded (using screen recording software).
Yes No

I understand that my taking part in the pilot study is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

How my information will be used during and after the project

I understand that how the data from the study will be used (for: a research thesis, a report for people who are interested, research presentations, and possibly a journal article).

Yes No

I understand that I will not be named or identifiable in any reports or presentations about the research.

Yes No

I give permission for the video recordings to be stored electronically on a secure University of Sheffield server.

Yes No

I give permission for the video recordings to be kept for three years before being deleted.

Yes No

Confirmation that the information you provide can legally be used by the researchers without infringing copyright

I agree to assign the copyright I hold in any materials generated by this project to the University of Sheffield.

Yes No

Having understood the above, I consent to take part in this study
Yes No

Participant Information Sheet and Consent Form For the Main Study

(note: this has also been edited online and is accessible here: https://research.sc/participant/login/dynamic/B285B149-10A1-4ADA-AEC7-C9194195858B)

You are being invited to take part in a research project called:

How do young people engage with concerns around climate change?

Please read this information sheet before deciding whether to take part and discuss it with your parents. You can also email me (Rob Lee, the researcher) at rlee11@sheffield.ac.uk to ask for more information.

1. What is the aim of the project?

The project will explore how young people such as yourself engage with worries or concerns around climate change. However, you do not need to be worried or concerned to take part, because the project will explore a range of people's experiences. I will also explore what engagement (if any) you would like around such concerns from your school or college staff, parents/carers, friends, and from Educational Psychologists.

You will undertake an online card sorting task, in which you are required to arrange sets of statements into groups according to how much you agree or disagree with them. The second half of the study will involve taking part in an online focus group, where you can talk about your experiences.

2. Why have I been chosen?

You have been chosen because someone you know thought you might be interested in the study and forwarded you the information about it, to which you responded. The only requirements to take part are that you are aged 11-18, live in the UK, and that your parents/carers consent to you taking part.

3. Do I have to take part?

No, it is completely up to you. You can stop taking part at any time, and you do not even have to give a reason.

4. What will the research involve?

Online Questionnaires

To begin, you will complete some online questionnaires, to help provide some background information about yourself. You will be invited to share information about your age, gender, ethnicity, and religious affiliation (if any). You do not need to provide this information, and can leave any question blank.

I will also invite you to complete some short questionnaires measuring your economic background, your social background, your school background, and your wider values. It is completely optional to complete these; they just help to provide more information for my analysis. All participants will have a code allocated to them, so that only I am able to link your questionnaire responses to your card sort responses.

Online Card Sort Activity

Following the online questionnaires, I will email you to arrange a time when we can undertake the **online card sorting activity** (called a Q sort) using a web-based application called **Miro**, which is a collaborative whiteboard. You will not need to download any software to use Miro, and do not need to create an account to use it.

Through Miro I will ask you to arrange the statements about climate change concern into multiple groups, from 'strongly disagree' on one side of the screen to 'strongly agree' on the other side. Once you have completed the card sort, I will then use Miro's in-browser video chat function to ask you some questions about how you found the card sort.

I will also invite you to recommend any other people who you think would like to participate in the research. This is completely voluntary and you do not need to recommend anyone.

Online Focus Group

A few months later, I will invite you to participate in an **online focus group** of 4-6 people via Google Meet. I will share my analysis of some of the common ways young people are engaging with concerns about climate change, and we will then explore whether you relate to any of these and what kind of engagement on this issue you would like from school staff, your parents/carers, your peers, and educational psychologists.

5. Will I be recorded, and how will my work be used?

Yes, if you and your parents/carers consent, I will record the card sort task and focus group. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

I will use the recording to make research notes about each task. I will not use your name, and will remove any details that could be used to identify you. The recording will not be seen by anyone else, but my notes could be seen by my research supervisor.

6. What are the possible risks of taking part?

There are no serious risks in taking part. However, if you experience significant distress whilst speaking about your concerns around climate change, I will send you and your parents/carers information about supportive organisations that you can speak to.

7. What will I gain from taking part?

There is no reward or payment for taking part. However, I will offer to send you a copy of the final research report.

8. What if something goes wrong?

[Please note that my current research supervisor, Martin Hughes is leaving at the end of August, so Lorraine Campbell will be my new research supervisor. I have therefore used Lorraine's name in the information sheet, at Martin's request]

If the research project stops earlier than expected, I will send you a clear explanation and I will ask whether you would like the recordings to be deleted earlier than scheduled.

If you feel something has gone wrong or would like to raise an issue/complaint, please do not hesitate to contact me: rlee11@sheffield.ac.uk

If you want to complain but do not want to contact me, please contact my research supervisor Dr Lorraine Campbell: L.N.Campbell@sheffield.ac.uk

If your complaint relates to how your personal data has been handled, please read the information about how to raise a complaint here: University's Privacy Notice

9. Will my taking part in this project be kept confidential?

Everything you say will be completely confidential and you will not be identified in any reports when I write up the findings of the research. If I use a quote from you in my research, I will not use your name, and will email you to ask whether you would like to choose a fake name to be used.

However, if you tell me something that suggests you are in danger (or pose a serious danger to others), then I have to share this with the designated safeguarding lead at your school or college. I will tell you if I have to do this.

10. What will happen to the results/findings?

I am undertaking this research as part of my training to become an educational psychologist. At the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, which will be made available in the White Rose thesis library.

I will also produce a shorter report, which I will send to anyone who has expressed an interest in the research (including yourself, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

11. Who is organising and funding the research?

My training is funded by the Department for Education. This research is part of the requirements for my training.

12. Who has ethically reviewed the project?

This project has been approved by the University of Sheffield School of Education's Ethics Committee.

13. What is the legal basis for processing my personal data?

The legal basis for processing your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice. The University of Sheffield (the 'Data Controller') is responsible for looking after your information and using it properly.

14. Contact for further information

If you have any questions about the study, please contact me (Rob Lee).

Email: rlee11@sheffield.ac.uk

Thank you for taking the time to read this!

Participant Consent Form for Main Study

Email Address

Please enter your email address to allow me to identify who has completed the consent form:

Consent form questions

I have read and understood the information sheet

Yes No

I have been given the opportunity to ask questions about the project (by email)

Yes No

I agree to undertake the online questionnaires.

Yes No

I agree to take part in the online card sort.

Yes No

I agree to take part in the post-card-sort online interview.

Yes No

I agree for my online card sort and post-card-sort online interview to be recorded.

Yes No

I agree to take part in the online focus groups via Google Meet.

Yes No

I agree for my participation in the online focus group to be recorded.

Yes No

I understand that my taking part is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

How my information will be used during and after the project

I understand that how the data from the study will be used (for: a research thesis, a report for people who are interested, research presentations, and possibly a journal article)

Yes No

I understand that I will not be named or identifiable in any reports or presentations about the research.

Yes No

I give permission for the video recordings to be stored electronically on a secure University of Sheffield server

Yes No

I give permission for the video recordings to be kept for three years before being deleted.

Yes No

Confirmation that the information you provide can legally be used by the researchers without infringing copyright

I agree to assign the copyright I hold in any materials generated by this project to the University of Sheffield.

Yes No

Having understood the above, I consent to take part in this study

Yes No

3.) The reviewers question whether the demographic data that is currently specified is really necessary. For example - why do you want to know ethnicity? Given this topic wouldn't faith allegiance be more useful?

(I have discussed the issue of collecting demographic information such as ethnicity with Martin Hughes my research supervisor, since I felt that there is a case to be made for including its collection. Martin replied that "*if you can justify the collection of data on ethnicity in your ethics review by bolstering your argument with studies such as the ones you've referred to here, then you should*", so I have outlined below why I believe that the study could benefit from the collection of data about age, gender, ethnicity, and faith allegiance.)

Prior to the main study I will send participants a link to some questions on Gorilla for them to complete. The first page of this link on Gorilla will contain an information sheet and consent form for young people to sign themselves (this is in addition to the legal consent already provided by their parents/carers). The subsequent questions on Gorilla will explore participants' social circumstances, background, demographic factors or wider beliefs and values about society, in order to allow me to explore with participant in the focus groups if/how they feel that these might intersect with their engagement with concerns about climate change.

Within the discipline of climate psychology it is emphasised that a person's psychological engagement with and responses to concerns about climate change cannot be understood solely through their individual psychology, character traits, and cognitive biases, but can also significantly depend upon their background, social and economic context, and their pre-existing network of beliefs and values. For example, in his introduction to 'Climate Psychology: On Indifference to Disaster', Paul Hoggett writes:

"*Consider a white, male, Catholic garbage collector living in the USA.*
As a white working class man he may feel climate change is some kind of liberal hoax devised by an educated elite. But the Catholic in him may be aware of and stirred up by the Pope's Encyclical on the Environment and the responsibility of stewardship to God's creation. He takes pride in his job and is also troubled at times by the casual way in which people, particularly those in affluent suburbs, treat their mountains of waste. He has two young children and sometimes worries about what kind of world they will grow up in.
Each of these identifications pull him in different ways.
Positivist models emphasise what can be seen and measured, hence the focus on behaviour. But much of what is most important to human experience is not visible."

(Hoggett, 2019, p.7)

In the context of Q methodology, Watts & Stenner (2012) argue that demographic and contextual information collected through preliminary surveys can also aid with the interpretation of factors generated by the Q analysis, but that this should ideally be done through an abductive process, in which information about demographic factors is considered as supplementary information applied to already fairly well established factors:

"Attending to this [demographic and contextual] information is something that could have been done in advance of factor interpretation, but our own preference is to wait. This strategy ensures that each factor array is approached on its own terms and it also prevents our succumbing to the temptations of preconception and expectation… It is preferable, in our experience, to let the items and the specific item configuration lead us to the demographics or, indeed, to lead us away from them where they are irrelevant"

(Watts & Stenner 2012, p.157).

Consequently, the demographic, contextual, and value-based information collected will initially be considered during the factor interpretation stage of the Q methodological analysis, to see whether it can contribute to a richer interpretative picture of any particular factor. If (during this abductive process) it appears that a particular demographic, contextual, or value-based variable could potentially be relevant to the interpretation of a factor, I will judge whether it would be appropriate to explore this further within the focus group for participants whose responses align with this factor (bearing in mind any sensitive topics). This has the potential to produce further qualitative information from participants about how they feel these variables influence their engagement with concerns about climate change (as opposed to quantitative information about correlations between a demographic variable and a particular pattern of engagement).

When performing this analysis, I will bear in mind that due to its small sample size, Q methodological analysis is an inappropriate method for providing statistical evidence that people from particular demographic are likely to hold a particular constellation of views, or to engage with an issue in a particular way; indeed, Watts & Stenner (2012) state that '*you're very unlikely to be able to generalize to a population of people using Q methodology and… you shouldn't really want to'* (p.73). However, Thomas and Baas (1993) state that whilst Q methodology does not allow for generalisation from the study sample to a wider population (as is often done with an r methodological analysis such as a survey), it can facilitate a process of '*substantive inference*' or conceptual generalisation that a particular complex viewpoint or way of engaging exists within a given population. Consequently, any particular associations of a factor with a particular demographic or contextual variable will not be taken as evidence of a wider association within the general population of young people in the UK, but can be seen as examples of how a particular way of engaging with concerns about climate change **can** be affected by such variables in some cases.

The demographic information that I will invite participants to share is: age, gender, ethnicity, and religious affiliation. I will emphasise that it is completely optional for participants to provide this information, and that they are free to choose the option 'prefer not to say'. The information (plus participant responses on the other scales) will be stored securely on the Gorilla server, and then exported into an SPSS Data File (.sav), which will be saved in a password protected folder (a separate password-protected folder to the key containing the association between each participant name and number) on the University of Sheffield U: Drive.

I will collect demographic information about age to inform my selection of participants for each focus group (for example; it could be unhelpful to place an 11-year-old in a focus group with five 18-year-olds, since they might feel intimidated to speak). Each of the remaining demographic areas has been chosen because of existing research within climate psychology that suggests that it can in some cases be a relevant factor that interacts with people's beliefs, worries, or engagement with concerns around climate change. Some of the research in this area stems from a relatively stable finding in risk perception research around climate change that has been labelled the "white- male" effect (Finucane et al., 2000), which refers to the finding that compared to white females and other ethnic groups regardless of gender, white conservative males report less concern about climate change (McCright & Dunlap, 2011). This appears to be particularly pronounced in the US (Leiserowitz, 2006), but also possibly a wider worldwide trend (Hornsey et al., 2016), although the strength of correlations vary between countries and individual studies.

Focusing specifically on gender, amongst adolescents, girls have consistently reported higher levels of concern about climate change than boys over a number of years, and in multiple countries. For example, Thielking & Moore (2001) found that teenage girls self-reported greater anxiety than boys in Australia; Borgstedt et al. (2010) reported likewise for a large-scale survey of youth in Germany, and Stevenson et al. (2014) reported a similar trend for adolescents in the USA. Within the UK, from a sample size of almost 2400 young people aged 10-17 the Good Childhood Report (2019) reported that 80% of girls aged are at least 'a little worried' about climate change, compared with 72% of boys, with a significantly higher proportion of girls self-reporting to be '*quite worried*', and '*very worried*'. Researchers such as McCright (2010) have explored theoretical perspectives for why there may be an association with gender, whilst Arora-Jonsson (2011) has cautioned against positioning women as either 'victims' or 'virtuous' in relation to climate change. It will therefore be helpful to explore within the focus groups whether young people feel that their gender is relevant to their engagement with concerns around climate change, and if so, what their experience of this has been.

Sensitivity and an approach that is careful to avoid stereotyping is important when exploring the relationship between ethnicity and concerns about climate change, but there is some research to suggest that it can be a relevant demographic factor. Additionally, as was highlighted in Sarb Bajwa's (the Chief Executive for the British Psychological Society) recent speech on racial injustice at the BPS annual conference: "*when it comes to ethnicity, as an organisation, we haven't talked enough*" (https://www.bps.org.uk/blogs/chief-executive/british-psychological-society-institutionally-racist). There is a risk that when ethnicity is not purposefully considered researchers can assume whiteness by default (Garner, 2007), a concern that has already been expressed within environmental groups, which motivated research by Taylor (2014), who reported that people from ethnic minorities in the US are underrepresented in US environmental organizations relative to white people (although this underrepresentation is gradually decreasing over time). It is therefore important to consider whether ethnicity could potentially be a variable affecting how people engage with concerns about climate change.

Some research has already been done into this area. From a survey of 2041 US adults, Schuldt & Pearson (2016) reported that people from ethnic minority groups in the US self-reported less polarised views (of very high concern about climate change or of scepticism about it) compared with white people in the US. Additionally, Leiserowitz & Akerlof (2010) conducted a survey which found that US citizens of Hispanic or African American ethnicity were more likely on average to support energy efficient policies than Caucasian Americans. Concerningly, from a nationally representative survey of 1,212 US adults Pearson et al. (2018) reported that participants from all groups mistakenly assumed that non-white and low-income Americans were less concerned about climate change than white and high-income Americans, although reassuringly they also found that this stereotype was relatively malleable to change.

Research exploring correlations between ethnicity and climate change beliefs and concerns have found the most pronounced effects within American populations, but to some extent such correlations are replicated more widely; In a meta-analysis of 25 polls and 171 academic studies across 56 nations, Hornsey et al. (2014) reported a statistically significant correlation of belief in climate change with ethnicity, with 'non-white' (sic) people being slightly more likely to believe in climate change than white people. It's important to note (as Van der Linden, 2015, points out) that these correlations were often not the most significant correlations observed, and that ethnicity will also intersect with other factors, including gender and socio-economic status. A careful qualitative approach (within the focus groups) towards discussions of ethnicity in which participants can share their own experiences around concerns about climate change and how they feel that these have been influenced by their ethnicity therefore has the potential to aid the construction of a more nuanced picture of any relationships than a simple quantitative survey.

The final demographic variable that I will invite participants to share is religious affiliation. As with ethnicity, it is important to engage with this variable with sensitivity, and I will facilitate the focus groups with care to ensure that no participants' beliefs are undermined or attacked by others within their group (and will establish ground rules to promote respectful disagreement in cases where participants' views diverge).

A correlation between religious affiliation and belief in climate change appears to be fairly well established within the US. For example, from a sample of 2164 US adults, Smith & Leiserowitz (2013) reported that American evangelicals were less likely than non-evangelicals to believe that global warming is happening, caused mostly by human activities, and causing serious harm, but also that a majority of them were still concerned about climate change and supported some policies to tackle it. Additionally, Schuldt et al. (2017) reported that amongst US Catholics, Pope Francis' moral appeal to the global community for swift action on climate change ('*Laudato Si': On Care for Our Common Home'*) increased their perceptions of climate change as a moral issue and increased felt personal responsibility for contributing to climate change and its mitigation.

Exploring an Australian sample of 1927 participants, Morrison et al. (2015) reported a significant correlation of religious affiliation with concern about climate change. Whilst Christian non-literal denominations' concerns and beliefs closely resembled those of the overall sample, Christian literalists were significantly more likely to fit the criteria for 'Doubtful' or 'Dismissive' categories

than the sample as a whole. By contrast, Buddhists and the Atheist/Agnostic/No Religion group were more likely to fit the criteria for the 'Alarmed' and 'Concerned' categories. More widely than this (and specifically in the UK), further research is required to explore the potential influence of religion on beliefs and concern about climate change, although Van der Linden (2015) asserts that there is some evidence for at least a limited influence of religion more widely (although the majority of studies currently focus upon the influence of Christianity). As with ethnicity, it will be important to create space in the focus groups for people to share their experiences, concerns and beliefs and how they feel these are influenced by their faith/religious affiliation, rather than just looking for simple correlations.

In addition to demographic information, I will also collect information on participants' socio-economic status. Qualitative research by Lorenzoni et al. (2007) suggests that people who are concerned with their own economic hardship sometimes cite this as a reason for being less open to engaging with concerns about climate change, and quantitative research by Pampel (2014) suggests that for people living in affluent countries such as the UK, higher socioeconomic status correlates with increased concern about the environment. It is therefore worthwhile to explore whether participants relative socioeconomic status correlates with any particular patterns of response on the Q sort. To do this, I will use the well-validated six-question Family Affluence Scale III (Torsheim et al. 2016, available at: https://www.euthyroid.eu/questionnaires-page/) which is judged to provide a reasonable estimate of a young person's family's relative economic wealth, plus the two-question MacArthur Scale of Subjective Social Status – Youth Version (Goodman 2001, available at: http://sparqtools.org/mobility-measure/macarthur-scale-of-subjective-social-status-youth-version/#all-survey-questions) and the seven-question Subjective Social Status - school dimensions questionnaire (Sweeting et al. 2010, question format displayed at: https://www.researchgate.net/figure/fig2_44801646 with the remaining questions listed in the journal article).

In addition to the socioeconomic status scales, I will also include a scale exploring young people's general values towards society. Kahan et al. (2012) found a strong positive correlation between egalitarian and communitarian worldviews and increased climate change concern, so it will be informative to see how such values correlate with the views that young people express in their Q sorts. To do this, I will use the twelve-question (short version) Cultural Cognition Worldview Scale (Kahan 2012, available at: http://www.sjdm.org/dmidi/files/Cultural%20Cognition%20Worldview%20Scale.docx).

(I have checked with Ferenc Igali about whether it is acceptable to use the above scales, and he has stated that it is acceptable to use existing established scales if the questions and scoring procedures have already been outlined in published research. This is the case for the scales I will use; The Family Affluence Scale III questions are detailed in full in Hobza et al. (2017); the MacArthur Scale of Subjective Social Status – Youth Version questions are detailed in Goodman (2001), the Subjective Social Status - school dimensions questionnaire questions are outlined in Sweeting et al. (2010),

and the Cultural Cognition Worldview Scale questions are detailed in Kahan (2012). However, out of courtesy, I will also email the lead researchers for each scale and request that I can use them in my study.)

Once participants have completed the preliminary scales (I will set an alert on Gorilla to email me to inform me when a participant has completed the scales), I will email them (and copy their parents into all emails) to arrange a time for them to complete the main online Q sort.

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Supplementary Appendix C2.1 Explanation of the Phenomenological Interview Technique and how it differs from Interpretative Phenomenological Analysis

The theoretical background/grounding for phenomenological research methods (including the naturalisation of phenomenology to increase its compatibility with social sciences) is provided in **Appendix A3**. In practical terms, Høffding & Martiny's (2016) phenomenological interview technique primarily differs from other phenomenologically-inspired interview techniques such as Interpretative Phenomenological Analysis (IPA) in its theoretical assumptions and the nature of its questions. IPA seeks to explore the first-person experiences of the specific participants being interviewed and can allow researchers "to make specific statements about those individuals" in their analysis (Smith & Shinebourne, 2012, p.76).

In contrast, whilst the phenomenological interview technique investigates participants' experiences, it does so in an attempt to explore theoretical questions about the *structure* of experience (often within particular contexts). This is usually done through the exploration of the experience of particular individuals (who will often have particular skills or experience relating to the subject of phenomenological exploration) in order to make or test hypotheses about how experience may be structured, either by/within particular contexts, or more generally (often by noting how the structure of general experience may differ from the structure of experience within the particular context). As an example of this, in an application of his phenomenological interview technique, Høffding (2019) used interviews investigating multiple musicians' experiences of playing music to form hypotheses about the general phenomenological structure of 'musical absorption', which in turn helped to challenge and further develop Dreyfus's (2014) account of the phenomenological structure of 'skilled coping' (in the context of skilled instrument playing, but also in other contexts involving highly skilled activity). In contrast, a study utilising IPA as a methodology would be able to produce a rich account of the specific experience of the musicians that were interviewed but would not seek to generalise or test hypotheses about the phenomenological structure or character of 'musical absorption' or 'skilled coping' more generally.

Høffding & Martiny (2016) recommend that the phenomenological interview technique use 'front-loaded' (i.e. theory-driven/informed) questions (Gallagher, 2003) that are constructed to test or explore hypotheses that are already presented within existing literature. For the current study, this

involved me using the interview questions to explore whether the statements that I had so-far created through my reading of the research literature around climate psychology had experiential validity or relevance for the young people whom I interviewed.

Høffding & Martiny (2016) distinguish between two 'tiers' within the process. The first tier involves coming to understand the interviewee's lived experience through their 'second-person' engagement with the interviewee. From a phenomenological perspective, the interview consists of an intersubjective engagement primarily characterised by the second-person perspective, since both interviewer and interviewee are simultaneously engaging with the other as 'you' whilst being impacted (at least implicitly) by being a 'you' for the other (Zahavi, 2015). This structure forms the basis for a relationship of reciprocity (Fuchs, 2013) in which knowledge is (in-part) *co-constructed* within the interactive process, rather than constructed solely 'in the head' of the interviewee then communicated to the interviewer. Høffding & Martiny (2016) describe this in the following manner: "*The interviewer asks a question and gets an answer that leads him to modify his next question. Thus, both subjects contribute to the knowledge generation process through complex dynamics, which are driven by reciprocal interaction. This kind of interaction strongly affects both the discursive and the tacit knowledge generation process*" (p.542). Consequently, most of the first-tier understanding is *co-constructed* within the phenomenological interview itself, although further understanding may be gained when transcribing or re-reading interviewee's comments.

The second tier consists of further analysis of the interviews (after the interview is over) and involves applying Gallagher & Zahavi's (2012) phenomenological method (chapter 2) to the interview transcripts whilst also holding in mind the key phenomenological questions that are being explored. The purpose of the method is to extract relevant knowledge about the interviewee's lived experience in order to use it to explore or construct hypotheses about the structure of experience within particular contexts (e.g. musical absorption/skilled coping). Whilst my goal from my analysis of the interviews was not to form hypotheses about how experiences of concerns around climate change may be characterised in general, I attempted to replicate a similar shift between levels/tiers, moving from my understanding of what was said to the creation of Q-set statements that might capture/highlight relevant aspects of people's experiences.

However, I want to emphasised that whilst the interviews were inspired by the phenomenological interview technique, they did not employ the full method. Aspects of the technique suited my study because they allowed me to check, explore, and refine various ideas. However, the purpose of this for me was not to test or develop any particular phenomenological hypothesis; it was to further develop my Q-set. I found the technique to be effective for this purpose, but my interview methodology itself should not be referred to as a "phenomenological interview".

Supplementary Appendix C2.2 Broad Question Areas plus transcripts of the Online Interviews

Initial Interview Questions/Areas

Intro – key points to cover:

- Information will be used to inform statements for a card sort.
- Everything they say will be anonymous.
- There are no right or wrong answers, just your opinions and experiences.
- You don't need to answer every question, and can end the interview at any point.
- Also, you can ask me questions, and also make comments about things I haven't asked about.
- We could take up to an hour, but I am happy to end earlier or later, depending upon your preferences.
- My thinking is to start with your concerns around what might happen, then to explore your emotions, and then to look at how it's affecting you in various ways.

Initial/warm-up Q (narrative): When did you first hear about climate change?
What impact has the knowledge had upon you?

Opinions and Beliefs about Climate Change

Do you think there's any debate still to be had about whether climate change is happening?

When do you think climate change will 'bite'? Is it already affecting us? Do we have time, and if so, how much time?

Do you think we can stop climate change?
Do you think we will stop it?
If so, how? (technological, political, social change)

What are your main concerns when it comes to climate change?

(e.g. Extreme weather events, destruction of vulnerable species, food shortages, water shortages, climate refugees, wars and conflict)(alternatively: it will affect me, others in developing countries, wildlife, future generations)

How much risk do you think is posed by climate change? How threatening is it compared to other problems in the world?

How concerned about climate change are you compared with COVID-19?

Do you think climate change offers any positive opportunities?

Are there any other opinions or beliefs about climate change that you would like to share?

Emotions and engagement with emotions

Okay, that's enough about thoughts and beliefs. Let's move on to emotions around Climate Change.

How does climate change make you feel?

There's a range of negative emotions that people have reported feeling around climate change – do any of these resonate with you?
Anxiety/Fear/Worry
Grief
Anger
Despair
Guilt or Shame
Feeling Powerless
Feeling Hopeless
Feeling Numb
Any other emotions?
How about positive emotions?

How intense are these emotions? Are they overwhelming, manageable, just distracting and in the background, etc.?

How often do you worry or feel negative about climate change? Is this something that affects you all the time, or in waves/phases, or only when people talk about it or when you hear about it?

How much impact do you feel that concerns about climate change have on your life?
Do you feel that concerns about climate change affect your mental health in any way?
Do you ever find yourself ruminating about climate change, or find that it affects your mood so much that you cancel plans, or change what you're doing?

Let's explore resentment and anger. Do you ever feel a sense of unfairness around climate change?
Do you feel that a particular group are more to blame for climate change? If so, why, and what group? Is this a big issue for you, or a minor issue?
What do you feel most resentful about?

How hopeful do you generally feel about the future?
Does anything in particular give you hope about the future with regards to climate change? (science, faith, politics, society, people, general optimism?)
Does anything in particular make you feel hopeless?

How has the worldwide response to COVID-19 affected how hopeful you feel about climate change?

Some people can get quite nihilistic about climate change and suggest that modern life is unsustainable and that they are almost excited to see it fall apart. How do you feel about that?

One experience that an Australian philosopher speaks about is called 'solastalgia'. This is a word that he has created to speak about distress that some people feel when the natural environment around their home or community has changed in a way that upsets them. Can you relate to this word? Does it make you think of any particular experiences? (it could be experiences that people you know have had)

Do you have anything else you would like to say about your emotions around climate change?

Coping with emotions

Okay, let's move on to how you cope with any concerns you have about climate change.

You've spoken about some pretty difficult emotions in relation to climate change. Is there anything that helps you to cope or deal with the emotions?

Some people like to cope with concerns by focusing on the problem and trying to fix or address it, or take small actions that help a bit (like recycling). Are there any ways you have found this helpful in relation to concerns around climate change?

Sometimes it's easier to cope with difficult emotions by trying to ignore them or think about something else. Have you noticed yourself doing this with concerns around climate change, and if so, what has that been like?

Sometimes when people can't solve a problem but still worry about it, they try to find meaning in other parts of life, and to lead a meaningful life even though they are still aware of the problem. They might also choose to work on a problem even if they know it might not be solved, because they feel it's important to try. Have you noticed yourself doing this with concerns around climate change, and if so, what has that been like?

Do you ever seek help or support from others when you feel concerned about climate change?

Of course, not everyone copes well with concerns and negative emotions. Are there any times you've felt that you haven't coped well with intense emotions around climate change?

Some people cope with concerns about an issue by criticising people who talk about it, or try to do something about it – this is called 'do-gooder derogation'. Have you ever come across people doing this in relation to climate change? If so, what happened?

Some people cope with concerns about an issue by just being quite fatalistic or defeatist, and concluding 'it's going to happen, so we should just accept it'. Have you ever felt this way about climate change, or come across anyone else who feels this way?

Is there anything else you'd like to say about coping?

Chronosphere/Future

Okay, now let's explore whether any concerns about climate change affect how you think about your life and your opportunities in the future

How do your concerns about climate change affect how you think about your future (if at all)?

Do your concerns about climate change affect your plans or opportunities for your future at all? (For example, education, jobs, travel, where you live, whether you have children, etc.)

How do you think (if at all) your concerns about the impact of climate change in the future affect how you live your life or engage with the world in the present?

Are there particular areas of your life where concerns about climate change affect you more? (e.g. school, hobbies, friends etc.?)

Is there anything else you'd like to say about your life and your future?

Phenomenological/Existential questions

Okay, now let's explore a few views relating to concerns about climate change. This is partly to check whether the research literature around this is relevant to your life.

There's an idea in philosophy that we don't really look at tools and systems until they are broken; we just get on with life and use them until this point. I was wondering whether the idea that the

world's systems might be disrupted by climate change makes you look differently at all about how the world works?

There's also the idea that we don't usually make informed choices about how to act, but are very influenced by what is considered 'normal' and 'possible' in society. For example, whilst everyone is technically free to choose whether to buy eco-friendly products or products that pollute the environment, it is considered normal by some people not to think about the ecological impact of their actions, and it takes effort to go against the general flow. Does this relate to your experiences at all, and has anything helped you to 'go against the flow' at any point? (for example, being around others who care about the environment)

There's also the idea that climate change might affect our sense of agency, i.e. whether we feel that our actions can make a difference or not. How do you feel about this?

There's also the idea that we base our sense of risk of a threat (such a climate change) and whether we should act not just on some objective analysis, but also partly on how concerned the people around us are. How concerned are the people around you, and do you feel this has had an impact on you? (Friends, school, parents, community)

There's also the idea that your wider values about life might determine how you engage with climate change. Some people have found that if you feel that some people are generally better than others and that a few people should be in charge of everyone, you're less likely to be concerned, whilst if you think we should all be treated equally and that it's important for everyone to have a say in what happens then you're more likely to be concerned about climate change. Can you relate to this at all?

Thank-you for your time!

Debrief

Interview 17th August

Question (Bold) and Response (not bold)	Relevant Statement
Initial/warm-up Q (narrative): When did you first hear about climate change? **What impact has the knowledge had upon you?** It was when I was in year 9; my friends heard about the climate change marches and they were telling me about it and then we also started learning a bit about it in school at the same time and especially when I was learning about it in school it seemed quite scary, like a big thing, and at some points it felt like people were saying "the world's going to end soon because climate change is a really big thing and it's getting worse and worse and nobody's doing anything about it". And it seemed quite overwhelming, but then I started going to climate change marches, and at the end of them people started talking about small ways in which we could help, and it seemed like it was more of a controllable thing than people were thinking about; it's just that they weren't prepared to do what needed to be done, really.	
Do you think there's any debate still to be had about whether climate change is happening? I think that it's clearly happening, and that there's scientific evidence, I mean you can see it yourself really, especially like we've seen a lot more of a temperature rise recently and it's quite clear to me that it's happening and I think that people just need to stop debating whether it's happening and accept that it is so we can start tackling it.	
When do you think climate change will 'bite'? Is it already affecting us? Do we have time, and if so, how much time? Personally I don't really understand the '12 year' thing because, you know, they say we have twelve years, but twelve years until what? Like is the world going to explode? No-one's really saying what will actually happen in the twelve years from my experience; they're just saying 'we only have 12 years left'. And it's like until that happens, what can we do? Instead of saying that, what's going to happen and how can we prevent it? It almost seems like… I understand that they're trying to scare us, and it is a scary thing, I don't know, it seems like the twelve years is quite… People are arguing that it seems like a long time, but it's really not that long compared to a lifetime, or especially not compared to how long the earth has been here and it's quite scary that humankind has caused this, like it wasn't meant to happen.	

Do you think we can stop climate change? I don't think personally that we can stop it, since there's too much damage that's already been done, but there's definitely ways that we can reduce it to the point where it's not an issue any more, over time, by everybody helping. You know, like I said with everyone doing the little steps if people don't want to make a massive change to their lives, because if everybody does a little step then that's going to make a huge impact on the world and I think we definitely can slow it down if we try. **Do you think we will stop it?** Hmm… I think it's getting better, and people are starting to realise that we need to do that, especially since I know that adults, you know the climate marches are for kids, and I know that adults are thinking 'This is my child's future and I need to implement stuff at home, and how to help, because you know, it is their future, I need to try to make it better for them'. And I think that as the twelve years that everyone talks about start to go, people will start to be scared, and will try to do something before it becomes too late. But I also feel that at some point people might say 'well it's too late now anyway; there's no point in me doing anything because it won't help anything – we're already too down in trouble'.	
What are your main concerns when it comes to climate change? I'm probably worried about the temperature the most, like how it's melting the ice, like that habitats of the animals – I feel really bad for the animals because they haven't done anything wrong, and then all their habitats are being destroyed and it's not fair on them and then that also means for humans that we won't be able to see that beautiful landscape any more; we've destroyed an animal's life and we're also ruining a landscape that is pretty, arguably, and we're already losing the 'snow White Christmas' type thing, and all the beautiful features are going, and what makes the earth quite pretty, they're the things that are going first.	
How much risk do you think is posed by climate change? How threatening is it compared to other problems in the world? I think that there are other problems that are as big as climate change, but given that climate change is quite easy to slow down, for example, reducing your meat intake is such a simple thing to do, but makes a massive difference, and there's so many other issues out there and there always will be loads of issues in the world and it's about not even focusing on one but just doing little bits where you can to do bits for as many	

issues as you can, because I definitely think there problems out there that are probably bigger issues than climate change but the fact that climate change is about the whole world changing for the worse is a really scary thing.	
How concerned about climate change are you compared with COVID-19? During lockdown when I was seeing all these things about some animals going back into their habitats, and it was in Italy I think that the river was becoming clear again, it made me clearly see how human created it really is, and when people were inside and not using cars and creating all this pollution, how much the landscape can change, and it made me want to talk about it more, because I didn't want people to think 'Oh now it's fine, it's helped it now; we're all done' – I thought that's what people would think, but actually it's quite an eye-opener that when the world goes back to normal and we're all using our cars again like they are now, it's just going to go straight in again, and no-one's going to think about that, because there's so many other issues going on, but it's kind-of like, there's loads of little things you can do, again, and it seems like people are in denial and do not want to think about it, because it's either too scary or it's unimportant in their life.	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change
Do you think climate change offers any positive opportunities? Um… Not that I've heard about, cause you know that people try to scare you into thinking there's nothing positive about it. I mean I have heard people joking that 'Ooh yeah, the temperature's rising; that means it's going to be hot summers all the time', but then that's got loads of negative impacts as well. And also during the past few hot days most people were complaining anyway, so it doesn't seem like there's anything good coming out of it to be honest.	
Are there any other opinions or beliefs about climate change that you would like to share? None.	
How does climate change make you feel? Especially going to the climate marches, you feel quite overwhelmed about how much of a big thing this is and it makes you feel quite small in the big context of it all, because it's the whole earth, compared with a few people who want to make a difference, and you feel almost	Makes me feel small Makes me feel scared

powerless due to how little is being done to actually stop it, even though it's a worldwide problem – it's our planet where we live, and still people don't seem to think it's a big issue. So it makes me quite scared – like, what is going to happen in twelve years, what are we going to see, how is it going to affect our lives. And it's quite scary to think about really, you know, growing up is scary as it is, you know, going into the big wide world and all of that, and then knowing that you've got this climate change here as well, yeah, it's quite scary.		Growing up is scary anyway and CC adds to this
There's a range of negative emotions that people have reported feeling around climate change – do any of these resonate with you? **Anxiety/Fear/Worry** **Grief** **Anger** **Despair** **Guilt or Shame**	I've felt more grief about the landscapes and the animals that we're losing; that life that we can see going away that we've killed; species and habitats that we're never going to get back – it's quite upsetting. It does frustrate me… it angers me about people not caring or denying that it's happening because it's so obvious that it is to me and it angers me that people aren't willing to do anything, or they just say 'Oh, I'm not going to think about it because it will stress me out'. You need to feel stressed, you need to feel these emotions to feel empowered to make a difference, because it is your future, it's this world, it's this life, and it frustrates me that some people don't even believe that it exists. [despair] Yeah, it kind-of links to… you feel a bit helpless, and I think you feel a bit defeated and you feel like you're not making any difference and it feels like you're losing the hope that you will be able to change anything before it's too late. I feel guilty about, because most of my friends who go to the climate marches are vegetarian or vegan, so I feel quite guilty about that because I know that I wouldn't be able to give up meat completely, and especially not be vegan because that's just how I've been brought up, that's just my diet, but I still want to help with that, so I do try – if I'm going out I will choose a vegetarian meal, for example a cheese pizza rather than a chicken pizza or peperoni pizza, because otherwise I feel too guilty, like I could have helped there just a little bit, but I chose not to. And you always feel guilty about going in the car somewhere when I could've gone on the train, but I chose not to because that was the easier option, or the quicker option, and you do feel a bit guilty because it's like you're going to these marches and you're protesting about it when you're not perfect yourself, you're not doing everything right, so who gives you the right to tell other people what they can and can't do?	You need to feel stressed, you need to feel these emotions to feel empowered to make a difference. I feel like I'm not making any difference.
(Follow-up question) Do you feel a sense of responsibility to tackle climate change? Yeah, it feels like… You're going there, and you're preaching, you're listening to all of these people telling you these things and you're going 'Yeah! We should all be vegetarian, let's not use cars, let's not buy clothes from supermarkets, let's get them from charity shops', and then you		

know that you don't do that every time you go shopping or every single time you go somewhere, and you do feel a bit guilty, and you feel hypocritical because you know what you need to do, but sometimes you choose not to do it, or you won't be able to do that for a certain reason, and you do feel a little bit responsible for what's happening in the world.	
Some people have talked a bit about feeling numb… Yeah, I did get that at the start, especially when I started hearing about all of this; I sometimes tried to push it away and not think about it because when people were telling me all these facts and things, I just felt overwhelmed and quite empty, like what am I meant to do with all this information – I just felt quite blanked out really, because you're telling me about all this meat intake, the pollution, the fast fashion, all these things, and you just don't know what to do, you're just like panicking almost, like how am I meant to deal with all of this at once?	I sometimes try to push it away and not think about CC
Any other emotions? Sometimes I do feel a positive emotion, like when I'm at the marches and I can see all these people coming together – it does give me a little bit of hope that we can make some difference, even if it's not good enough to completely save the planet, we are still here making that slight difference that can do something. I remember one time when the UK finally announced that it was a climate emergency, and everyone was really happy, but then after a minute they were like 'but we still need to do more', it was that slight bit of hope that we are getting somewhere, it's just taking a long time, but it does keep you going knowing that we are making some difference.	The climate marches give me hope We still need to do more It keeps me going knowing that we are making some difference
How intense are these emotions? Are they overwhelming, manageable, just distracting and in the background, etc.? Well at the moment they're in the background because I've got a lot of other things going on right now with COVID, and I know that a lot of people have been feeling that way, like with the GCSE and A-Level results and stuff like that. But I know that last year it was definitely at some points quite overwhelming for me, because… it was the unknown that was the scariest, like not knowing what's going to happen. Because no-one knows what's going to happen; that's the scariest thing about it.	

How often do you worry or feel negative about climate change? Is this something that affects you all the time, or in waves/phases, or only when people talk about it or when you hear about it? Sometimes I do think about it a bit because of social media and the things that people are still posting, but also if I see something like for example we had a fire the other day and there was loads of smoke everywhere, and it made me think about 'Ooh, that's the same as a car exhaust, that's smoke, that's emissions', and then you start getting into a cycle of all of the negative things that are happening that are causing global warming. Once you think about it once, it's hard to forget about it then for the next few days, because it's in your head or whatever and you know that it's happening.	Once I start thinking about climate change, I find it hard to forget about it
Do you feel that concerns about climate change affect your mental health in any way? I wouldn't say it has personally, but I know that for some of my friends it does stress them out a lot more than it does for me, because they're a lot more invested in it than I am; for me it's just something that I'm trying to help alongside other things in my education, but I know for some people it's a massive thing because they've experienced it up and close, like for example their family have travelled to antarctica where they can physically see how the ice caps have disappeared, and they went last year, and then they went the next year after that and saw how much it had disappeared, and it's scary thinking about how much it's happening, you know, we can't hold it off any longer – we can see it happening, we know it's happening, and we need to do something now. And it is scary, it makes me feel quite overwhelmed, and also you always feel that you're not doing enough. Like in school, it's not taught; I think we had like one lesson on it, and it's like, you know, it's our future, and we need to be taught about it, and how to make it so that it's not as bad and overwhelming as it seems at the moment.	I feel very invested in tackling climate change I always feel that I'm not doing enough
Let's explore resentment and anger. Do you ever feel a sense of unfairness around climate change? Do you feel that a particular group are more to blame for climate change? If so, why, and what group? Is this a big issue for you, or a minor issue? I understand when people say 'Well, it's the older generation's fault; they're the ones who have caused this', but, I mean, that's how they were being brought up; they didn't know about it, we shouldn't be blaming them, because we're still doing so much wrong; everyone here is doing so much wrong right now because no-one on the planet is doing perfect things to help the earth. I mean, yeah, people recycle, and people are vegetarian, and I don't think anyone's to blame really, we just need to stop blaming each other for things and realise that we need to come	

together and actually solve it, rather than going 'Oh yeah, it's your fault, so you need to do more than me'. Why don't we all just help each other, so that we can all actually make a difference?	
How do you generally feel about the future? I don't think we'll get a winter. I think it will go slightly colder, but I think snow is going to go completely; I don't think we'll get snow (In the UK). I think temperatures will rise. I also think that with pollution, at some point we're going to be more cautious about what we're breathing in, and it's going to cause a lot of health damage to our lungs, and people are going to be suffering with illnesses a lot more due to what we're breathing in, and the way we're living we're having to adapt, but not by choice this time; we need to change the way we live because otherwise we'll die from the intake of fumes and stuff like that. So I don't think it's a very positive future going forwards; no matter how much we do about it, I think it's going to go downhill. **Is there anything you feel hopeful about within that?** I do feel hopeful about the ways that we can help, for example going vegetarian: I think that's a positive thing because it's going to make people actually think about what they're eating, and that also is going to save some animals, and also with the fast fashion, where people are encouraging people to buy second hand clothes from charity stores, that's going to help in so many ways to reduce the waste of so many clothes thrown away. It will just help – I think that everyone will learn to be a bit more resourceful with what we've got, rather than thinking 'Oh, that's broken, I'll go and get a new one', they'll think 'Maybe I can get it fixed' or 'Maybe I can ask my friend'… I think we'll learn to use what we have to get by, rather than using money and fast fashion and stuff like that.	Caring about climate change has made me consider what I eat We need to become more resourceful and reuse more items
You've spoken about some pretty difficult emotions in relation to climate change. Is there anything that helps you to cope or deal with the emotions? On social media, when you see people posting about it, most of the time it is negative, and it's 'Look at these habitats that are dying', but then sometimes you'll see a nice story, just one little nice story, and it makes you think, if more people can see that, maybe they'll be more motivated to do something about it, so we can see more happy stories like that, and that's a way of learning about it, it's a way of dealing with all these	

questions coming at you, like 'What are you doing to help climate change?', you know, if you learn about it, and you read about it, it seems easier to cope with and manage, because you're feeling more educated, rather than overwhelmed with all these unknown things.	
Some people like to cope with concerns by focusing on the problem and trying to fix or address it, or take small actions that help a bit (like recycling). Are there any ways you have found this helpful in relation to concerns around climate change? You feel a little less guilty if you help a little bit, like if you become vegetarian or cut down on your meat intake, using your education, knowing what that will do, and knowing what positive impacts that will have, that's like a way of coping with it, and thinking 'that's a positive thing that I am doing, this is a positive thing that is going to contribute to saving the planet, effectively, and that is a nice way to think about it, rather than a negative that is constantly thrown at you.	I feel less guilty when I try to do my bit for climate change
Sometimes it's easier to cope with difficult emotions by trying to ignore them or think about something else. Have you noticed yourself doing this with concerns around climate change, and if so, what has that been like? Yeah, I've definitely had that at some points I just try not to think about it because you almost feel like you're hopeless, like if you don't zone out just for a little bit, I've felt sometimes that there's no point in me doing anything because it's already so bad. I just needed time to go away and think 'You know what, the world is still here'. At the end of the day, you've still got plants and animals, and it's about saving what we can now, and accepting that we've already lost some things, but focusing on what we can save, rather than what we've lost. And when you zone out or forget about it, just for a second, you can see how we still have beautiful landscapes, and we still have all these things left that we need to save while we can, before it turns into another thing that we've lost, or that's gone away.	Sometimes I need to switch off from worrying about climate change, in order to recharge
How does knowledge of climate change impact your experience of the countryside? I think it is still a positive experience because when I travel down to (countryside), for example, to see my (relative), you see loads of fields, and there's loads of greenery, and it does make you think when you live in (City) where it's constant buildings and pollution, not everywhere is as bad as that; some places are worse, some places are better, and you have to appreciate the landscape; the landscape is still beautiful to me, but you will still see the occasional thing such as a cliff that's collapsed, and it's like 'well, that was beautiful, and it's gone now, and that's another thing that we've had to say goodbye to', and it's about seeing these things disappear in front of you, but you have to appreciate what's there,	The natural landscape is very important to me

like the scenery and countryside is still there and still pretty. They might not have been as pretty as they were 10, 20 years ago, but they're still the landscape that I would consider pretty	
Do you ever seek help or support from others when you feel concerned about climate change? Sometimes I will go to one of my friends, and they know a lot more than me, they are more interested and more involved in it, and sometimes I'll be like 'Am I doing this wrong?' or 'Should I be doing something better? What does this mean?' and they'll be able to, kind of, not reassure me, because sometimes they'll scare me even more with the facts, but most of the time they'll be like 'But we are doing this to help; this is the issue, but look what we're doing to make it better', and it does kind of make you think like 'yeah, you know what, yeah, we need to try to think of the positives as much as we can to keep motivated and empowered to do it and make a change'.	We need to try to think of the positives as much as we can to keep motivated
Some people want to make sure they make the most of the world now, and travel before things become spoilt. Is this something that you've come across? Yeah, definitely I've felt like that, especially when you hear, you know, your friends have been to all these beautiful places, and then I know that one time my friend said that they'd been somewhere and then I Googled it, and then this massive news story came up, like 'Landscape destroyed' and all this, and you're like that's gone now, and they've got to see it, and now I can't see it ever again because it's ruined. And it does make you feel like, you know, rushed, because you need to go and see everything while you can, because it's too late, we can't save it, and you still want to experience what other people have experienced in the beauty of nature, and you do feel like otherwise you're missing out, I guess.	
Some people cope with concerns about an issue by criticising people who talk about it, or try to do something about it – this is called 'do-gooder derogation'. Have you ever come across people doing this in relation to climate change? If so, what happened? Yeah, er, I personally don't do that or get involved in anything to do with that really, because I find it very controversial when people say 'Ooh, look what they're saying, that's clearly wrong', because I then feel really guilty because, well I've probably just said something that isn't right; I've probably just done something that is having a negative impact, and when people are putting down other people, even if what they are saying is clearly wrong and I understand that they are trying to educate them to say better things, but it's quite a challenging thing to do,	I try to avoid criticising people for not doing enough about

because not everyone's perfect, and they'll easily be able to pinpoint something back to you, and then all of a sudden you're the person being attacked. But I do know people that do it, especially on social media, because there's that whole thing about you're behind a screen, no-one can see you, and all that kind of stuff.	climate change
Some people cope with concerns about an issue by just being quite fatalistic or defeatist, and concluding 'it's going to happen, so we should just accept it'. Have you ever felt this way about climate change, or come across anyone else who feels this way? Yeah, it's… I mean, it's clearly happening, and then you get the people saying 'well, it's not happening because I saw, you know, there was a cold day the other day', and I feel like they almost know it's happening, but they're trying to convince themselves that it's not happening to try and reassure themselves that what they're doing is enough, because no-one really wants this much damage to the earth, and I think that some people are just in denial thinking 'I can't have another issue that I need to worry about, that one will just be dealt with elsewhere, that will fix itself', when in reality it won't fix itself because we're the problem, we always have been, and we probably always will be (to do with climate change) and yeah, you kind-of just have to accept it at this point.	It's important to me to feel like I'm doing enough about climate change
Sometimes people need to limit the amount of information they read about climate change on social media. Do you find you need to do that? Yeah, on people's Instagram stories, sometimes I'll see quite a lot of posts about all these damaging things that are happening, and sometimes you just have to select which ones you want to read because you want to feel educated and you don't want to ignore it, but you also have to choose which ones you can actually handle yourself, like you won't feel too overwhelmed with, and you have to choose what you're reading, because, you know, you don't want to upset yourself, but you also want to understand what's going on so that you can know how to be a better person. So you do kind-of have to balance out what you choose to read and what you don't choose to read or what you try and ignore, but also what you try and listen to because you know, you have to try and balance out to make yourself a better person and deal with it in the right way.	It's important to me to feel educated about climate change
I'm interested in people's sense of agency – do you think that you can make a difference about climate change & do you feel empowered or disempowered around this issue?	

I feel it's a bit of both, like if I use the climate marches as an example, I feel both empowered that I'm here and that I'm doing this thing that is meant to make a difference, but at the same time, just by being there and seeing all these other people that are doing better things than me, but they still aren't making a massive difference, you kind-of feel even smaller than you did before, because, you know, this person's vegan and they've never been to a shopping centre in their life and they always go to charity shops, but they're still not making a massive difference, and you know, I'm not vegetarian and I don't do this, and I'm even smaller than that small person. But then, there's that sense of we all just need to accept what each other can do, do what we can and come together, so all of these little people can make a massive thing and try and make a difference, so you do feel empowered in that sense, but also a little bit smaller than you did before.	
How do your concerns about climate change affect how you think about your life and your opportunities in the future (if at all)? Erm… I haven't really properly thought about how it will affect my future because I don't even know how my future is anyway, like fully, at the moment, but I am worried about places that I go regularly, or yearly, and how the landscape will change, like for example my cousins that live in (a place with countryside), they live at the top of a cliff type thing, and you can see, you know, this beautiful landscape, and you kind-of think to yourself 'What's going to happen there? Is that going to turn into something not nice to look at?' and also, you know, these animals that we're seeing on the telly, will all of those nice species like go, and how guilty will we feel, and how different will our lives be in the sense of pollution and the way we live and the air we breathe in, and that's quite a scary thought that we don't know and we can't fully control it; we can try and slow it down and can try and help it, but we can't fully control everything to do with global warming and climate change and that's scary and I think that will be a constant fear, even if it's a small one, through my whole life, because, you know, that sense of not being able to control your own habitat and where you live, that's quite scary.	I haven't really thought about how climate change will affect my own life
Do you think your concerns impact on your education, or how you engage with it? Umm… Not really, I know some people who want to go into, for example, politics, purely to get the point across and to try to help make the planet better. I personally wouldn't be able to do that because I wouldn't be able to put my voice on the telly or wherever it is and to say all these things that I feel, because I'd be too scared of the judgement from the people who are still in denial about it, because most people would see it and then… I just want to stay out of the limelight in that sense because it's quite a big role to be able to tell people what's going on and how they can help and stuff like that, and I know that your job is a big part in how you can help the world, like what you're contributing to	

society, so I know that some people that can mean them choosing a specific job, but for me I just kind of want to do what I can and what I'll enjoy rather than making that massive difference.	
There's an idea in philosophy that we don't really look at tools and systems until they are broken; we just get on with life and use them until this point. I was wondering whether the idea that the world's systems might be disrupted by climate change makes you look differently at all about how the world works? Yeah, I think it is that there's this sense of 'this needs more of my attention now it's damaged; now that we are breaking it, it needs more of our attention', but really we should have been focusing on it from the start to prevent the damage ever being caused. But it is good in a way that we are starting to feel the urgency to help with this cause, even though we have probably left it too late at this point, but the fact that people are starting to realise what's going on is definitely a good thing.	The world needs more of my attention now it's damaged; now that we are breaking it
There's also the idea that we don't usually make informed choices about how to act, but are very influenced by what is considered 'normal' and 'possible' in society. For example, whilst everyone is technically free to choose whether to buy eco-friendly products or products that pollute the environment, it is considered normal by some people not to think about the ecological impact of their actions, and it takes effort to go against the general flow. Does this relate to your experiences at all, and has anything helped you to 'go against the flow' at any point? (for example, being around others who care about the environment) Yeah, I can completely understand that, for example, like with my dog, buying the poo bags you get the plastic ones, which you know, everyone gets and it's like the normal thing that you go to the shop to buy, and then one time we saw these ones that are like eco-friendly biodegradable ones, and it's like, that's really weird, I'd never heard about those before, I wouldn't know about them unless I saw them. So you don't think about things that aren't the typical normal and aren't what everyone else is doing, because it wouldn't cross your mind, because if no-one does it, how are you going to know about it, unless more people start using it to spread the awareness of it, and it is what's the norm that you tend to follow because it's the safe option, and you know that loads of other people do it, it's safer for you to do, you know that it works, or whatever it is, and it's almost a safety thing that you feel it's not a risk, you're confident that it will work and do its purpose.	
There's also the idea that your wider values about life might determine how you engage with climate change. Some people have found that if you feel that some people are generally better than others and that a few people should be in charge of everyone, you're less likely to be	My values around

concerned, whilst if you think we should all be treated equally and that it's important for everyone to have a say in what happens then you're more likely to be concerned about climate change. Can you relate to this at all? Yeah, I think so, you tend to see a lot of beliefs that are almost linked together, like all of my friends that I know of that go to the climate marches, they're liberal, and they believe in so many things that you would almost consider as basic beliefs that everyone should have, like you know, for example, Black Lives Matter, all races are equal, sexism shouldn't exist, and that rich people need to be taxed, and you find all these things that, they almost come together like it's all the beliefs that should… the positive beliefs, if that makes sense, and you will find that people will live in certain areas or have certain backgrounds, or certain knowledge or education, or families even, what the families have experienced, you will find certain beliefs that come with that because different things will seem more important to them personally.	climate change are connected with my wider values about what society should be like
Would you say there are any groups underrepresented at the climate marches? Umm… Well, when I went there, I remember there was a black woman who had travelled all the way from her country, which I think was South Africa, to come to these climate marches and to tell her story, and it was very moving, and she was saying how it doesn't matter who you are, it doesn't matter where you come from, this is an issue, everyone's going to be affected, some more than others, and she told this story about how her home had been ripped down by all these storms and these negative things that had happened, and she has evidence that it was from climate change, and it's really moving that you see all these different lifestyles and you almost feel guilty that you're not them, like you're not living that, like why does she have to go through that and I don't, even though I'm probably putting in more of a negative effect because of where I live and the culture here is, you know, shopping and all that, whilst where she lived it was more of a village type thing, you know, they didn't have massive city centres and stuff like that, and you feel 'why does she have to go through stuff like that because I went into a shopping centre, or I went into this place, and it does make you feel a bit guilty really.	
How important is connecting to nature for you? I think it can link to it [climate change] in some ways, like you start thinking about how you can help nature more, like not picking that flower from the ground. It's just like little things; you start to appreciate the nature that you have more than you did before once you've learnt more about how we've already put a negative effect into it, and we appreciate what we've got now, knowing that in the future they might not have it, they might not be able to experience what we've experienced through nature, and you do learn to appreciate it more.	Learning about climate change has made me think about

	how I can help nature more
How do others at school engage with climate change? At my school in my year, I would say that the majority… I wouldn't say don't really care about it, but I would say definitely don't think about it or want to make that difference. I know that some people in my year even went to the climate marches just to have the day off school. Like they went, they walked about a little bit, and then they went off shopping. It does frustrate you in a way, because you're here to try to make a difference, and you appreciate that they have still come to the march, and they could have just left the whole thing, but you know, I know some people would be like 'Well that's just a bit stupid'. Well it's like, you know that whole 'popular' thing at school, it's not really popular to go and support climate change; it seems like it's quite a stupid thing to do, you know 'Why would you care about that?', and again it's going with the normal and what everyone else believes because you don't want to be that odd-bod that's doing something that no-one else is; I know that some people even mock it, like you know… I don't even know how you can really, when it's their lives that are being affected, but it's like 'Well why are you doing that? That's not making any difference whatsoever', but it's making more of a difference than not going at all, and that's what you have to think about, even if it's not making a difference that you can see, it's still making a difference, and I know that a lot of people in my year just don't even think about it, not because they don't believe in it, just because it doesn't cross their lives; they're not seeing the effects it's having, so most of them try and not think about it, or they don't think about it, or they don't go to the marches, especially given that we don't learn about it as much as we should, in my opinion, in schools, because that's where, you know, we do our learning, that's where we're taking in all this knowledge, and if we're not learning about this issue, how are we going to understand it? How are we going to try to get more people to try and understand that it is an issue and that we do need to do stuff to help, rather than just sitting back and going 'Ooh, you don't want to go to the climate march, it's a bit weird, it's a stupid thing to do', you know, there are loads of places where we can help and inform people about what's going on really. I mean, it does depend upon what friendship groups you're in, but I know that one of my friendship groups in my class, who are, you know, the typical… I wouldn't say 'Mean girls', they're not mean, but they're kind of that popular group that everyone looks up to, they definitely don't associate with it and it's not… you know, when I said I was going to miss this day of school to go on the march, they're all a bit like 'Okay, whatever, you know, why? It's a bit stupid', but I do see how in some… the little friendship groups, it can be a thing like 'well why aren't you coming to the climate marches? We're all going' and it is like kind of who you associate with I guess, in school.	Some people at school think it's strange for people to care a lot about climate change

Do people talk about 'VSCO girls' at your school? I think it was at the beginning of last year, like the new year sevens coming in, they were coming in, but it wasn't really… because there was this whole thing like, you know 'Save the turtles', that was their kind of motto, but they weren't actually helping in literally any way, like you know, some of them would carry round a metal straw, like 'Well done love, that's really… Save the turtles!', like that's not really going to make much of a difference, and it was just kind of this thing again that that was the trend at the time, that was what was normal in their little, their age group, and their year, that was what was trendy, that was why they did it; most of them didn't do it because they properly cared about the turtles or whatever, it was just because that was fashionable at the time, but I know that that has faded away now because people were being called out, you know, 'You don't actually care about it; you're just doing it because your friends are', or whatever; people were starting to realise that 'I can't actually preach this without properly believing in it and understanding why I'm having to do this'.	
Have your teachers been supportive when you've had concerns around climate change? Erm… I know at the start when our school found out about the climate marches, they were a lot more supportive than most schools because some schools were saying that if a child leaves to go to the climate march, they will be having, you know, detentions because they're missing school, whilst with our school they were being quite good with that, especially if you are in not the GCSE years, so not years 10 and 11, they actually encourage people to go and make this difference, because education is important, but so is your future, and they were really good with that, really, but I know that some teachers did get mad when it was, um, you know, because I think it was once every-other Friday, and teachers were getting mad, like the subject teachers, like 'Why would you go? You know, you're learning here, you don't need to go elsewhere'. They would get quite frustrated with you really, and I do understand, you know, because they are trying to teach, and it was almost their responsibility to make sure you had caught up, and it was an extra job for them. But most teachers were supportive at our school that you should go and make that difference, because I found especially with the physics teachers, because that was one of the lessons where we learnt about climate change, and they were, you know, they understood it more than any other teachers, especially at my school, and it was, you know, they were like 'Go and do this, go and make this change', and they were quite supportive really, but other teachers were like 'Yeah, you can go if you want', and it was just not really talked about.	
Any other comments, or questions for me? Not really	

1st Interview 19th August

Question (Bold) and Response (not bold)	Relevant Statement
Initial/warm-up Q (narrative): When did you first hear about climate change? **What impact has the knowledge had upon you?** So my mum was the first one to tell me about it, and she took us to lots of strikes and things like that, and then when I started secondary I started walking in, and she told me about the impact it will all have and stuff like that, and it's one of her main concerns, which then teaches us more about what's going on and how we can help.	
Do you think there's any debate still to be had about whether climate change is happening? I think that it probably can be stopped because mum was watching this thing about Greta Thunberg, and she said something about 12 years, yeah, something about 2-3 years ago, I'm not sure when, 12 years until it's irreversible, so I think that she's someone who you should believe because she clearly cares about it and has found out a lot about it.	
When do you think climate change will 'bite'? Is it already affecting us? Do we have time, and if so, how much time? I think it will get worse, but it has already started because if you've seen some of the David Attenborough things, you can see how some of the icebergs are melting and the snow storms more, and the weather is becoming unpredictable due to the carbon dioxide and the fumes being released into the atmosphere. But I think it will get worse as we go along, unless we do something.	
Do you think we can stop climate change? Um… Maybe if the government if most or all of the world realise that it's a problem before it happens and acts on it.	

Do you think we will stop it? Um… Well it depends on the prime minister or the person in change. Cause I know that some places are doing some stuff, but then I don't think that Boris Johnson has quite realised what is going on.	
What are your main concerns when it comes to climate change? Well, when I was six I became vegetarian because I didn't want to harm any animals, and if climate change happens then it will probably kill a lot of things, like Orcas are going to die out because of something we use in the paints at school is harmful to them, I think, and it stops them being able to breed and give birth, I think, and so I don't really want any of them to die. Because if it happens, then I might be telling my grandkids about how elephants once existed rather than being able to show them what elephants actually look like.	
How much risk do you think is posed by climate change? How threatening is it compared to other problems in the world? I think it's one of the bigger problems because some parts of wildlife are very crucial to us. For instance, if bees were to die out, we would only live a few years due to how they pollinate most of the food we eat, so if they weren't able to pollinate that we would probably just need to live on meat for ages, and that wouldn't last forever, because yeah, so it, like, I think it's pretty high, but it really does depend on some of the other problems as well though, because… I think for me it's the most important one, but for other people it might not be.	
How concerned about climate change are you compared with COVID-19? Well, it, with coronavirus, because people have stopped for a while, stopped using things like cars, things like dolphins came back into the canals of Venice because there was no-one polluting them, and it just shows that there is a way to help, it just needs to be everyone acting, not just a few people.	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope

Do you think climate change offers any positive opportunities? Well I think it is a way for a lot of younger people to have their voices heard and practice being heard and stuff, and it's also got a creative element for some people, and it's also a way for some of us to come together and fight something, rather than having wars against each other.		Climate change provides an opportunity for younger people to have their voices heard
Are there any other opinions or beliefs about climate change that you would like to share? Not really		
How does climate change make you feel? Well it's a bit sad to think of what we've done to the planet, when we could have helped it to survive and things like that, but instead we kind of wrecked it a bit.		
There's a range of negative emotions that people have reported feeling around climate change – do any of these resonate with you? **Anxiety/Fear/Worry** **Grief** **Anger** **Despair** **Guilt or Shame** **Feeling Powerless**	Anxiety – Um, like, I don't know, I have kind-of, but it seems like it's far away at the same time, like it feels like it's there, but also that it's not there, if you get what I mean? Because we're not being affected as much as some other countries by it, so it feels like far away, rather than… Grief (at the loss of landscapes and wildlife) – Yeah, I think that that is one of the sadder parts about it, because lots of wildlife and landscapes and beautiful places will have been destroyed to make factories that make climate change worse, rather than letting them be protected. Anger – Yeah, I suppose, but not all people actually knew what they were doing. I think that a lot of people if they had known what impact they were going to have, they would have probably stopped, but then I know some people did, but… Guilt – Um… Well, we have not been driving as much, but it is kind-of, like, because we haven't driven that much anyway because dad's slightly obsessed with making us go out and cycle even if we don't need to drive	

Feeling Hopeless **Feeling Numb** **Any other emotions?** **How about positive emotions?**	anywhere, just making us do something, so we do walk quite a lot and I think we would anyway rather than drive because they would want us to get the exercise, but I think that some places we do cycle when if we didn't know about it we would drive, so I feel kind-of guilty but not as guilty as I would do, because mum and dad force us to do cycling anyway. Any other emotions? – Um… I don't think so Positive emotions? Um… I guess when you're at the strikes it's really nice because there's everyone there and there's everyone, like coming together and stuff, but to be honest I don't think there is anything.	
How intense are these emotions? Are they overwhelming, manageable, just distracting and in the background, etc.? Well I think it does affect me sometimes, but then it also doesn't because it's like… It's like I said, it feels further away than it actually is, I think, so I do feel sad and everything about it when you have about animals dying and stuff like that, but it also feels like it's also not here or something like that, so I think if it was on a scale of 1-10, I would probably rate it about a 7 or 6.		
How often do you worry or feel negative about climate change? Is this something that affects you all the time, or in waves/phases, or only when people talk about it or when you hear about it? Well, I find that I often, whenever I feel anything like that, I often try to come up with another way I can help, rather than just staying in a closed, well like, circle, and things, and I think at school because of Eco club, it also helps to feel like you're doing something because of eco club and then we think of ways we can help and improve the school environment, and things like that, and how we can try and help through school and things like that. **What's the eco club like? How do they talk about climate change?** Well, we do a lot of thinking about how we can help our school be a better place, and how we could recycle more, and ways to help people to recycle more, and they also talk about it in a way that's… they talk about it as something that can be prevented, like if we all work together then it will stop, and things like that, rather than it being unstoppable or something like that.		

Do you ever feel a sense of unfairness around climate change? Sometimes I feel it's because we've only been around for a bit, but people around us have messed up a bit, but then other times I think that a lot of them won't know what they were doing wrong, because the fossil fuels and everything were new to them and they didn't know the effect that they could have.	
How hopeful do you generally feel about the future? Well I think that I'm quite hopeful because although Boris Johnson has been ignoring us, he will eventually realise that he should listen, otherwise he won't get voted in again, so then he'll probably try and do something, or if he doesn't listen and he doesn't realise then it might not work, because we're one of the richer countries and a lot of us have cars so we release a lot of fossil fuels into the atmosphere.	
Do you have anything else you would like to say about your emotions around climate change? I don't think so.	
Is there anything that helps you to cope or deal with the difficult emotions? Well I quite like to, like, sometimes invent things in my head that would help, rather than just sitting, and like, going to strikes helps because it makes you feel like you're doing something, rather than just hoping and waiting. **What sort of things do you invent?** Well me and my brother have ideas that we think about like electric aeroplanes that don't produce fossil fuels or stuff, or like flying things that don't pollute, or things like that, rather than actual fossil fuels and stuff.	
Sometimes it's easier to cope with difficult emotions by trying to ignore them or think about something else. Have you noticed yourself doing this with concerns around climate change, and if so, what has that been like?	

Um… Not really, I don't think so.	
Sometimes when people can't solve a problem but still worry about it, they try to find meaning in other parts of life, and to lead a meaningful life even though they are still aware of the problem. They might also choose to work on a problem even if they know it might not be solved, because they feel it's important to try. Have you noticed yourself doing this with concerns around climate change, and if so, what has that been like? No, not really.	
Do you ever seek help or support from others when you feel concerned about climate change? Um, I think I would probably talk to my friends at the moment, because a lot of them go to eco club and school strikes with me, so a lot of them know what's going on with that. And I think I would probably talk to my mum as well.	
Some people want to travel and see the world before stuff gets worse. Is this something that has occurred to you? Well it has, but then also to travel the world, you're taking ages to travel in a boat to get there, or you pollute a lot, so as much as I'd like to travel the world, I wouldn't want to leave that bigger carbon footprint.	
Some people cope with concerns about an issue by criticising people who talk about it, or try to do something about it – this is called 'do-gooder derogation'. Have you ever come across people doing this in relation to climate change? If so, what happened? Well at one strike there was one person who came across who said that climate change wasn't real, but then there were some people there who had plans for stuff like that and so they had this thing where they gave them sweets and said to them 'I think you'll find it is, now would you like a sweet?' and so they went, and then after that we didn't have many other things that happened.	

Some people cope with concerns about an issue by just being quite fatalistic or defeatist, and concluding 'it's going to happen, so we should just accept it'. Have you ever felt this way about climate change, or come across anyone else who feels this way? I haven't felt that way. I don't think I've come across anyone…	
Is there anything else you'd like to say about coping? No.	
How do your concerns about climate change affect how you think about your future (if at all)? I think it does a bit because it affects how much we actually travel at home, because we have an uncle and aunty who live in Canada, and we've only been to see them once because they moved quite recently, but because of climate change I don't think Mum wants to go, which means that all of us are less likely to go because we have to fly and stuff, so it's like I think we might not, and in the future I won't want to travel as much, because I've always wanted to go to the Amazon rainforest and things, but I don't really want to go as much any more because of the carbon footprint and things.	
Do your concerns about climate change affect your plans or opportunities for your future at all? (For example, education, jobs, travel, where you live, whether you have children, etc.) I don't really know because I want to be a marine biologist at the moment, but um, I think for a while I wanted to be a conservationist and things like that, but I think it has affected a lot of how I think more about jobs to do with nature rather than other jobs. **How about education?** Well I've always quite liked school, so I don't think it's affected me much because I've always quite liked going.	

Is there anything else you'd like to say about your life and your future? No	
How do your friends feel about climate change? Well a lot of my friends have parents who are good friends with my mum and because I'm good friends with them, a lot of them have been forced to go to eco club with me, because it's like a lunchtime thing, so everyone can come. And then a lot of them have stayed, and some of them were there before me. So most of my friends know and are very aware of it and things like that, and then I think there are a few who don't really know and stuff and who don't like clubs and haven't been able to come.	
How do others at school engage with climate change? I don't think that many people are properly educated about it, because people have done assemblies on it, but like not that many, and a lot of people just don't really get it because they haven't been told or they haven't quite clocked it and things like that, because it's not really part of the school curriculum, and a lot of parents won't have told them or noticed themselves because they don' know, because part of eco club is actually to try and educate as many of the people in school about climate change, so we do assemblies. **Is it cool or geeky to care about climate change?** I don't really know, because I am one of those geeky kids, so me and my friends can just do what we want. Well, not what we want what we want, but like…	
Have you felt any pressure from others to engage with climate change? I think a lot of it is self-driven, and also sometimes I don't want to do stuff, that I do enjoy in the end; I just need a push to get going and then I really like it. A lot of stuff I need a push, like strikes, and then I've really enjoyed them.	

Any other comments, or questions for me? We had this headteacher from year 3 to year 6 in primary and she was really nice and she cared a lot about climate change, which meant that we did lots of days where we would go and see other schools and do things with them, and when it was our turn we did a lot of things about climate change as part of the religious aspect [as part of a C of E network of schools]. And she let me and my brother, after we did our first strike, to come and do an assembly on it, to try and educate the rest of our school, and because we were a small primary, our assemblies were the entire school, so I think our primary school was very well educated about climate change. But when I came to secondary school, there are so many kids, that it's quite hard to get them to listen and things.	

2nd Interview 19th August

Question (Bold) and Response (not bold)	Relevant Statement
Initial/warm-up Q (narrative): When did you first hear about climate change? **What impact has the knowledge had upon you?** I first heard about it when my mum was going somewhere and I think she saw a climate strike and then she looked up about climate change and like got really into doing strikes with us. I kind-of feel a bit sad because all these creatures are dying and creatures that people might not have ever seen before might have like died away and people might find fossils of them, but probably not.	
Do you think there's any debate still to be had about whether climate change is happening? I think there's kind of still a debate going because like a load of people are saying like climate change is real and things like that, and then like quite a few people are just ignoring it and saying 'eco isn't actually real, we don't need to be eco-friendly, we can just roam around in vehicles and cars and planes'. **What about in terms of the science?**	

Yeah, it's settled with scientists because all the scientists have been looking at climate change things over years using devices and things like that and it says it's going up really fast, and in 20 years there's three times the amount or something.	
When do you think climate change will 'bite'? Is it already affecting us? Do we have time, and if so, how much time? I think we're already feeling the effects a little but not that much, but animals are feeling the effects a lot more because what happens is that they're dying, like polar bears are getting stranded on ice blocks, stuff like that. And quite a few people, they're not realising that all these creatures are being killed, or they know they're being killed, but what's happening is they're denying it.	
Do you think we can stop climate change? It really depends on how many people want to participate in it. Because if everyone stopped using cars and planes and stuff like that as much, if they did do that, that means it would definitely start slowing down. But then there might be kind-of a 'no stopping things' because a lot of things use up carbon dioxide. But then I think that what should happen is that either you use an electric car or no car. **Do you think we will stop it?** Maybe, I'm not sure.	
What are your main concerns when it comes to climate change? Polluting places, so like on the load of beaches I've been that are sandy, people have been there and have just left stuff. Or people have dumped stuff into the sea, or then dropped them because they had no more room, cause they're like 'Oh I can't be bothered to look for a bin to put it in' when they're on the seaside, so they're just like 'I'll just drop it here and then no one will notice'. And then all the plastic is killing all the environment and seaweed and stuff like that, and you don't want to kill the water life and stuff like that because half the world's oxygen comes from the sea.	

How much risk do you think is posed by climate change? How threatening is it compared to other problems in the world? I think it's a really big threat because animals, their attacks aren't actually a killing just for the fun of it, like poachers: they just do it for the fun and the money, but animals, they're just doing it to defend themselves or get food. They don't usually attack you unless they're feeling threatened or they're really starving.	
How has COVID-19 affected how you feel about climate change? Yeah, I think with coronavirus people are wanting to get out more, but some people they're really not good with exercise, and what they do, they are like, even if it's only a mile away to do a really nice walk, they're like 'Uugh, that's so long, why don't we just go in the car to get there?' and since people want to get out more, I feel like there's been more climate change.	
Do you think climate change offers any positive opportunities? I don't know, because like if it has an impact, it might turn out really well, but what will probably happen is that all these freak storms and weird global weather accidents like lightning bolts hitting roofs and stuff like that or really really hot sweltering days – that would be really bad because then you've got no oxygen that's not humid or dry. And also, people would want to go to the beach more then, so they would probably do more polluting because they would probably want to go for a swim.	
Are there any other opinions or beliefs about climate change that you would like to share? I think that climate change, it will be really good if it was stopped, and if it isn't then something bad, really bad might happen, like lakes would be polluted and nobody could swim any more, stuff like that.	
How does climate change make you feel? Annoyed because people, they know it's happening, even like MPs know it's happening, but the only thing is, MPs, they think if they leave it long enough, people will just forget about it or stop it by themselves. Because what's happening is like really really critical after like a long term, like	

coronavirus, that isn't that critical over a long term. It may be critical over like a really short term, but it's more going to be alright because once coronavirus stops everything else will.		
There's a range of negative emotions that people have reported feeling around climate change – do any of these resonate with you? **Anxiety/Fear/Worry** **Grief** **Anger** **Despair** **Guilt or Shame** **Feeling Powerless** **Feeling Hopeless** **Feeling Numb** **Any other emotions?** **How about positive emotions?**	Grouped together: Fear, Grief, Anger, Despair, Guilt: Yeah, they're good ones. Guilt is for the people who are doing it, despair is for the ones who think that they won't get anywhere, angry is good because people, they know it's happening and they're really frustrated about it. Fear, people should be scared of what the consequences will be because they could be super bad. Powerless, Hopeless, Numb, Empty: You should try and feel really really really positive, but eventually if this carries on there's no point being positive because a load of bad things could happen, but they might not if we're really lucky, but if this carries on and something bad does happen, like weather accidents and more things, then that's bad. Positive emotions: I feel positive that it will stop, but if it doesn't stop it will kind of be a bit bad, to be honest.	
How intense are these emotions? Are they overwhelming, manageable, just distracting and in the background, etc.? Um, I feel like it's really intense because people, they keep like using fossil fuels and doing fossil fuel things, and like burning coal and stuff like that, and making coal mines. Because like they could spring carbon dioxide that has been in the ground for years, and they just break into it and it comes all out, and coal mines aren't that good for the environment because it's a load of machinery that is needed to start it off and more machinery is needed.		

How often do you worry or feel negative about climate change? Is this something that affects you all the time, or in waves/phases, or only when people talk about it or when you hear about it? I don't worry about it yet, but I think eventually if it carries on, I'll be worried.	
How much impact do you feel that concerns about climate change have on your life? It really depends what's going on, like if it's like this really really big thing that pollutes it, I always feel bad, but in school we're always really eco-friendly, because now my headteacher is using solar panels, and only if necessary generated electricity from power plants and places like that.	

(interview ended early. The interviewee was not in any distress, but felt that they had answered enough questions for that day. Follow-up emails with the young person and their parent/carer(s) confirmed that they were okay and had not been upset or distressed)

Supplementary Appendix C2.3 Summary of the main statements that came out of the Online Interviews

The statements included below are the final versions of statements, rather than the earlier drafts that were refined within the pilot studies. Statements which were inspired by the phenomenological interviews but which were not included within the final Q-set are not included. It should also be noted that whilst the interviews explored a lot of questions around emotional experiences and the participant responses helped to refine and further develop the statements, the original inspiration for a lot of these statements came from the research literature, outlined in **Section 4.3.1**. One exception to this is the statement on anxiety; whilst there is a wealth of literature on climate/eco-anxiety (see **Section 4.2**), I was uncertain about how to word a statement on it (in particular, how to distinguish the statement from other statements that referenced worry or fear). Within the phenomenological interviews, one participant said "*I feel some background anxiety about climate change most of the time*"; the wording here felt very effective, so this became statement **2**. A second exception was statement **27**, which was inspired by one of the interviewees speaking about needing to 'switch off': "*Sometimes I need to switch off from thinking about climate change, in order to recharge*".

As mentioned in **Section 4.3.1**, I had found some research literature around eco-anger (Stanley et al. 2021) but was uncertain about what would be the most appropriate target ('object') of anger, so used the phenomenological interviews to explore what/who the interviewees identified as an object of anger. Three objects emerged from the interviews: the inaction/complicity of adults, which inspired statement **5**: "*Sometimes I feel anger at older generations for not doing more to address climate change*", the inaction/complicity of people in positions of power, which inspired **6**: "*I feel angry that governments and oil companies say they care about climate change but don't make the changes needed*", and climate denialists, which inspired **7**: "*I feel angry at people who deny the existence of climate change*".

Section 4.1 covers research detailing the development of media coverage from the 1970s and I knew that I wanted to include at least one statement that would allow people to share how relevant they felt the impact of media around climate change was for them. However, the focus of the statements about media was primarily influenced by comments from young people in the

phenomenological interviews (and also refined within the pilot studies). I included one statement about news: **67** "*Coverage of climate change in the news has a big impact on my emotions"* plus one statement about social media: **56** "*Viewing content about climate change on social media helps to keep the issues alive for me*". As mentioned under the chronosphere section in **Section 4.3.1**, statement **17** was also inspired by the phenomenological interviews: "*Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change*", though participant comments around this area were likely affected by questions that I asked exploring the relationship between how they felt about covid-19 and how they felt about climate change.

The interviewees tended to find personal and relational questions most easy to answer and their responses helped inspire a range of statements exploring how people undertaking the Q-sort might relate to others with regards to climate change. These included statement **57**: "*Spending time around others who care about the environment helps me to believe change is possible*" and statement **62**: "*I find it hard to relate to people who aren't concerned about climate change*". One young person spoke about feeling some pressure to behave environmentally, which inspired statement **58**: "*I feel pressure from others at school to be environmentally conscious*". The general reflections that followed this also inspired statement **26**: "*I don't want to criticise others for their environmental impact*".

Comments and concerns around ethical consumerism arose several times, which influenced the development of the provocative statement **48**: "*Only rich people can afford to be environmentally friendly*". One interviewee also commented about wanting to travel before places are ruined; this inspired statement **36**: "*I want to make sure that I travel the world before places become worse due to climate change*". Finally, some ethical questions arose over the interviews, so I opted to include two statements referencing ethics from opposing angles: statement **51**: "*I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change*" which I hoped would explore ethical judgements regarding opposition towards effective climate measures, and statement **52**: "*I believe that it is morally right to protest about climate change, even if it inconveniences people*" which I hoped would explore participants' moral judgements/intuitions around public climate change protests.

Supplementary Appendix C2.4 Initial statements constructed from the research literature and the phenomenological interview process

Emotional Engagement with Climate Change

Anxiety about Climate Change

- I feel a lot of fear and anxiety about climate change
- When I think about climate change it leaves me feeling helpless
- I feel despair about climate change
- When I think about climate change, it leaves me feeling overwhelmed
- Climate change leaves me feeling quite numb and distant from my emotions
- I have a general background anxiety about climate change, rather than worrying intensely about it

Ecological Grief (anticipatory grief)

- I feel grief about the changes that climate change will cause to the environment in the future
- I feel grief about how climate change will limit the opportunities I will have in the future

Resentment

- I feel resentment that older generations have caused climate change, but my generation and future generations will feel the worst effects
- I feel resentment that Western countries are most to blame for climate change, but people in developing countries will be affected the worst

Anger/Frustration/Blame

- I feel angry at politicians for not doing enough to stop climate change
- I feel angry at oil companies for driving climate change
- I feel angry at people who deny the existence of climate change
- I feel angry at all of us for causing climate change

Guilt/shame

- I feel guilty that I am not doing more to save the environment
- I feel guilty that my lifestyle contributes to climate change
- I feel guilty that I don't care more about climate change

Rejection of negative emotions

- I have enough to worry about anyway, so don't have the space to worry much about climate change
- It's a waste of time to feel guilty about how your lifestyle contributes to climate change

Splitting/Black-and-White thinking

- Sometimes I feel full of hope about the future; other times I feel that we are doomed

Positive Emotions(?)

- I feel really positive about the future

Indifference

- Concerns about climate change don't have much emotional impact upon me

The Scale of the Emotional Impact

How often do people feel negative emotions about climate change?

- I worry about climate change every day
- I worry about climate change when someone mentions it, but the rest of the time it doesn’t have much impact on me
- I go through phases of worrying more and less about climate change
- I'm not always thinking about climate change, but I often have a sense of background anxiety about it
- Maybe I should be more worried, but concerns about climate change don't have much impact upon my life
- I spend most of my time in the here-and-now, so don't spend much time worrying about climate change
- When I am already feeling low anyway, I can really start worrying about climate change

Particular consequences associated with emotions about climate change

- I ruminate a lot about climate change
- Concerns about climate change are negatively affecting my mental health
- I try not to think about climate change because it really affects my mood
- I quite often feel anxious anyway, and worrying about climate change then makes me feel worse

Hope and Hopelessness about the Future

Hope due to people (Ojala)

- I feel hope about climate change because we can change our behaviour; together we can make a difference

Hope due to science & technology (Ojala)

- I feel hope about climate change because I believe that we will find technological solutions to it

Hope due to positive appraisal(Ojala)

- I feel hope about climate change because the awareness about the problem has increased considerably during recent years

Hope due to faith

- My faith gives me hope that we will be saved from climate change

Hope due to Politics

- I feel hope about climate change because politicians are increasingly taking climate change seriously
- The worldwide response to COVID-19 gives me hope that we will make the changes needed to stop climate change

Hope due to ecological beliefs (Symbiocene - Albrecht)

- As we tackle climate change we will adopt a way of life in which we live in harmony with nature

General Optimism

- Despite the risks posed by climate change, I still feel hopeful about the future

Hope due to denial (Ojala)

- I feel hope about climate change because I do not think that climate change is as big of a problem as climate scientists claim

Deep Adaptation

- Climate change will disrupt our current way of life but I have hope that we will be able to develop new ways of living

Feeling Hopeless

- When I think about climate change, I feel hopeless about the future

Nihilsim

- I feel that modern life is unsustainable and when climate change hits we will reap what we've sown
- Part of me is excited to see what happens when everything collapses due to climate change

Distrust in humanity

- I don't trust humans to make the changes required to tackle climate change

Coping Strategies to manage negative emotions

Problem-Focused Coping (Ojala)

- I try to plan for my future so that I can adapt to the challenges posed by climate change
- I try to tackle climate change by making ecologically conscious choices
- I try to tackle climate change by joining campaigns pushing for change

Emotion-focused coping (Ojala)

- The threat of climate change has been exaggerated and we will be fine
- I talk to other people about climate change to help me cope with my worries
- I find ways to 'blow off steam' when I get stressed about climate change

Meaning-Focused Coping (Ojala)

- Regardless of how much impact I have on climate change, it's important to me to not contribute to the problem
- I try to cultivate hope about climate change in order to help me cope
- I try to find meaning in life to help me cope with my concerns about climate change

Dual-track thinking (Threadgold)

- Climate change will be bad within my lifetime but my life will be good anyway
- I am more worried about how climate change will focus other people than how it will affect me

Struggling to Cope

- I don't know how to manage my worries about climate change

Defeatism/Fatalism

- There's nothing we can do to stop climate change, so we should just accept it

Wilful distance/avoidance as a protective mechanism

- I don't want to find out more about climate change because it will only upset me
- Climate change concerns me, so I try not to think about it
- I try to avoid reading too much bad news about climate change
- I find it exhausting to think about climate change and would rather focus on the here-and-now

Psychological Distance from Climate Change

Goal-setting Theory and Psychological Distance (Spence)

- I find it hard to engage with climate change because it's not entirely clear what I should do

Construal-level Theory and Psychological Distance (Spence)

- I find it hard to engage with climate change because it feels really abstract when compared with the concrete problems we face
- Climate change feels like a distant concern to me because it will mostly be affecting people in other countries
- Climate change feels like a distant concern to me because it will mostly be affecting people in the future

Uncertainty and Psychological Distance (Spence)

- I find it hard to engage with climate change because there are many things we don't know about what will happen

Hyperobjects(ish) - Morton

- I find it hard to engage with concerns about climate change because I can't directly see or feel it
- I find it hard to engage with climate change because it is so complex that I do not know whether it is affecting my life here and now
- I find it hard to engage with climate change because we can't say for certain whether any particular weather event is due to climate change

Super-Wicked Problems - Rittel & Weber

- I find it hard to engage with climate change because the world is so complex that there's no simple solution to it
- I find it hard to engage with climate change because there's no single 'enemy'; we are all partly responsible

Rejection of distance (and judgement)

- It's not hard to engage with climate change; people just make excuses for not wanting to engage with it

Agency and Responsibility/Rejection of Responsibility

Sense of Agency

- I try to translate my concerns about climate change into practical actions
- Even if we can't stop climate change, I feel that we still have to try

Lack of Agency/disempowerment (Hibberd & Nguyen, 2013).

- I feel quite paralysed by climate change because I don't know how to make a difference
- I feel a sense of disempowerment that despite what I do, I can't stop climate change

Sense of Responsibility

- I feel a strong sense of responsibility to care for the environment
- I put pressure on myself to be environmentally conscious

Rejection of responsibility

- I can't take on personal responsibility for the future of the planet

- I have to look after myself and my family & friends first; then I can think about climate change

Making the most of the world before things get worse

- I want to make sure that I travel the world before places become uninhabitable
- The world is going to burn so I want to make sure I make the most of it first

'Path of least resistance' (Johnson)

- I don't want to have a large carbon footprint, but the system makes it really hard to be environmentally friendly

Affordances and Impacts of Beliefs about the Future

Affordances (possibilities) affected

- Changes due to climate change will reduce my opportunities in life
- Changes due to climate change will open up new opportunities for my life
- My concerns about climate change lurk in the background of my experience and subtly affect how I engage with life

(Heideggerian Ready-to-hand/Lived World)

- My concerns about the future impact of climate change affect how I choose to live in the present
- I can't spend my life assuming the future will be bad due to climate change; I have to plan with the assumption that it will be fine

Das Unheimliche (the uncanny - Freud)

- Sometimes, my knowledge about climate change makes our modern way of life feel absurd

Collapse (The 'Only Yet' - Heidegger)

- I don't see any point in my education because climate change means that we won't have a future
- I don't see the point in planning for my future because climate change will change everything
- I am considering not having my own children because I do not want to bring them into a world that might collapse

Scaffolded cognition/Authenticity (Kruger)

- Becoming aware of the threat of climate change has caused me to realise how much my life depends upon many other people and systems
- Becoming aware of the threat of climate change has caused me to realise how fragile our way of life could be

Ecological Values

Deep Ecology

- It's important to me to connect with nature
- I feel that the welfare of other creatures is as important as our own

Psychoterratic Dis-ease (Albrecht Climate Emotions)/Das Unheimliche (the uncanny - Freud)

- I sometimes feel alienated or out-of-place in the natural world
- Knowing about climate change sometimes makes me feel threatened by the natural world

Soliphilia (Albrecht Climate Emotions)

- I feel a sense of love towards my local environment and am willing to take action to protect it

Topoaversion (Albrecht Climate Emotions)

- There are natural places that I do not want to visit again because I feel they have been spoilt

The Ghedeist (Albrecht Climate Emotions)

- I feel a strong sense of interconnectedness between myself and other beings with whom I share the earth

Political Values

Klein, Monbiot

- Focusing on environmentally friendly individual consumer choices can be a distraction because it allows oil companies and corporations to absolve responsibility for their emissions

Economic Prioritisation

- We have to sort out the economy first, then we can focus on climate change
- It's acceptable to damage the environment in order to improve the quality of people's lives

Student strikes for climate

- I find Greta Thunberg deeply inspiring
- I feel hurt by the media attacks on the student strikes for climate
- I feel angry at people who criticise the student strikes for climate
- I feel that the student strikes for climate are pointless

Neoliberal conceptions of personal freedom

- It's important that everyone has the choice about whether to buy environmentally friendly products, rather than having restrictions placed upon us

Identity

Per Espen Stoknes

- My engagement with climate change forms an important part of my identity
- Trying to combat climate change is an important part of my life
- I think of myself as an environmentally conscious person
- I try to encourage others to think about their ecological impact

Holden (2007)

- It's important to me to learn about global issues

Personal environmental consumer values

- It's important for me to think about the impact of my actions upon the environment
- It's important to me to recycle
- It's important to me to reduce my carbon footprint when possible

Identification with the student strikes for climate

- I feel empowered by the student strikes for climate
- I feel hurt when people criticise the student strikes for climate
- I feel angry when people criticise the student strikes for climate

- I think the student strikes for climate are pointless

Defiance

- Other people should not tell me what to think about climate change
- I have bigger things to worry about than climate change
- People who claim to care about climate change are hypocrites; we are all responsible for damaging the planet

Social Influences

Interviews

- I pick up information about climate change through social media

Influence of Teachers (Ojala 2015)

- I feel that I can speak to some of my teachers about climate change if I need to
- My teachers are quite dismissive of my concerns around climate change

Influence of Family Members (Ojala & Bengtsson 2018)

- Others in my family are worried about climate change
- My family tries to be environmentally conscious
- My family will listen to me talk about any concerns I have about climate change
- My family tries to avoid talking about climate change

Bourdieu – habitus

- Being around others working to tackle climate change helps me to see the difference we can make
- Being around others who care about climate change helps to keep me motivated about it

Influence of Friends

- Most of my friends are anxious about climate change
- I talk with my friends about climate change quite a lot
- My friends and I have similar values and concerns around climate change
- Most people I know try to avoid talking about climate change

Social Pressure

- I feel pressure from others at school to be environmentally conscious
- I worry about being called a hypocrite for saying I care about climate change, but not doing enough about it

Power

- Sometimes, people who are controlling use concerns about climate change as a reason to tell others what they should be doing

Demographics/Feeling marginalised

- You don't see many people like me being involved in tackling climate change

The Popularity of Climate Change

- Most people in my generation are concerned about climate change
- I am wary about being identified as a 'VSCO girl' because I care about climate change
- I am concerned that because it is trendy to care about climate change people will eventually move on to a new trend

Supplementary Appendix C2.5 Pilot study iterations with refinements to statements used in Q-set

Initial statements used (in Pilot study 1)

Statement number	Statement	Broad Area
1	I feel a lot of anxiety about climate change	Emotions
2	When I think about climate change I feel quite helpless	Emotions
3	Learning about climate change left me feeling quite numb/empty/overwhelmed	Emotions
4	I have a general background anxiety about climate change, rather than worrying intensely about it	Emotions
5	I sometime feel a bit guilty that I don't care more about climate change	Emotions
6	I feel ashamed that I'm not doing enough to tackle climate change	Emotions
7	I experience grief when I think about the changes that climate change will cause to the natural world	Emotions
8	I feel resentment that older generations have caused climate change, but my generation will feel the effects	Emotions
9	I feel resentment that Western countries are mainly to blame for climate change, but developing countries will be worst affected	Emotions
10	I feel angry at politicians for not taking enough action on climate change	Emotions
11	I feel angry at oil companies for driving climate change	Emotions
12	I feel angry at people who deny the existence of climate change	Emotions
13	We are all to blame for climate change	Emotions
14	I have enough to worry about anyway, so don't have the space to worry much about climate change	Emotions
15	It's a waste of time to feel guilty about your carbon emissions	Emotions
16	Sometimes I feel that the future will be amazing; other times I feel that we are doomed	Emotions
17	Concerns about climate change don't have much emotional impact upon me	Emotions
18	I worry about climate change most days	Scope of emotional impact
19	I worry about climate change when someone mentions it, but the rest of the time it doesn't have much impact on me	Scope of emotional impact
20	I spend most of my time in the here-and-now, so don't spend much time worrying about climate change	Scope of emotional impact
21	When I am already feeling anxious or low, thinking about climate change can make me feel really worried	Scope of emotional impact

22	Once I start to think about climate change, I find it hard to stop thinking about it	Scope of emotional impact
23	Concerns about climate change are negatively affecting my mental health	Scope of emotional impact
24	I try not to think about climate change because it really affects my mood	Scope of emotional impact
25	I feel hope about climate change because we can change our behaviour; together we can make a difference	Hope and Hopelessness
26	My religious faith and beliefs help me feel hopeful about climate change	Hope and Hopelessness
27	I feel hope about climate change because I believe that we will find technological solutions to it	Hope and Hopelessness
28	I feel hope about climate change because politicians are increasingly taking climate change seriously	Hope and Hopelessness
29	I feel hope about climate change because people's awareness about the problem has increased in recent years	Hope and Hopelessness
30	I feel hope about climate change because I do not think that climate change is as big of a problem as climate scientists claim	Hope and Hopelessness
31	Seeing some wildlife recover during the COVID-19 lockdown gives me hope about climate change	Hope and Hopelessness
32	We're probably not going to stop climate change, so we need to focusing on adapting to the changes it brings	Hope and Hopelessness
33	Part of me is excited to see what happens when everything collapses due to climate change	Hope and Hopelessness
34	I don't trust humans to make the changes required to tackle climate change	Hope and Hopelessness
35	It sometimes feels like we're living in a state of 'socially organised denial' where we know about climate change but live our lives as if we don't	Hope and Hopelessness
36	It's important to me to think about how I can adapt to future challenges posed by climate change within my lifetime	Coping Strategies
37	I try to be aware of the environmental impact of my actions	Coping Strategies
38	I cope with my worries about climate change by supporting campaigns pushing for climate action	Coping Strategies
39	Caring about climate change has made me consider the impact of the food I eat	Coping Strategies
40	Regardless of how much impact I have on climate change, it's important to me to not contribute to the problem	Coping Strategies
41	Sometimes we need to feel bad about climate change, in order to motivate us to take action	Coping Strategies
42	The threat of climate change has been exaggerated and we will be fine	Coping Strategies

43	I am mainly worried about how climate change will affect people in developing countries, rather than how it will affect me	Coping Strategies
44	Climate change will cause many problems, but my own life will be fine	Coping Strategies
45	I feel ready to adapt to any challenges posed to my life plans due to climate change	Coping Strategies
46	We need to try to think of the positives as much as we can to keep motivated to tackle climate change	Coping Strategies
47	I try to avoid criticising others for not doing enough about climate change	Coping Strategies
48	Sometimes I need to switch off from thinking about climate change, in order to recharge	Coping Strategies
49	I find it exhausting to think about the future of the environment and would rather focus on the here-and-now	Coping Strategies
50	I don't know how to manage my worries about climate change	Coping Strategies
51	There's nothing we can do to stop climate change, so we should just accept it	Coping Strategies
52	Climate change feels really abstract to me because I can't directly see or feel it	Distance from Climate Change
53	My concern about climate change is not just one issue, but many environmental issues that link together and affect each other	Distance from Climate Change
54	I find it hard to engage with concerns about climate change because we don't really know what will happen	Distance from Climate Change
55	I find it hard to engage with concerns about climate change because it's too complex to know what I should do to make a difference	Distance from Climate Change
56	Climate change feels distant to me because it will mostly be affecting people in the future	Distance from Climate Change
57	It's not hard to engage with climate change; people just make excuses for not wanting to engage with it	Distance from Climate Change
58	I feel empowered to take action on climate change	Agency and Responsibility
59	I feel disempowered about climate change because despite what I do I can't stop it	Agency and Responsibility
60	I feel a strong sense of responsibility to take action on climate change	Agency and Responsibility
61	I am worried about people criticising me for not doing enough to tackle climate change	Agency and Responsibility
62	The way the world works makes it really hard and inconvenient for me to be environmentally friendly	Agency and Responsibility

63	I want to make sure that I travel the world before places become worse due to climate change	Agency and Responsibility
64	As I grow up, I have to look after myself and my family & friends first; then I can think more about climate change	Agency and Responsibility
65	I feel grief about how climate change will reduce my opportunities in life	Impacts of Beliefs about the Future
66	I can't spend my life assuming the future will be bad due to climate change; I have to live as if it will be fine	Impacts of Beliefs about the Future
67	Becoming aware of the threat of climate change has caused me to realise how fragile our way of life could be	Impacts of Beliefs about the Future
68	Knowing about climate change makes our modern way of life feel completely absurd	Impacts of Beliefs about the Future
69	It's even more important than before for me to get a good education so that I can adapt to the challenges posed by climate change	Impacts of Beliefs about the Future
70	Becoming aware of the threat of climate change has caused me to realise how much my life depends upon many other people and systems	Impacts of Beliefs about the Future
71	I don't see any point in my education because climate change means that we won't have a future	Impacts of Beliefs about the Future
72	I am considering not having my own children because I do not want to bring them into a world that might collapse	Impacts of Beliefs about the Future
73	The welfare of other creatures is as important as our own welfare	Ecological Values
74	I sometimes feel alienated or out-of-place in the natural world	Ecological Values
75	I often feel a personal bond with things in my natural surroundings, like trees, wildlife or the view on the horizon	Ecological Values
76	I prefer to spend my time in the city rather than the country	Ecological Values
77	Focusing on individual consumer choices lets oil companies and corporations off the hook, when it's them who are the most to blame for carbon emissions	Political Values
78	We have to sort out the economy first, then we can focus on climate change	Political Values
79	It's important that everyone has the choice about whether to buy environmentally friendly products, rather than having restrictions placed upon us	Political Values
80	The student strikes for climate give me hope for change	Political Values

81	I feel empowered by the student strikes for climate	Political Values
82	It's too expensive to be environmentally friendly; only rich people can afford it	Political Values
83	My engagement with climate change forms an important part of my identity	Identity
84	Other people should not tell me what to think or feel about climate change	Identity
85	For me, tackling climate change is fundamentally a moral issue	Identity
86	Ultimately, it's our fault and we deserve what happens to the world due to climate change	Identity
87	It's important to me to feel well informed about climate change	Identity
88	My friends spend a lot of time thinking about the impact of climate change	Social Influences
89	Most people in my generation are concerned about climate change	Social Influences
90	It is trendy to act concerned about climate change and people will eventually move on to a new trend	Social Influences
91	I consume a lot of information about climate change on social media	Social Influences
92	Being around others who care about climate change helps to keep me motivated about it	Social Influences
93	I feel pressure from others at school to be environmentally conscious	Social Influences
94	You don't see many people like me being involved in tackling climate change	Social Influences
95	People use concerns about climate change as a reason to control others and tell them what they should be doing	Social Influences
96	It's important to others in my family to be environmentally conscious	Social Influences
97	I feel that I can speak to some of my teachers about climate change if I need to	Social Influences
98	I find it hard to relate to people who aren't concerned about climate change	Empathy/ Othering
99	People who say they care about climate change are just 'virtue signalling'	Empathy/ Othering
100	People who say they care about climate change are hypocrites because we all contribute to global warming	Empathy/ Othering

Changes made to statements as a result of Pilot Study 1:

- Statement 1 (I feel a lot of anxiety about climate change) --> Cut (too similar to statement 18: I worry about climate change most days)
- Statement 85 (For me, climate change is fundamentally a moral issue) --> For me, tackling climate change is a question of right and wrong

- Statement 86 (Ultimately, it's our fault, and we deserve what happens to the world due to climate change) --> We deserve what happens as a result of climate change
- Query Statement 16 (Sometimes I feel that the future will be amazing; other times I feel that we are doomed) --> Measures sci fi beliefs rather than splitting?
- Statement 4 (I have a general background anxiety about climate change, rather than worrying intensely about it) --> I have a general background anxiety about climate change
- Statement 46 (We need to try to think of the positives as much as we can to keep motivated to tackle climate change) --> I need to try to think of the positives as much as I can to keep motivated to tackle climate change
- Statement 43 (I am mainly worried about how climate change will affect people in developing countries, rather than how it will affect me) --> I am predominantly worried about how climate change will affect people in developing countries, rather than how it will affect me

Changes made to statements as a result of Pilot Study 2:

- Statement 4 (I sometime feel a bit guilty that I don't care more about climate change) & Statement 5 (I feel ashamed that I'm not doing enough to tackle climate change) too similar --> Cut statement 4, reword statement 5 to: I sometimes feel guilty that I'm not doing enough to tackle climate change
- Statement 18 (I worry about climate change when someone mentions it, but the rest of the time it doesn't have much impact on me) technically 2 statements --> I only really worry about climate change when someone mentions it
- Statement 33: I don't trust humans to make the changes required to tackle climate change --> inverse of statement 24 (I feel hope about climate change because we can change our behaviour; together we can make a difference) --> Cut statement 33
- New statement: Joking about climate change helps me connect with others about our concerns
- Query: Statement 36: (I try to be aware of the environmental impact of my actions) & Statement 39 (Regardless of how much impact I have on climate change, it's important to me to not contribute to the problem) - too similar?

- Statement 41 (The threat of climate change has been exaggerated and we will be fine) & Statement 29 (I feel hope about climate change because I do not think that climate change is as big of a problem as climate scientists claim) --> Too similar --> cut statement 41
- Statement 45 (I need to try to think of the positives as much as I can to keep motivated to tackle climate change) --> I need to focus on the positives as much as I can to keep motivated to tackle climate change
- Statement 49 (I don't know how to manage my worries about climate change) --> Too unfocused (% inverse of other management ones) --> cut
- Statement 61 (The way the world works makes it really hard and inconvenient for me to be environmentally friendly) --> Hard AND Inconvenient --> change to: The way the world works makes it really difficult for me to be environmentally friendly
- Statement 52 (My concern about climate change is not just one issue, but many environmental issues that link together and affect each other) --> remove environmental so people don't think this is about plastic pollution or local air pollution --> Change to: My concern about climate change is not just one issue, but includes many political and social issues that connect together
- New statement: Corporations and oil companies try to make it look like they care about climate change, when they don't really
- Statement 50: (I find it hard to engage with concerns about climate change because it's too complex to know what I should do to make a difference) --> Change to positive: (Changes should be made so that it's easier for people to see the environmental impact of their actions)
- Statement 53 (I feel empowered to take action on climate change) & Statement 76 (I feel empowered by the student strikes for climate) - both contain 'empowered' --> Cut statement 53
- Statement 76 (I feel empowered by the student strikes for climate) --> Re-word: The student strikes for climate make me feel empowered to take action
- Statement 77 (It's too expensive to be environmentally friendly; only rich people can afford it) --> Two statements there --> Change to: Only rich people can afford to be environmentally friendly

- Statement 83 (My friends spend a lot of time thinking about the impact of climate change) --> Not quite capturing the social influence angle --> My friends feel similarly to me about climate change
- Statement 85 (It is trendy to act concerned about climate change and people will eventually move on to a new trend) --> Two statements --> People will lose interest in climate change when it's no longer trendy
- Statement 89 (You don't see many people like me being involved in tackling climate change) --> Didn't get it was about demographics --> You don't see many people in my demographic being involved with climate change issues
- Statement 94 (People who say they care about climate change are just 'virtue signalling') --> People might not know what 'virtue signalling' is --> Cut

Changes made to statements as a result of Pilot Study 3:

- Statement 40 (Climate change will cause many problems, but my own life will be fine) & Statement 39 (I am predominantly worried about how climate change will affect people in developing countries, rather than how it will affect me) --> Both refer to my own life being fine; cut 'rather than how it will affect me' from statement 39, change statement 40 to 'Climate change will cause many problems for the UK, but my own life will be fine'
- Statement 9 (I feel angry at oil companies for driving climate change) & Statement 95 (Corporations and oil companies try to make it look like they care about climate change, when they don't really) too similar --> Cut statement 9, change Statement 95 to 'when it's really their fault'
- Statement 43 (I try to avoid criticising others for not doing enough about climate change) --> Ambiguous; sounds like you want to be critical but aren't --> Change to: I avoid criticising others for their environmental impact
- Statement 18 (I spend most of my time in the here-and-now, so don't spend much time worrying about climate change) & Statement 45 (I find it exhausting to think about the future of the environment and would rather focus on the here-and-now) both about here-and-now --> Cut Statement 18, change Statement 45 to I don't want to think about future climate change and would rather focus on the here-and-now

- Statement 60 (I can't spend my life assuming the future will be bad due to climate change; I have to live as if it will be fine) --> Two statements --> Change to: Most of the time, I live my life as if it will not be affected by climate change --> Cut Statement 40 (Climate change will cause many problems for the UK, but my own life will be fine) since it doesn't adequately capture dual=track thinking; infer dual-track thinking from the Q sort as a whole if there
- New Statement: Any effective solutions to climate change need to be able to preserve our current way of life
- Statement 63 (It's even more important than before for me to get a good education so that I can adapt to the challenges posed by climate change) & Statement 65 (I don't see any point in my education because climate change means that we won't have a future) --> Inverse of each other --> Cut statement 63
- Statement 61 (Becoming aware of the threat of climate change has caused me to realise how fragile our way of life could be) & Statement 64 (Becoming aware of the threat of climate change has caused me to realise how much my life depends upon many other people and systems) --> Too similar, cut statement 61
- Statement 5 (Learning about climate change left me feeling quite numb/empty/overwhelmed) --> Shouldn't have 3 emotion words --> Change to: Learning about climate change left me feeling quite numb
- Statement 52 (It's not hard to engage with climate change; people just make excuses for not wanting to engage with it) --> If people have agreed with the other 'I find it hard to engage' statements, then this is superfluous --> Cut

Changes made to statements as a result of Pilot Study 4:

- Statement 69: (The student strikes for climate give me hope for change) --> change to 'for the future'
- Statement 32 (It's important to me to think about how I can adapt to future challenges posed by climate change within my lifetime) & Statement 39 (I feel ready to adapt to any challenges posed to my life plans due to climate change) both cover a sort of forward-facing problem-focused coping. Cut 32 & keep 39 because it also related to neoliberal modernity

- Statement 64 (I often feel a personal bond with things in my natural surroundings, like trees, wildlife or the view on the horizon) & Statement 65 (I prefer to spend my time in the city rather than the country) are roughly inverse; cut statement 65 & change in statement 64 'personal bond' to 'connection' (I often feel a connection with things in my natural surroundings, like trees, wildlife or the view on the horizon)
- Statement 66 (Focusing on individual consumer choices lets oil companies and corporations off the hook, when it's them who are the most to blame for carbon emissions) --> the focus should be more on individual action being effective, rather than blame (2 separate issues) --> Change to: Individual actions are not enough; we need governments to put stricter regulations on the environmental impact of corporations
- Statement 90 (Corporations and oil companies try to make it look like they care about climate change, when it's really their fault) --> Two statements; pretending to care, and blame --> Change to: Corporations and oil companies say they care about climate change whilst doing very little to reduce their environmental impact
- Statement 21 (I try not to think about climate change because it really affects my mood) & Statement 43 (I don't want to think about future climate change and would rather focus on the here-and-now) are similar --> Cut statement 43
- Statement 3 (I have a general background anxiety about climate change) --> Misunderstood intensity; add 'mild': I have a mild background anxiety about climate change most of the time
- Statement 15 (Concerns about climate change don't have much emotional impact upon me) --> a bit abstract. Change to: I don't really think much about climate change
- Statement 4 (I sometimes feel guilty that I'm not doing enough to tackle climate change) --> Not strong enough --> change 'sometimes' to 'often': I often feel guilty that I'm not doing enough to tackle climate change
- Statement 6 (I feel resentment that older generations have caused climate change, but my generation will feel the effects): two statements (resentment at older generation & belief I will feel effects) --> Change to: It's the older generation's fault for causing climate change
- Statement 7 (I feel resentment that Western countries are mainly to blame for climate change, but developing countries will be worst affected) --> Too bland. Change to: It's really

unfair that Western countries are blame for climate change but developing countries will be worst affected

- Statements 8 (I feel angry at politicians for not taking enough action on climate change), 9 (I feel angry at oil companies for driving climate change), 10 (I feel angry at people who deny the existence of climate change) - too many angry statements. Cut 9, change 8 to: I feel really angry about climate change
- Statement 13 (It's a waste of time to feel guilty about your carbon emissions) - ambiguous: why is is a waste of time? Cut.
- Statement 14 (Sometimes I feel that the future will be amazing; other times I feel that we are doomed) --> Make more about emotions than beliefs: Sometimes I feel great about our future, other times I feel awful
- Statement 17 (I only really worry about climate change when someone mentions it) - superfluous; can get a feel for impact from other statements. Cut

Changes made to statements as a result of Pilot Study 5:

- Statement 13 (I don't really think much about climate change) --> If put negative, then it's a double-negative --> Change to: I spend very little time thinking about climate change
- Statement 7 (It's really unfair that Western countries are to blame for climate change but developing countries will be worst affected) --> Potentially just factual; needs more emotional content --> I feel angry that Western countries are to blame for climate change but developing countries will be worst affected
- Statement 8 (I feel really angry about climate change) --> Could be more specific --> I feel angry that people in positions of power who could make a big difference about Climate Change are not doing what's needed
- Statement 6 (It's the older generation's fault for causing climate change) --> Make it clear it's about blame: I blame older generations for causing climate change
- Statement 10 (We are all to blame for climate change) --> Superfluous; cut
- Statement 37 (I avoid criticising others for their environmental impact) --> 'Try to' might be more appropriate, since the implied judgement might be valid --> I try to avoid criticising others for their environmental impact

- Statement 22 (I feel hope about climate change because politicians are increasingly taking climate change seriously) --> Roughly inverse of statement 8 (I feel angry that people in positions of power who could make a big difference about Climate Change are not doing what's needed) --> Cut
- Statement 19 (I feel hope about climate change because we can change our behaviour; together we can make a difference) & Statement 23 (I feel hope about climate change because people's awareness about the problem has increased in recent years) a bit similar - change 'can' to will in statement 19: I feel hope about climate change because we will come together and make the changes needed, Cut Statement 23
- Statement 43 (Changes should be made so that it's easier for people to see the environmental impact of their actions) --> Didn't understand; re-word to make clearer: Changes should be made to food packaging so that it's easier for people to see the environmental impact of what they buy
- Statement 73 (People will lose interest in climate change when it's no longer trendy) --> Didn't agree that climate change will stop being trendy --> Change to: When the next cause comes along, people will lose interest in climate change

Changes made to statements as a result of Pilot Study 6:

- Statement 13 (I worry about climate change most days) & statement 12 (I spend very little time thinking about climate change) are sort of inverse to each other --> Re-word Statement 13 to: I feel a lot of anxiety about climate change
- Statement 14 (When I am already feeling anxious or low, thinking about climate change can make me feel really worried) --> could be clearer about the cumulative impact --> When I'm already feeling low or anxious, thinking about climate change can make me feel even worse
- Statement 56 (I often feel a connection with things in my natural surroundings, like trees, wildlife or the view on the horizon) --> add in The Sea -> I often feel a connection with things in my natural surroundings, like trees, the sea, wildlife, or the view on the horizon
- Statement 1 (When I think about climate change I feel quite helpless) & statement 42 (I feel disempowered about climate change because despite what I do I can't stop it) both a bit about helplessness --> cut statement 1

- Statement 21 (I feel hope about climate change because I do not think that climate change is as big of a problem as climate scientists claim) --> Bit wordy --> Change to: I feel hope about climate change because it's not as big of a problem as scientists claim
- Statement 25 (It sometimes feels like we're living in a state of 'socially organised denial' where we know about climate change but live our lives as if we don't) --> Bit wordy --> We live in a state of 'socially organised denial' where we know about climate change but live most of our lives as if we don't
- Statement 55 (I sometimes feel alienated or out-of-place in the natural world) --> Not sure what alienated means --> re-word: I sometimes feel disconnected from or out-of-place in the natural environment
- Add in statement about Media: Coverage of climate change in the news has a big impact on me
- Statement 72 (Being around others who care about climate change helps to keep me motivated about it) --> be more specific --> Being around others who care about climate change helps to keep me motivated to tackle the problem
- Statement 81 (Corporations and oil companies say they care about climate change whilst doing very little to reduce their environmental impact) --> Too long --> Corporations and oil companies say they care about climate change whilst making very few changes
- Statement 59 (It's important that everyone has the choice about whether to buy environmentally friendly products, rather than having restrictions placed upon us) --> too wordy --> Everyone should be free to choose whether or not to buy environmentally friendly products
- Statement 57 (Individual actions are not enough; we need governments to put stricter regulations on the environmental impact of corporations) --> make shorter: Individual actions are not enough; we need governments to properly regulate the carbon emissions of corporations
- Statement 51 (Becoming aware of the threat of climate change has caused me to realise how much my life depends upon many other people and systems) --> cut words --> Becoming aware of climate change helped me to realise how much my lifestyle relies upon many other people and systems

- Statement 40 (Changes should be made to food packaging so that it's easier for people to see the environmental impact of what they buy) --> Make more specific: Food packaging should include a sticker informing people of the carbon emissions caused by each product
- Statement 8 (I feel angry that people in positions of power who could make a big difference about Climate Change are not doing what's needed) --> Make more punchy: I feel angry that people in positions of power are not implementing the changes that are needed to tackle climate change
- Statement 7 (I feel angry that Western countries are to blame for climate change but developing countries will be worst affected) --> Anger might not be the right word --> I feel resentment that Western countries are to blame for climate change but developing countries will be worst affected

Changes made to statements as a result of Pilot Study 7:

- Statement 1 (Learning about climate change left me feeling quite numb) --> Not sure quite what numb means --> change to overwhelmed: Learning about climate change left me feeling quite overwhelmed
- Statement 12 (I feel a lot of anxiety about climate change) --> Not sure if this is intensity or temporal --> Change to quite intense --> I feel quite intense anxiety about climate change
- Statement 3 (I often feel guilty that I'm not doing enough to tackle climate change) --> Not sure how much freedom young people have to make these choices? Query changing to: I feel ashamed that my family and I are not doing enough to tackle climate change
- Perhaps clarify how much young people have learnt about climate change at school in the survey questions?
- Statement 33 (I try to avoid criticising others for their environmental impact) --> Also need an 'I actually manage to avoid criticising others' statement? Or put it in the post-sort interview?
- Statement 24 (We live in a state of 'socially organised denial' where we know about climate change but live most of our lives as if we don't) --> Will young people understand 'socially organised denial'? Query changing just to 'denial'?

- Statement 34 (Sometimes I need to switch off from thinking about climate change, in order to recharge) --> will young people get 'recharge'? --> Change to recover?
- Statement 25 (I try to be aware of the environmental impact of my actions) --> Not clear this is about problem-focused coping --> One way that I manage my emotions around climate change is by considering how my actions affect the planet
- Statement 26 (I cope with my worries about climate change by supporting campaigns pushing for climate action) --> Make clear this is just one way --> One way I cope with my worries about climate change by supporting campaigns pushing for climate action
- Statement 36 (Climate change feels really abstract to me because I can't directly see or feel it) --> Change abstract to Distant: Climate change feels really distant to me because I can't directly see or feel it
- Statement 28 (Regardless of how much impact I have on climate change, it's important to me to not contribute to the problem) --> Bit wordy --> Even if we can't fix climate change, it's important to me that I don't make it worse
- Statement 41 (I feel disempowered about climate change because despite what I do I can't stop it) --> Do they know 'disempowered'? --> There's no point in me taking action because despite what I do, I can't stop climate change
- Statement 54 (I sometimes feel disconnected from or out-of-place in the natural environment) Just the inverse of I feel connected to nature --> Cut
- Statement 73 (You don't see many people in my demographic being involved with climate change issues) --> Do young people know demographic? --> Change to community: You don't see many people in my community being involved with climate change issues
- Statement 66 (It's important to me to feel well informed about climate change) --> Change to well educated --> It's important to me to feel well educated about climate change
- Statement 67 (My friends feel similarly to me about climate change) --> Most of my friends feel the same way as I do about climate change
- Statement 81 (Any effective solutions to climate change need to be able to preserve our current way of life) --> get rid of preserve --> Any effective solutions to climate change need to be able to keep our current standard of living

- Statement 69 (When the next cause comes along, people will lose interest in climate change) --> Young people --> When the next cause comes along, young people will lose interest in climate change

Changes made to statements as a result of Pilot Study 8:

- Statement 6 (I feel resentment that Western countries are to blame for climate change but developing countries will be worst affected) --> Not sure whether young people will know 'developing countries' --> I feel resentment that the richest countries are to blame for climate change but the poorest countries will be the worst affected
- Statement 12 (I feel quite intense anxiety about climate change) --> Will they know 'anxiety'? --> I worry about climate change quite intensely
- Query: Statement 7 (I feel angry that people in positions of power are not implementing the changes that are needed to tackle climate change) --> positions of power; will young people understand? --> I feel angry that the people with the power to change how the world works are not doing what is needed to tackle climate change
- Statement 10 (Sometimes I feel great about the future, other times I feel awful) --> Make it clearer there's nothing in between --> I switch between feeling great about the future and awful about it
- Statement 25 (When I act in an environmentally friendly it way helps me to feel better about climate change) --> Typo --> When I act in an environmentally friendly way it helps me to feel better about climate change
- Statement 30 (I am predominantly worried about how climate change will affect people in developing countries) --> Will young people understand predominantly? --> What concerns me most about climate change is how it will affect people in the poorest countries
- Statement 38 (I find it hard to engage with concerns about climate change because we don't really know what will happen) --> I don't really engage with concerns about climate change because we don't yet know what will happen
- Statement 49 (Becoming aware of of climate change helped me to realise how much my lifestyle relies upon many other people and systems) --> Are young people aware? Also

make shorter: Climate change means I can't ignore how much my lifestyle relies upon many other people and systems

- Statement 61 (Other people should not tell me what to think or feel about climate change) --> Everyone agrees with this --> I don't want to be told what to think or feel about climate change
- Statement 58 (I felt hurt by the media criticisms of climate campaigns such as XR and the student strikes) --> Didn't know what XR is --> I felt hurt by the media criticisms of climate change campaigners
- Statement 55 (We have to sort out the economy first, then we can focus on climate change) --> How many young people know about the economy? --> Cut
- Statement 67 (When the next cause comes along, young people will lose interest in climate change) --> New causes come along all the time (re-word) --> When a new cause becomes fashionable, people will lose interest in climate change
- Statement 68 (Consuming information about climate change on social media helps me to keep the issues is mind) --> Will they know 'consuming'? --> Taking in content about climate change on social media helps me to keep the issues is mind
- Statement 79 (Any effective solutions to climate change need to be able to keep our current standard of living) --> Quite abstract --> I hope that the solutions to climate change will allow us to keep our current way of life
- Statement 76 (People who say they care about climate change are hypocrites because we all contribute to global warming) --> Not sure they will know 'hypocrites', nor that it captures 'do gooder derogation' --> People just say they care about climate change so they can act like they're better than other people
- Statement 71 (You don't see many people in my class/ethnicity being involved with climate change issues) --> Not sure about class --> You don't see many people from my background being involved with climate change issues
- Statement 6 (I feel resentment that the richest countries are to blame for climate change but the poorest countries will be the worst affected) --> Is resentment appropriate? Guilt? Shame? --> I feel shame that the richest countries are to blame for climate change but the poorest countries will be the worst affected

Changes made to statements as a result of Pilot Study 9:

- Statement 22 (We're probably not going to stop climate change, so we need to focus on adapting to the changes it brings) --> Is this two statements? --> My primary focus with climate change is around considering how to adapt to the changes it brings
- Statement 71 (People use concerns about climate change as a reason to control others and tell them what they should be doing) --> Which people? --> I'm concerned that climate change issues are being used as a way of controlling people
- Statement 3 (I often feel guilty that I'm not doing enough to tackle climate change) --> Maybe not guilt --> I often feel pressure that I'm not doing enough to tackle climate change
- Statement 6 (I feel shame that the richest countries are to blame for climate change but the poorest countries will be the worst affected) --> Similar to statement 30 (What concerns me most about climate change is how it will affect people in the poorest countries) --> Cut statement 6
- Statement 16 (I try not to think about climate change because it really affects my mood) --> Some overlap with statement 34 (Sometimes I need to switch off from thinking about climate change, in order to recharge) --> Cut 16
- Statement 12 (I worry about climate change quite intensely) --> Be more specific: My concerns about climate change interfere with my ability to get my school assignments done
- Statement 2 (I have a mild background anxiety about climate change most of the time) --> Get rid of mild --> I feel background anxiety about climate change most of the time
- Statement 6 --> Insert: Thinking about climate change makes it difficult for me to sleep
- Statement 35 (There's nothing we can do to stop climate change, so we should just accept it) and Statement 41 (There's no point in me taking action because despite what I do, I can't stop climate change) --> Too similar; cut statement 35
- Statement 39 (Food packaging should include a sticker informing people of the carbon emissions caused by each product) --> Refers to something that should happen --> We would take more care to reduce our carbon emissions if it were easier to see their impact
- Statement 54 (Individual actions are not enough; we need governments to properly regulate the carbon emissions of corporations) --> Refers to something that should happen -->

Individual actions are not enough if the government doesn't restrict carbon pollution by corporations

- Statement 55 (Everyone should be free to choose whether or not to buy environmentally friendly products) --> Should statement --> It's important to me that we keep the freedom to choose whether or not to buy environmentally friendly products
- Statement 25 (When I act in an environmentally friendly way it helps me to feel better about climate change) & 26 (When I support campaigns pushing for climate action it helps me feel better about climate change) --> Both problem focused --> Cut and insert: Trying to 'do my bit' helps me to feel better about climate change
- Statement 28 (Even if we can't fix climate change, it's important to me that I don't make it worse) --> Don't necessarily need the 'fix' part --> It's important to me to be environmentally conscious regardless of the wider difference it makes
- Statement 36 (Climate change feels really distant to me because I can't directly see or feel it) --> Be clear it's emotional distance: Emotionally, climate change feels very distant to me because I can't directly see or feel it
- Statement 53 (I often feel a connection with things in my natural surroundings, like trees, the sea, wildlife or the view on the horizon) --> Change to natural world --> I often feel a connection with things in the natural world like trees, the sea, wildlife or the view on the horizon
- Statement 52 (The welfare of other creatures is as important as our own welfare) --> Make clear it's 'to me' --> The welfare of other creatures is as importantto me as our own welfare
- Statement 77 (Corporations and oil companies say they care about climate change whilst making very few changes) --> Just a factual statement --> I feel concerned that corporations and oil companies are saying they care about climate change but are making very few changes
- Statement 64 (Most of my social group feels the same way as I do about climate change) --> Change this to the negative --> My friends say I think about climate change too much
- Statement 67 (Taking in content about climate change on social media helps me to keep the issues is mind) --> Helps keep the issue alive

Changes made to statements as a result of Pilot Study 10:

- Statement 20 (Seeing some wildlife recover during the COVID-19 lockdown gives me hope about climate change) --> Change to 'gave' --> Seeing some wildlife recover during the COVID-19 lockdown gave me hope about climate change
- Statement 77 (The problem is overpopulation; there are too many people on the planet) --> Need more context --> I am concerned that we won't tackle climate change because there are too many people on the planet
- Statement 39 (I feel a strong sense of responsibility to do something about climate change) --> Individual or collective? --> I feel a strong sense of personal responsibility to do something about climate change
- Statement 72 (People just say they care about climate change so they can act like they're better than other people) --> Which people? --> People I know just say they care about climate change so they can act like they're better than others
- Statement 38 (There's no point in me taking action because despite what I do, I can't stop climate change) --> Clarify --> I feel there's no point in me taking action about climate change because despite what I do, I can't stop it
- Statement 76 (Campaigns pushing for environmental change never make a real difference) --> maybe make it positive? --> I am confident that campaigns for environmental change will eventually make a big difference
- Statement 47 (I don't see any point in my education because climate change means that we won't have a future) --> Get rid of 'don't', make it personal --> I see no point in my education because climate change means that I won't have a future
- Statement 74 (I feel concerned that corporations and oil companies are saying they care about climate change but are making very few changes) --> I am concerned that corporations and oil companies say that they care about climate change but are make very few changes
- Statement 35 (I don't really engage with concerns about climate change because we don't yet know what will happen) --> Get rid of 'really' --> I don't engage with concerns about climate change because we don't yet know what will happen

Changes made to statements as a result of Pilot Study 11:

- Statement 5 (I blame older generations for causing climate change) --> No-one has agreed with this --> Tone it up? --> I feel anger at older generations for doing nothing about climate change
- Statement 17 (My religious faith and beliefs help me feel hopeful about climate change) --> Make it less explicitly religious --> My faith or beliefs help me feel hopeful about climate change
- Statement 22 (Part of me is excited to see what happens when everything collapses due to climate change) --> Tone down --> Part of me is excited to observe what happens when things start collapsing due to climate change
- Statement 1 (Learning about climate change left me feeling overwhelmed) --> Perhaps this ground is already covered --> Change --> Thinking about climate change feels like a chore to me
- Statement 29 (I feel ready to adapt to any challenges posed to my life plans due to climate change) --> I feel ready to deal with any challenges posed to my life plans due to climate change
- Statement 38 (I feel there's no point in me taking action about climate change because despite what I do, I can't stop it) --> It feels like there's no point in me taking action about climate change because despite what I do, I can't stop it
- Statement 51 (Individual actions are not enough if the government doesn't restrict carbon pollution by corporations) --> I am concerned that Individual actions won't be enough unless the government also restricts emissions by corporations
- Statement 54 (I felt hurt by the media criticisms of climate change campaigners) --> Feel hurt --> I feel hurt when the media criticises climate change campaigners
- Statement 57 (I don't want to be told what to think or feel about climate change) --> I strongly react against being told what to think or feel about climate change
- Statement 63 (When a new cause becomes fashionable, people will lose interest in climate change) --> Most people --> When a new cause becomes fashionable, most people will lose interest in climate change

- Statement 75 (I hope that the solutions to climate change will allow us to keep our current way of life) --> Make it about Me --> It's important to me that any solutions to climate change will allow me to keep my current way of life
- Statement 62 (Most people in my generation are concerned about climate change) --> Too factual? --> It feels like most people in my generation are concerned about climate change

Changes made to statements as a result of Pilot Study 12:

- Statement 4 (I experience grief when I think about the changes that climate change will cause to the natural world) --> Feel --> I feel grief when I think about the changes that climate change will cause to the natural world
- Statement 58 (For me, tackling climate change is a question of right and wrong) --> Could be misintrpreted as factually right or wrong; add in a moral judgement --> I believe that trying to stop or delay measures to tackle climate change is ethically wrong
- Statement 59 (We deserve what happens as a result of climate change) --> Who is the 'we'? Humanity? The West? It's not specific enough --> Make it another moral question --> I believe that we have a moral duty to protest about climate change, even if the protest inconveniences people
- Statement 29 (I feel ready to deal with any challenges posed to my life plans due to climate change) --> What counts as 'ready'? --> I feel confident that I can deal with any challenges posed to my life plans due to climate change
- Statement 68 (I'm concerned that climate change issues are being used as a way of controlling people) --> It's not clear who is doing the controlling - make it the government? --> I'm concerned that the government are using concerns around climate change as a way of controlling people
- Statement 70 (I feel that I can speak to some of my teachers about climate change if I need to) --> re-word --> I would feel comfortable to speak to some of my teachers about climate change if I needed to
- Statement 44 (I feel grief about how climate change will reduce my opportunities in life) --> Make more clear --> I feel grief that climate change will limit what I can do with my life in the future

Changes made to statements as a result of Pilot Study 13:

- Statement 24 (Trying to 'do my bit' helps me to feel better about climate change) --> Feel better, but not about climate change --> Trying to 'do my bit' helps me to manage the emotions I feel about climate change
- Statement 30 (I need to focus on the positives as much as I can to keep motivated to tackle climate change) --> 'as much as I can' may be a bit much --> I need to focus on the positives to help keep me motivated to tackle climate change
- Statement 1 (Thinking about climate change feels like a chore to me) --> Not a good place to start; shuffle round with statement 14
- Statement 62 (It feels like most people in my generation are concerned about climate change) --> Could make more specific --> It feels like most people I know who are my age are concerned about climate change
- Statement 68 (I'm concerned that the government are using concerns around climate change as a way of controlling people) --> Let's keep it personal --> I feel that some people I know personally use concerns around climate change as a way of controlling others
- Statement 14 (Thinking about climate change feels like a chore to me) --> Make more specific --> Engaging with concerns about climate change feels like a chore to me
- Statement 12 (My concerns about climate change interfere with my ability to get my school assignments done) --> More specifice --> When I worry about climate change it can interfere with my ability to get my school assignments done
- Statement 15 (Concerns about climate change are negatively affecting my mental health) --> Make it more specific --> Worrying about climate change is negatively affecting my mental health
- Statement 3 (I often feel pressure that I’m not doing enough to tackle climate change) --> Pressure from whom? Maybe change back to guilty --> I sometimes feel guilty that I’m not doing more to tackle climate change
- Suggestion for statement: My concerns about climate change permeate everything I do (too close to other anxiety statements?)

- Statement 57 (I strongly react against being told what to think or feel about climate change) --> Everyone agrees with this --> Cut, and replace with: I avoid talking to others about my worries about climate change
- Statement 74 (I am concerned that corporations and oil companies say that they care about climate change but are make very few changes) --> Typo (Make--> Making) --> I am concerned that corporations and oil companies say they care about climate change but only ever make very small changes
- Statement 49 (The welfare of other creatures is as important to me as our own welfare) --> Make it clear this is their own values --> For me, the welfare of other creatures is as important as our own welfare
- Statement 50 (I often feel a connection with things in the natural world like trees, the sea, wildlife or the view on the horizon) --> Add in flowers --> I often feel a connection with things in the natural world like flowers, trees, the sea, wildlife or the view on the horizon
- Statement 46 (Climate change means I can't ignore how much my lifestyle relies upon many other people and systems) --> add in a 'that' --> Climate change means that I can't ignore how much my lifestyle relies upon many other people and systems
- Statement 54 (I feel hurt when the media criticises climate change campaigners) --> Not just the media --> I feel hurt when people criticise climate change campaigners

Changes made to statements as a result of Pilot Study 14:

- Statement 2 (I feel background anxiety about climate change most of the time) --> Insert 'some' --> I feel some background anxiety about climate change most of the time
- Statement 23 (Our society lives in a state of denial where we know about climate change but live as if we don't) --> Make it emotional --> I feel like we live in a state of denial where we know about climate change but live as if we don't
- Statement 31 (I try to avoid criticising others for their environmental impact) --> who? --> I try to avoid criticising people I know personally for their environmental impact
- Statement 36 (We would take more care to reduce our carbon emissions if it were easier to see their impact) --> Make it more personal --> I believe that most people I know would reduce their greenhouse gas emissions if it were made easier to trace their impact

- Statement 72 (People I know just say they care about climate change so they can act like they're better than others) --> Make clear the authenticity --> People I know just pretend they care about climate change so they can act like they're better than others
- Statement 74 (I am concerned that corporations and oil companies say they care about climate change but only ever make very small changes) --> Put in more emotion --> It angers me that corporations and oil companies say they care about climate change but only ever make very small changes
- Cut statement 30 (I need to focus on the positives to help keep me motivated to tackle climate change) --> Only getting middle of the road responses
- Cut statement 51 (I am concerned that individual actions won't be enough unless the government also restricts emissions by corporations) --> More testing knowledge than opinion

Changes made to statements as a result of Pilot Study 15:

- Statement 66 (I feel that some people I know personally use concerns around climate change as a way of controlling others) --> Wordy --> I'm concerned that people I know sometimes use concerns around climate change to control others' actions
- Statement 7 (I feel angry that people in positions of power are not implementing the changes that are needed to tackle climate change) & 72 (It angers me that corporations and oil companies say they care about climate change but only ever make very small changes) are too similar --> Merge & cut 72 --> It angers me that governments and oil companies say they care about climate change but don't make the changes needed
- Statement 74 (I am confident that campaigns for environmental change will eventually make a big difference) --> Doesn't need to be as definitive --> I am confident that climate change campaigns will make a difference
- Statement 4 (I feel grief when I think about the changes that climate change will cause to the natural world) --> add in animals --> I feel grief when I think about the damage that climate change will cause to wildlife and the natural world
- Statement 6 (Thinking about climate change makes it difficult for me to sleep) --> Maybe too strong? High levels of anxiety may be deduced from other factors --> Cut

- Statement 12 (When I worry about climate change it can interfere with my ability to get my school assignments done) --> Change assignments to work --> Worrying about climate change it can make it hard for me to complete my school work
- Statement 59 (My friends say I think about climate change too much) --> Change to talk --> My friends say I talk too much about climate change
- Statement 61 (When a new cause becomes fashionable, most people will lose interest in climate change) --> Put in an emotion --> I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable
- Statement 30 (I try to avoid criticising people I know personally for their environmental impact) --> Get rid of 'personally' --> I avoid criticising the people around me for their environmental impact
- Statement 42 (As I grow up, I have to look after myself and my family & friends first; then I can think more about climate change) --> 'As I Grow Up' is superfluous --> I have to look after myself and my family & friends first, then I can think more about climate change
- Statement 58 (It's important to me to feel well educated about climate change) --> Everyone agrees with this --> Cut
- Statement 33 (My concern about climate change is not just one issue, but includes many social and political issues that connect together) --> Shorten --> My concern about climate change involves many social and political issues that link together and affect each other
- Statement 25 (Caring about climate change has made me consider the impact of the food I eat) --> expand to general consumption --> Caring about climate change has made me consider the impact of the food I eat and the things I buy
- Statement 5 (I feel anger at older generations for doing nothing about climate change) --> Everyone disagrees, tone down --> Sometimes I feel anger at older generations for not doing enough to tackle climate change
- Statement 15 (I feel hope about climate change because we will come together and make the changes needed) --> No-one agrees with this --> Cut

Changes made to statements as a result of Pilot Study 16:

- Statement 60: (Being around others who care about climate change helps to keep me motivated to focus on it) --> Not quite Habitus --> Being around others who care about climate change helps me to look for ways that I can help
- Statement 50: (I feel hurt when people criticise climate change campaigners) --> Hurt might not be the right word --> When people criticise the student strikes I feel that my values are being attacked
- New Statement (73): It disturbs me that climate change could disrupt the current way our world works
- New Statement (74) I wish that others were more understanding about how I feel about climate change
- New Statement (75) I feel insecure due to the uncertainty around what our future will look like in light of climate change
- Statement 19 (My primary focus with climate change is around considering how to adapt to the changes it brings) --> (My main focus is working out how to adapt to the changes that climate change will bring)
- Statement 21 (I feel like we live in a state of denial where we know about climate change but live as if we don't) --> I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't
- Statement 22 (Trying to 'do my bit' helps me to manage the emotions I feel about climate change) --> Taking actions to reduce my ecological impact helps me to manage the emotions I feel about climate change
- Statement 23 (Caring about climate change has made me consider the impact of the food I eat and the things I buy) --> Caring about climate change has made me re-think the impact of the food I eat and the things I buy
- Statement 25 (Sometimes we need to feel bad about climate change, in order to motivate us to take action) --> Sometimes we need to feel bad about climate change, to motivate us to take action
- Statement 26 (What concerns me most about climate change is how it will affect people in the poorest countries) --> I am very concerned about how climate change will affect people's lives in the poorest counties

- Statement 28 (I avoid criticising the people around me for their environmental impact) --> I don't want to criticise others for their environmental impact
- Statement 31 (My concerns about climate change involve many social and political issues that link together and affect each other) --> My concerns about climate change involve many social and political issues that all impact upon each other in complex ways
- Statement 32 (I don't engage with concerns about climate change because we don't yet know what will happen) --> I don't engage with concerns about climate change because we don't know what is going to happen
- Statement 35 (It feels like there's no point in me taking action about climate change because despite what I do, I can't stop it) --> Despite what I do I can't stop climate change, so it feels like it's pointless to keep thinking about it
- Statement 36 (I feel a strong sense of personal responsibility to do something about climate change) --> I feel a strong sense of responsibility around climate change
- Statement 41 (I feel grief that climate change will limit what I can do with my life in the future) --> I feel grief that climate change will limit the opportunities I have for my life as I grow older
- Statement 45 (I am considering not having my own children because I don't want to bring them into a world that might collapse)--> (The idea that our world systems might collapse due to climate change has made me question whether to have children)
- Statement 53 (I avoid talking to others about my worries aabout climate change) --> I avoid talking to others about my worries around climate change in case it upsets them
- Statement 54 (I believe that trying to stop or delay measures to tackle climate change is ethically wrong) --> I believe that it is ethically wrong for businesses and politicians to oppose or delat measures to tackle climate change
- Statement 55 (I believe that we have a moral duty to protest about climate change, even if the protest inconveniences people) --> I believe that we have a moral duty to protest about climate change, even if it inconveniences people
- Statement 56 (My friends say I talk too much about climate change) --> I feel comfortable to talk with my friends about climate change concerns
- Statement 57 (It feels like most people I know who are my age are concerned about climate change) --> It feels like most people my age are concerned about climate change

- Statement 63 (I'm concerned that people I know sometimes use concerns around climate change to control others' actions) --> It feels like people at school sometimes use concerns around climate change to tell others what to do
- Statement 64 (It's important to others in my family to be environmentally conscious) --> Climate change issues are important to the others in my family
- Statement 65 (I would feel comfortable to speak to some of my teachers about climate change if I needed to) --> I feel my teachers are (or would be) supportive if students shared their concerns around climate change
- Statement 67 (People I know just pretend they care about climate change so they can act like they're better than others) --> I feel that some people just pretend they care about climate change so they can act like they're better than others
- Statement 70 (I am confident that climate change campaigns will make a difference) --> I believe that climate change campaigns are making a difference
- Statement 71 (I am concerned that we won't tackle climate change because there are too many people on the planet) --> I worry that even if we make changes we won't tackle climate change because of overpopulation
- Statement 72 (Coverage of climate change in the news has a big impact on me) --> Coverage of climate change in the news has a big impact on my emotions
- Statement 27 (I feel confident that I can deal with any challenges posed to my life plans due to climate change) --> I feel confident that I can deal with any challenges that climate change raises for me
- Statement 33: (I believe that most people would reduce their greenhouse gas emissions if it were made easier to trace their impact) --> I believe that most people would reduce their carbon footprint if it were made easier to track their emissions
- Statement 10: I spend very little time thinking about climate change --> I don't spend much time thinking about climate change
- Statement 69 (It's important to me that any solutions to climate change will allow me to keep my current way of life) --> Merge with Statement 73 --> (It's important to me that any solutions to climate change will allow us to keep our current way of life)

- Statement 24: (It's important to me to be environmentally conscious regardless of the wider difference it makes) --> I feel a responsibility to be environmentally conscious regardless of the wider difference it makes

Delete statements that are not working:

- Statement 11: Worrying about climate change it can make it hard for me to complete my school work
- Statement 41: I feel grief that climate change will limit the opportunities I have for my life as I grow older
- Statement 63: It feels like people at school sometimes use concerns around climate change to tell others what to do
- Statement 12: When I'm already feeling bad, thinking about climate change can make me feel even worse --> Swap to: I feel a lot of fear about climate change
- Statement 70: I believe that climate change campaigns are making a difference
- Statement 10: I don't spend much time thinking about climate change
- Statement 36: I feel a strong sense of responsibility around climate change

Comments made by participant in Pilot Study 17 (young person, no changes made this time):

- I'm not sure whether this one is disagree or neutral (background anxiety)
- I'm not quite sure if I want children anyway
- I'm not really a religious person
- Lots of people won't do anything unless the government tells them to
- The scientists will have made their results repeatable and repoducable so we should trust what they say
- Travelling will actually increase our greenhouse gasses and make things worse
- Scientists have told us what's going to happen, if we don't trust them who can we believe?
- (Poor Countries) It isn't what I'm most concerned about but it's in my top few
- All statements made sense
- Wanted more in +6 and -6

- No new statements needed
- Found it 'quite interesting'

Comments made by participant in Pilot Study 18 (young person, no changes made this time):

- All statements made sense
- Neutral point was 'in the middle'
- Wanted more spaces to put statements 'everywhere'
- No new statements are needed

Comments made by participant in Pilot Study 19 (young person, no changes made this time):

- It would be useful to have a sometimes/always/never range [Likert scale?]
- Maybe add in 'sometimes' to more of the statements
- Wanted to qualify statements more
- Mid point = 0
- Can't think of more statements to add

Comments made by participant in Pilot Study 20 (young person):

- When I first learnt about CC it affected my mental health, but not now
- Kids don't have purchasing power to make eco-friendly purchasing decisions…

Changes made to statements as a result of Pilot Study 20 (young person):

- Statement 56 (Taking in content about climate change on social media helps to keep the issues alive for me) --> Viewing content about climate change on social media helps to keep the issues alive for me

Changes made to statements as a result of Pilot Study 21 (final):

- He was slow to read the Deep Adaptation statement - look at wording?
- Statement 18 (For me, the most important focus is to work out how to adapt to the challenges that a warming planet will bring) --> For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring
- Statement 5 (Sometimes I feel anger at older generations for not doing enough to tackle climate change) --> Sometimes I feel anger at older generations for not doing more to address climate change
- New statement? We have more immediate concerns to address before tackling climate change? Problem is, it's more of a 'what should be done', a 'response' rather than an 'understanding'. The 'I have enough to worry about anyway' is possibly enough?
- Statement 8 (I have enough to worry about anyway and don't have the space to think much about climate change) --> I have more immediate concerns to worry about and don't have the space to think much about climate change

Supplementary Appendix C2.6 Final Statements Used in the Online Q-Sort Study

No.	Statement	Broad Topic
1	Once I start to think about climate change, I find it hard to stop worrying about it	Emotions
2	I feel some background anxiety about climate change most of the time	Emotions
3	I sometimes feel guilty that I'm not doing more to tackle climate change	Emotions
4	I feel a sense of grief about the damage that climate change will cause to the natural world	Emotions
5	Sometimes I feel anger at older generations for not doing more to address climate change	Emotions/emotion-focused coping
6	I feel angry that governments and oil companies say they care about climate change but don't make the changes needed	Emotions
7	I feel angry at people who deny the existence of climate change	Emotions
8	I have more immediate concerns to worry about and don't have the space to think much about climate change	Emotions
9	I switch between feeling great about the future and awful about it	Emotions
10	I feel a lot of fear about climate change	Emotions
11	Thinking about climate change feels like a bit of a chore to me	Scope of emotional impact
12	When I'm already feeling bad, thinking about climate change can make me feel even worse	Scope of emotional impact
13	Worrying about climate change is negatively affecting my mental health	Scope of emotional impact
14	My faith or beliefs help me to feel hope around climate change	Hope and Hopelessness
15	I feel hope that we will find technological solutions to fix climate change	Hope and Hopelessness
16	I feel hope about climate change because it's not as big of a problem as scientists claim	Hope and Hopelessness
17	Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change	Hope and Hopelessness
18	For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring	Hope and Hopelessness
19	Part of me is excited to observe what happens when things start collapsing due to climate change	Hope and Hopelessness
20	I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't	Hope and Hopelessness
21	Taking actions to reduce my ecological impact helps me to manage how I feel about climate change	Coping Strategies
22	Caring about climate change has made me rethink the impact of the food I eat and the things I buy	Coping Strategies

23	I feel a responsibility to be environmentally conscious regardless of the wider difference it makes	Coping Strategies
24	I feel very concerned about how climate change will affect people's lives in the poorest counties	Coping Strategies
25	I feel confident that I can deal with any challenges that climate change raises for me	Coping Strategies
26	I don't want to criticise others for their environmental impact	Coping Strategies
27	Sometimes I need to switch off from thinking about climate change, in order to recharge	Coping Strategies
28	Emotionally, climate change feels very distant to me because I can't directly see or feel it	Distance from Climate Change
29	My concerns about climate change involve many social and political issues that all impact upon each other in complex ways	Distance from Climate Change
30	I don't engage with concerns about climate change because we don't know what is going to happen to the environment	Distance from Climate Change
31	I trust that most people would reduce their carbon footprint if they could track their emissions and see their impact	Distance from Climate Change
32	Climate change feels distant to me because it will mostly be affecting people in the future	Distance from Climate Change
33	Despite what I do I can't stop climate change, so it feels pointless for me to keep thinking about it	Agency and Responsibility
34	I worry about people criticising me for not doing enough to tackle climate change	Agency and Responsibility
35	The way the world works makes it really difficult for me to be environmentally friendly	Agency and Responsibility
36	I want to make sure that I travel the world before places become worse due to climate change	Agency and Responsibility
37	I have to look after myself and my family & friends first, then I can think more about climate change	Agency and Responsibility
38	Knowing about climate change makes our modern way of life feel completely absurd	Impacts of Beliefs about the Future
39	Climate change means I need to recognise how my life relies and impacts upon other people and systems	Impacts of Beliefs about the Future
40	I see no point in my education because climate change means I won't have a future	Impacts of Beliefs about the Future
41	The idea of potential collapse due to climate change has made me question whether to have children	Impacts of Beliefs about the Future
42	I feel grief that climate change will limit the opportunities I have for my life as I grow older	Impacts of Beliefs about the Future
43	For me, the welfare of other creatures is as important as our own welfare	Ecological Values
44	I feel a strong connection with things in the natural world like plants, the sea, animals, or the view on the horizon	Ecological Values
45	It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products	Political Values
46	The student strikes for climate give me hope for the future	Political Values
47	When people criticise the student strikes for climate I feel that my values are being attacked	Political Values

48	Only rich people can afford to be environmentally friendly	Political Values
49	My engagement with climate change forms an important part of my identity	Identity
50	I avoid talking to others about my worries around climate change in case they react negatively	Social Influences
51	I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change	Identity
52	I believe that it is morally right to protest about climate change, even if it inconveniences people	Identity
53	I can discuss concerns around climate change with others in my friendship group(s)	Social Influences
54	It feels like most people my age are concerned about climate change	Social Influences
55	I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable	Social Influences
56	Viewing content about climate change on social media helps to keep the issues alive for me	Social Influences
57	Spending time around others who care about the environment helps me to believe change is possible	Social Influences
58	I feel pressure from others at school to be environmentally conscious	Social Influences
59	You don't see many people from my background being involved with climate change issues	Social Influences
60	My family will listen to me and take my feelings about climate change seriously	Social Influences
61	I am confident that my teachers would be supportive if I talked to them about my concerns around climate change	Social Influences
62	I find it hard to relate to people who aren't concerned about climate change	Empathy/Othering
63	Some people just pretend they care about climate change so they can act like they're better than others	Empathy/Othering
64	Joking about climate change helps me connect with others about our concerns	Empathy/Othering
65	It's important to me that any solutions to climate change will allow us to keep our current way of life	Existential threat to lifeworld
66	I worry that even if we make changes we won't tackle global warming because of overpopulation	Political Values
67	Coverage of climate change in the news has a big impact on my emotions	Social Influences
68	I wish that others were more understanding around how I feel about climate change	Empathy/Othering
69	I feel insecure due to the uncertainty around what our future will look like in light of climate change	Ontological insecurity

Final statements used in the online Q-sort main study.

The broad topic covered by each statement is included for reference.

Supplementary Appendix C2.7 Final Q-Set statements organised into a random order

Statement numbers were removed so that they did not influence participants. Statements were randomised using: https://onlinerandomtools.com/shuffle-lines

It feels like most people my age are concerned about climate change
Worrying about climate change is negatively affecting my mental health
For me, the welfare of other creatures is as important as our own welfare
Some people just pretend they care about climate change so they can act like they're better than others
I feel a responsibility to be environmentally conscious regardless of the wider difference it makes
Knowing about climate change makes our modern way of life feel completely absurd
I believe that it is ethically wrong for anyone to oppose or delay measures needed to tackle climate change
I find it hard to relate to people who aren't concerned about climate change
I worry about people criticising me for not doing enough to tackle climate change
I am confident that my teachers would be supportive if I talked to them about my concerns around climate change
For me, the most immediate task is to consider how we can adapt to the challenges that climate change will bring
I feel pressure from others at school to be environmentally conscious
I switch between feeling great about the future and awful about it
It's important to me that any solutions to climate change will allow us to keep our current way of life
I feel a strong connection with things in the natural world like plants, the sea, animals, or the view on the horizon
Sometimes I feel anger at older generations for not doing more to address climate change
Sometimes I need to switch off from thinking about climate change, in order to recharge
You don't see many people from my background being involved with climate change issues
It's important to me that we keep the freedom to choose whether or not to buy eco-friendly products
I feel a lot of fear about climate change
The student strikes for climate give me hope for the future
My family will listen to me and take my feelings about climate change seriously
Viewing content about climate change on social media helps to keep the issues alive for me
I worry that even if we make changes we won't tackle global warming because of overpopulation
Coverage of climate change in the news has a big impact on my emotions
I can discuss concerns around climate change with others in my friendship group(s)
I trust that most people would reduce their carbon footprint if they could track their emissions and see their impact
Seeing some wildlife recover during the initial COVID-19 lockdown gave me hope about climate change
Part of me is excited to observe what happens when things start collapsing due to climate change
Caring about climate change has made me rethink the impact of the food I eat and the things I buy
My engagement with climate change forms an important part of my identity
Despite what I do I can't stop climate change, so it feels pointless for me to keep thinking about it

When people criticise the student strikes for climate I feel that my values are being attacked
I feel grief that climate change will limit the opportunities I have for my life as I grow older
I feel a sense of grief about the damage that climate change will cause to the natural world
I wish that others were more understanding around how I feel about climate change
I see no point in my education because climate change means I won't have a future
Once I start to think about climate change, I find it hard to stop worrying about it
Taking actions to reduce my ecological impact helps me to manage how I feel about climate change
I believe that it is morally right to protest about climate change, even if it inconveniences people
I feel hope about climate change because it's not as big of a problem as scientists claim
I feel like we live in a state of denial where we know about climate change but are encouraged to live as if we don't
When I'm already feeling bad, thinking about climate change can make me feel even worse
The idea of potential collapse due to climate change has made me question whether to have children
Climate change feels distant to me because it will mostly be affecting people in the future
I feel very concerned about how climate change will affect people's lives in the poorest counties
I want to make sure that I travel the world before places become worse due to climate change
Spending time around others who care about the environment helps me to believe change is possible
I feel confident that I can deal with any challenges that climate change raises for me
Only rich people can afford to be environmentally friendly
I feel angry at people who deny the existence of climate change
I feel angry that governments and oil companies say they care about climate change but don't make the changes needed
Emotionally, climate change feels very distant to me because I can't directly see or feel it
I avoid talking to others about my worries around climate change in case they react negatively
I have to look after myself and my family & friends first, then I can think more about climate change
The way the world works makes it really difficult for me to be environmentally friendly
I have more immediate concerns to worry about and don't have the space to think much about climate change
I'm concerned that most people will lose interest in climate change when a new cause becomes fashionable
I feel insecure due to the uncertainty around what our future will look like in light of climate change
I feel some background anxiety about climate change most of the time
Joking about climate change helps me connect with others about our concerns
I don't want to criticise others for their environmental impact
Climate change means I need to recognise how my life relies and impacts upon other people and systems
I don't engage with concerns about climate change because we don't know what is going to happen to the environment
I feel hope about finding technological solutions to climate change
My faith or beliefs help me to feel hope around climate change
My concerns about climate change involve many social and political issues that all impact upon each other in complex ways
Thinking about climate change feels like a bit of a chore to me
I sometimes feel guilty that I’m not doing more to tackle climate change

Supplementary Appendix C3.1 Recruitment emails

Email for EPNET (EP online forum, accessed via email)

Subject: Young people concerned about climate change (research)

Hello EPNET,

Do you know any young people who are concerned about climate change? If so, I'd like to work with them for my thesis.

I want to explore their views around climate change, and investigate what involvement or support they would like from adults (school staff, parents, and EPs). They must:

- Be aged 11-18
- Live in the UK
- Have access to a laptop and internet
- Have parental/carer consent (I will email their parents/carers to get this)

They **do not** need to be highly anxious about climate change; I want to gather a range of views and am not seeking to pathologise climate anxiety (although I will of course signpost them to supportive services if they are distressed).

Each young person will complete an online card-sorting task (a Q-sort) in which they arrange statements according to how strongly they agree or disagree with them. You can view the statements here: https://miro.com/app/board/o9J_kiSUeMg=/

A few months later, they will then be invited to take part in an online focus group with other young people who expressed views similar to their own.

I need to recruit 30-60 participants, which feels like a daunting task.
→ If you think your own child would be interested, please could you ask them?
→ Additionally, if some young people in one of your schools (in the UK) might be interested, please could you put me in touch with a relevant school staff member?
→ Finally, if you have any links to an environmental youth group or school society (in the UK), please could you put me in contact with them?

My email address for the research is: rlee11@sheffield.ac.uk

Thank-you for your help!
Rob Lee
Sheffield TEP

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Email for Climate Psychology Alliance

Subject: Do you know any young people concerned about climate change? (research recruitment)

Hi everyone,

I hope you are all well. Thank-you so much to everyone who replied to my previous emails about the pilot study and the main study for my research; you've been incredibly helpful, and it was lovely meeting you! I'm still recruiting young people to take part in my research; I don't want to bombard people with emails, but I need to work with 15 more young people over the next month (before Christmas), so I thought I would send one more message in case anyone missed the last one:

Are you the parent of, or do you know any young people who are concerned about climate change? If so, I'd like to work with them for my research.

I want to explore a range of ways that young people are engaging with concerns about climate change, and then investigate what involvement/support they would like from adults (school staff, parents, and psychologists). They must:

- Be aged 11-18
- Live in the UK
- Have access to a laptop and internet
- Have parental/carer consent

They **do not** need to be highly anxious about climate change; I want to gather a range of views and am not seeking to pathologize climate anxiety (although I will of course signpost them to supportive services if they are distressed).

Each young person will complete an online card-sorting task in which they arrange cards containing statements according to how strongly they agree or disagree with them. You can view the statements here: https://miro.com/app/board/o9J_kiSUeMg=/

In January they will then be invited to take part in an online focus group with other young people who have expressed views similar to their own.

If your child or a relative/friend's child would be interested, please could you ask them, and send me an email?

My email address for the research is: rlee11@sheffield.ac.uk

Thank-you for your help!
Rob Lee
Trainee Educational Psychologist
University of Sheffield
(UoS Ethics Committee Approval for study: 034192)

Email for Sheffield Trainee Educational Psychologists

Subject: Do you know any young people who are concerned about climate change? (Thesis research)

Hi everyone,

I'm a year 3 TEP at Sheffield and my research thesis is on how young people engage with concerns around climate change.

Do you know any young people who are concerned about climate change? If so, I'd like to work with them.

I want to explore these concerns (using a Q Sort), and then ask what involvement/support they would like from adults (school staff, parents, and EPs). They must:

- Be aged 11-18
- Live in the UK
- Have access to a laptop and internet
- Have parental/carer consent (I will email their parents/carers to get this)

They **do not** need to be highly anxious about climate change; I want to gather a range of views and am not seeking to pathologise climate anxiety (although I will of course signpost them to supportive services if they are distressed).

Each young person will undertake a survey, then an online Q sort on a collaborative whiteboard. You can view the Q sort statements here:
https://miro.com/app/board/o9J_kiSUeMg=/

A few months later, they will then be invited to take part in an online focus group with other young people who expressed views similar to their own.

I need to recruit 30-60 participants, which is where I'm asking for help:
→ If you think your own child would be interested, please could you ask them?
→ Additionally, if some young people in one of your schools might be interested, please could you put me in touch with a relevant school staff member?
→ Finally, if you have any links to an environmental youth group or school society, please could you put me in contact with them?

My email address for the research is: rlee11@sheffield.ac.uk

Thank-you for your help!
Rob Lee
Y3 TEP

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Email for the Birmingham Educational Psychology Service

Subject: Young people concerned about climate change (Y3 Thesis Research)

Hi everyone,

I hope you're well. Do you know any young people who are concerned about climate change? If so, I'd like to work with them for my Y3 thesis.

I want to explore their views around climate change, and investigate what involvement or support they would like from adults (school staff, parents, and EPs). They must:

- Be aged 11-18
- Live in the UK
- Have access to a laptop and internet
- Have parental/carer consent (I will email their parents/carers to get this)

They **do not** need to be highly anxious about climate change; I want to gather a range of views and am not seeking to pathologise climate anxiety (although I will of course signpost them to supportive services if they are distressed).

Each young person will complete an online card-sorting task (a Q-sort) in which they arrange statements according to how strongly they agree or disagree with them. You can view the statements here: https://miro.com/app/board/o9J_kiSUeMg=/

A few months later, they will then be invited to take part in an online focus group with other young people who expressed views similar to their own.

I need to recruit 30-60 participants, which is currently feeling like a daunting task.
→ If you think your own child (or a child of a family member or friend) would be interested, please could you ask them?
→ Additionally, if some young people in one of your schools might be interested, please could you put me in touch with a relevant school staff member?
→ Finally, if you have any links to an environmental youth group or school society, please could you put me in contact with them?

My email address for the research is: rlee11@sheffield.ac.uk

Thank-you for your help!
Many Thanks,
Rob Lee

Supplementary Appendix C3.2 Formal Complaint about research and University Response

(Email record, with names removed)

XXXX Tue, 20 Oct 2020, 20:07

to me

Hi Rob,

XXXX has forwarded your email to me, both my 14 and 12 year old daughters are happy to participate and we are certain we could get some more participants of the same age for you.

What would you like them to do next?

Thanks

XXXX

Robert Lee <rlee11@sheffield.ac.uk> 20 Oct 2020, 21:05

Hi XXXX,

Thank-you for getting in contact, and that was really kind of XXXX to pass on the details about my research study!

That's really great that your daughters are interested in taking part. The first step required is for you to complete a consent form for them, please. I'm using a social science platform called Gorilla to collect consent online - you can access the link here: https://research.sc/participant/login/dynamic/F56B1D1F-2226-4177-9793-1544D0FB15AD

Once you've completed this, I will also need your children to complete their own consent forms. These are similar to your form (with slightly simpler wording), and also contain some initial survey questions after the consent form part (demographics, then two short surveys about how they feel about climate change). The surveys are completely optional; they just help to provide me with more information when I interpret the Q sort studies.

After this, I can email to arrange a time for them to complete the main card sort study. In the meantime, if they would like to see the statements that are used in the card sort, they can view them here: https://miro.com/app/board/o9J_kiSUeMg=/

Many Thanks,
Rob Lee
Trainee Educational Psychologist (Year 3)

University of Sheffield

XXXX 20 Oct 2020, 22:35

to me

Hi Rob,

I have to apologise, I posted your request onto a couple of Facebook groups where I know friends who have kids that might be interested.

One of them was my old school and someone has just contacted me to say that the way you are going about getting participants is inappropriate and that they have emailed your director.

I have said that it was just me trying to help, as I know it is hard to get participants for a study and the students at Bristol Uni are always asking the kids through my daughter's school to get involved, and my friends are always asking me and others to get involved on FB and other platforms. It didn't occur to me that it would be a problem.

I am really sorry if this gets you into any trouble. Please feel free to get your director to contact me if you need me to explain.

I will sort out the permissions etc and respond to your email.

Sorry again.
XXXX

Robert Lee <rlee11@sheffield.ac.uk> 20 Oct 2020, 23:07

to (Tutor)

Hi (Tutor),

I hope you are well. I've just gotten this email (below) from someone who expressed an interest through snowballing recruitment techniques (they are the friend of the sister of a friend of mine). They didn't ask me before posting on Facebook (you can see all the correspondence we've had below). Out of interest, is it actually a problem for someone to forward a recruitment message via facebook anyhow? Anyone who is interested would have to email me to get in touch, so I really can't see how it would be ethically relevant. Anyhow, I thought I should give you a heads-up. Is there anything I should do?

Many thanks,
Rob

Robert Lee <rlee11@sheffield.ac.uk> Tue, 20 Oct 2020, 23:11

to XXXX

Hi XXXX,

Thanks for letting me know. I've let my research tutor know about the situation (she's also the deputy director for my course). I would be very surprised if this is a problem, but will keep you updated once I have a response from her (probably some time tomorrow). I wouldn't worry about it, but please hold off on posting anything on Facebook about the research in the meantime.

Many thanks,
Rob

(Tutor) 21 Oct 2020, 10:31

to me

Hi Rob,

sorry to hear about this.

I have just heard from (course director) that an email came in about it. The email was, however, rather vague in terms of what the issue was. I have replied to (course director) as below and attach the articles I am referring to.

I have already had a communication from Rob about this. It turns out that someone had forwarded his link on a facebook page without his knowledge - in order to be helpful. So the accusation is a bit unfair to say the least. On another point, I have recently been asked about posting information up on facebook to invite participants - e.g. I have a research student who is working with a support forum to recruit participants and that forum want to use their facebook group to invite their forum members as this is the way they communicate. This caused me to do some research in to use of social media for recruitment and what I found was that concerns were focused on collection of data via social media rather than a concern with recruitment via social media. There was an article I found which was of some use but related to medical situations, however it offered a useful aide memoir - not advocating against recruitment via social media but offering some ethical considerations. In addition, I found a couple of Sheffield ethics articles - attached, again not being specific about this being a problem. I was going to ask UREC but they don't seem to have a ready way of asking quick questions online. Their Q+A section doesn't raise this as a concern.

I will contact Rob with these links/articles, but he feels that giving out his contact details is the possible ethical issue (which I would agree) - and as he says, he would be doing that anyway. It might be about what the social media forum allows - e.g. advertising? but Rob hasn't as far as I can see, breached any rules.

We'll see if anything useful comes out of it....

(Tutor)

Robert Lee <rlee11@sheffield.ac.uk> 21 Oct 2020, 16:45

to (Tutor)

Hi (Tutor),

Thank-you for your response about this. Having had a quick look at the documents you've attached, I agree with what you've suggested to (Course Director) - it becomes an ethical issue (a data and confidentiality issue) if data is collected or generated via social media (since this is not a secure platform), but it's hard to see how posting a recruitment message on facebook is any different from sending out a recruitment email (or posting on an email forum, such as EPNET), or putting up a physical recruitment poster. Of course, this might be slightly different if the topic were highly sensitive, in which case being sent a public message about a topic (such as cancer, or abuse) might arguably itself imply (rightly or wrongly) information about a person that they haven't chosen to share. However, that's not the case with my research topic, at least.

Thank-you for your support around this, anyhow, and I'm looking forward to hearing what (Course Director) decides.

Many thanks,
Rob

(Tutor) 21 Oct 2020, 17:20

to me

Hi Rob,

I think (Course Director) has acknowledged receipt of the email reporting the use of facebook and said that we would discuss it - but he doesn't feel it raises an ethical issue and neither does (other tutor), who is now our research lead. So I think it has ended there.

(Tutor)

Supplementary Appendix C3.3 Information Sheets and Consent Forms

Parent information sheet and consent form for initial video interviews and pilot study:

Information Sheet for Parents/Carers of Potential Participants

Your child has been invited to participate in a research project called:

How do young people engage with concerns around climate change?

They will not be able to participate in this research unless you (as their parent/carer) consent for them to take part because they are under 18 (additionally, I will also ask for their consent).

The consent form is at the end of this sheet (page 3). Please read the current information sheet carefully and thoroughly before deciding on whether to consent - it is important for you to understand why the research is being done and what it will involve before you decide whether your child can participate.

You can also email me (the researcher) at rlee11@sheffield.ac.uk to ask for more information, or to ask me about anything that is unclear.

1. What is the aim of the project?

The project will explore what concerns young people have around climate change, what their experience of this is, and how this interacts with the rest of their lives. Once I have identified particular types of experience/engagement, I will conduct focus groups with groups of young people who reported similar experiences, to explore what engagement with their concerns (if any) they would like from their school/college staff, their parents/carers, their peers, and from other professionals such as Educational Psychologists.

I am undertaking the study as part of the research requirements to complete my Doctorate of Child and Educational Psychology at the University of Sheffield.

2. Why has my child been chosen?

Your child has been identified as an appropriate participant because they are aged 11-18, live in the UK, and (in most cases) feel impacted in some way by concerns around climate change. Your child has been recruited through one of several methods:

1. A staff member in their school/college sent them and other students a recruitment email (or put up a poster/made an announcement) to which they responded.
2. An administrator for a group that is involved with issues around climate change (and whose mailing list your child has signed up to) sent your child an email and they responded.
3. One of your child's friends/peers undertook the study and thought that they might be interested in participating, so sent your child an email and they responded (this is a research recruitment technique known as 'snowballing').

3. Does my child have to take part?

No, it is completely up to you whether you consent to your child taking part or not. It is then completely up to your child whether they decide that they still want to take part. Their participation is entirely voluntary. Your child will also be asked to sign a consent form to say that they are happy to participate. However, both you and you

child can still change your mind and stop your child from participating at any time, and neither of you are required to give a reason for withdrawing.

4. What does the research involve?

Preliminary Research: Online Video Interviews

Your child is being invited to take part in the preliminary research that will inform the main study, rather than the main study itself (this research is still crucial in the construction of the main study). After you complete the consent form, I will email your child their own consent form to complete. In all email exchanges with your child I will CC you into the email to keep you updated. Once your child has consented to participate, I will email them to arrange a time for me to undertake an **online video interview** with them using Google Meet (which will be recorded if you consent to this). Google Meet has been analysed by the University of Sheffield, and is considered to be a safe and secure platform to host the interview. Your child will not need to download any software in order to use Google Meet; they can access it through a web browser.

The online interview will explore your child's experiences around concerns relating to climate change, and I will use the responses from them and other people I interview to help me construct a set of statements relating to young people's experience of concerns around climate change (These statements will be a key component the main study).

Once they have completed the interview, I will invite them to recommend other young people who they think would like to participate in the study. This is a well-established recruitment technique known as 'snowballing'. If your child is happy to do so, I will send them an email about the research for them to forward to the people they identified (by using this procedure I will not require your child to send me the other people's email addresses, since the others will then email me if they are interested).

Additional Research Opportunity: Pilot Study Online Card Sort

If you and your child consent, I will also email them to invite them to take part in the pilot study for the main study (and will CC you into all emails). If they agree to take part in this, I will arrange a time for them to undertake an activity called a **Card Sort** using a web-based application called **Miro**. Miro is a collaborative whiteboard, and it will contain the set of statements relating to young people's experience of concerns around climate change. Your child will not need to download any software to use Miro; they can access it through a web browser without needing an account.

Your child will be asked to arrange the statements into groups, with a 'strongly disagree' group at one end and a 'strongly agree' group at the other end. I will observe their card sort through Miro (the web-based app). Once they have completed the card sort, I will then ask them some questions (using Miro's video chat function) about how they found the activity, and whether they felt that the statements in the card sort made sense to them. This will help me to refine the card sort prior to its use in the main study.

5. Will my child's interview be recorded, and how will this be used?

Yes, if you and your child consent to their online video interview being recorded, then I will use the record feature on Google Meet to record the interview. The recording will be securely stored on the University of Sheffield servers, and will be deleted after a maximum of three years.

I will use the recording to transcribe the interview (i.e. write down what they said in the interview). In the transcription, I will not use their name, and will remove any details that could be used to identify them. The recording will not be seen by anyone else, but the anonymous transcription could be seen by my research supervisor, **Dr Martin Hughes** at the University of Sheffield.

If you consent for your child to also take part in the pilot study (and if your child consents and decides to undertake the pilot study), I will record their online card sort and post-sort online interview using the in-built recording software on Mac OS Catalina to record my screen. I will use this recording to make notes on what works well and what doesn't work in the card sorting activity. The recording will be securely stored on the University of Sheffield servers, and will be deleted after a maximum of three years.

6. What are the possible disadvantages and risks of taking part?

We don't foresee any serious disadvantages or risks to your child that might occur through participating in the study. However, if your child experiences significant distress whilst speaking about their concerns around climate change, I will send them (and you) the contact details of counsellors from the Climate Psychology Alliance, who are experienced in supporting people with such distress.

In the interview, your child does not have to answer every question. They have the right to say that they do not wish to answer the question, and they can withdraw their participation at any time. You can also withdraw their participation at any time on their behalf.

7. What will my child gain from taking part?

There is no financial reward for taking part. However, I will offer to send you and your child a copy of the final research report if you are interested.

8. What happens if the research project stops earlier than expected?

Although unlikely, if for any reason the research project stops earlier than expected, you and your child will be offered a full and clear explanation as to why, and I will ask whether you or your child would like any of the personal data collected (i.e. the video recordings) to be deleted.

9. What if something goes wrong?

If you feel something has gone wrong or you or your child would like to raise an issue/complaint, please do not hesitate to contact me: **rlee11@sheffield.ac.uk**

If you or your child want to complain but do not want to contact me, please contact my research supervisor Dr Martin Hughes: **m.j.hughes@sheffield.ac.uk**

I am ultimately accountable to my doctoral course director Dr Anthony Williams, so you or your child can also contact him: **anthony.williams@sheffield.ac.uk**

If your complaint relates to how your child's personal data has been handled, please also refer to the information about how to raise a complaint here: **The University of Sheffield Data Protection Guidance**.

10. Will my child's participation in this project be kept confidential?

Your child's participation in the project and everything they say will be kept strictly confidential. They will not be identified in any reports or publications when I write up the findings of the research. If I use quotes from your child, I will assign them a pseudonym (i.e. a fake name), and will remove any details that could be used to identify them.

However, if your child tells me something that suggests they are in danger or at serious risk, then I will share this information with the designated safeguarding lead at their school or college. I will inform them if I plan to do this. Additionally, in the (very unlikely) event that they talk about having harmed (or intending to harm) other people or animals, or having undertaken (or intending to undertake) actions that will result in intentional and substantial

property damage, I will share this information with the designated safeguarding lead at their school or college. This response is equivalent to the standard safeguarding procedure followed by most educational psychologists working for local authorities, and the designated safeguarding leads are likely to inform you of any concerns raised.

Your child's data (my transcriptions of your child's interviews) will only be shared with me and my dissertation supervisor at the University of Sheffield, **Dr Martin Hughes**.

11. What will happen to the results/findings?

I am undertaking this research as part of my doctoral training to become an educational psychologist. This is a three-year course, and at the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, and will be assessed on this thesis in order to pass the course. The thesis will then be made publicly available in the **White Rose** thesis library.

Additionally, I will write up my results into a shorter report, which I will send to anyone who has expressed an interest in the results of the research (including you and your child, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

12. Who is organising and funding the research?

My three-year training to become an educational psychologist is funded by the Department for Education. This research is part of the requirements for work I must undertake in order to complete my training.

13. Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield School of Education's ethics review procedure. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

14. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that *'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e))*. Further information can be found in the **University's Data Protection and Privacy Notice**. The University of Sheffield will act as the '**Data Controller**' for this study. This means that the University is responsible for looking after your child's information and ensuring that it is used properly.

15. Contact for further information

If you have any questions about the study, please contact Robert Lee:

Email: **rlee11@sheffield.ac.uk**

Thank you for taking the time to read about the project!

The Consent Form

(please note: this form is online, so the 'Yes No' parts are tick boxes)

Email Address

Please enter your email address (if you have more than one address, please enter the address from which you have been emailing me), to allow me to identify who has completed the consent form:

Consent Form Questions

I confirm that I have read and understood the project information sheet (if you will answer **no** to this question then I will contact you to answer any questions, and will ask you to complete the consent form at a later date).
Yes No

I have been given the opportunity to ask questions about the project (If you answer **no** to this question, then I will contact you via email to answer any questions, and will ask you to complete the consent form at a later date).
Yes No

I give permission for my child to take part in an online interview via Google Meet.
Yes No

I agree for my child's online interview to be recorded and then transcribed, with my child's name and all identifying details removed from the transcription
Yes No

I understand that my child's participation is voluntary and that they can withdraw from the study at any point, and I can withdraw participation on their behalf; I do not have to give any reasons for why I no longer want them to take part and there will be no adverse consequences if I choose to withdraw my child from the research.
Yes No

Additional Consent for my child to take part in Pilot Study

I give permission for my child to be contacted by email about taking part in the pilot study, and for me to be CC'd into all emails.
Yes No

I give permission for my child to take part in the online card sort for the pilot study.
Yes No

I give permission for my child to take part in the post-card-sort online interview for the pilot study.
Yes No

I give permission for my child's online card sort and post-card-sort online interview to be recorded.
Yes No

I understand that my child taking part in the pilot study is voluntary and that they can withdraw from the study at any point, and that I can withdraw their participation on their behalf; I do not have to give any reasons for why I no longer want them to take part and there will be no adverse consequences if I choose to withdraw their participation.
Yes No

How my child's information will be used during and after the project

I understand that all my child's details will be anonymised. I understand that my child will not be named in any research output.
Yes No

I understand that the resulting data or information from the study will be used for a doctoral thesis at the University of Sheffield, a report for interested parties, research presentations, and also potentially publication as a journal article, but that my child will not be identifiable from this data.
Yes No

I give permission for the video recording of my child's responses to be stored securely on the University of Sheffield's U: Drive in a password protected folder
Yes No

I give permission for the video recording of my child's responses to be stored securely (by the University of Sheffield) for three years before being deleted.
Yes No

Confirmation that the information you provide can be legally used by the researchers without infringing copyright

I give permission for my child to agree to to assign the copyright they hold in any materials generated as part of this project to the University of Sheffield.
Yes No

Having understood the above, I consent for my child to take part in this study
Yes No

Participant information sheet and consent form for initial video interviews and pilot study:

Participant Information Sheet for Initial Video Interview

[note: this has also been edited online and is accessible here:
https://research.sc/participant/login/dynamic/0B4B0B00-EDDA-4B1D-B03A-0C716AC998A4]

You are being invited to take part in a study called:

How do young people engage with concerns around climate change?

Please read this information sheet before deciding whether to take part and discuss it with your parents. You can also email me (Rob Lee, the researcher) at rlee11@sheffield.ac.uk to ask for more information.

1. What is the aim of the project?

The project will explore how young people such as yourself engage with worries or concerns around climate change. However, you do not need to be worried or concerned to take part, because the project will explore a

range of people's experiences. I will also explore what engagement (if any) you would like around such concerns from your school or college staff, parents/carers, friends, and from Educational Psychologists.

You have been invited to take part in the initial study. For this, I will interview you online about your concerns about climate change using Google Meet.

2. Why have I been chosen?

You have been chosen because someone you know thought you might be interested in the study and forwarded you the information about it, to which you responded. The only requirements to take part are that you are aged 11-18, live in the UK, and that your parents/carers consent to you taking part.

3. Do I have to take part?

No, it is completely up to you. You can stop taking part at any time, and you do not even have to give a reason.

4. What will the research involve?

Online Video Interview

I will email you (in all email exchanges I will copy your parents/carers into the email) to arrange an **online video interview** using Google Meet (which will be recorded if you consent to this). You will not need to download any software to use Google Meet; you can access it through a web browser once I send you a link. The interview will explore how you experience any concerns relating to climate change. I will use the responses from you and other people to help inform the main study.

Once you have completed the interview, I will also invite you to recommend any other young people who you think would like to participate in the study. This is completely voluntary and you do not need to recommend anyone.

Additional Research Opportunity: Pilot Study Card Sort

If you would like to take part in additional research, I will also email you to invite you to take part in the pilot study. This will involve an activity called a **Card Sort** using a web-based application called **Miro**, which is a collaborative online whiteboard. You will not need to download any software to use Miro, and do not need to create an account to use it.

The Miro board will contain the set of statements relating to young people's experiences of concerns around climate change. You will need to arrange the statements about climate change concern into groups, with a 'strongly disagree' group on one side of the screen and a 'strongly agree' group on the other side. Once you have completed the card sort, I will use Miro's video chat function to ask you some questions about how you found the activity and how you think other young people would find it.

5. Will I be recorded, and how will my work be used?

Yes, if you and your parents/carers consent, I will use Google Meet to record the interview. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

I will use the recording to take notes about what you say in the interview. I will not use your name, and will remove any details that could be used to identify you. The recording will not be seen by anyone else, but my notes could be seen by my research supervisor.

If you also take part in the pilot study, with consent I will record your online card sort task and post-sort interview, and will use this to make notes on the card sorting task. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

6. What are the possible risks of taking part?

There are no serious risks in taking part. However, if you experience significant distress whilst speaking about your concerns around climate change, I will send you and your parents/carers information about supportive organisations that you can speak to.

7. What will I gain from taking part?

There is no reward for taking part. However, I will offer to send you a copy of the final research report.

8. What if something goes wrong?

[Please note that my current research supervisor, Martin Hughes is leaving at the end of August, so Lorraine Campbell will be my new research supervisor. I have therefore used Lorraine's name in the information sheet, at Martin's request]

If the research project stops earlier than expected, I will send you a clear explanation and I will ask whether you would like the recordings to be deleted earlier than scheduled.

If you feel something has gone wrong or would like to raise an issue/complaint, please do not hesitate to contact me: rlee11@sheffield.ac.uk

If you want to complain but do not want to contact me, please contact my research supervisor Dr Lorraine Campbell: L.N.Campbell@sheffield.ac.uk

If your complaint relates to how your personal data has been handled, please read the information about how to raise a complaint here: University's Privacy Notice

9. Will my taking part in this project be kept confidential?

Everything you say will be completely confidential and you will not be identified in any reports when I write up the findings of the research. If I use a quote from you in my research, I will not use your name, and will email you to ask whether you would like to choose a fake name to be used.

However, if you tell me something that suggests you are in danger (or pose a serious danger to others), then I have to share this with the designated safeguarding lead at your school or college. I will tell you if I have to do this.

10. What will happen to the results/findings?

I am undertaking this research as part of my training to become an educational psychologist. At the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, which will be made available in the White Rose thesis library.

I will also produce a shorter report, which I will send to anyone who has expressed an interest in the research (including yourself, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

11. Who is organising and funding the research?

My training is funded by the Department for Education. This research is part of the requirements for my training.

12. Who has ethically reviewed the project?

This project has been approved by the University of Sheffield School of Education's Ethics Committee.

13. What is the legal basis for processing my personal data?

The legal basis for processing your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice. The University of Sheffield (the 'Data Controller') is responsible for looking after your information and using it properly.

14. Contact for further information

If you have any questions about the study, please contact me (Rob Lee).

Email: rlee11@sheffield.ac.uk

Thank you for taking the time to read this!

Participant Consent Form

Email Address

Please enter your email address to allow me to identify who has completed the consent form:

Consent form questions

I have read and understood the project information sheet

Yes No

I have been given the opportunity to ask questions about the project (by email)

Yes No

I agree to take part in the online interview using Google Meet.

Yes No

I agree for my online interview to be recorded and then converted into written text in which my name and all identifying details have been removed.

Yes No

I understand that my taking part is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

Additional Consent to take part in the Pilot Study

I agree to be emailed about the pilot study (with my parents/carers copied into the email).

Yes No

I agree to take part in the online card sort for the pilot study.

Yes No

I agree to take part in the online interview after the card sort.

Yes No

I agree for these activities to be recorded (using screen recording software).
Yes No

I understand that my taking part in the pilot study is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

How my information will be used during and after the project

I understand that how the data from the study will be used (for: a research thesis, a report for people who are interested, research presentations, and possibly a journal article).

Yes No

I understand that I will not be named or identifiable in any reports or presentations about the research.

Yes No

I give permission for the video recordings to be stored electronically on a secure University of Sheffield server.

Yes No

I give permission for the video recordings to be kept for three years before being deleted.

Yes No

Confirmation that the information you provide can legally be used by the researchers without infringing copyright

I agree to assign the copyright I hold in any materials generated by this project to the University of Sheffield.

Yes No

Having understood the above, I consent to take part in this study
Yes No

Information sheet and consent form for (adult) participants in pilot study:

Participant Information Sheet for Pilot Study

You are being invited to participate in pilot study for a research project called:

How do young people engage with concerns around climate change?

The consent form is at the end of this sheet. Please read this information sheet carefully and thoroughly before deciding on whether to consent - it is important for you to understand why the research is being done and what it will involve before you decide whether to participate.

Please read the following information carefully and take time to discuss it with others if you wish. You can also email me (the researcher) at **rlee11@sheffield.ac.uk** to ask for more information, or to ask me about anything that you do not understand.

1. What is the aim of the project?

The project will explore what concerns young people have around climate change, what this feels like, and how this interacts with the rest of their lives. Once I have identified particular types of experience/engagement, I will conduct focus groups with groups of young people who reported similar experiences, to explore what engagement with their concerns (if any) they would like from their school/college staff, their parents/carers, their peers, and from Educational Psychologists.

The main project will explore young people's concerns using an activity called a 'card sort', in which young people arrange sets of statements according to the degree that they agree or disagree with them. The purpose of the pilot study is to test whether the statements that I intend to use make sense, and to explore whether there are any additional statements that I should add. To make recruitment more manageable, I am using a mixture of young people and adults for the pilot study, but the main study will just be undertaken with young people aged 11-18.

2. Why have I been chosen for the Pilot Study?

You have been chosen due to one of the following reasons:

1. You are a member of the Climate Psychology Alliance, and responded to a recruitment email that I sent to the mailing list.
2. You are a trainee on the University of Sheffield Doctorate of Child and Educational Psychology training course, and responded to a recruitment email that I sent to the mailing list.
3. Someone you know undertook the study and thought that you have a valuable perspective and might be interested in participating, so they sent you an email and you responded.

In all cases, you have been identified as an appropriate participant because you may have some understanding of either the complexities of climate psychology and people's experiences of concerns relating to climate change, of

the complexities facing educational psychologists who would like to work with young people who have concerns relating to climate change, or a combination of the two.

3. Do I have to take part?

No, it is completely up to you whether you take part or not. Your participation is entirely voluntary. You will be asked to sign a consent form at the end of this information sheet to say that you are happy to participate. However, you can still change your mind and stop participating at any time, and you do not have to give a reason for doing so.

4. What will the research involve?

All participation will be online (due to the University of Sheffield regulations as a result of COVID-19). You are being invited to take part in the pilot study that will inform the main study.

After you complete the consent form, I will email you to arrange a time when we can undertake a **card sorting activity** (called a **Q sort**) using a web-based application called **Miro**. Miro is a collaborative whiteboard, and it will contain the set of statements relating to young people's experience of concerns around climate change (these will be taken from existing climate psychology literature, plus interviews with young people). You will not need to download any software to use Miro, and do not need to create an account to use it (my account allows me to add you as a 'guest collaborator').

You will need to arrange the statements about climate change concern into groups, from 'strongly disagree' on one side of the screen to 'strongly agree' on the other side. During this, I will observe your activity through Miro. Once you have completed the card sort, I will then use the in-browser video chat function that Miro provides to ask you some questions about how you found the activity, how you think young people will find it, and whether the statements in the card sort made sense.

Once you have completed the post-card-sort online interview, I will invite you to recommend any other people who you think would like to participate in the pilot study. If you are happy to contact them, I will send you an email for you to forward to them (so that you do not need to share their email address with me, and they can choose to email me if they are interested in participating).

5. Will I be recorded, and how will my work be used?

Yes, if you consent to your online card sort and post-card-sort online video interview being recorded, then I will record your online card sort task and post-sort interview using the in-build recording software on Mac OS Catalina to record my screen. I will use this to make notes on what works well and what doesn't work in the card sorting activity; these notes will not contain your name or any identifying details. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

The recording will not be seen by anyone else, but the notes could be seen by my research supervisor, Dr Martin Hughes.

6. What are the possible disadvantages and risks of taking part?

I don’t foresee any serious disadvantages or risks in participating in the study. However, if you experience significant distress whilst undertaking the card sort or post-sort interview, I will signpost you to appropriate sources of support (such as other therapists from the Climate Psychology Alliance).

In the post-card sort online interview, you do not have to answer every question. You have the right to say no to questions if you do not wish to answer them, and you can withdraw your participation at any time.

7. What will I gain from taking part?

There is no reward or payment for taking part. However, I will offer to send you a copy of the final research report.

8. What happens if the research project stops earlier than expected?

Although unlikely, if for any reason the research project stops earlier than expected, you will be offered a full and clear explanation as to why, and I will ask whether you would like any personal data collected (i.e. the recordings of your card sort and post-sort interview) to be deleted.

9. What if something goes wrong?

If you feel something has gone wrong or would like to raise an issue/complaint, please do not hesitate to contact me: **rlee11@sheffield.ac.uk**

If you want to complain but do not want to contact me, please contact my research supervisor Dr Martin Hughes: **m.j.hughes@sheffield.ac.uk**

I am ultimately accountable to my course director Dr Anthony Williams, so you can also contact him: **anthony.williams@sheffield.ac.uk**

If your complaint relates to how your personal data has been handled, please use the information about how to raise a complaint here: **University of Sheffield Data Protection Guidance**.

10. Will my taking part in this project be kept confidential?

As a participant of the research, your participation in the project and everything you say (and do during the card sorting activity) will be kept strictly confidential. You will not be identified in any reports or publications when I write up the findings of the research. If I use quotes from you, I will give you a pseudonym and will remove any details that could be used to identify you.

However, if you tell me something that suggests you are in danger or at serious risk, then I will have to pass this on (as a safeguarding concern). In such a situation, I will consult with my research supervisor to assess who would be the appropriate person/organisation to contact for your particular situation. Additionally, in the (very unlikely) event that you talk about having harmed (or intending to harm) other people or animals, I will again consult with my research supervisor to assess who would be the appropriate person/organisation to contact for your particular situation. In either situation, I will inform you that I am going to consult with my research supervisor.

Your non-video data (my anonymised transcriptions and notes of your post-card sort interviews) will only be shared with me and my research supervisor at the University of Sheffield, **Dr Martin Hughes**.

11. What will happen to the results/findings?

I am undertaking this research as part of my training to become an educational psychologist. This is a three-year course, and at the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, and will be assessed on this thesis in order to pass the course. The thesis will then be made publicly available in the **White Rose** thesis library.

Additionally, I will write up my results into a shorter report, which I will send to anyone who has expressed an interest in the results of the research (including yourself, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

12. Who is organising and funding the research?

My three-year training to become an educational psychologist is funded by the Department for Education. This research is part of the requirements for my training.

13. Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield School of Education's ethics review procedure. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

14. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that *'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)).* Further information can be found in the **University of Sheffield Privacy Notice**.

The University of Sheffield will act as the **'Data Controller'** for this study. This means that the University is responsible for looking after your information and using it properly.

15. Contact for further information

If you have any questions about the study, please contact me (Rob Lee):

Email: **rlee11@sheffield.ac.uk**

Thank you for taking the time to read about the project!

Consent Form for the Pilot Study

(please note that the actual consent form is online, so the 'Yes No' parts are radio buttons for participants to select)

Email Address

Please enter your email address below to allow the researcher to identify who is completing the consent form (if you have more than one email address, please use the address that you have been using to communicate with me):

Consent Form Main Questions

I confirm that I have read and understood the project information sheet (if you will answer **no** to this question then I will contact you to answer any questions, and will ask you to complete the consent form at a later date).

Yes No

I have been given the opportunity to ask questions about the project (If you answer **no** to this question, then I will contact you via email to answer any questions, and will ask you to complete the consent form at a later date).

Yes No

I agree to take part in the online card sort for the pilot study.

Yes No

I agree to take part in the post-card-sort online interview for the pilot study.

Yes No

I agree for my online card sort and post-card-sort online interview to be recorded.

Yes No

I understand that my taking part in the pilot study is voluntary and that I can withdraw from the study at any point; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.

Yes No

How my information will be used during and after the project

I understand that all my details will be anonymised. I understand that I will not be named in any of the research output.

Yes No

I understand that the resulting data or information from the study will be used for a doctoral thesis at the University of Sheffield, a report for interested parties, research presentations, and also potentially publication as a journal article, but that I will not be identifiable from any of this data.

Yes No

I give permission for the video recording of my responses to be stored securely on the University of Sheffield's U: Drive in a password protected folder.

Yes No

I give permission for the video recording of my responses to be stored securely (by the University of Sheffield) for three years before being deleted.

Yes No

Confirmation to allow the researchers to legally use information generated from the research without infringing copyright

I agree to assign the copyright I hold in any materials generated as part of this project to the University of Sheffield.

Yes No

Having understood the above, I consent to take part in this study
Yes No

Information Sheet and Consent Form for Parents/Carers of Participants Undertaking Main Study:

Information Sheet and Consent Form for Parents/Carers of Participants Undertaking Main Study

Your child has been invited to participate in a research project called:

How do young people engage with concerns around climate change?

The consent form is at the end of this sheet. Please read this information sheet carefully and thoroughly before deciding on whether to consent to their participation - it is important for you to understand why the research is being done and what it will involve before you decide whether they can participate.

Please read the following information carefully and take time to discuss it with others if you wish. You can also email me (the researcher) at **rlee11@sheffield.ac.uk** to ask for more information, or to ask me about anything that you do not understand.

1. What is the aim of the project?

The project will explore what concerns young people in the UK have around climate change, what this feels like, and how this interacts with the rest of their lives. Once I have identified particular patterns of experience/engagement, I will conduct focus groups with groups of young people who reported similar experiences, to explore what engagement with their concerns (if any) they would like from their school/college staff, their parents/carers, their classmates, and from Educational Psychologists.

The project will explore young people's concerns using an online **card sort**, in which they are required to arrange sets of statements into groups according to how much they agree or disagree with them. The second half of the study will involve taking part in an online focus group, in which they will have an opportunity to talk about their experience and what engagement they would like from others.

2. Why has my child been chosen for the research?

Your child has been identified as an appropriate participant because they are aged 11-18, live in the UK, and (in most cases) feel impacted in some way by concerns around climate change. Your child has been recruited through one of several methods:

1. A staff member in their school/college sent them and other students a recruitment email (or put up a poster/made an announcement) to which they responded.
2. An administrator for a group that is involved with issues around climate change (and whose mailing list your child has signed up to) sent your child an email and they responded.

3. One of your child's friends/peers undertook the study and thought that they might be interested in participating, so sent your child an email and they responded (this is a research recruitment technique known as 'snowballing').

3. Does my child have to take part?

No, it is completely up to you whether you consent to your child taking part or not. It is then completely up to your child whether they decide that they still want to take part. Their participation is entirely voluntary. Your child will also be asked to sign a consent form to say that they are happy to participate. However, both you and you child can still change your mind and stop your child from participating at any time, and neither of you are required to give a reason for withdrawing.

4. What will the research involve?

All participation will be online (due to the University of Sheffield regulations as a result of COVID-19).

Online Questionnaires

After you complete this consent form, I will email your child their own consent form to complete. Once this is completed, I will send them a link to some online questionnaires. These will be used to provide some context for people's responses in the online card sort activity. I will collect some basic demographic information (age, gender, ethnicity, and school/college), and then invite them to complete the **Family Affluence Scale III** as an economic measure, the **MacArthur Scale of Subjective Social Status - youth version** and **Subjective Social Status - school dimensions** questionnaires as measures of perceived social status, and **Kahan's Cultural Cognition Worldview Scale** as a measure of their wider values.

It is completely optional as to whether they answer the questions in these scales, and the data generated will be stored separately from their contact details to ensure that all responses are anonymous and cannot be traced back to them (a code will be allocated to their responses, so that their responses on the questionnaires can be linked to their responses on the card sort).

Online Card Sort Activity

Following the online questionnaires, I will email them to arrange a time for them to undertake the **online card sorting activity** (called a **Q sort**) using a web-based application called **Miro**. Miro is a collaborative whiteboard, and it will contain the set of statements relating to young people's experience of concerns around climate change. They will not need to download any software to use Miro, and do not need to create an account to use it (my account allows me to add them as an 'anonymous guest collaborator').

They will need to arrange the statements about climate change concern into multiple groups, from 'strongly disagree' on one side of the screen to 'strongly agree' on the other side. During this, I will observe their activity live through Miro. Once they have completed the card sort, I will then use the in-browser video chat function that Miro provides to ask them some questions about how they found the activity, whether they felt that they could express their experience through the task, and whether there is anything they would like to add.

Once they have completed the interview, I will invite them to recommend other young people who they think would like to participate in the study. This is a well-established recruitment technique known as 'snowballing'. If your child is happy to do so, I will send them an email about the research for them to forward to the people they identified (by using this procedure I will not require your child to send me the other people's email addresses, since the others will then email me if they are interested).

Online Focus Group

A few months later, I will contact them again by email, and ask whether they would like to participate in an **online focus group** with 3-5 other participants. I will feed back my analysis of the Q Sorts on some of the common ways that young people are engaging with concerns about climate change, and we will then explore whether they young people in the group relate to any of these ways, and what kind of engagement on this issue they would like from school staff, their parents/carers, educational psychologists, and their peers.

The focus groups will be undertaken using **Google Meet**. I will send them a link to the focus group chat, so they won't need a Google account (although it's also fine if they have one), and they won't need to download any apps to participate (Google Meet can be accessed from a web browser).

5. Will my child be recorded, and how will this be used?

Yes, if you and your child consent to their online card sort and post-card-sort online video interview being recorded, then I will record these using the in-build recording software on Mac OS Catalina to record my screen. I will use the recording to make notes on their experience of the card sorting activity; these notes will not contain their name or any identifying details. The recording will be securely stored on the University of Sheffield servers, and will be deleted after a maximum of three years.

If you and your child consent to the online focus groups being recorded, then I will use the record feature on Google Meet to record the interview. The recording will be securely stored on the University of Sheffield servers, and will be deleted after a maximum of three years.

I will use the recording to transcribe the focus group (i.e. write down what everyone says in the focus group). In the transcription, I will not use your child's name, and will remove any details that could be used to identify them and others.

The recordings will not be seen by anyone else, but the notes could be seen by my research supervisor, **Dr Martin Hughes**.

6. What are the possible disadvantages and risks of taking part?

I don’t foresee any serious disadvantages or risks to your child that might occur through them participating in the study. However, if your child experiences significant distress whilst speaking about their concerns around climate change, I will send them (and you) the contact details of counsellors from the Climate Psychology Alliance, who are experienced in supporting people with such distress.

In the post-card sort online interview and focus groups, your child does not have to answer every question. They have the right to say that they do not wish to answer the question, and they can withdraw their participation at any time. You can also withdraw their participation at any time on their behalf.

7. What will my child gain from taking part?

There is no financial reward for taking part. However, I will offer to send you and your child a copy of the final research report if you are interested.

8. What happens if the research project stops earlier than expected?

Although unlikely, if for any reason the research project stops earlier than expected, you and your child will be offered a full and clear explanation as to why, and I will ask whether you or your child would like any of the personal data collected (i.e. the video recordings) to be deleted.

9. What if something goes wrong?

If you feel something has gone wrong or you or your child would like to raise an issue/complaint, please do not hesitate to contact me: **rlee11@sheffield.ac.uk**

If you or your child want to complain but do not want to contact me, please contact my research supervisor Dr Martin Hughes: **m.j.hughes@sheffield.ac.uk**

I am ultimately accountable to my doctoral course director Dr Anthony Williams, so you or your child can also contact him: **anthony.williams@sheffield.ac.uk**

If your complaint relates to how your child's personal data has been handled, please also refer to the information about how to raise a complaint here: **The University of Sheffield Data Protection Guidance**.

10. Will my child's participation in this project be kept confidential?

Your child's participation in the project and everything they say will be kept strictly confidential. They will not be identified in any reports or publications when I write up the findings of the research. If I use quotes from your child, I will assign them a pseudonym (i.e. a fake name), and will remove any details that could be used to identify them.

However, if your child tells me something that suggests they are in danger or at serious risk, then I will share this information with the designated safeguarding lead at their school or college. I will inform them if I plan to do this. Additionally, in the (very unlikely) event that they talk about having harmed (or intending to harm) other people or animals, or having undertaken (or intending to undertake) actions that will result in intentional and substantial property damage, I will share this information with the designated safeguarding lead at their school or college. This response is equivalent to the standard safeguarding procedure followed by most educational psychologists working for local authorities, and the designated safeguarding leads are likely to inform you of any concerns raised.

Your child's data (my transcriptions of your child's interviews) will only be shared with me and my dissertation supervisor at the University of Sheffield, **Dr Martin Hughes**.

11. What will happen to the results/findings?

I am undertaking this research as part of my doctoral training to become an educational psychologist. This is a three-year course, and at the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, and will be assessed on this thesis in order to pass the course. The thesis will then be made publicly available in the **White Rose** thesis library.

Additionally, I will write up my results into a shorter report, which I will send to anyone who has expressed an interest in the results of the research (including you and your child, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

12. Who is organising and funding the research?

My three-year training to become an educational psychologist is funded by the Department for Education. This research is part of the requirements for work I must undertake in order to complete my training.

13. Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield School of Education's ethics review procedure. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

14. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that *'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e))*. Further information can be found in the **University's Data Protection and Privacy Notice**. The University of Sheffield will act as the '**Data Controller**' for this study. This means that the University is responsible for looking after your child's information and ensuring that it is used properly.

15. Contact for further information

If you have any questions about the study, please contact Robert Lee:

Email: **rlee11@sheffield.ac.uk**

Thank you for taking the time to read about the project!

Parent/Carer Consent Form for Main Study

Email Address

Please enter **your** email address (if you have more than one address, please enter the address from which you have been emailing me), to allow me to identify who has completed the consent form:

Consent form questions

I confirm that I have read and understood the project information sheet (if you will answer **no** to this question then I will contact you to answer any questions, and will ask you to complete the consent form at a later date).

Yes No

I have been given the opportunity to ask questions about the project (If you answer **no** to this question, then I will contact you via email to answer any questions, and will ask you to complete the consent form at a later date).

Yes No

I consent for my child to undertake the online questionnaires to provide context for my card sort.

Yes No

I consent for my child to take part in the online card sort.

Yes No

I consent for my child to take part in the post-card-sort online interview.

Yes No

I consent for my child's online card sort and post-card-sort online interview to be recorded.

Yes No

I consent for my child to take part in the online focus groups via Google Meet.

Yes No

I consent for my child's participation in the online focus group to be recorded and then transcribed with my name and all identifying details removed.

Yes No

I understand that my child's participation is voluntary and that both they and I I can withdraw them from the study at any point; I do not have to give any reasons for why I no longer want them to take part and there will be no adverse consequences if I choose to withdraw my child.

Yes No

How my child's information will be used during and after the project

I understand that all my child's details will be anonymised. I understand that my child will not be named in any of the research output.

Yes No

I understand that the resulting data or information from the study will be used for a doctoral thesis at the University of Sheffield, a report for interested parties, research presentations, and also potentially publication as a journal article, but that my child will not be identifiable from any of this data.

Yes No

I give permission for the video recording of my child's responses to be stored securely on the University of Sheffield's U: Drive in a password protected folder.

Yes No

I give permission for the video recording of my child's responses to be stored securely (by the University of Sheffield) for up to three years before being deleted.

Yes No

Confirmation that the information your child provides can legally be used by the researchers without infringing copyright

I agree to assign the copyright that I or my child hold in any materials generated as part of this project to the University of Sheffield.

Yes No

Having understood the above, I consent for my child to take part in this study
Yes No

Information Sheet and Consent Form for Participants Undertaking Main Study:

Participant Information Sheet and Consent Form For the Main Study

You are being invited to take part in a research project called:

How do young people engage with concerns around climate change?

Please read this information sheet before deciding whether to take part and discuss it with your parents. You can also email me (Rob Lee, the researcher) at rlee11@sheffield.ac.uk to ask for more information.

1. What is the aim of the project?

The project will explore how young people such as yourself engage with worries or concerns around climate change. However, you do not need to be worried or concerned to take part, because the project will explore a range of people's experiences. I will also explore what engagement (if any) you would like around such concerns from your school or college staff, parents/carers, friends, and from Educational Psychologists.

You will undertake an online card sorting task, in which you are required to arrange sets of statements into groups according to how much you agree or disagree with them. The second half of the study will involve taking part in an online focus group, where you can talk about your experiences.

2. Why have I been chosen?

You have been chosen because someone you know thought you might be interested in the study and forwarded you the information about it, to which you responded. The only requirements to take part are that you are aged 11-18, live in the UK, and that your parents/carers consent to you taking part.

3. Do I have to take part?

No, it is completely up to you. You can stop taking part at any time, and you do not even have to give a reason.

4. What will the research involve?

Online Questionnaires

To begin, you will complete some online questionnaires, to help provide some background information about yourself. You will be invited to share information about your age, gender, ethnicity, and religious affiliation (if any). You do not need to provide this information, and can leave any question blank.

I will also invite you to complete some short questionnaires measuring your **economic background**, your **social background**, your **school background**, and your **wider values**. It is completely optional to complete these; they just help to provide more information for my analysis. All participants will have a code allocated to them, so that only I am able to link your questionnaire responses to your card sort responses.

Online Card Sort Activity

Following the online questionnaires, I will email you to arrange a time when we can undertake the **online card sorting activity** (called a **Q sort**) using a web-based application called **Miro**, which is a collaborative whiteboard. You will not need to download any software to use Miro, and do not need to create an account to use it.

Through Miro I will ask you to arrange the statements about climate change concern into multiple groups, from 'strongly disagree' on one side of the screen to 'strongly agree' on the other side. Once you have completed the card sort, I will then use Miro's in-browser video chat function to ask you some questions about how you found the card sort.

I will also invite you to recommend any other people who you think would like to participate in the research. This is completely voluntary and you do not need to recommend anyone.

Online Focus Group

A few months later, I will invite you to participate in an **online focus group** of 4-6 people via **Google Meet**. I will share my analysis of some of the common ways young people are engaging with concerns about climate change, and we will then explore whether you relate to any of these and what kind of engagement on this issue you would like from school staff, your parents/carers, your peers, and educational psychologists.

5. Will I be recorded, and how will my work be used?

Yes, if you and your parents/carers consent, I will record the card sort task and focus group. The recording will be securely stored on the University of Sheffield servers, and will be deleted after three years.

I will use the recording to make research notes about each task. I will not use your name, and will remove any details that could be used to identify you. The recording will not be seen by anyone else, but my notes could be seen by my research supervisor.

6. What are the possible risks of taking part?

There are no serious risks in taking part. However, if you experience significant distress whilst speaking about your concerns around climate change, I will send you and your parents/carers information about supportive organisations that you can speak to.

7. What will I gain from taking part?

There is no reward or payment for taking part. However, I will offer to send you a copy of the final research report.

8. What if something goes wrong?

[Please note that my current research supervisor, Martin Hughes is leaving at the end of August, so Lorraine Campbell will be my new research supervisor. I have therefore used Lorraine's name in the information sheet, at Martin's request]

If the research project stops earlier than expected, I will send you a clear explanation and I will ask whether you would like the recordings to be deleted earlier than scheduled.

If you feel something has gone wrong or would like to raise an issue/complaint, please do not hesitate to contact me: rlee11@sheffield.ac.uk

If you want to complain but do not want to contact me, please contact my research supervisor Dr Lorraine Campbell: L.N.Campbell@sheffield.ac.uk

If your complaint relates to how your personal data has been handled, please read the information about how to raise a complaint here: University's Privacy Notice

9. Will my taking part in this project be kept confidential?

Everything you say will be completely confidential and you will not be identified in any reports when I write up the findings of the research. If I use a quote from you in my research, I will not use your name, and will email you to ask whether you would like to choose a fake name to be used.

However, if you tell me something that suggests you are in danger (or pose a serious danger to others), then I have to share this with the designated safeguarding lead at your school or college. I will tell you if I have to do this.

10. What will happen to the results/findings?

I am undertaking this research as part of my training to become an educational psychologist. At the end of my course I will present my results to the other trainees on my course, plus my university tutors. I will also write it up as a doctoral thesis, which will be made available in the White Rose thesis library.

I will also produce a shorter report, which I will send to anyone who has expressed an interest in the research (including yourself, if you would like a copy). Finally, I may present the research at conferences, and hope to publish a summary of the research as a journal article.

11. Who is organising and funding the research?

My training is funded by the Department for Education. This research is part of the requirements for my training.

12. Who has ethically reviewed the project?

This project has been approved by the University of Sheffield School of Education's Ethics Committee.

13. What is the legal basis for processing my personal data?

The legal basis for processing your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice. The University of Sheffield (the 'Data Controller') is responsible for looking after your information and using it properly.

14. Contact for further information

If you have any questions about the study, please contact me (Rob Lee).

Email: rlee11@sheffield.ac.uk

Thank you for taking the time to read this!

Participant Consent Form for Main Study

Email Address

Please enter your email address to allow me to identify who has completed the consent form:

Consent form questions

I have read and understood the information sheet

Yes No

I have been given the opportunity to ask questions about the project (by email)

Yes No

I agree to undertake the online questionnaires.

Yes No

I agree to take part in the online card sort.

Yes No

I agree to take part in the post-card-sort online interview.

Yes No

I agree for my online card sort and post-card-sort online interview to be recorded.

Yes No

I agree to take part in the online focus groups via Google Meet.

Yes No

I agree for my participation in the online focus group to be recorded.

Yes No

I understand that my taking part is voluntary and that I can withdraw from the study at any point without giving a reason.

Yes No

How my information will be used during and after the project

I understand that how the data from the study will be used (for: a research thesis, a report for people who are interested, research presentations, and possibly a journal article)

Yes No

I understand that I will not be named or identifiable in any reports or presentations about the research.

Yes No

I give permission for the video recordings to be stored electronically on a secure University of Sheffield server

Yes No

I give permission for the video recordings to be kept for three years before being deleted.

Yes No

Confirmation that the information you provide can legally be used by the researchers without infringing copyright

I agree to assign the copyright I hold in any materials generated by this project to the University of Sheffield.

Yes No

Having understood the above, I consent to take part in this study
Yes No

Supplementary Appendix C3.4 Optional Questionnaires for main study participants

Climate Change Concern Surveys

These surveys will help me to interpret your online card sort. However, you do not need to answer them, and can leave questions blank.

Demographic Questions

1.) What is your age?
2.) What is your gender?
3.) What is your ethnicity?
4.) Do you have a faith or religion? If so, what is it?

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Family Affluence Scale

The following scale is used by the World Health Organisation as a rough measure of socio-economic status. You do not need to answer it, but if you do, please answer all six questions.

1.) Does your family have a car, van or truck?

No
Yes - one
Yes - two or more

2.) Do you have your own bedroom for yourself?

No
Yes

3.) How many times did you travel abroad for holiday/vacation last year? (the year before the coronavirus pandemic)

Not at all
Once
Twice
More than twice

4.) How many computers does your family own?

None
One
Two
More than two

5.) Do you have a dishwasher at home?

No
Yes

6.) How many bathrooms (room with a bath) are in your home?

None
One
Two
More than two

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McArthur Scale of Subjective Social Status

Imagine that the ladder below pictures how **British** society is set up.

At the top of the ladder are the people who are the best off — those who have the most money, the highest amount of schooling, and the jobs that bring the most respect. At the bottom are people who are the worst off — those who have the least money, little or no education, no job, or jobs that no one wants or respects.

Now think about your family.

Please tell us where you think your family would be on this ladder. Select the rung number that best represents where your family would be on this ladder.

[picture of ladder with numbers on rungs]

Please select the rung number that best represents where your family would be on this ladder.

Please Select... 10 9 8 7 6 5 4 3 2 1

Subjective Social Status - School Dimensions Questionnaire

Now assume that the ladder is a way of picturing people in your year group at **school or college**.

Where would you place yourself on this ladder? Please select the numbered rung that best represents where you would be on this ladder for each question.

Please note that answering this questionnaire is entirely optional.

1.) How POPULAR are you compared with the rest of your year group? (Not just compared with your friends)

Please Select... 10 9 8 7 6 5 4 3 2 1

2.) How WELL ARE YOU DOING AT SCHOOL compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

3.) How POWERFUL are you compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

4.) How much of a TROUBLE-MAKER are you compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

5.) How ATTRACTIVE OR STYLISH are you compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

6.) How RESPECTED are you compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

7.) How SPORTY are you compared with the rest of your year group?

Please Select... 10 9 8 7 6 5 4 3 2 1

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'Six Americas' Climate Change Scale (UK Version)

The following scale is used by Yale University to distinguish between six prominent approaches towards climate change. It is optional whether you complete it, but if you do, I will compare your responses to your responses on the Q sort.

Recently you may have noticed that global warming has been getting some attention in the news. Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result.

1.) What do you think? Do you think that global warming is happening?

Yes and I'm extremely sure
Yes and I'm very sure
Yes and I'm somewhat sure
Yes but I'm not at all sure
No and I'm extremely sure
No and I'm very sure
No and I'm somewhat sure
No but I'm not at all sure
I don't know

2.) Assuming global warming is happening, do you think it is ...

Caused mostly by human activities
Caused mostly by natural changes in the environment
Other
None of the above because global warming isn't happening

3.) How worried are you about global warming?

Very worried
Somewhat worried
Not very worried
Not at all worried

4.) How much do you think global warming will harm you personally?

Not at all
Only a little
A moderate amount
A great deal
Don't know

5.) When do you think global warming will start to harm people in the United Kingdom?

They are being harmed now
In 10 years
In 25 years
In 50 years
In 100 years
Never

6.) How much do you think global warming will harm future generations of people?

Not at all
Only a little
A moderate amount
A great deal
Don't know

7.) How much had you thought about global warming before today?

A lot
Some
A little
Not at all

8.) How important is the issue of global warming to you personally?

Not at all important
Not too important
Somewhat important
Very important
Extremely important

9.) How much do you agree or disagree with the following statement: "I could easily change my mind about global warming."

Strongly agree
Somewhat agree
Somewhat disagree
Strongly disagree

10.) How many of your friends share your views on global warming?

None
A few
Some
Most
All

11.) Which of the following statements comes closest to your view?

Global warming isn't happening.
Humans can't reduce global warming even if it is happening.
Humans could reduce global warming but people aren't willing to change their behaviour so we're not going to.
Humans could reduce global warming but it's unclear at this point whether we will do what's needed.
Humans can reduce global warming and we are going to do so successfully.

12.) Do you think citizens themselves should be doing more or less to address global warming?

Much less
Less
Currently doing the right amount
More
Much more

13.) Over the past 12 months, how many times have you punished companies that are opposing steps to reduce global warming by NOT buying their products?

Never
Once
A few times (2-3)
Several times (4-5)
Many times (6+)
Don't know

14.) Do you think global warming should be a low, medium, high, or very high priority for the Prime Minister and Parliament?

Low
Medium
High
Very high

15.) People disagree whether the United Kingdom should reduce greenhouse gas emissions on its own, or make reductions only if other countries do too. Which of the following statements comes closest to your own point of view?

The United Kingdom should reduce its greenhouse gas emissions ...

Regardless of what other countries do
Only if other industrialised countries (such as: the USA; Germany; Japan) reduce their emissions
Only if other industrialised countries and developing countries (such as: China; India; Brazil) reduce their emissions
The UK should not reduce its emissions
Don't know

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Final Survey: Climate Anxiety Scale

Thank-you for working through the surveys. This final survey is a measure of climate anxiety that has recently been developed by some leading researchers in the field (Clayton & Karazsia, 2020)

Please rate how often the following items are true of you:

1. Thinking about climate change makes it difficult for me to concentrate.

Never	Rarely	Sometimes	Often	Almost Always

2. Thinking about climate change makes it difficult for me to sleep.

[Imagine that the above boxes: ‘never’, ‘rarely’, ‘sometimes’, ‘often’, ‘almost always’ are present for every question – they’ve been cut from this document to reduce the file size]

3. I have nightmares about climate change

4. I find myself crying because of climate change

5. I think, “why can't I handle climate change better?”

6. I go away by myself and think about why I feel this way about climate change

7. I write down my thoughts about climate change and analyse them

8. I think, “why do I react to climate change this way?”

9. My concerns about climate change make it hard for me to have fun with my family or friends.

10. I have problems balancing my concerns about sustainability with the needs of my family.

11. My concerns about climate change interfere with my ability to get work or school assignments done.

12. My concerns about climate change undermine my ability to work to my potential.

13. My friends say I think about climate change too much.

14. I have been directly affected by climate change

15. I know someone who has been directly affected by climate change

16. I have noticed a change in a place that is important to me due to climate change

17. I wish I behaved more sustainably

18. I recycle

19. I turn off lights

20. I try to reduce my behaviours that contribute to climate change

21. I feel guilty if I waste energy

22. I believe I can do something to help address the problem of climate change

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Supplementary Appendix C4.1 Instructions for using Miro provided to participants

Dear XXXX,

Thank-you for agreeing to participate on XXXXX at XX:XX. Here's a link to the online whiteboard for that session - I'll explain the task at the start of the session: [Link]

The whiteboard link should work in any web browser (such as Firefox or Chrome) and you don't need to create an account or download anything. I've found that it's easiest to do the card sort using a laptop with a mouse which has a mouse wheel, since this allows you to easily zoom in and out.

It's also helpful if your laptop has a webcam, since it allows us to video conference within the session. To video conference (or if you prefer, audio conference), I think what you need to do is to wait for me (as the admin) to start the video conference (which I will do as soon as I'm logged on), and then click 'Join'.

After this, click 'start' once on the bar that appears at the bottom of the screen and then on the video icon and wait 30 seconds (Sometimes the video takes a while to load):

[image here cut to reduce file zise]

You'll then need to click on the microphone icon (on the same bar) to get audio.

Many thanks,
Rob

Supplementary Appendix C4.2 Rough script for the explanation of the Q-sorting activity for Participants

The activity that you are going to undertake is called a 'Q-sort'. The purpose of it is to allow you to show how strongly you agree or disagree with a series of statements, all of which relate to how you engage with concerns around climate change.

There is one statement on each orange post-it. You can move these around the whiteboard by clicking once on it, and then clicking and holding whilst moving the cursor around, to drag the post-it (demonstrate). You can zoom in and out by using the mouse wheel, by clicking on the plus and minus signs in the bottom right hand corner, or if you're using a touchscreen or trackpad, by moving your fingers apart or together, using the same technique that you would use to zoom in or out when looking at a photo on a mobile phone (demonstrate). I recommend that you zoom in to read the statements, then zoom out slightly to move them about (demonstrate).

There are 69 statements in total. You'll undertake the Q-sorting activity in two stages. In the first stage I want you to sort the statements into three groups; place statements that you broadly agree with next to the 'agree' sign (demonstrate); place statements that you broadly disagree with next to the 'disagree' sign (demonstrate); and for statements where you either don't have a strong opinion about them, or you feel ambivalent about them (i.e. you partially agree and partially disagree with them), or you don't know where to place them, place them in the middle next to the 'neutral/ambivalent/unsure' sign (demonstrate).

In this first stage you don't need to decide how strongly you feel about a statement. However, once the first stage is finished, I will ask you to sort the statements into this Q-sort grid (demonstrate). This grid has columns labelled from minus five to plus five. Minus five is for statements with which you most strongly disagree, whilst plus five is for statements with which you most strongly agree. You can only place as many statements in a column as there are squares in that column (place one post-it on each square). The purpose of the grid is to allow you to show how strongly you agree or disagree with a statement, relative to all other statements. If you have five statements with which you really strongly disagree, you will therefore need to decide which four statements you most

strongly disagree with, and then the remaining statement will go in another column (probably the minus four column).

(You do not need to arrange statements according to rows, i.e. all statements places in the minus five column are treated as if you disagree with them equally, regardless of row)

There are precisely as many squares in the grid as there are statements, so all statements will need to be placed into the grid. This may mean that you need to rearrange statements that you have already placed within the grid, e.g. if your plus three column is full (and your plus four and plus five columns are also full) but you have another statement that you want to put in the plus three column, you may need to move a statement that you agree with slightly less into the plus two column.

The column labelled zero does not need to contain statements about which you feel completely neutral. Some people have lots of statements with which they agree, so they will need to place some statements with which they slightly agree in column zero, or even the negative columns; likewise, some people have lots of statements with which they disagree, so will need to place some statements with which they slightly disagree in the zero column or even the positive columns. I will ask you at the end which column contains statements about which you feel neutral.

You're free to keep your camera and microphone on during the Q-sort, or to turn them off; whichever you prefer. I will keep my camera on, but mute my microphone. If you have any questions now or during the process, please feel free to ask me. I can answer questions about the procedure, or about the literal meaning of words in statements if it's unclear. However, I cannot tell you how I meant for a statement to be interpreted.

The Q-sorting process usually takes between 20 minutes to 1 hour; there's a lot of variation, so don't worry about being too quick or too slow. Once you have finished, I would like to ask you some quick questions about your Q-sort, if you are happy to answer these. This will only take around 5 minutes.
You are free to stop participating at any time, or to take a break if you need one.
Do you have any questions?

Supplementary Appendix C4.3 Factor Summaries in Second-Person presented to each Focus Group

Summary of Factor 1

The state of the world is important to you; climate change has highlighted for you just how much we rely upon each other and world systems (39, +3). You feel a strong connection with nature (44, +4), and consider the welfare of other creatures as important as our own (43, +5). You are also concerned about how climate change will affect people living in poorer countries (24, +4), and your concerns about climate change include many social and political issues that impact upon each other in complex ways (29, +3). However, despite such complexities, you believe it is possible for people to be environmentally friendly (35, +1), and do not find our world particularly baffling or absurd (38, 0).

Personally, you do not feel much fear about climate change (10, -1), and thinking about it does not cause you to keep worrying about it (1, -2). You don't feel much background anxiety around its impact (2, -3), and do not feel the need to distance or 'switch off' from concerns around climate change. It's something important to think about, and certainly not a chore to engage with (11, -5), and your concerns are not affecting your mental health at all (13, -5).

You also feel well supported by others when you need to talk through your concerns about climate change; your family will listen to you and treat your feelings seriously (60, +5), and you are confident that your teachers would be supportive if you talked to them about your concerns (61, +4). You also feel comfortable speaking with your friends about climate change (53, +3) and can view content on social media that engages with the issues that concern you (56, +1). Quite a few people your age seem concerned about climate change (51, +1), and a lot of people from your background are engaging with the issues (59, -2). Your closeness with family and friends means that your concerns about climate change are also balanced with your concerns for them and their wellbeing (37, +0).

Overall, you feel quite hopeful that we will be able to tackle climate change; spending time around others who care around the environment can help to highlight for you how change is possible (57, +4), and the student strikes for climate give you hope for the future (46, +3). You have some hope that we will find some technological 'fixes' for climate change (15, +2), and may also draw some hope from your faith or beliefs (14, +1). You feel relatively confident that you will be able to deal with any challenges that climate change may

raise for you (25, +0), and generally feel positive about the future (9, -2). You highly value your education and see it as important for equipping you for whatever the future may hold (40, -5).

It's important to you to be environmentally responsible; caring about your impact has made you consider your diet and consumption patterns (22, +5), and taking actions to reduce your ecological impact can help you to manage how you feel about climate change (21, +2). Even when it only makes a small difference, it's important to you to be environmentally conscious (23, +3), and it's important to consider what you can do even if you can't stop climate change on your own (33, -3). Your engagement with climate change is a part of who you are (49, +2), and you do not want to rush to travel to see the world if this will have a negative environmental impact (36, -1). Overall, you feel relatively positive about your environmental impact and what you're doing to make a difference (3, -1).

It's also important to you not to be judgemental of others; you don't want to criticise others for their environmental impact (26, +1), and do not see climate change in particularly ethical or moral terms (51, +1; 52, +2). You don't feel much anger or resentment towards older generations for not doing more to address climate change (5, +1), and can relate to most people, even if they are not concerned about climate change (68, -3). You trust that most people would take actions to reduce their carbon footprint if it were made easier for them to track their emissions and see the impact that their actions have (31, +4), and whilst you would like more products to be ecologically friendly by default, it's also valuable for people to have the freedom to choose eco-friendly options (45, -2). This need not be expensive, and you reject the notion that 'only rich people can afford to be environmentally friendly' (48, -2). You also reject negative narratives around climate change such as that we won't be able to tackle climate change due to 'overpopulation' (66, -3), or that some people just pretend to be environmental just 'for show', rather than because they genuinely care about the environment (63, -2).

Summary of Factor 2

You feel a lot of fear about climate change (10, +5), and can find it hard to stop worrying when you think about it (1, +2). When not directly thinking about climate change, you still can feel some background anxiety about it (2, +2), and if you are already feeling bad, thinking about it can make you feel worse (3, +2). Part of this fear is that you do not feel able to deal with the challenges that climate change may raise for your life (25, +5), and this can leave you feeling insecure due to the uncertainty around what the future will look like (69, +3). The idea of things changing or collapsing is concerning (19, -3); it's not important to you that actions to tackle climate change maintain our

current way of life (65, -5), but you strongly feel that we are currently living in a state of denial in which we know about climate change, but live as if we don't know what is happening (20, +5).

Currently, you do not feel much hope about our prospects for tackling climate change when considering the scientific evidence (16, -5) and are not hopeful about us finding a technological 'fix' for climate change (15, -3). Seeing some wildlife recover during the first COVID-19 lockdown gave you little hope (17, +1), and you are concerned that most people will lost interest in climate change when new causes become fashionable (55, +3). You are mildly suspicious that some people may have opposed climate change because it made them look good (63, 0), and are slightly sceptical of the idea that most people would reduce their carbon footprint if that could track their emissions and see their impact (31, -1).

Whilst worrying about climate change is not actively harming your mental health, you do not reject the idea that it could impact upon it (13, 0), and you find that sometimes you need to switch off from thinking about climate change to recharge your batteries (27, +3), particularly since coverage of climate change on the news can have an impact on your emotions (67, +2). At times you may feel slightly alone in your concerns; whilst some others from your background are also engaged in issues around climate change (59, -2), it still feels like not that many people your age are concerned about climate change (54, -2), and you don't feel entirely comfortable discussing your concerns about climate change with others in your friendship group (53, -1). You may also feel slightly uncertain about discussing your concerns with adults; whilst you hope that your family will take your concerns seriously (60, +1), you are slightly less supportive that your teachers would be supportive (61, 0).

You feel angry at governments and oil companies for not making the changes needed to tackle climate change (6, +5), at older generations for not doing more to address climate change (5, +4), and at climate change deniers (7, +4). You believe that it is ethically wrong to oppose or delay measures that will tackle climate change (51, +4), and morally right to protest about climate change, even if it inconveniences people (52, +5). This is something that people should focus on right now, rather than just on immediate day-to-day concerns (8, -3), and we can't just focus on friends and family first then get around to thinking about climate change later (37, -4). Whilst you would not necessarily identify your climate concern as an important part of your identity (49, -2),

when people criticise the student strikes for climate, it can feel like your values are being attacked (47, +1), and you are prepared to call-out/criticise others for their environmental impacts (26, -3). Your concern is primarily how to stop or slow climate change, rather than how to adapt to it (18, -4).

You prioritise being environmentally friendly when it makes a difference (rather than as an inherent good) (23, +1), and taking actions to reduce your ecological impact does not usually help with how you feel about climate change as a whole (21, -2). You would like to travel the world before places become worse due to climate change (36, +2), although part of you also dislikes the idea of being criticised by others for not doing enough to tackle climate change (34, -1). At the same time, you do not feel a particularly strong connection to the natural world (44, 0), and you have slightly more concern for the impact of climate change on human welfare than you do for the welfare of other creatures (43, 0).

Summary of Factor 3

You feel quite frustrated with the world that you are inheriting; sometimes you feel angry at older generations for not doing more to address climate change (5, +5), and it seems that the way that the world has been set up makes it really difficult for people to be environmentally friendly (35, +4). You also feel angry at governments and oil companies (6, +4), and believe that it is ethically wrong for anyone to oppose or delay measures that could tackle climate change (51, +4), particularly when the welfare of other creatures is as important as our own (43, +5). Climate change will affect us, rather than future generations (32, -5), and changes need making now.

Whilst you value education, you sometimes question how relevant it will be to life in the future (40, -1); knowing about climate change makes our modern way of life appear completely absurd (38, +5), and part of you is interested to observe changes if things start collapsing due to climate change (19, +1). However, it's also important to you that any solutions or adaptations to climate change can allow us to keep our current way of life if possible (65, +2), and your concerns can leave you feeling split between feeling great about the future and awful about it (9, +4), depending on the context.

You also feel some fear about the impact of climate change (10, +2), and whilst your concerns are not currently affecting your mental health, you do not reject the possibility that they could (13, +0). At the same time, thinking about climate change when you already feel low does not make you feel worse (12, -3), and you don't find that news coverage of climate change has much impact on your emotions (67, -2). You are slightly uncertain about who you would feel comfortable talking to about climate change; you are unsure whether your family would take your concerns seriously (60, 0), but hope that your teachers would be supportive (61, +1), and feel that you could sometimes discuss your concerns with friends if needed (53, +2). Whilst you don't find any hope in religion or spiritual beliefs (14, +5), you have some hope that technological solutions might help tackle climate change (15 +1), and found hope in seeing some wildlife recover during the first COVID-19 lockdown (17, +4).

Despite your concerns, you do not feel particularly connected to climate change campaigning and activism; the student strikes for climate don't give you much hope (46, -2), and you do not view much content about climate change on social media (56, -3), nor spend much time around people who care about the environment (57, -1). Overall, you feel that there are not many people from your background involved with climate change issues (59, +1), and when people criticise the student strikes for climate, you do not feel that your own values are being attacked (47, -5). At the same time, however, you find it hard to relate to people who are not concerned about climate change at all (62, +3).

You are also not particularly focused yet on making changes to your own ecological footprint; your concerns around climate change have not made you consider the impact of the food you eat, nor the things you buy (22, -3), nor how your life relies upon many other people and global systems (39, +1). This is partly because you are sceptical whether individual actions will make a difference; part of you feels that despite what you do you will not be able to stop climate change (33, +2), and you are worried that overpopulation may be a major barrier to tackling global warming (66, +5) regardless of individual actions. Consequently, you do not feel any pressure from others at school to be environmentally conscious (58, -5), and feel that you have other pressing concerns to focus on in addition to concerns around climate change (8, 0). However, you do find that sometimes you feel guilty that you're not doing more to tackle climate change (3, +3), and wish it could be made easier, for example by making products eco-friendly by default (45, -4).

Supplementary Appendix C4.4 Graduated signposting information for participants experiencing distress related to their concerns around climate change

Signposting should be specific to the young person's situation and emotional needs.

If they are nervous but not to the extent of feeling highly anxious, I will mention the following topic-specific services for young people:

Force of Nature offer free online workshops helping young people to further explore challenging emotions that they face around climate change, and to consider how to manage their emotions through engaged action in the world. This is motivated by the theory of problem-focused coping, i.e. that taking small local actions can help people to manage and cope with their wider worries about the environment (Koger et al. 2011). These are available for young people aged 12-24, and young people will be placed with others in a similar age bracket (12-14, 15-17, 18-20, 21-25). Young people can find out more information and can sign up for an online workshop at: https://www.forceofnature.xyz/

(Koger, S. M., Leslie, K. E., & Hayes, E. D. (2011). Climate change: Psychological solutions and strategies for change. *Ecopsychology*, *3*(4), 227-235.)

Dr Patrick Kennedy Williams is a clinical psychologist, who delivers workshops helping people to process climate anxiety: https://www.climatepsychologists.com/who-we-are
If there is an upcoming workshop open to young people, I will signpost young people experiencing some eco anxiety towards it.

Climate Psychology Alliance therapeutic support (up to 3 free sessions, including for young people): https://www.climatepsychologyalliance.org/support/indsupport In all cases, this support will be provided by trained counsellors and psychotherapists.

The Therapeutic Support will focus on:

- Supporting people to face the unthinkable and uncertainty of the climate crisis
- Validating emotional responses to the climate crisis - such as helplessness, grief, anger, despair, anxiety and fear
- Helping individuals, families and groups develop emotional resilience
- Contributing to sustainable communities and preparing for change
- Helping to understand our complex individual and cultural responses

If the young person is experiencing anxiety or very challenging emotions, I will signpost them towards a range of supportive services, depending upon what they feel might best suit their needs:

If they feel that they would benefit from group support sessions with other young people via Zoom, I will signpost them towards No Limits: https://nolimitshelp.org.uk/get-help/virtual-services/
(Youth Workers are available to talk and organise sessions Monday: 10am-5pm, Tuesday: 10am – 5pm, Wednesday: 1.30pm –8pm, Thursday: 10am –8pm, Friday: 10am-5pm, Saturday: 10am – 1.30pm [closed Sunday], by phoning: 02380 224 224 or emailing: enquiries@nolimitshelp.org.uk)

If they feel they may benefit from sharing their concerns with other young people in an online community and accessing online-message based counselling services, I will signpost them towards Kooth: https://www.kooth.com/ (Counsellors available Monday-Friday 12:00-22:00, Saturday-Sunday 18:00-22:00, requires young people to create an account).

If they feel that they would benefit from speaking to a counsellor and would like a choice between phoning or using web-based chat, I will signpost them towards Childline: www.childline.org.uk/get-support/ 0800 1111 (Counsellors available Monday-Friday 09:00-24:00, requires young people to create an account if they want to use web-based chat, but not if they phone. Calls do not appear on phone bill; support available for young people using British Sign Language)

If they would like to speak to someone straight away, I will signpost them to the Samaritans https://www.samaritans.org/ Phone number: 116 123, who have volunteers ready to answer the phone 24 hours a day, 7 days a week. The Samaritans also offer an email service with a 24 hour response time by emailing: jo@samaritans.org and also offer face-to-face support at drop-in branches (COVID-19 restrictions permitting): https://www.samaritans.org/branches/

If the young person is not comfortable to speak or communicate with a counsellor, Samaritans also offer a web-based and mobile phone self-help app: https://www.samaritans.org/how-we-can-help/contact-samaritan/self-help/

If the young person is not yet sure what support they would like, or would like to explore what local support is available in their area, I will signpost them to The Mix: https://www.themix.org.uk/get-support/speak-to-our-team 0808 808 4994 (Helpline open 16:00-23:00 7 days a week, email service open 24 hours a day with a 24 hour response time: https://www.themix.org.uk/get-support/speak-to-our-team/email-us Web-based chat open 16:00-23:00 7 days a week [same web link as above], or they can browse local services via The Mix website: https://www.themix.org.uk/get-support/)

If the young person is in crisis (for example: having suicidal thoughts), I will signpost them towards the following services depending upon their preferences:

If the young person is in crisis and would like to speak to someone on the phone, I will signpost them to the Samaritans https://www.samaritans.org/ (Phone number: 116 123, available 24/7)

If the young person is in crisis but doesn't want to speak on the phone, I will signpost them to The Mix Crisis Text Line: https://www.themix.org.uk/get-support/speak-to-our-team/crisis-messenger (open 24/7, text THEMIX to 85258)

Alternatively, if the young person would like to access local urgent mental health services, I will signpost them to the NHS Urgent Mental Health Helpline service, which will connect them to a local crisis service for young people: https://www.nhs.uk/service-search/mental-health/find-an-urgent-mental-health-helpline

If the young person is feeling suicidal, I will signpost them to Papyrus: https://papyrus-uk.org/ (phone number: 0800 068 4141, email pat@papyrus-uk.org available Monday-Friday 09:00-22:00, Saturday-Sunday [and bank holidays] 14:00-22:00)

If the young person needs emergency help, I will signpost them to phone 999. For non-emergency police support, I will signpost them to phone 101 or to visit: https://www.police.uk/

Supplementary Appendix D: Raw Data from the study

Supplementary Appendix D1.1 Correlation Matrix of the relative similarity between each participant's Q-sort

PQMethod2.35 How do young people engage with climate change

Correlation Matrix Between Sorts

SORTS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	14F8A125	100	56	31	39	50	53	61	53	41	34	55	64	62	41	34	46	63	53	61	54	59	21	72	36	51	73	66	24	55	41
2	14F7A238	56	100	34	54	55	48	51	48	25	32	44	59	54	39	32	24	57	62	44	47	39	11	57	40	40	56	64	29	33	47
3	16F7A300	31	34	100	50	34	26	53	25	23	46	12	35	16	30	17	34	29	43	35	48	43	25	37	21	33	51	55	33	47	51
4	15F7A257	39	54	50	100	47	45	44	28	29	29	29	42	45	18	30	27	36	41	51	47	47	24	43	24	31	48	65	46	49	31
5	13F7A238	50	55	34	47	100	49	43	35	35	26	42	54	44	26	44	24	50	60	55	48	33	7	47	44	36	47	59	18	38	44
6	11M7A186	53	48	26	45	49	100	31	27	14	22	55	57	55	37	41	33	36	59	49	42	34	20	43	31	38	56	58	33	52	38
7	18M7A186	61	51	53	44	43	31	100	46	44	44	26	34	41	33	26	19	36	60	45	53	55	33	69	19	45	64	60	33	47	39
8	11F7A238	53	48	25	28	35	27	46	100	14	38	41	31	48	7	32	15	51	44	32	39	40	3	51	22	43	48	44	30	26	48
9	16DG8A28	41	25	23	29	35	14	44	14	100	33	12	23	29	24	26	18	23	26	38	43	39	27	25	25	28	33	34	9	32	27
10	12M7C238	34	32	46	29	26	22	44	38	33	100	-4	21	24	15	11	6	20	41	38	64	32	32	29	28	36	51	47	32	31	11
11	13F7A138	55	44	12	29	42	55	26	41	12	-4	100	60	55	26	37	51	47	46	37	10	25	17	39	24	30	39	38	31	40	36
12	15F6A100	64	59	35	42	54	57	34	31	23	21	60	100	56	41	27	42	59	53	63	39	37	29	56	46	42	56	61	16	42	54
13	12M8A238	62	54	16	45	44	55	41	48	29	24	55	56	100	26	32	30	57	44	60	36	54	16	50	41	46	50	52	37	43	44
14	17M7C138	41	39	30	18	26	37	33	7	24	15	26	41	26	100	22	26	27	33	31	29	23	20	29	23	31	35	36	12	38	26
15	17F6D129	34	32	17	30	44	41	26	32	26	11	37	27	32	22	100	30	24	18	38	22	22	4	42	31	31	24	22	24	30	24
16	15F7C150	46	24	34	27	24	33	19	15	18	6	51	42	30	26	30	100	46	18	37	18	36	14	36	31	44	35	30	37	44	31
17	17F7C163	63	57	29	36	50	36	36	51	23	20	47	59	57	27	24	46	100	45	52	32	51	16	56	39	42	54	51	33	25	55
18	16F6A200	53	62	43	41	60	59	60	44	26	41	46	53	44	33	18	18	45	100	31	50	29	23	52	35	28	68	69	31	41	41
19	14M8A163	61	44	35	51	55	49	45	32	38	38	37	63	60	31	38	37	52	31	100	60	51	36	54	34	60	53	54	33	40	45
20	15F6A186	54	47	48	47	48	42	53	39	43	64	10	39	36	29	22	18	32	50	60	100	43	25	49	36	38	64	68	20	41	34
21	13F8A300	59	39	43	47	33	34	55	40	39	32	25	37	54	23	22	36	51	29	51	43	100	32	56	41	59	58	50	32	66	54
22	11M7A263	21	11	25	24	7	20	33	3	27	32	17	29	16	20	4	14	16	23	36	25	32	100	12	17	26	35	32	27	24	28
23	17M7A200	72	57	37	43	47	43	69	51	25	29	39	56	50	29	42	36	56	52	54	49	56	12	100	34	58	65	57	32	46	40
24	17FC125	36	40	21	24	44	31	19	22	25	28	24	46	41	23	31	31	39	35	34	36	41	17	34	100	26	37	36	18	22	36
25	11F7A125	51	40	33	31	36	38	45	43	28	36	30	42	46	31	31	44	42	28	60	38	59	26	58	26	100	43	46	35	48	47
26	16F9A213	73	56	51	48	47	56	64	48	33	51	39	56	50	35	24	35	54	68	53	64	58	35	65	37	43	100	70	39	59	40
27	11F8A238	66	64	55	65	59	58	60	44	34	47	38	61	52	36	22	30	51	69	54	68	50	32	57	36	46	70	100	34	56	52
28	15F7A286	24	29	33	46	18	33	33	30	9	32	31	16	37	12	24	37	33	31	33	20	32	27	32	18	35	39	34	100	37	16
29	12M7C138	55	33	47	49	38	52	47	26	32	31	40	42	43	38	30	44	25	41	40	41	66	24	46	22	48	59	56	37	100	40
30	16F6C188	41	47	51	31	44	38	39	48	27	11	36	54	44	26	24	31	55	41	45	34	54	28	40	36	47	40	52	16	40	100

Supplementary Appendix D1.2 Email to Q Methodology Email Forum asking about extraction techniques using Brown Centroid and Horst 5.5 Centroid (reply from Peter Schmolck)

Am 18.03.2021 um 21:50 schrieb Robert Lee:

Dear all,

I'm an educational psychology student using Q Methodology to explore how young people are engaging with concerns around climate change. I've collected my data and am in the process of analysing it, mainly using Watts and Stenner's (2012) book as a guide, but also trying to supplement this with additional reading.

I'm currently exploring how many factors to extract and rotate. My data seems to have an unusual feature when extracted using centroid factor analysis with Brown's methodology (in PQMethod): factors 1, 2, 4, 6, & 7 all have some strong loadings, but factors 3 & 5 have no significant loadings (interestingly, this problem doesn't occur if I select Horst's '5.5 centroid factor analysis with iterative solutions', although it's not clear to me when it's appropriate to select this option).

Unless I've missed something, Watts and Stenner don't address such situations, but I've found an article by Damio (2018, available here: https://files.eric.ed.gov/fulltext/EJ1207802.pdf) about the analytic process of Q methodology that appears to encounter (and downplay) this issue. In the paper's example (p.13-15 of the pdf, p71-73 in the article page numbers) Damio selects a 5-factor extraction (after rotation) but it has no Q sorts loading on factor 4, so she removes factor 4, but keeps factors 1,2,3, and 5. Is it permissible to do this?

Whether or not it is permissible to do this could make quite a big difference to how many factors I ultimately extract, so any guidance around this area would be very much appreciated (and apologies if this is a question that has come up in this group previously).

Many thanks,
Rob Lee,
University of Sheffield

Peter Schmolck Peter@schmolck.org via ksuprod.onmicrosoft.com 19 Mar 2021, 18:29

to Q-METHOD

Dear Robert,

the irregularity of interspersed "empty" factors in the sequence of extracted factors has been noticed for a long time already. It appears to be a peculiarity of the centroid algorithm described in Brown (1980) and implemented in PQMethod (and presumably newer software based on it). Since I in fact have always been unable (or unwilling as some would think) to

understand Stevenson's "indeterminacy" reasoning for favouring the centroid method I did not try hard to understand the exact computational reason for that irregularity. Instead I tried to find some alternative, easily adaptable, Fortran code for centroid factors in one of the well-known factor analysis text books, and found it in Horst (1965).

I think I can explain by now why Steven Brown, following Stephenson, does not worry about the interspersed "empty" factors. When they manually rotate factors they do not mind collecting some variance from unrotated, "later", small factors they eventually drop. "Empty" factors can be ignored as they contain no variance. And interestingly, that's not a matter of theoretical rotation. As you can test by yourself, if there are, say, two empty unrotated factors there will also be two empty factors after varimax rotation. Apparently, interspersed empty factors simply are ignored by the Varimax algorithm also.

Coming now to the explanation for expecting factor eigenvalues and corresponding percentages of variance to decrease in size in the sequence of factors extracted. This expectation corresponds to the general task of factor analysis, namely, reduction of complexity, which translates into explaining as much variance as is possible with the minimal number of factors. This principle would be violated if there exists one additional factor that when extracted explains more variance than the last one already extracted. Principal component analysis attains that principle with 100 per cent mathematical precision: every next factor extracted unambiguously adds as much variance as is possible. This principle holds also after rotation of factors which distributes the total sum of variances more evenly (remember: the solution with most uneven distribution is the unrotated one). William Stephenson (and Steven Brown) do not assume that there exists one best factor solution whose number of factors and their rotation should be determined upon a priori set, analytical criteria, including criteria related to reduction of complexity. Therefore there exists no reason for them for specifying the number of factors to retain for rotation in advance.

In other applications of ("R") factor analysis there exists some confidence in, for instance, being able to distinguish between "true" and "random" factors with statistical criteria that can be applied without any interference on part of the researcher. In this context, determining the correct number of factors to extract and rotate is quite relevant. In Q, however, I doubt that any such rules like eigenvalue > 1 (the most irrelevant for Q of all!), scree test, parallel analysis can be of any decisive value. All these rules function as upper limits, that is, should prevent "overextraction". But with a pragmatic approach, excess factors do not have defining sorts. In this reasoning the simplicity of PCA is helpful, extraction of additional factors has no influence on the factors already extracted. This is true also for the Brown centroid algorithm but not for principal axis factoring as well as for Horst centroid.
Peter

Horst, P. (1965) *Factor Analysis of Data Matrices.* Holt, Rinehart and Winston.

Supplementary Appendix D1.3 Factor Extractions attempted using Horst 5.5 Centroid and Brown Centroid Algorithms

Horst 7 factors 0.31 Varimax
[screenshot cut to reduce file size – please email rob.lee.email@gmail.com if you want a copy]

Correlations Between Factor Scores

	1	2	3	4	5	6	7
1	1.0000	0.4898	0.5459	0.1925	0.5100	0.4623	0.4450
2	0.4898	1.0000	0.5032	0.2740	0.2859	0.3211	0.4284
3	0.5459	0.5032	1.0000	0.3278	0.4093	0.2833	0.4301
4	0.1925	0.2740	0.3278	1.0000	0.2593	0.2640	0.1839
5	0.5100	0.2859	0.4093	0.2593	1.0000	0.3335	0.2809
6	0.4623	0.3211	0.2833	0.2640	0.3335	1.0000	0.3519
7	0.4450	0.4284	0.4301	0.1839	0.2809	0.3519	1.0000

Horst 7 factors 0.42 varimax Q29 needs adjusting
[screenshot cut to reduce file size – please email if you want a copy]

Correlations Between Factor Scores

	1	2	3	4	5	6	7
1	1.0000	0.5370	0.6659	0.5033	0.5102	0.6821	0.4550
2	0.5370	1.0000	0.5843	0.3588	0.2859	0.4979	0.4284
3	0.6659	0.5843	1.0000	0.4359	0.4933	0.5690	0.5324
4	0.5033	0.3588	0.4359	1.0000	0.4187	0.5237	0.5222
5	0.5102	0.2859	0.4933	0.4187	1.0000	0.4949	0.2809
6	0.6821	0.4979	0.5690	0.5237	0.4949	1.0000	0.5474
7	0.4550	0.4284	0.5324	0.5222	0.2809	0.5474	1.0000

Horst 7 Factors 0.31 Varimax with manual rotation

QSORT		1	2	3	4	5	6	7
1	14F8A125	0.5383	0.4245	0.3322	0.3693	0.1601	0.3690	-0.1208
2	14F7A238	0.3806	0.3441	0.4148	0.0113	0.3617	0.1237	0.2409
3	16F7A300	0.1742	0.4021	0.1392	0.3499	0.1573	-0.2889	0.3250
4	15F7A257	0.2714	0.2834	0.3042	0.1526	0.0721	-0.0783	0.5947X
5	13F7A238	0.1480	0.4589	0.4015	0.0419	0.2214	0.2283	0.2229
6	11M7A186	0.1946	0.2434	0.6330X	0.2161	-0.0324	0.1725	0.2350
7	18M7A186	0.5130	0.4686	0.0718	0.3322	0.1726	-0.0717	0.1274
8	11F7A238	0.6278X	0.1654	0.0877	-0.0094	0.3039	0.2548	0.1689
9	16DG8A28	0.0652	0.4957X	-0.0054	0.2432	0.0099	0.1336	0.0804
10	12M7C238	0.2843	0.6521X	-0.0883	0.0340	-0.1048	-0.0404	0.2588
11	13F7A138	0.2271	-0.0743	0.6888X	0.3027	0.1412	0.2787	0.0527
12	15F6A100	0.0797	0.3819	0.5967	0.2321	0.3913	0.2039	0.0248
13	12M8A238	0.3231	0.2415	0.3398	0.1965	0.2004	0.3878	0.2612
14	17M7C138	0.0281	0.3034	0.3100	0.2999	0.1238	0.0169	-0.0422
15	17F6D129	0.0354	0.1184	0.2812	0.1763	0.0117	0.4505X	0.2954
16	15F7C150	0.0102	0.0739	0.2704	0.5465X	0.1686	0.2151	0.1194
17	17F7C163	0.2981	0.2333	0.2967	0.1750	0.5289X	0.2728	0.1410
18	16F6A200	0.5125	0.4241	0.5877	-0.0032	0.1430	-0.1885	0.0506
19	14M8A163	0.1558	0.4850	0.2296	0.2797	0.1863	0.3490	0.2776
20	15F6A186	0.2663	0.7670X	0.1128	0.0358	-0.0131	0.0865	0.2406
21	13F8A300	0.3525	0.3395	-0.1167	0.5806	0.2637	0.1772	0.2864
22	11M7A263	0.0142	0.3760	0.0184	0.3317	0.0094	-0.1296	0.0957
23	17M7A200	0.5616X	0.2963	0.1831	0.2973	0.2395	0.3036	0.1098
24	17FC125	0.0216	0.3815	0.2570	0.1018	0.1919	0.2152	0.1291
25	11F7A125	0.2130	0.2839	0.0857	0.4038X	0.2510	0.2920	0.2765
26	16F9A213	0.5386	0.5299	0.3253	0.3110	0.0563	0.0088	0.0814
27	11F8A238	0.4028	0.5208	0.4356	0.1779	0.1979	-0.1030	0.2790
28	15F7A286	0.2964	0.0534	0.1576	0.2884	-0.0530	0.0446	0.4462X
29	12M7C138	0.3021	0.2323	0.2831	0.6108X	-0.0755	-0.0005	0.2578
30	16F6C188	0.1031	0.2848	0.2055	0.2976	0.6169X	0.0212	0.2087

% expl.Var.	10	15	11	9	5	5	6

Correlations Between Factor Scores

	1	2	3	4	5	6	7
1	1.0000	0.4947	0.4912	0.4905	0.6272	0.4209	0.4432
2	0.4947	1.0000	0.2297	0.4227	0.3513	0.2301	0.4392
3	0.4912	0.2297	1.0000	0.5925	0.5032	0.4395	0.4541
4	0.4905	0.4227	0.5925	1.0000	0.5257	0.3731	0.5348
5	0.6272	0.3513	0.5032	0.5257	1.0000	0.2741	0.3824
6	0.4209	0.2301	0.4395	0.3731	0.2741	1.0000	0.3176
7	0.4432	0.4392	0.4541	0.5348	0.3824	0.3176	1.0000

Horst 6 factors 0.31 Varimax rotation

[screenshot cut to reduce file size – please email if you want a copy]

Correlations Between Factor Scores

	1	2	3	4	5
1	1.0000	0.4290	0.4389	0.3111	0.3797
2	0.4290	1.0000	0.3065	0.3195	0.3417
3	0.4389	0.3065	1.0000	0.3000	0.3087
4	0.3111	0.3195	0.3000	1.0000	0.2632
5	0.3797	0.3417	0.3087	0.2632	1.0000

Horst 6 Factors 0.42 Varimax rotation
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Correlations Between Factor Scores

	1	2	3	4	5	6
1	1.0000	0.5858	0.5864	0.5619	0.6158	0.4750
2	0.5858	1.0000	0.4848	0.5158	0.3676	0.2989
3	0.5864	0.4848	1.0000	0.5308	0.6317	0.5114
4	0.5619	0.5158	0.5308	1.0000	0.6256	0.4470
5	0.6158	0.3676	0.6317	0.6256	1.0000	0.5607
6	0.4750	0.2989	0.5114	0.4470	0.5607	1.0000

Horst 5 factors at 0.31, Varimax rotation
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Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.4743	0.2554	0.3506
2	0.4743	1.0000	0.3000	0.2820
3	0.2554	0.3000	1.0000	0.3282
4	0.3506	0.2820	0.3282	1.0000

Horst 5 factors at 0.42, Varimax rotation

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Correlations Between Factor Scores

	1	2	3	4	5
1	1.0000	0.6158	0.7023	0.5195	0.5741
2	0.6158	1.0000	0.5863	0.5342	0.5494
3	0.7023	0.5863	1.0000	0.4687	0.5053
4	0.5195	0.5342	0.4687	1.0000	0.6349
5	0.5741	0.5494	0.5053	0.6349	1.0000

Horst 5 factors at 0.31, Varimax rotation plus manual rotation

QSORT	1	2	3	4	5
1 14F8A125	0.4887	0.2698	0.5569	0.2396	0.2487
2 14F7A238	0.5002	0.5088	0.2824	0.0860	0.1658
3 16F7A300	0.1253	0.3966	0.0195	0.2585	0.5013
4 15F7A257	0.2504	0.4292	0.0205	0.3879	0.3535
5 13F7A238	0.5219	0.4395	0.1546	0.1024	0.1839
6 11M7A186	0.4284	0.4119	0.1383	0.4465	0.0481
7 18M7A186	0.1386	0.3406	0.4184	0.2587	0.4887
8 11F7A238	0.2696	0.1965	0.5874X	0.0881	0.1448
9 16DG8A28	0.2230	0.0994	0.1458	0.0485	0.4361X
10 12M7C238	-0.0349	0.3302	0.2666	0.0148	0.5833X
11 13F7A138	0.5380	0.2161	0.2482	0.4875	-0.2356
12 15F6A100	0.7534X	0.3193	0.1207	0.1177	0.1621
13 12M8A238	0.5454X	0.1531	0.3704	0.2550	0.1739
14 17M7C138	0.2881	0.2393	0.0704	0.2034	0.1597
15 17F6D129	0.4405X	0.0663	0.1454	0.2350	0.0339
16 15F7C150	0.4390	0.0097	0.0680	0.4258	0.1101
17 17F7C163	0.6128X	0.1822	0.3755	0.0943	0.1473
18 16F6A200	0.2346	0.7512X	0.3269	0.1547	0.1532
19 14M8A163	0.6240	0.0746	0.1738	0.1685	0.4838
20 15F6A186	0.2490	0.4290	0.2391	-0.0253	0.5896
21 13F8A300	0.3411	-0.0787	0.3972	0.3155	0.5881
22 11M7A263	0.1001	0.0473	-0.0277	0.1897	0.4801X
23 17M7A200	0.3728	0.2969	0.6154X	0.2418	0.1828
24 17FC125	0.4477X	0.1971	0.1024	0.0583	0.2058
25 11F7A125	0.4532	-0.0391	0.3159	0.3002	0.3726
26 16F9A213	0.2419	0.4874	0.4664	0.2806	0.4097
27 11F8A238	0.3716	0.5851X	0.2088	0.2159	0.4455
28 15F7A286	0.1258	0.1182	0.1632	0.4579X	0.2302
29 12M7C138	0.1835	0.2090	0.1703	0.6905X	0.3518
30 16F6C188	0.5078X	0.1870	0.1463	0.1646	0.2879
% expl.Var.	16	10	9	8	12

Correlations Between Factor Scores

	1	2	3	4	5
1	1.0000	0.6490	0.6771	0.4895	0.3799
2	0.6490	1.0000	0.6071	0.5290	0.4931
3	0.6771	0.6071	1.0000	0.4687	0.3418
4	0.4895	0.5290	0.4687	1.0000	0.4369
5	0.3799	0.4931	0.3418	0.4369	1.0000

Horst 4 factors at 0.31, Varimax
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Correlations Between Factor Scores

	1	2
1	1.0000	0.4346
2	0.4346	1.0000

Horst 4 factors at 0.42, Varimax
[screenshot cut to reduce file size – please email if you want a copy]

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.5513	0.4747	0.6801
2	0.5513	1.0000	0.2468	0.5314
3	0.4747	0.2468	1.0000	0.5932
4	0.6801	0.5314	0.5932	1.0000

Horst 4 factors at 0.31, Varimax plus manual rotation

QSORT		1	2	3	4
1	14F8A125	0.5643	0.1988	0.3799	0.4214
2	14F7A238	0.7102X	0.0756	0.2975	0.1599
3	16F7A300	0.3677	0.5433	0.0140	0.2016
4	15F7A257	0.4712	0.4131	0.1458	0.1840
5	13F7A238	0.6149X	0.0648	0.2734	0.2214
6	11M7A186	0.4963	0.2806	0.4905	0.0230
7	18M7A186	0.4451	0.4529	0.0045	0.4682
8	11F7A238	0.5010	-0.0339	0.0917	0.4185
9	16DG8A28	0.2680	0.2003	-0.0334	0.4165X
10	12M7C238	0.5201	0.3608	-0.2911	0.2136
11	13F7A138	0.3032	0.1069	0.7549X	0.0533
12	15F6A100	0.5351	0.1156	0.6035	0.1675
13	12M8A238	0.5116	0.0641	0.4021	0.3458
14	17M7C138	0.2287	0.2534	0.2738	0.1726
15	17F6D129	0.2288	0.0026	0.3559	0.3207
16	15F7C150	0.0519	0.3018	0.5328X	0.2992
17	17F7C163	0.4977	-0.0046	0.4355	0.3575
18	16F6A200	0.7602X	0.2757	0.2017	-0.0500
19	14M8A163	0.4967	0.1878	0.2851	0.4490
20	15F6A186	0.6640X	0.2880	-0.1051	0.2912
21	13F8A300	0.3367	0.3388	0.1490	0.5976
22	11M7A263	0.1402	0.4360X	0.0187	0.1699
23	17M7A200	0.5134	0.1608	0.2674	0.4881
24	17FC125	0.4302X	0.0236	0.2133	0.2206
25	11F7A125	0.2515	0.2371	0.2885	0.5958X
26	16F9A213	0.6469	0.4545	0.1728	0.2540
27	11F8A238	0.7494	0.4037	0.1810	0.1444
28	15F7A286	0.2772	0.3502	0.1862	0.1180
29	12M7C138	0.2521	0.6224X	0.3007	0.3028
30	16F6C188	0.4174	0.1682	0.3170	0.3035
% expl.Var.		23	9	10	10

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.4753	0.4490	0.5065
2	0.4753	1.0000	0.4530	0.5569
3	0.4490	0.4530	1.0000	0.3689
4	0.5065	0.5569	0.3689	1.0000

Horst 3 Varimax at .31

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3663	0.3878
2	0.3663	1.0000	0.3709
3	0.3878	0.3709	1.0000

Horst 3 Varimax at 0.42

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.5650	0.6280
2	0.5650	1.0000	0.6351
3	0.6280	0.6351	1.0000

Horst 3 Varimax plus hand rotation 1 at .31 → Done to add 7 onto 2 and 29 onto 3

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.4327	0.5359
2	0.4327	1.0000	0.5471
3	0.5359	0.5471	1.0000

Horst 3 Varimax plus hand rotation 2 at 0.31 – added 29 to 3 but got rid of 14 on 1

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3539	0.5466
2	0.3539	1.0000	0.4784
3	0.5466	0.4784	1.0000

Horst 3 Varimax plus hand rotation 3 at 0.31 – added 29 to 3 but got rid of 14 and 17 on 1

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3463	0.5443
2	0.3463	1.0000	0.4784
3	0.5443	0.4784	1.0000

Horst 3 Varimax plus hand rotation 4 at 0.31 – added 29 to 3 but got rid of 14, 17, and 30 on 1

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3286	0.5555
2	0.3286	1.0000	0.4783
3	0.5555	0.4783	1.0000

Horst 3 Varimax plus hand rotation 5 at 0.31 → added 29 to factor 3 only

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3607	0.5539
2	0.3607	1.0000	0.4792
3	0.5539	0.4792	1.0000

Horst 2 factors Varimax at .31

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Correlations Between Factor Scores

	1	2
1	1.0000	0.4278
2	0.4278	1.0000

Summary table of Horst extractions:

Q-sorts that load onto each factor for each solution:

Factor solution (Horst)	Factor 1 Q sorts	Factor 2 Q sorts	Factor 3 Q sorts	Factor 4 Q sorts	Factor 5 Q sorts	Factor 6 Q sorts	Factor 7 Q sorts
7 Varimax .31	8, 23	9, 10, 20	18	14	30	15, 24	4, 28
7 Varimax .42	1, 8, 23	9, 10, 20	2, 18, 27	16, 29	30	5, 13, 15, 19	4, 28
7 Varimax .31 + manual	8, 23	9, 10, 20	6, 11	16, 25	17, 30	15	4, 28
6 Varimax .31	18	9, 10, 22	8	28	14, 15, 24	-	
6 Varimax .42	18, 27	9, 10, 20	8, 23	4, 21, 28, 29	5, 11, 12, 13, 15, 16, 25	30	
5 Varimax .31	15, 24, 30	-	8	28	9, 10, 22		
5 Varimax .42	12, 13, 15, 17, 24, 25, 30	4, 18	8, 23	28, 29	3, 9, 10, 21, 22		
5 Varimax .31 + manual	12, 13, 15, 17, 24, 30	18, 27	8, 23	28, 29	9, 10, 22		
4 Varimax .31	-	3, 22, 28	14, 16	-			
4 Varimax .42	2, 5, 18	3, 4, 10, 22	11, 16	1, 8, 13, 17, 19, 23, 25			
4 Varimax.31 + manual	5, 18, 20, 24	22, 29	11, 16	9, 25			
3 Varimax .31	11, 12, 13, 14, 15, 17, 24, 30	9, 10, 20	22, 28				
3 Varimax .42	6, 8, 11, 12, 13, 14, 15, 17, 19, 24, 30	7, 10, 20, 26	22, 28, 29				
3 Varimax .31 + manual 1	11, 12, 13, 14, 15, 17, 24, 30	7, 9, 10, 20	22, 28, 29				

3 Varimax .31 + manual 2	11, 12, 13, 15, 17, 24, 30	9, 10, 20	22, 28, 29				
3 Varimax .31 + manual 3	11, 12, 13, 15, 24, 30	9, 10, 20	22, 28, 29				
3 Varimax .31 + manual 4	11, 12, 13, 15, 30	9, 10, 20	22, 28, 29				
3 Varimax .31 + manual 5	11, 12, 13, 14, 15, 17, 24, 30	9, 10, 20	22, 28, 29				
2 Varimax .31	11, 12, 13, 14, 15, 16, 17, 24	3, 9, 10, 20, 22, 28					

Solutions using Brown Centroid Algorithm:

Brown 7 factors Varimax

Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.4085	0.3210	0.4317
2	0.4085	1.0000	0.4441	0.4504
3	0.3210	0.4441	1.0000	0.5053
4	0.4317	0.4504	0.5053	1.0000

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Brown 7 factors extracted varimax solution at .40

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Correlations Between Factor Scores

	1	2	3	4	5
1	1.0000	0.4798	0.3914	0.4991	0.6362
2	0.4798	1.0000	0.4331	0.5050	0.4013
3	0.3914	0.4331	1.0000	0.5655	0.5052
4	0.4991	0.5050	0.5655	1.0000	0.6157
5	0.6362	0.4013	0.5052	0.6157	1.0000

Brown 7 factors extracted varimax plus 4 factor solution rotated

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Correlations Between Factor Scores

	1	2	3	4
1	1.0000	0.5426	0.5667	0.5644
2	0.5426	1.0000	0.5545	0.4387
3	0.5667	0.5545	1.0000	0.4892
4	0.5644	0.4387	0.4892	1.0000

Brown 7 Factor Varimax at .40

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Brown 7 factors Varimax 3 factor solution at .40

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.5346	0.6351
2	0.5346	1.0000	0.5372
3	0.6351	0.5372	1.0000

Brown 6 factors Varimax

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.1954	0.4165
2	0.1954	1.0000	0.4217
3	0.4165	0.4217	1.0000

Brown 6 factors varimax plus manual loading onto factor 6

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.4975	0.5680
2	0.4975	1.0000	0.4180
3	0.5680	0.4180	1.0000

Brown 6 factors Varimax plus manual loading onto factor 4

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.4118	0.6017
2	0.4118	1.0000	0.4128
3	0.6017	0.4128	1.0000

But if 14, 28 & 30 are omitted:

Correlations Between Factor Scores

	1	2	3
1	1.0000	0.4118	0.5430
2	0.4118	1.0000	0.3577
3	0.5430	0.3577	1.0000

Brown 5 Factors Varimax

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Correlations Between Factor Scores

	1	2
1	1.0000	0.4911
2	0.4911	1.0000

Brown 5 factors with more rotating

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.4462	0.6194
2	0.4462	1.0000	0.5109
3	0.6194	0.5109	1.0000

Brown 4 Factors Varimax

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3595	0.4352
2	0.3595	1.0000	0.3060
3	0.4352	0.3060	1.0000

Brown 4 factors manually rotated

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Correlations Between Factor Scores

	1	2	3
1	1.0000	0.5198	0.5423
2	0.5198	1.0000	0.1984
3	0.5423	0.1984	1.0000

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Correlations Between Factor Scores

	1	2
1	1.0000	0.4243
2	0.4243	1.0000

Brown 2 Factors

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Correlations Between Factor Scores

	1	2
1	1.0000	0.4313
2	0.4313	1.0000

Brown 1 factor

QSORT		Loadings 1
1	14F8A125	0.8127X
2	14F7A238	0.7163X
3	16F7A300	0.5631X
4	15F7A257	0.6335X
5	13F7A238	0.6650X
6	11M7A186	0.6569X
7	18M7A186	0.7000X
8	11F7A238	0.5581X
9	16DG8A28	0.4404X
10	12M7C238	0.4789X
11	13F7A138	0.5537X
12	15F6A100	0.7249X
13	12M8A238	0.6957X
14	17M7C138	0.4431X
15	17F6D129	0.4384X
16	15F7C150	0.4854X
17	17F7C163	0.6737X
18	16F6A200	0.6926X
19	14M8A163	0.7358X
20	15F6A186	0.6666X
21	13F8A300	0.6917X
22	11M7A263	0.3480X
23	17M7A200	0.7477X
24	17FC125	0.4950X
25	11F7A125	0.6444X
26	16F9A213	0.8143X
27	11F8A238	0.8222X
28	15F7A286	0.4564X
29	12M7C138	0.6649X
30	16F6C188	0.6203X
% expl.Var.		40

Q-sorts that load onto each factor for each solution:

Factor solution (Brown)	Factor 1 Q sorts	Factor 2 Q sorts	Factor 3 Q sorts	Factor 4 Q sorts	Factor 5 Q sorts
7 Varimax	8	9, 10, 20	28, 29	12, 15, 24, 25	
7 Varimax at .40	8, 23	9, 10, 20	4	3, 16, 21, 29	5, 11, 12, 13, 15, 24, 30 Care
7 Varimax + manual	1, 8, 23	9, 10, 20	3, 4, 14, 16, 22, 28, 29	5, 15, 24	
7 Varimax + manual at .40	1, 2, 8, 13, 17, 23	9, 10, 20	3, 4, 6, 16, 28, 29		
6 Varimax	8	9, 22, 28	15, 16, 24, 30		
6 Varimax + manual onto factor 6	8, 18, 27	3, 9, 22	11, 15, 16, 24, 30		
6 Varimax + manual onto Factor 4	1, 8, 23	9, 10, 22	4, 6, 14, 28, 30		
5 Varimax	2, 13, 15, 16, 17, 24, 30	7, 9, 10, 20, 22			
5Varimax +manual	13, 15, 17, 24, 30	7, 10, 20 22	6, 14, 18		
4 Varimax	8	3, 10, 22, 28	5, 11, 14, 15, 16, 24		
4Varimax +manual	8, 19, 25	3, 10, 22	6, 11, 16		
3 Varimax	11, 12, 13, 14, 15, 16, 17, 24	3, 9, 10, 20, 22, 28			
2 Varimax	11, 12, 13, 14, 15, 16, 17, 24	3, 9, 10, 20, 22, 28			
1 Varimax	All				

Supplementary Appendix D1.4 Initial Output for 3-Factor Horst Solution, 0.31 factor significance, varimax rotation

Unrotated Factor Matrix

	Factors		
	1	2	3
SORTS			
1 14F8A125	0.8120	0.1400	0.1552
2 14F7A238	0.7176	0.1261	0.2373
3 16F7A300	0.5692	-0.3718	-0.0860
4 15F7A257	0.6340	-0.1936	-0.1177
5 13F7A238	0.6652	0.1317	0.1767
6 11M7A186	0.6561	0.1213	-0.1278
7 18M7A186	0.7032	-0.2976	0.1252
8 11F7A238	0.5581	0.0766	0.1832
9 16DG8A28	0.4398	-0.1398	0.0032
10 12M7C238	0.4926	-0.4789	0.2133
11 13F7A138	0.5639	0.4444	-0.1384
12 15F6A100	0.7284	0.3318	0.0026
13 12M8A238	0.6964	0.2449	-0.0132
14 17M7C138	0.4414	0.0204	-0.0154
15 17F6D129	0.4410	0.2664	-0.0762
16 15F7C150	0.4928	0.2063	-0.3488
17 17F7C163	0.6774	0.3179	0.1004
18 16F6A200	0.6967	-0.0811	0.3352
19 14M8A163	0.7337	0.0801	-0.0886
20 15F6A186	0.6735	-0.3010	0.2728
21 13F8A300	0.6905	-0.0776	-0.1452
22 11M7A263	0.3525	-0.2767	-0.1705
23 17M7A200	0.7463	0.0899	0.1379
24 17FC125	0.4941	0.1279	0.0479
25 11F7A125	0.6443	0.0755	-0.1925
26 16F9A213	0.8146	-0.2028	0.1439
27 11F8A238	0.8215	-0.1793	0.1133
28 15F7A286	0.4607	-0.1220	-0.3085
29 12M7C138	0.6726	-0.1925	-0.3792
30 16F6C188	0.6187	0.1137	-0.0402
Eigenvalues	12.1203	1.5235	0.9784
% expl.Var.	40	5	3

Cumulative Communalities Matrix

	Factors		
SORTS	1	2	3
1 14F8A125	0.6594	0.6790	0.7030
2 14F7A238	0.5150	0.5309	0.5872
3 16F7A300	0.3240	0.4622	0.4696
4 15F7A257	0.4019	0.4394	0.4532
5 13F7A238	0.4425	0.4598	0.4910
6 11M7A186	0.4304	0.4451	0.4615
7 18M7A186	0.4945	0.5831	0.5988
8 11F7A238	0.3115	0.3174	0.3509
9 16DG8A28	0.1934	0.2130	0.2130
10 12M7C238	0.2426	0.4720	0.5175
11 13F7A138	0.3179	0.5154	0.5346
12 15F6A100	0.5306	0.6406	0.6406
13 12M8A238	0.4849	0.5449	0.5451
14 17M7C138	0.1949	0.1953	0.1955
15 17F6D129	0.1945	0.2655	0.2713
16 15F7C150	0.2429	0.2855	0.4071
17 17F7C163	0.4589	0.5599	0.5700
18 16F6A200	0.4853	0.4919	0.6043
19 14M8A163	0.5383	0.5447	0.5526
20 15F6A186	0.4536	0.5442	0.6186
21 13F8A300	0.4768	0.4828	0.5039
22 11M7A263	0.1243	0.2008	0.2299
23 17M7A200	0.5569	0.5650	0.5840
24 17FC125	0.2441	0.2605	0.2628
25 11F7A125	0.4151	0.4208	0.4579
26 16F9A213	0.6636	0.7047	0.7254
27 11F8A238	0.6749	0.7071	0.7199
28 15F7A286	0.2123	0.2272	0.3223
29 12M7C138	0.4524	0.4895	0.6333
30 16F6C188	0.3828	0.3957	0.3973
cum% expl.Var.	40	45	49

Factor Matrix with an X Indicating a Defining Sort

		Loadings		
	QSORT	1	2	3
1	14F8A125	0.6562	0.4828	0.1984
2	14F7A238	0.5836	0.4873	0.0956
3	16F7A300	0.1109	0.4725	0.4838
4	15F7A257	0.2851	0.3934	0.4661
5	13F7A238	0.5510	0.4169	0.1165
6	11M7A186	0.5313	0.2292	0.3559
7	18M7A186	0.2603	0.6393	0.3498
8	11F7A238	0.4381	0.3898	0.0842
9	16DG8A28	0.1954	0.3283X	0.2589
10	12M7C238	-0.0141	0.6719X	0.2567
11	13F7A138	0.7061X	-0.0049	0.1896
12	15F6A100	0.7376X	0.2369	0.2012
13	12M8A238	0.6517X	0.2560	0.2341
14	17M7C138	0.3138X	0.2310	0.2090
15	17F6D129	0.4933X	0.0599	0.1562
16	15F7C150	0.4790	-0.0465	0.4190
17	17F7C163	0.6947X	0.2759	0.1063
18	16F6A200	0.4190	0.6481	0.0934
19	14M8A163	0.5544	0.3199	0.3779
20	15F6A186	0.2404	0.7154X	0.2214
21	13F8A300	0.4082	0.3457	0.4666
22	11M7A263	0.0323	0.2453	0.4107X
23	17M7A200	0.5745	0.4618	0.2018
24	17FC125	0.4298X	0.2419	0.1398
25	11F7A125	0.4885	0.2072	0.4199
26	16F9A213	0.4058	0.6629	0.3482
27	11F8A238	0.4272	0.6352	0.3660
28	15F7A286	0.2166	0.1379	0.5063X
29	12M7C138	0.3071	0.2531	0.6891
30	16F6C188	0.5021X	0.2661	0.2728
	% expl.Var.	22	17	11

Correlations Between Factor Scores

	1	2	3
1	1.0000	0.3663	0.3878
2	0.3663	1.0000	0.3709
3	0.3878	0.3709	1.0000

Supplementary Appendix D2.1 PQMethod Output showing z-scores for each statement within each Factor

Factor 1

Statement Number	Shortened Statement	Z-SCORE
60	My family take my concerns about CC seriously	1.788
6	I feel angry at governments and oil companies	1.786
43	The welfare of animals is as important as ours	1.690
22	Concerns about CC have impacted my diet or consumerism	1.576
61	My teachers would be supportive of my concerns around CC	1.526
24	I feel concerned about CC's impact on developing countries	1.386
44	I feel a strong nature connection	1.304
57	Time with others concerned about CC keeps me engaged	1.288
31	People will reduce emissions if they could track impact	1.268
29	My social, political, and environmental concerns intersect	1.252
53	I can discuss CC with my friends	1.228
23	I feel a responsibility to be eco regardless of my wider imp	1.106
39	CC highlights that I am interconnected with others	1.068
17	I feel hope due to recovery of wildlife in pandemic	1.064
46	Student strikes give me hope for the future	1.037
20	I feel we live in a state of denial	1.007
7	I feel angry at climate change deniers	0.993
52	It's morally right to protest even if inconvenient to others	0.862
4	I feel grief at damage to natural world	0.843
21	Reducing my ecological impact makes me feel better	0.711
15	I feel hope due to technology	0.587
49	My engagement with CC is part of my identity	0.527
5	I feel anger at older generations	0.413
26	I don't want to criticise others for polluting	0.391
14	I feel hope due to faith or beliefs	0.374
54	Most people my age are concerned about CC	0.328
56	Using social media keeps me engaged with CC	0.285
51	It's ethically wrong to oppose climate legislation	0.256
35	World systems make it difficult to be eco-friendly	0.215
55	People will lose interest in CC when new causes arise	0.183
38	CC shows that modern life is absurd	0.153
68	I wish others were more understanding of my concerns	0.074
18	I want to focus on Deep Adaptation	0.050
37	I have to look after my friends and family first	0.044
25	I can deal with challenges posed to my life from CC	-0.037
41	I'm not sure whether to have children because of CC	-0.051
65	It's important that solutions to CC keep our current way of	-0.115
47	Criticisms of student strikes attack my values	-0.137
3	I sometimes feel guilty I'm not doing more	-0.250
42	I feel grief that CC limits my opportunities	-0.294
69	I feel insecure due to the uncertainty caused by CC	-0.304
64	Joking with others about CC helps	-0.312

8	I have more immediate concerns than CC	-0.330
36	I want to travel before places are ruined by CC	-0.400
10	I feel a lot of fear about climate change	-0.425
67	News coverage of CC affects my emotions	-0.427
50	I avoid talking to others about my worries about CC	-0.445
59	Not many people from my background are engaged with CC	-0.469
45	We need the freedom to choose whether to buy eco	-0.532
48	Only rich people can afford to be eco	-0.605
9	I switch between feeling great and awful about the future	-0.621
63	Some people just pretend they care about CC	-0.684
1	It's hard to stop worrying once I've started	-0.756
12	When I feel low, thinking about CC makes me feel worse	-0.900
19	I am excited about potential collapse	-0.980
66	I'm worried that overpopulation is a problem for CC	-1.015
2	I feel some background anxiety most of the time	-1.057
58	I feel pressure from others at school to be eco-friendly	-1.111
62	It's hard to relate to people who are not concerned about CC	-1.135
33	We can't stop CC so there's no point thinking about it	-1.217
32	CC feels distant because it affects people in the future	-1.253
28	CC feels distant because it's a hyperobject	-1.333
16	I feel hope due to denial of scientific research	-1.398
34	I worry about being criticised for not doing enough about CC	-1.423
27	Sometimes I need to switch off from CC	-1.446
30	I don't engage because we don't know what will happen	-1.483
11	Thinking about CC feels like a chore	-1.709
13	Worrying about CC is affecting my mental health	-1.980
40	No point in my education because we have no future	-2.028

Factor 2

Statement Number	Shortened Statement	Z-SCORE
10	I feel a lot of fear about climate change	2.024
6	I feel angry at governments and oil companies	1.876
20	I feel we live in a state of denial	1.825
52	It's morally right to protest even if inconvenient to others	1.576
5	I feel anger at older generations	1.460
4	I feel grief at damage to natural world	1.443
7	I feel angry at climate change deniers	1.394
38	CC shows that modern life is absurd	1.244
51	It's ethically wrong to oppose climate legislation	1.212
55	People will lose interest in CC when new causes arise	1.178
24	I feel concerned about CC's impact on developing countries	1.096
35	World systems make it difficult to be eco-friendly	1.062
27	Sometimes I need to switch off from CC	1.029
69	I feel insecure due to the uncertainty caused by CC	0.962
12	When I feel low, thinking about CC makes me feel worse	0.862
46	Student strikes give me hope for the future	0.779
2	I feel some background anxiety most of the time	0.764
9	I switch between feeling great and awful about the future	0.697
67	News coverage of CC affects my emotions	0.664
39	CC highlights that I am interconnected with others	0.663
1	It's hard to stop worrying once I've started	0.631
36	I want to travel before places are ruined by CC	0.630
47	Criticisms of student strikes attack my values	0.515
3	I sometimes feel guilty I'm not doing more	0.513
29	My social, political, and environmental concerns intersect	0.480
60	My family take my concerns about CC seriously	0.447
48	Only rich people can afford to be eco	0.400
23	I feel a responsibility to be eco regardless of my wider imp	0.382
17	I feel hope due to recovery of wildlife in pandemic	0.382
22	Concerns about CC have impacted my diet or consumerism	0.265
41	I'm not sure whether to have children because of CC	0.083
57	Time with others concerned about CC keeps me engaged	0.033
44	I feel a strong nature connection	0.017
63	Some people just pretend they care about CC	-0.014
43	The welfare of animals is as important as ours	-0.016
56	Using social media keeps me engaged with CC	-0.034
61	My teachers would be supportive of my concerns around CC	-0.049
42	I feel grief that CC limits my opportunities	-0.050
13	Worrying about CC is affecting my mental health	-0.166
33	We can't stop CC so there's no point thinking about it	-0.181
34	I worry about being criticised for not doing enough about CC	-0.249
66	I'm worried that overpopulation is a problem for CC	-0.265
62	It's hard to relate to people who are not concerned about CC	-0.331
53	I can discuss CC with my friends	-0.348
31	People will reduce emissions if they could track impact	-0.447

64	Joking with others about CC helps	-0.482
68	I wish others were more understanding of my concerns	-0.499
49	My engagement with CC is part of my identity	-0.680
59	Not many people from my background are engaged with CC	-0.697
54	Most people my age are concerned about CC	-0.746
21	Reducing my ecological impact makes me feel better	-0.781
14	I feel hope due to faith or beliefs	-0.814
50	I avoid talking to others about my worries about CC	-0.830
11	Thinking about CC feels like a chore	-0.845
40	No point in my education because we have no future	-0.862
8	I have more immediate concerns than CC	-0.930
26	I don't want to criticise others for polluting	-0.946
15	I feel hope due to technology	-1.013
19	I am excited about potential collapse	-1.044
45	We need the freedom to choose whether to buy eco	-1.062
18	I want to focus on Deep Adaptation	-1.145
30	I don't engage because we don't know what will happen	-1.312
58	I feel pressure from others at school to be eco-friendly	-1.327
37	I have to look after my friends and family first	-1.493
32	CC feels distant because it affects people in the future	-1.560
65	It's important that solutions to CC keep our current way of	-1.692
28	CC feels distant because it's a hyperobject	-1.776
25	I can deal with challenges posed to my life from CC	-1.925
16	I feel hope due to denial of scientific research	-1.975

Factor 3

Statement Number	Shortened Statement	Z-SCORE
5	I feel anger at older generations	1.957
43	The welfare of animals is as important as ours	1.957
66	I'm worried that overpopulation is a problem for CC	1.841
38	CC shows that modern life is absurd	1.700
6	I feel angry at governments and oil companies	1.655
35	World systems make it difficult to be eco-friendly	1.514
9	I switch between feeling great and awful about the future	1.444
51	It's ethically wrong to oppose climate legislation	1.328
17	I feel hope due to recovery of wildlife in pandemic	1.212
18	I want to focus on Deep Adaptation	1.142
29	My social, political, and environmental concerns intersect	1.097
3	I sometimes feel guilty I'm not doing more	1.026
24	I feel concerned about CC's impact on developing countries	0.956
62	It's hard to relate to people who are not concerned about CC	0.885
23	I feel a responsibility to be eco regardless of my wider imp	0.745
4	I feel grief at damage to natural world	0.629
53	I can discuss CC with my friends	0.629
65	It's important that solutions to CC keep our current way of	0.629
33	We can't stop CC so there's no point thinking about it	0.558
10	I feel a lot of fear about climate change	0.558
20	I feel we live in a state of denial	0.538
52	It's morally right to protest even if inconvenient to others	0.513
19	I am excited about potential collapse	0.468
15	I feel hope due to technology	0.443
49	My engagement with CC is part of my identity	0.443
7	I feel angry at climate change deniers	0.443
61	My teachers would be supportive of my concerns around CC	0.372
36	I want to travel before places are ruined by CC	0.327
59	Not many people from my background are engaged with CC	0.302
39	CC highlights that I am interconnected with others	0.257
31	People will reduce emissions if they could track impact	0.231
54	Most people my age are concerned about CC	0.211
44	I feel a strong nature connection	0.186
8	I have more immediate concerns than CC	0.141
60	My family take my concerns about CC seriously	0.141
13	Worrying about CC is affecting my mental health	0.045
21	Reducing my ecological impact makes me feel better	0.000
25	I can deal with challenges posed to my life from CC	-0.045
48	Only rich people can afford to be eco	-0.070
68	I wish others were more understanding of my concerns	-0.186
42	I feel grief that CC limits my opportunities	-0.282
64	Joking with others about CC helps	-0.372
37	I have to look after my friends and family first	-0.443
69	I feel insecure due to the uncertainty caused by CC	-0.443
57	Time with others concerned about CC keeps me engaged	-0.513

1	It's hard to stop worrying once I've started	-0.513
40	No point in my education because we have no future	-0.538
67	News coverage of CC affects my emotions	-0.558
46	Student strikes give me hope for the future	-0.583
16	I feel hope due to denial of scientific research	-0.629
2	I feel some background anxiety most of the time	-0.629
63	Some people just pretend they care about CC	-0.674
26	I don't want to criticise others for polluting	-0.770
11	Thinking about CC feels like a chore	-0.815
12	When I feel low, thinking about CC makes me feel worse	-0.956
50	I avoid talking to others about my worries about CC	-1.001
41	I'm not sure whether to have children because of CC	-1.026
56	Using social media keeps me engaged with CC	-1.142
28	CC feels distant because it's a hyperobject	-1.142
22	Concerns about CC have impacted my diet or consumerism	-1.212
30	I don't engage because we don't know what will happen	-1.258
55	People will lose interest in CC when new causes arise	-1.283
27	Sometimes I need to switch off from CC	-1.328
45	We need the freedom to choose whether to buy eco	-1.444
34	I worry about being criticised for not doing enough about CC	-1.444
47	Criticisms of student strikes attack my values	-1.469
58	I feel pressure from others at school to be eco-friendly	-1.771
32	CC feels distant because it affects people in the future	-1.771
14	I feel hope due to faith or beliefs	-2.213

Supplementary Appendix D2.2 Tables from PQMethod output showing Factor Array positionings for each Factor

Factor Array Positionings, shown according to statement number

Statement Number	Shortened Statement	Factor Arrays 1	2	3
1	It's hard to stop worrying once I've started	-2	2	-1
2	I feel some background anxiety most of the time	-3	2	-2
3	I sometimes feel guilty I'm not doing more	0	1	3
4	I feel grief at damage to natural world	2	4	2
5	I feel anger at older generations	1	4	5
6	I feel angry at governments and oil companies	5	5	4
7	I feel angry at climate change deniers	2	4	1
8	I have more immediate concerns than CC	-1	-3	0
9	I switch between feeling great and awful about the future	-2	2	4
10	I feel a lot of fear about climate change	1	5	2
11	Thinking about CC feels like a chore	-5	-2	-2
12	When I feel low, thinking about CC makes me feel worse	-2	3	-3
13	Worrying about CC is affecting my mental health	-5	0	0
14	I feel hope due to faith or beliefs	1	-2	-5
15	I feel hope due to technology	2	-3	1
16	I feel hope due to denial of scientific research	-4	-5	-2
17	I feel hope due to recovery of wildlife in pandemic	3	1	4
18	I want to focus on Deep Adaptation	0	-4	3
19	I am excited about potential collapse	-3	-3	1
20	I feel we live in a state of denial	2	5	2
21	Reducing my ecological impact makes me feel better	2	-2	0
22	Concerns about CC have impacted my diet or consumerism	5	1	-3
23	I feel a responsibility to be eco regardless of my wider imp	3	1	3
24	I feel concerned about CC's impact on developing countries	4	3	3
25	I can deal with challenges posed to my life from CC	0	-5	0
26	I don't want to criticise others for polluting	1	-3	-2
27	Sometimes I need to switch off from CC	-4	3	-4
28	CC feels distant because it's a hyperobject	-4	-5	-3
29	My social, political, and environmental concerns intersect	3	1	3
30	I don't engage because we don't know what will happen	-5	-4	-4
31	People will reduce emissions if they could track impact	4	-1	0
32	CC feels distant because it affects people in the future	-4	-4	-5
33	We can't stop CC so there's no point thinking about it	-3	-1	2
34	I worry about being criticised for not doing enough about CC	-4	-1	-4
35	World systems make it difficult to be eco-friendly	1	3	4
36	I want to travel before places are ruined by CC	-1	2	1
37	I have to look after my friends and family first	0	-4	-1
38	CC shows that modern life is absurd	0	4	5
39	CC highlights that I am interconnected with others	3	2	1
40	No point in my education because we have no future	-5	-3	-1
41	I'm not sure whether to have children because of CC	0	0	-3

42	I feel grief that CC limits my opportunities	-1	0	-1
43	The welfare of animals is as important as ours	5	0	5
44	I feel a strong nature connection	4	0	0
45	We need the freedom to choose whether to buy eco	-2	-3	-4
46	Student strikes give me hope for the future	3	2	-2
47	Criticisms of student strikes attack my values	0	1	-5
48	Only rich people can afford to be eco	-2	1	0
49	My engagement with CC is part of my identity	2	-2	1
50	I avoid talking to others about my worries about CC	-1	-2	-3
51	It's ethically wrong to oppose climate legislation	1	4	4
52	It's morally right to protest even if inconvenient to others	2	5	2
53	I can discuss CC with my friends	3	-1	2
54	Most people my age are concerned about CC	1	-2	0
55	People will lose interest in CC when new causes arise	1	3	-4
56	Using social media keeps me engaged with CC	1	0	-3
57	Time with others concerned about CC keeps me engaged	4	0	-1
58	I feel pressure from others at school to be eco-friendly	-3	-4	-5
59	Not many people from my background are engaged with CC	-2	-2	1
60	My family take my concerns about CC seriously	5	1	0
61	My teachers would be supportive of my concerns around CC	4	0	1
62	It's hard to relate to people who are not concerned about CC	-3	-1	3
63	Some people just pretend they care about CC	-2	0	-2
64	Joking with others about CC helps	-1	-1	-1
65	It's important that solutions to CC keep our current way of	65	0	-5	2
66	I'm worried that overpopulation is a problem for CC	-3	-1	5
67	News coverage of CC affects my emotions	-1	2	-2
68	I wish others were more understanding of my concerns	0	-1	-1
69	I feel insecure due to the uncertainty caused by CC	-1	3	-1

Supplementary Appendix D2.3 Tables from PQMethod output showing z-scores for statements for each factor, differences between z-scores for statements for each factor, when the differences are significant, plus consensus statements between factors

Factor Scores -- For Factor 1

No.	Statement	No.	Z-SCORES
60	My family take my concerns about CC seriously	60	1.788
6	I feel angry at governments and oil companies	6	1.786
43	The welfare of animals is as important as ours	43	1.690
22	Concerns about CC have impacted my diet or consumerism	22	1.576
61	My teachers would be supportive of my concerns around CC	61	1.526
24	I feel concerned about CC's impact on developing countries	24	1.386
44	I feel a strong nature connection	44	1.304
57	Time with others concerned about CC keeps me engaged	57	1.288
31	People will reduce emissions if they could track impact	31	1.268
29	My social, political, and environmental concerns intersect	29	1.252
53	I can discuss CC with my friends	53	1.228
23	I feel a responsibility to be eco regardless of my wider imp	23	1.106
39	CC highlights that I am interconnected with others	39	1.068
17	I feel hope due to recovery of wildlife in pandemic	17	1.064
46	Student strikes give me hope for the future	46	1.037
20	I feel we live in a state of denial	20	1.007
7	I feel angry at climate change deniers	7	0.993
52	It's morally right to protest even if inconvenient to others	52	0.862
4	I feel grief at damage to natural world	4	0.843
21	Reducing my ecological impact makes me feel better	21	0.711
15	I feel hope due to technology	15	0.587
49	My engagement with CC is part of my identity	49	0.527
5	I feel anger at older generations	5	0.413
26	I don't want to criticise others for polluting	26	0.391
14	I feel hope due to faith or beliefs	14	0.374
54	Most people my age are concerned about CC	54	0.328
56	Using social media keeps me engaged with CC	56	0.285
51	It's ethically wrong to oppose climate legislation	51	0.256
35	World systems make it difficult to be eco friendly	35	0.215
55	People will lose interest in CC when new causes arise	55	0.183
38	CC shows that modern life is absurd	38	0.153
68	I wish others were more understanding of my concerns	68	0.074
18	I want to focus on Deep Adaptation	18	0.050
37	I have to look after my friends and family first	37	0.044
25	I can deal with challenges posed to my life from CC	25	-0.037
41	I'm not sure whether to have children because of CC	41	-0.051
65	It's important that solutions to CC keep our current way of	65	-0.115
47	Criticisms of student strikes attack my values	47	-0.137
3	I sometimes feel guilty I'm not doing more	3	-0.250
42	I feel grief that CC limits my opportunities	42	-0.294
69	I feel insecure due to the uncertainty caused by CC	69	-0.304
64	Joking with others about CC helps	64	-0.312
8	I have more immediate concerns than CC	8	-0.330
36	I want to travel before places are ruined by CC	36	-0.400
10	I feel a lot of fear about climate change	10	-0.425
67	News coverage of CC affects my emotions	67	-0.427
50	I avoid talking to others about my worries about CC	50	-0.445
59	Not many people from my background are engaged with CC	59	-0.469
45	We need the freedom to chose whether to buy eco	45	-0.532
48	Only rich people can afford to be eco	48	-0.605
9	I switch between feeling great and awful about the future	9	-0.621
63	Some people just pretend they care about CC	63	-0.684
1	It's hard to stop worrying once I've started	1	-0.756
12	When I feel low, thinking about CC makes me feel worse	12	-0.900
19	I am excited about potential collapse	19	-0.980
66	I'm worried that overpopulation is a problem for CC	66	-1.015
2	I feel some background anxiety most of the time	2	-1.057
58	I feel pressure from others at school to be eco friendly	58	-1.111
62	It's hard to relate to people who are not concerned about CC	62	-1.135
33	We can't stop CC so there's no point thinking about it	33	-1.217
32	CC feels distant because it affects people in the future	32	-1.253

28	CC feels distant because it's a hyperobject	28	-1.333
16	I feel hope due to denial of scientific research	16	-1.398
34	I worry about being criticised for not doing enough about CC	34	-1.423
27	Sometimes I need to switch off from CC	27	-1.446
30	I don't engage because we don't know what will happen	30	-1.483
11	Thinking about CC feels like a chore	11	-1.709
13	Worrying about CC is affecting my mental health	13	-1.980
40	No point in my education because we have no future	40	-2.028

Factor Scores -- For Factor 2

No.	Statement	No.	Z-SCORES
10	I feel a lot of fear about climate change	10	2.024
6	I feel angry at governments and oil companies	6	1.876
20	I feel we live in a state of denial	20	1.825
52	It's morally right to protest even if inconvenient to others	52	1.576
5	I feel anger at older generations	5	1.460
4	I feel grief at damage to natural world	4	1.443
7	I feel angry at climate change deniers	7	1.394
38	CC shows that modern life is absurd	38	1.244
51	It's ethically wrong to oppose climate legislation	51	1.212
55	People will lose interest in CC when new causes arise	55	1.178
24	I feel concerned about CC's impact on developing countries	24	1.096
35	World systems make it difficult to be eco friendly	35	1.062
27	Sometimes I need to switch off from CC	27	1.029
69	I feel insecure due to the uncertainty caused by CC	69	0.962
12	When I feel low, thinking about CC makes me feel worse	12	0.862
46	Student strikes give me hope for the future	46	0.779
2	I feel some background anxiety most of the time	2	0.764
9	I switch between feeling great and awful about the future	9	0.697
67	News coverage of CC affects my emotions	67	0.664
39	CC highlights that I am interconnected with others	39	0.663
1	It's hard to stop worrying once I've started	1	0.631
36	I want to travel before places are ruined by CC	36	0.630
47	Criticisms of student strikes attack my values	47	0.515
3	I sometimes feel guilty I'm not doing more	3	0.513
29	My social, political, and environmental concerns intersect	29	0.480
60	My family take my concerns about CC seriously	60	0.447
48	Only rich people can afford to be eco	48	0.400
23	I feel a responsibility to be eco regardless of my wider imp	23	0.382
17	I feel hope due to recovery of wildlife in pandemic	17	0.382
22	Concerns about CC have impacted my diet or consumerism	22	0.265
41	I'm not sure whether to have children because of CC	41	0.083
57	Time with others concerned about CC keeps me engaged	57	0.033
44	I feel a strong nature connection	44	0.017
63	Some people just pretend they care about CC	63	-0.014
43	The welfare of animals is as important as ours	43	-0.016
56	Using social media keeps me engaged with CC	56	-0.034
61	My teachers would be supportive of my concerns around CC	61	-0.049
42	I feel grief that CC limits my opportunities	42	-0.050
13	Worrying about CC is affecting my mental health	13	-0.166
33	We can't stop CC so there's no point thinking about it	33	-0.181
34	I worry about being criticised for not doing enough about CC	34	-0.249
66	I'm worried that overpopulation is a problem for CC	66	-0.265
62	It's hard to relate to people who are not concerned about CC	62	-0.331
53	I can discuss CC with my friends	53	-0.348
31	People will reduce emissions if they could track impact	31	-0.447
64	Joking with others about CC helps	64	-0.482
68	I wish others were more understanding of my concerns	68	-0.499
49	My engagement with CC is part of my identity	49	-0.680
59	Not many people from my background are engaged with CC	59	-0.697
54	Most people my age are concerned about CC	54	-0.746
21	Reducing my ecological impact makes me feel better	21	-0.781
14	I feel hope due to faith or beliefs	14	-0.814
50	I avoid talking to others about my worries about CC	50	-0.830
11	Thinking about CC feels like a chore	11	-0.845
40	No point in my education because we have no future	40	-0.862
8	I have more immediate concerns than CC	8	-0.930
26	I don't want to criticise others for polluting	26	-0.946
15	I feel hope due to technology	15	-1.013

19	I am excited about potential collapse	19	-1.044
45	We need the freedom to choose whether to buy eco	45	-1.062
18	I want to focus on Deep Adaptation	18	-1.145
30	I don't engage because we don't know what will happen	30	-1.312
58	I feel pressure from others at school to be eco-friendly	58	-1.327
37	I have to look after my friends and family first	37	-1.493
32	CC feels distant because it affects people in the future	32	-1.560
65	It's important that solutions to CC keep our current way of	65	-1.692
28	CC feels distant because it's a hyperobject	28	-1.776
25	I can deal with challenges posed to my life from CC	25	-1.925
16	I feel hope due to denial of scientific research	16	-1.975

Factor Scores -- For Factor 3

No.	Statement	No.	Z-SCORES
5	I feel anger at older generations	5	1.957
43	The welfare of animals is as important as ours	43	1.957
66	I'm worried that overpopulation is a problem for CC	66	1.841
38	CC shows that modern life is absurd	38	1.700
6	I feel angry at governments and oil companies	6	1.655
35	World systems make it difficult to be eco friendly	35	1.514
9	I switch between feeling great and awful about the future	9	1.444
51	It's ethically wrong to oppose climate legislation	51	1.328
17	I feel hope due to recovery of wildlife in pandemic	17	1.212
18	I want to focus on Deep Adaptation	18	1.142
29	My social, political, and environmental concerns intersect	29	1.097
3	I sometimes feel guilty I'm not doing more	3	1.026
24	I feel concerned about CC's impact on developing countries	24	0.956
62	It's hard to relate to people who are not concerned about CC	62	0.885
23	I feel a responsibility to be eco regardless of my wider imp	23	0.745
4	I feel grief at damage to natural world	4	0.629
53	I can discuss CC with my friends	53	0.629
65	It's important that solutions to CC keep our current way of	65	0.629
33	We can't stop CC so there's no point thinking about it	33	0.558
10	I feel a lot of fear about climate change	10	0.558
20	I feel we live in a state of denial	20	0.538
52	It's morally right to protest even if inconvenient to others	52	0.513
19	I am excited about potential collapse	19	0.468
15	I feel hope due to technology	15	0.443
49	My engagement with CC is part of my identity	49	0.443
7	I feel angry at climate change deniers	7	0.443
61	My teachers would be supportive of my concerns around CC	61	0.372
36	I want to travel before places are ruined by CC	36	0.327
59	Not many people from my background are engaged with CC	59	0.302
39	CC highlights that I am interconnected with others	39	0.257
31	People will reduce emissions if they could track impact	31	0.231
54	Most people my age are concerned about CC	54	0.211
44	I feel a strong nature connection	44	0.186
8	I have more immediate concerns than CC	8	0.141
60	My family take my concerns about CC seriously	60	0.141
13	Worrying about CC is affecting my mental health	13	0.045
21	Reducing my ecological impact makes me feel better	21	0.000
25	I can deal with challenges posed to my life from CC	25	-0.045
48	Only rich people can afford to be eco	48	-0.070
68	I wish others were more understanding of my concerns	68	-0.186
42	I feel grief that CC limits my opportunities	42	-0.282
64	Joking with others about CC helps	64	-0.372
37	I have to look after my friends and family first	37	-0.443
69	I feel insecure due to the uncertainty caused by CC	69	-0.443
57	Time with others concerned about CC keeps me engaged	57	-0.513
1	It's hard to stop worrying once I've started	1	-0.513
40	No point in my education because we have no future	40	-0.538
67	News coverage of CC affects my emotions	67	-0.558
46	Student strikes give me hope for the future	46	-0.583
16	I feel hope due to denial of scientific research	16	-0.629
2	I feel some background anxiety most of the time	2	-0.629
63	Some people just pretend they care about CC	63	-0.674
26	I don't want to criticise others for polluting	26	-0.770
11	Thinking about CC feels like a chore	11	-0.815
12	When I feel low, thinking about CC makes me feel worse	12	-0.956

50	I avoid talking to others about my worries about CC	50	-1.001
41	I'm not sure whether to have children because of CC	41	-1.026
56	Using social media keeps me engaged with CC	56	-1.142
28	CC feels distant because it's a hyperobject	28	-1.142
22	Concerns about CC have impacted my diet or consumerism	22	-1.212
30	I don't engage because we don't know what will happen	30	-1.258
55	People will lose interest in CC when new causes arise	55	-1.283
27	Sometimes I need to switch off from CC	27	-1.328
45	We need the freedom to chose whether to buy eco	45	-1.444
34	I worry about being criticised for not doing enough about CC	34	-1.444
47	Criticisms of student strikes attack my values	47	-1.469
58	I feel pressure from others at school to be eco friendly	58	-1.771
32	CC feels distant because it affects people in the future	32	-1.771
14	I feel hope due to faith or beliefs	14	-2.213

Descending Array of Differences Between Factors 1 and 2

No.	Statement	No.	Type 1	Type 2	Difference
25	I can deal with challenges posed to my life from CC	25	-0.037	-1.925	1.887
31	People will reduce emissions if they could track impact	31	1.268	-0.447	1.715
43	The welfare of animals is as important as ours	43	1.690	-0.016	1.706
15	I feel hope due to technology	15	0.587	-1.013	1.601
65	It's important that solutions to CC keep our current way of	65	-0.115	-1.692	1.578
53	I can discuss CC with my friends	53	1.228	-0.348	1.576
61	My teachers would be supportive of my concerns around CC	61	1.526	-0.049	1.575
37	I have to look after my friends and family first	37	0.044	-1.493	1.538
21	Reducing my ecological impact makes me feel better	21	0.711	-0.781	1.492
60	My family take my concerns about CC seriously	60	1.788	0.447	1.341
26	I don't want to criticise others for polluting	26	0.391	-0.946	1.337
22	Concerns about CC have impacted my diet or consumerism	22	1.576	0.265	1.311
44	I feel a strong nature connection	44	1.304	0.017	1.287
57	Time with others concerned about CC keeps me engaged	57	1.288	0.033	1.256
49	My engagement with CC is part of my identity	49	0.527	-0.680	1.207
18	I want to focus on Deep Adaptation	18	0.050	-1.145	1.195
14	I feel hope due to faith or beliefs	14	0.374	-0.814	1.189
54	Most people my age are concerned about CC	54	0.328	-0.746	1.074
29	My social, political, and environmental concerns intersect	29	1.252	0.480	0.771
23	I feel a responsibility to be eco regardless of my wider imp	23	1.106	0.382	0.724
17	I feel hope due to recovery of wildlife in pandemic	17	1.064	0.382	0.682
8	I have more immediate concerns than CC	8	-0.330	-0.930	0.600
16	I feel hope due to denial of scientific research	16	-1.398	-1.975	0.577
68	I wish others were more understanding of my concerns	68	0.074	-0.499	0.572
45	We need the freedom to choose whether to buy eco	45	-0.532	-1.062	0.530
28	CC feels distant because it's a hyperobject	28	-1.333	-1.776	0.443

39	CC highlights that I am interconnected with others	39	1.068	0.663	0.405
50	I avoid talking to others about my worries about CC	50	-0.445	-0.830	0.385
56	Using social media keeps me engaged with CC	56	0.285	-0.034	0.318
32	CC feels distant because it affects people in the future	32	-1.253	-1.560	0.306
24	I feel concerned about CC's impact on developing countries	24	1.386	1.096	0.290
46	Student strikes give me hope for the future	46	1.037	0.779	0.258
59	Not many people from my background are engaged with CC	59	-0.469	-0.697	0.228
58	I feel pressure from others at school to be eco friendly	58	-1.111	-1.327	0.216
64	Joking with others about CC helps	64	-0.312	-0.482	0.170
19	I am excited about potential collapse	19	-0.980	-1.044	0.064
6	I feel angry at governments and oil companies	6	1.786	1.876	-0.089
41	I'm not sure whether to have children because of CC	41	-0.051	0.083	-0.133
30	I don't engage because we don't know what will happen	30	-1.483	-1.312	-0.172
42	I feel grief that CC limits my opportunities	42	-0.294	-0.050	-0.244
7	I feel angry at climate change deniers	7	0.993	1.394	-0.400
4	I feel grief at damage to natural world	4	0.843	1.443	-0.599
47	Criticisms of student strikes attack my values	47	-0.137	0.515	-0.651
63	Some people just pretend they care about CC	63	-0.684	-0.014	-0.670
52	It's morally right to protest even if inconvenient to others	52	0.862	1.576	-0.714
66	I'm worried that overpopulation is a problem for CC	66	-1.015	-0.265	-0.750
3	I sometimes feel guilty I'm not doing more	3	-0.250	0.513	-0.763
62	It's hard to relate to people who are not concerned about CC	62	-1.135	-0.331	-0.803
20	I feel we live in a state of denial	20	1.007	1.825	-0.818
35	World systems make it difficult to be eco friendly	35	0.215	1.062	-0.847
11	Thinking about CC feels like a chore	11	-1.709	-0.845	-0.864
51	It's ethically wrong to oppose climate legislation	51	0.256	1.212	-0.956
55	People will lose interest in CC when new causes arise	55	0.183	1.178	-0.995
48	Only rich people can afford to be eco	48	-0.605	0.400	-1.005
36	I want to travel before places are ruined by CC	36	-0.400	0.630	-1.029
33	We can't stop CC so there's no point thinking about it	33	-1.217	-0.181	-1.036
5	I feel anger at older generations	5	0.413	1.460	-1.047
67	News coverage of CC affects my emotions	67	-0.427	0.664	-1.091
38	CC shows that modern life is absurd	38	0.153	1.244	-1.091
40	No point in my education because we have no future	40	-2.028	-0.862	-1.166
34	I worry about being criticised for not doing enough about CC	34	-1.423	-0.249	-1.174
69	I feel insecure due to the uncertainty caused by CC	69	-0.304	0.962	-1.267
9	I switch between feeling great and awful about the future	9	-0.621	0.697	-1.318
1	It's hard to stop worrying once I've started	1	-0.756	0.631	-1.387
12	When I feel low, thinking about CC makes me feel worse	12	-0.900	0.862	-1.763
13	Worrying about CC is affecting my mental health	13	-1.980	-0.166	-1.814
2	I feel some background anxiety most of the time	2	-1.057	0.764	-1.821
10	I feel a lot of fear about climate change	10	-0.425	2.024	-2.449
27	Sometimes I need to switch off from CC	27	-1.446	1.029	-2.475

Descending Array of Differences Between Factors 1 and 3

No.	Statement	No.	Type 1	Type 3	Difference
22	Concerns about CC have impacted my diet or consumerism	22	1.576	-1.212	2.788
14	I feel hope due to faith or beliefs	14	0.374	-2.213	2.588
57	Time with others concerned about CC keeps me engaged	57	1.288	-0.513	1.801
60	My family take my concerns about CC seriously	60	1.788	0.141	1.647
46	Student strikes give me hope for the future	46	1.037	-0.583	1.621
55	People will lose interest in CC when new causes arise	55	0.183	-1.283	1.466
56	Using social media keeps me engaged with CC	56	0.285	-1.142	1.427
47	Criticisms of student strikes attack my values	47	-0.137	-1.469	1.332
26	I don't want to criticise others for polluting	26	0.391	-0.770	1.160
61	My teachers would be supportive of my concerns around CC	61	1.526	0.372	1.153
44	I feel a strong nature connection	44	1.304	0.186	1.118
31	People will reduce emissions if they could track impact	31	1.268	0.231	1.037
41	I'm not sure whether to have children because of CC	41	-0.051	-1.026	0.975
45	We need the freedom to choose whether to buy eco	45	-0.532	-1.444	0.912
39	CC highlights that I am interconnected with others	39	1.068	0.257	0.811
21	Reducing my ecological impact makes me feel better	21	0.711	0.000	0.711
58	I feel pressure from others at school to be eco-friendly	58	-1.111	-1.771	0.660
53	I can discuss CC with my friends	53	1.228	0.629	0.599
50	I avoid talking to others about my worries about CC	50	-0.445	-1.001	0.556
7	I feel angry at climate change deniers	7	0.993	0.443	0.551
32	CC feels distant because it affects people in the future	32	-1.253	-1.771	0.517
37	I have to look after my friends and family first	37	0.044	-0.443	0.487
20	I feel we live in a state of denial	20	1.007	0.538	0.469
24	I feel concerned about CC's impact on developing countries	24	1.386	0.956	0.430
23	I feel a responsibility to be eco regardless of my wider imp	23	1.106	0.745	0.362
52	It's morally right to protest even if inconvenient to others	52	0.862	0.513	0.349
68	I wish others were more understanding of my concerns	68	0.074	-0.186	0.260
4	I feel grief at damage to natural world	4	0.843	0.629	0.214
29	My social, political, and environmental concerns intersect	29	1.252	1.097	0.155
15	I feel hope due to technology	15	0.587	0.443	0.145
69	I feel insecure due to the uncertainty caused by CC	69	-0.304	-0.443	0.138
6	I feel angry at governments and oil companies	6	1.786	1.655	0.132
67	News coverage of CC affects my emotions	67	-0.427	-0.558	0.131
54	Most people my age are concerned about CC	54	0.328	0.211	0.117
49	My engagement with CC is part of my identity	49	0.527	0.443	0.084
64	Joking with others about CC helps	64	-0.312	-0.372	0.060
12	When I feel low, thinking about CC makes me feel worse	12	-0.900	-0.956	0.056
34	I worry about being criticised for not doing enough about CC	34	-1.423	-1.444	0.021
25	I can deal with challenges posed to my life from CC	25	-0.037	-0.045	0.008
63	Some people just pretend they care about CC	63	-0.684	-0.674	-0.010
42	I feel grief that CC limits my opportunities	42	-0.294	-0.282	-0.012
27	Sometimes I need to switch off from CC	27	-1.446	-1.328	-0.118
17	I feel hope due to recovery of wildlife in pandemic	17	1.064	1.212	-0.148
28	CC feels distant because it's a hyperobject	28	-1.333	-1.142	-0.191

30	I don't engage because we don't know what will happen	30	-1.483	-1.258	-0.226
1	It's hard to stop worrying once I've started	1	-0.756	-0.513	-0.243
43	The welfare of animals is as important as ours	43	1.690	1.957	-0.267
2	I feel some background anxiety most of the time	2	-1.057	-0.629	-0.429
8	I have more immediate concerns than CC	8	-0.330	0.141	-0.471
48	Only rich people can afford to be eco	48	-0.605	-0.070	-0.535
36	I want to travel before places are ruined by CC	36	-0.400	0.327	-0.726
65	It's important that solutions to CC keep our current way of	65	-0.115	0.629	-0.743
16	I feel hope due to denial of scientific research	16	-1.398	-0.629	-0.769
59	Not many people from my background are engaged with CC	59	-0.469	0.302	-0.771
11	Thinking about CC feels like a chore	11	-1.709	-0.815	-0.894
10	I feel a lot of fear about climate change	10	-0.425	0.558	-0.983
51	It's ethically wrong to oppose climate legislation	51	0.256	1.328	-1.072
18	I want to focus on Deep Adaptation	18	0.050	1.142	-1.092
3	I sometimes feel guilty I'm not doing more	3	-0.250	1.026	-1.277
35	World systems make it difficult to be eco-friendly	35	0.215	1.514	-1.299
19	I am excited about potential collapse	19	-0.980	0.468	-1.448
40	No point in my education because we have no future	40	-2.028	-0.538	-1.490
5	I feel anger at older generations	5	0.413	1.957	-1.544
38	CC shows that modern life is absurd	38	0.153	1.700	-1.547
33	We can't stop CC so there's no point thinking about it	33	-1.217	0.558	-1.775
62	It's hard to relate to people who are not concerned about CC	62	-1.135	0.885	-2.020
13	Worrying about CC is affecting my mental health	13	-1.980	0.045	-2.025
9	I switch between feeling great and awful about the future	9	-0.621	1.444	-2.065
66	I'm worried that overpopulation is a problem for CC	66	-1.015	1.841	-2.856

Descending Array of Differences Between Factors 2 and 3

No.	Statement	No.	Type 2	Type 3	Difference
55	People will lose interest in CC when new causes arise	55	1.178	-1.283	2.461
27	Sometimes I need to switch off from CC	27	1.029	-1.328	2.357
47	Criticisms of student strikes attack my values	47	0.515	-1.469	1.984
12	When I feel low, thinking about CC makes me feel worse	12	0.862	-0.956	1.818
22	Concerns about CC have impacted my diet or consumerism	22	0.265	-1.212	1.477
10	I feel a lot of fear about climate change	10	2.024	0.558	1.466
69	I feel insecure due to the uncertainty caused by CC	69	0.962	-0.443	1.405
14	I feel hope due to faith or beliefs	14	-0.814	-2.213	1.399
2	I feel some background anxiety most of the time	2	0.764	-0.629	1.392
46	Student strikes give me hope for the future	46	0.779	-0.583	1.362
20	I feel we live in a state of denial	20	1.825	0.538	1.287
67	News coverage of CC affects my emotions	67	0.664	-0.558	1.222
34	I worry about being criticised for not doing enough about CC	34	-0.249	-1.444	1.195
1	It's hard to stop worrying once I've started	1	0.631	-0.513	1.144
41	I'm not sure whether to have children because of CC	41	0.083	-1.026	1.109
56	Using social media keeps me engaged with CC	56	-0.034	-1.142	1.108
52	It's morally right to protest even if inconvenient to others	52	1.576	0.513	1.063

7	I feel angry at climate change deniers	7	1.394	0.443	0.951
4	I feel grief at damage to natural world	4	1.443	0.629	0.814
63	Some people just pretend they care about CC	63	-0.014	-0.674	0.660
57	Time with others concerned about CC keeps me engaged	57	0.033	-0.513	0.546
48	Only rich people can afford to be eco	48	0.400	-0.070	0.470
58	I feel pressure from others at school to be eco-friendly	58	-1.327	-1.771	0.444
39	CC highlights that I am interconnected with others	39	0.663	0.257	0.406
45	We need the freedom to choose whether to buy eco	45	-1.062	-1.444	0.381
60	My family take my concerns about CC seriously	60	0.447	0.141	0.307
36	I want to travel before places are ruined by CC	36	0.630	0.327	0.303
42	I feel grief that CC limits my opportunities	42	-0.050	-0.282	0.232
6	I feel angry at governments and oil companies	6	1.876	1.655	0.221
32	CC feels distant because it affects people in the future	32	-1.560	-1.771	0.211
50	I avoid talking to others about my worries about CC	50	-0.830	-1.001	0.171
24	I feel concerned about CC's impact on developing countries	24	1.096	0.956	0.140
11	Thinking about CC feels like a chore	11	-0.845	-0.815	-0.030
30	I don't engage because we don't know what will happen	30	-1.312	-1.258	-0.054
64	Joking with others about CC helps	64	-0.482	-0.372	-0.110
51	It's ethically wrong to oppose climate legislation	51	1.212	1.328	-0.116
44	I feel a strong nature connection	44	0.017	0.186	-0.169
26	I don't want to criticise others for polluting	26	-0.946	-0.770	-0.176
13	Worrying about CC is affecting my mental health	13	-0.166	0.045	-0.212
68	I wish others were more understanding of my concerns	68	-0.499	-0.186	-0.312
40	No point in my education because we have no future	40	-0.862	-0.538	-0.324
23	I feel a responsibility to be eco regardless of my wider imp	23	0.382	0.745	-0.362
61	My teachers would be supportive of my concerns around CC	61	-0.049	0.372	-0.421
35	World systems make it difficult to be eco-friendly	35	1.062	1.514	-0.452
38	CC shows that modern life is absurd	38	1.244	1.700	-0.457
5	I feel anger at older generations	5	1.460	1.957	-0.497
3	I sometimes feel guilty I'm not doing more	3	0.513	1.026	-0.513
29	My social, political, and environmental concerns intersect	29	0.480	1.097	-0.616
28	CC feels distant because it's a hyperobject	28	-1.776	-1.142	-0.634
31	People will reduce emissions if they could track impact	31	-0.447	0.231	-0.678
33	We can't stop CC so there's no point thinking about it	33	-0.181	0.558	-0.740
9	I switch between feeling great and awful about the future	9	0.697	1.444	-0.746
21	Reducing my ecological impact makes me feel better	21	-0.781	0.000	-0.781
17	I feel hope due to recovery of wildlife in pandemic	17	0.382	1.212	-0.830
54	Most people my age are concerned about CC	54	-0.746	0.211	-0.957
53	I can discuss CC with my friends	53	-0.348	0.629	-0.976
59	Not many people from my background are engaged with CC	59	-0.697	0.302	-0.999
37	I have to look after my friends and family first	37	-1.493	-0.443	-1.051
8	I have more immediate concerns than CC	8	-0.930	0.141	-1.070
49	My engagement with CC is part of my identity	49	-0.680	0.443	-1.123
62	It's hard to relate to people who are not concerned about CC	62	-0.331	0.885	-1.217
16	I feel hope due to denial of scientific research	16	-1.975	-0.629	-1.346
15	I feel hope due to technology	15	-1.013	0.443	-1.456
19	I am excited about potential collapse	19	-1.044	0.468	-1.512
25	I can deal with challenges posed to my life from CC	25	-1.925	-0.045	-1.879

43	The welfare of animals is as important as ours	43	-0.016	1.957	-1.973
66	I'm worried that overpopulation is a problem for CC	66	-0.265	1.841	-2.106
18	I want to focus on Deep Adaptation	18	-1.145	1.142	-2.287
65	It's important that solutions to CC keep our current way of	65	-1.692	0.629	-2.321

Distinguishing Statements for Factor 1

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors					
			1		2		3	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
60	My family take my concerns about CC seriously	60	5	1.79*	1	0.45	0	0.14
22	Concerns about CC have impacted my diet or consumerism	22	5	1.58*	1	0.27	-3	-1.21
61	My teachers would be supportive of my concerns around CC	61	4	1.53*	0	-0.05	1	0.37
44	I feel a strong nature connection	44	4	1.30*	0	0.02	0	0.19
57	Time with others concerned about CC keeps me engaged	57	4	1.29*	0	0.03	-1	-0.51
31	People will reduce emissions if they could track impact	31	4	1.27*	-1	-0.45	0	0.23
5	I feel anger at older generations	5	1	0.41*	4	1.46	5	1.96
26	I don't want to criticise others for polluting	26	1	0.39*	-3	-0.95	-2	-0.77
14	I feel hope due to faith or beliefs	14	1	0.37*	-2	-0.81	-5	-2.21
51	It's ethically wrong to oppose climate legislation	51	1	0.26*	4	1.21	4	1.33
35	World systems make it difficult to be eco friendly	35	1	0.22*	3	1.06	4	1.51
55	People will lose interest in CC when new causes arise	55	1	0.18*	3	1.18	-4	-1.28
38	CC shows that modern life is absurd	38	0	0.15*	4	1.24	5	1.70
18	I want to focus on Deep Adaptation	18	0	0.05*	-4	-1.14	3	1.14
65	It's important that solutions to CC keep our current way of	65	0	-0.11	-5	-1.69	2	0.63
47	Criticisms of student strikes attack my values	47	0	-0.14	1	0.51	-5	-1.47
3	I sometimes feel guilty I'm not doing more	3	0	-0.25	1	0.51	3	1.03
10	I feel a lot of fear about climate change	10	-1	-0.42*	5	2.02	2	0.56
9	I switch between feeling great and awful about the future	9	-2	-0.62*	2	0.70	4	1.44
66	I'm worried that overpopulation is a problem for CC	66	-3	-1.02	-1	-0.27	5	1.84
62	It's hard to relate to people who are not concerned about CC	62	-3	-1.13	-1	-0.33	3	0.89
33	We can't stop CC so there's no point thinking about it	33	-3	-1.22*	-1	-0.18	2	0.56
11	Thinking about CC feels like a chore	11	-5	-1.71	-2	-0.85	-2	-0.81
13	Worrying about CC is affecting my mental health	13	-5	-1.98*	0	-0.17	0	0.05
40	No point in my education because we have no future	40	-5	-2.03*	-3	-0.86	-1	-0.54

Distinguishing Statements for Factor 2

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors					
			1		2		3	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
10	I feel a lot of fear about climate change	10	-1	-0.42	5	2.02*	2	0.56
20	I feel we live in a state of denial	20	2	1.01	5	1.82	2	0.54
52	It's morally right to protest even if inconvenient to others	52	2	0.86	5	1.58	2	0.51
55	People will lose interest in CC when new causes arise	55	1	0.18	3	1.18*	-4	-1.28
27	Sometimes I need to switch off from CC	27	-4	-1.45	3	1.03*	-4	-1.33
69	I feel insecure due to the uncertainty caused by CC	69	-1	-0.30	3	0.96*	-1	-0.44
12	When I feel low, thinking about CC makes me feel worse	12	-2	-0.90	3	0.86*	-3	-0.96
2	I feel some background anxiety most of the time	2	-3	-1.06	2	0.76*	-2	-0.63
67	News coverage of CC affects my emotions	67	-1	-0.43	2	0.66*	-2	-0.56
1	It's hard to stop worrying once I've started	1	-2	-0.76	2	0.63*	-1	-0.51
47	Criticisms of student strikes attack my values	47	0	-0.14	1	0.51	-5	-1.47
22	Concerns about CC have impacted my diet or consumerism	22	5	1.58	1	0.27*	-3	-1.21
43	The welfare of animals is as important as ours	43	5	1.69	0	-0.02*	5	1.96
34	I worry about being criticised for not doing enough about CC	34	-4	-1.42	-1	-0.25*	-4	-1.44
66	I'm worried that overpopulation is a problem for CC	66	-3	-1.02	-1	-0.27	5	1.84
62	It's hard to relate to people who are not concerned about CC	62	-3	-1.13	-1	-0.33	3	0.89
53	I can discuss CC with my friends	53	3	1.23	-1	-0.35	2	0.63
49	My engagement with CC is part of my identity	49	2	0.53	-2	-0.68*	1	0.44
54	Most people my age are concerned about CC	54	1	0.33	-2	-0.75	0	0.21
14	I feel hope due to faith or beliefs	14	1	0.37	-2	-0.81*	-5	-2.21
15	I feel hope due to technology	15	2	0.59	-3	-1.01*	1	0.44
18	I want to focus on Deep Adaptation	18	0	0.05	-4	-1.14*	3	1.14
37	I have to look after my friends and family first	37	0	0.04	-4	-1.49	-1	-0.44
65	It's important that solutions to CC keep our current way of	65	0	-0.11	-5	-1.69*	2	0.63
25	I can deal with challenges posed to my life from CC	25	0	-0.04	-5	-1.92*	0	-0.05

Distinguishing Statements for Factor 3

(P < .05 ; Asterisk (*) Indicates Significance at P < .01)

Both the Factor Q-Sort Value (Q-SV) and the Z-Score (Z-SCR) are Shown.

			Factors					
			1		2		3	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
66	I'm worried that overpopulation is a problem for CC	66	-3	-1.02	-1	-0.27	5	1.84*
18	I want to focus on Deep Adaptation	18	0	0.05	-4	-1.14	3	1.14*
62	It's hard to relate to people who are not concerned about CC	62	-3	-1.13	-1	-0.33	3	0.89*
65	It's important that solutions to CC keep our current way of	65	0	-0.11	-5	-1.69	2	0.63
10	I feel a lot of fear about climate change	10	-1	-0.42	5	2.02	2	0.56*
19	I am excited about potential collapse	19	-3	-0.98	-3	-1.04	1	0.47*
59	Not many people from my background are engaged with CC	59	-2	-0.47	-2	-0.70	1	0.30
46	Student strikes give me hope for the future	46	3	1.04	2	0.78	-2	-0.58*
16	I feel hope due to denial of scientific research	16	-4	-1.40	-5	-1.97	-2	-0.63
41	I'm not sure whether to have children because of CC	41	0	-0.05	0	0.08	-3	-1.03
56	Using social media keeps me engaged with CC	56	1	0.28	0	-0.03	-3	-1.14
22	Concerns about CC have impacted my diet or consumerism	22	5	1.58	1	0.27	-3	-1.21*
55	People will lose interest in CC when new causes arise	55	1	0.18	3	1.18	-4	-1.28*
47	Criticisms of student strikes attack my values	47	0	-0.14	1	0.51	-5	-1.47*
14	I feel hope due to faith or beliefs	14	1	0.37	-2	-0.81	-5	-2.21*

Consensus Statements -- Those That Do Not Distinguish Between ANY Pair of Factors.

All Listed Statements are Non-Significant at P>.01, and Those Flagged With an * are also Non-Significant at P>.05.

			Factors					
			1		2		3	
No.	Statement	No.	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
4*	I feel grief at damage to natural world	4	2	0.84	4	1.44	2	0.63
6*	I feel angry at governments and oil companies	6	5	1.79	5	1.88	4	1.65
7	I feel angry at climate change deniers	7	2	0.99	4	1.39	1	0.44
8	I have more immediate concerns than CC	8	-1	-0.33	-3	-0.93	0	0.14
17	I feel hope due to recovery of wildlife in pandemic	17	3	1.06	1	0.38	4	1.21
23	I feel a responsibility to be eco regardless of my wider imp	23	3	1.11	1	0.38	3	0.74
24*	I feel concerned about CC's impact on developing countries	24	4	1.39	3	1.10	3	0.96
28*	CC feels distant because it's a hyperobject	28	-4	-1.33	-5	-1.78	-3	-1.14
29	My social, political, and environmental concerns intersect	29	3	1.25	1	0.48	3	1.10
30*	I don't engage because we don't know what will happen	30	-5	-1.48	-4	-1.31	-4	-1.26
32*	CC feels distant because it affects people in the future	32	-4	-1.25	-4	-1.56	-5	-1.77
39	CC highlights that I am interconnected with others	39	3	1.07	2	0.66	1	0.26
42*	I feel grief that CC limits my opportunities	42	-1	-0.29	0	-0.05	-1	-0.28
45	We need the freedom to choose whether to buy eco	45	-2	-0.53	-3	-1.06	-4	-1.44
50*	I avoid talking to others about my worries about CC	50	-1	-0.44	-2	-0.83	-3	-1.00
52	It's morally right to protest even if inconvenient to others	52	2	0.86	5	1.58	2	0.51
58*	I feel pressure from others at school to be eco-friendly	58	-3	-1.11	-4	-1.33	-5	-1.77
59	Not many people from my background are engaged with CC	59	-2	-0.47	-2	-0.70	1	0.30
63	Some people just pretend they care about CC	63	-2	-0.68	0	-0.01	-2	-0.67
64*	Joking with others about CC helps	64	-1	-0.31	-1	-0.48	-1	-0.37
68*	I wish others were more understanding of my concerns	68	0	0.07	-1	-0.50	-1	-0.19

Supplementary Appendix E: Additional Information produced as part of Generating Final Results

Supplementary Appendix E1.1 Summary, Additional Statistical Information, plus a Summary of the Key Points for Factor 1

Summary

I feel a high level of care and concern about the world and am concerned with how climate change will impact the natural world, animals, and people in poorer countries. However, I do not feel threatened by climate change nor anxious that it will personally affect me. I feel comfortable to speak about my concerns and am well supported by others. I am quite hopeful that we will be able to tackle climate change and optimistic about the future. I consider what personal actions I can take to reduce my impact but try not to be judgemental of others.

Statistical information

Factor 1 has an eigenvalue of 12.60 and explains 22% of the study variance. It has eight defining variables: participants 11, 12, 13, 14, 15, 17, 24 & 30, each of whose Q sorts loaded onto the factor at 0.31 or above (whilst loading onto other factors at values below 0.31); the average factor loading was 0.57. Factor 1 variables correlated with factor 2 at 0.37 and factor 3 at 0.39.

Contextual information for participants who load strongly onto Factor 1

Key contextual information is displayed in **Table E1.1**:

Feature	Average Value or Count For Participants who load onto Factor 1	Average Value or Count For all 30 Participants
Age	15.5	14.33
Gender	6 female, 2 male	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	3 white British, 2 white, 1 british, 1 Nigerian	18 White British, 3 White, 2 Irish/British, 2 Caucasian, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	5 none, 1 agnostic, 1 Islam	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	8.38	9
McArthur Subjective Social Status Family	6.71	7.10
Six Americas Segment	3 Alarmed, 4 Concerned, 1 Disengaged	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale – Behavioural Engagement	3.98	4.08
Climate Anxiety Scale - Overall	2.04	2.36

Table E1.1: Key Contextual information for Participants loading significantly onto Factor 1

Key themes in Factor 1

Factor 1 embodies a viewpoint of concern for the world, but lower personal anxiety:

→ The concern expressed is about the impact of climate change upon the world – in particular, people living in poorer countries, plus wild animals and the natural world.
→ There did not appear to be concern about being personally affected by climate change, and all statements relating to fear/anxiety and negative emotions were ranked negatively.

→ There is a strong sense of being well supported and being able to speak with others about any worries or concerns.

→ There is a sense of hope and positivity about the future (both personal and global), regardless of climate change.

→ A fair amount of importance is given to personal environmental impact and responsibility and this may help manage negative emotions experienced around climate change.

→ Judgement of others for their own impacts is low and a positive and practical approach to tackling climate change is emphasised. The starting point for this appears to lean more towards personal choices and responsibility rather than systemic changes (e.g. through international agreements/ government regulations).

Supplementary Appendix E1.2 Summary, Additional Statistical Information, plus a Summary of the Key Points for Factor 2

Summary

I feel a lot of fear about climate change and a sense of urgency that it must be addressed, along with anxiety, bewilderment and anger around the slow and inadequate public and political response. I worry about how I could cope with the impact of climate catastrophes on my life; I can ruminate about this and often experience background anxiety about it. I can feel quite isolated in my concerns and sometimes need to switch off or distance myself from them.

Statistical information

Factor 2 has an eigenvalue of 2.09 and explains 17% of the study variance. It has three defining variables: participants 9, 10 & 20, each of whose Q sorts loaded onto the factor at 0.31 or above (whilst loading onto other factors at values below 0.31); the average factor loading was 0.57. Factor 2 variables correlated with factor 1 at 0.37 and factor 3 at 0.37.

Contextual information for participants who load strongly onto Factor 2

Key contextual information is displayed in **Table E1.2**:

Feature	Average Value or Count For Participants who load onto Factor 2	Average Value or Count For all 30 Participants
Age	14.33	14.33
Gender	1 demi girl, 1 male, 1 female	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	3 White British	18 White British, 3 White, 2 Irish/British, 2 Caucasian, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	3 none	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	9	9
McArthur Subjective Social Status Family	7	7.10
Six Americas Segment	2 Alarmed 1 Concerned	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale – Behavioural Engagement	4.11	4.08
Climate Anxiety Scale - Overall	2.54	2.36

Table E1.2: Key Contextual information for Participants loading significantly onto Factor 2

Key themes in Factor 2

Factor 2 embodies a viewpoint of high fear/anxiety about climate change:

→ The concern expressed seems to be primarily about the impact of climate change upon people and society, rather than about damage to the natural world. In particular, there is concern about being personally affected by climate change.

→ Along with the fear, a lot of anger and judgement is expressed towards others perceived as powerful (adults, politicians, oil companies, climate deniers) for their inaction or denial of the problem.

→ There is a sense that society should be 'panicking' and taking action but that many people and organisations are ignoring the problem, leaving the people who are anxiously focusing upon it feeling baffled and 'gaslit'.[28] There is a sense that there is still time to act but that people were not acting, which seems to compound this.

→ Along with this is a sense of isolation, i.e. there being few people with whom concerns and anxiety around climate change could be shared and understood.

→ Possibly as a consequence, a need is expressed to withdraw/'switch off' from thinking about climate change at times.

Supplementary Appendix E1.3 Summary, Additional Statistical Information, plus a Summary of the Key Points for Factor 3

Summary

Climate changes/catastrophes now appear inevitable within my lifetime; I feel resigned to this, but angry that it has been allowed to happen. I am concerned about how this will impact wildlife and the natural world and I feel that we should be focusing upon preparation and adaptation to manage the challenges that climate change will bring. We need less focus upon individual personal changes and more upon large systemic changes that will really make a difference. Not many others around me are engaging with these issues.

Statistical information

[28] The term 'gaslighting' is defined by Merriam-Webster as '*to psychologically manipulate (a person) usually over an extended period of time so that the victim questions the validity of their own thoughts, perception of reality, or memories and experiences confusion, loss of confidence and self-esteem, and doubts concerning their own emotional or mental stability*' (https://www.merriam-webster.com/dictionary/gaslight). The term originates from the 1944 film Gaslight in which a husband repeatedly adjusts the gas lighting of the family house (and engages in other trickery) in order to make his wife question her perceptions/judgements. The term has been used in academic research since a study of the phenomenon by Gass & Nichols (1988).

Factor 3 has an eigenvalue of 1.50 and explains 11% of the study variance. It has two defining variables: participants 22 & 28, each of whose Q sorts loaded onto the factor at 0.31 or above (whilst loading onto other factors at values below 0.31); the average factor loading was 0.46. Factor 3 variables correlated with factor 1 at 0.39 and factor 2 at 0.37.

Contextual information for participants who load strongly onto Factor 3

Key contextual information is displayed in **Table E1.3**:

Feature	Average Value or Count For Participants who load onto Factor 3	Average Value or Count For all 30 Participants
Age	13	14.33
Gender	1 female, 1 male	19 female, 1 girl, 1 demigirl, 9 male
Ethnicity	1 Irish/British, 1 Chinese	18 White British, 3 White, 2 Irish/British, 2 Caucasian, 1 White European, 1 Nigerian, 1 Chinese, 1 British/Indian, Asian, 1 blank
Religion	2 no	17 none, 4 Christianity, 2 Roman Catholic, 2 Agnostic, 2 Atheist, 1 Islam, 1 Hinduism, 1 blank
Family Affluence Scale Total	9	9
McArthur Subjective Social Status Family	7	7.10
Six Americas Segment	2 Alarmed	22 Alarmed, 7 Concerned, 1 Disengaged
Climate Anxiety Scale – Behavioural Engagement	4.16	4.08
Climate Anxiety Scale - Overall	2.79	2.36

Table E1.3: Key Contextual information for Participants loading significantly onto Factor 3

Key themes in Factor 3

Factor 3 embodies a viewpoint of resignation and frustration about climate change:

→ Significant climate changes/catastrophes are seen as inevitable, so a sense of resignation/hopelessness seems more prevalent than anxiety.
→ There is a focus upon adaptation and managing challenges due to climate change, rather than on trying to prevent changes from occurring.
→ This viewpoint appears to assume that they will be personally affected by climate change within their lifetime, but there does not seem to be much concern expressed about this. The concern that is expressed is about the impact of climate change upon wildlife and the environment, rather than personal or humanitarian concerns.
→ The main emotion expressed is anger (at older generations [and also at governments/oil companies, which is highly expressed in all three factors]) though some fear is expressed (much less than for Factor 2), some excitement and some guilt (grief is also expressed across all three factors).
→ Family are seen as not necessarily being supportive of concerns around climate change (the statement about family support is placed lower than for all other factors) and the view expressed is that others from the same background are unlikely to engage with issues. This suggests a relative lack of communication with others about climate change.
→ Personal environmental choices are seen as relatively unimportant (though guilt is also expressed at 'not doing more'), whilst much more weight is given to larger systemic changes.

Supplementary Appendix E2 Poster Presentation for Mind and Life Summer Research Institute

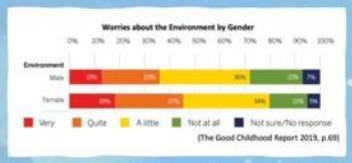
How are young people in the UK engaging with Concerns Around Climate Change?

Robert Lee, BA, MSc, PGDE, Educational Psychologist in Training

The University Of Sheffield.

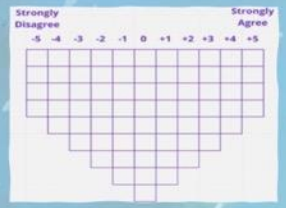
Introduction

Educational Psychologists in the UK use applied psychology to support young people in school, including their mental health and wellbeing. The 2019 Good Childhood Report reported that 77% of young people aged 10-17 were worried about climate change, with 25% of children feeling 'quite worried', and 16% 'very worried':



Whilst these worries will interact with many other factors in a young person's life, evidence is accumulating that worrying about climate change can act as a stressor that can significantly impact upon (at least some) children's wellbeing (e.g. Hickman 2020). However, as with all issues, young people will engage and interact with such concerns in a range of different ways. The current research therefore starts to identify some key shared perspectives of young people in the UK and explores what engagement and/or support they would like from schools, families, and psychologists.

Attempts to categorize different ways of engaging with concerns around climate change are referred to as 'segmentation studies'. These are useful for tracking population trends but have been criticized because the process of drawing boundaries between each segment can be relatively arbitrary (see Hine et al. 2014). The current study uses Q Methodology to try to address this limitation.



In Q methodology, participants arrange statements into a grid according to how strongly they agree or disagree with each one. This process allows each participant to outline their overall perspective through the relative ranking of statements when they compare them with each other. Each complete answer set is then quantitively correlated against all other complete answer sets using factor analysis, which produces 'factors' containing groups of complete response-sets (overall viewpoints) rather than groups of questions whose response patterns correlate with each other.

Methodology

A literature review of key concepts in climate psychology research was used to construct a semi-structured interview (via Google Meet) which used a simple version of the phenomenological interview technique (Høffding & Martiny, 2016). The interviews were used to explore and expand upon core ideas identified within the climate psychology literature. Five young people were interviewed; their responses informed the construction of a set of 100 statements for the pilot study Q sorts.

Pilot study Q sorts were conducted online using collaborative whiteboard software (Miro) with in-built video conferencing. 22 pilot study iterations were used to refine the Q set until 69 statements were selected for the final study. 32 participants (UK-based, 11-18) were recruited and took part online (via Miro). Each participant was interviewed immediately after completing their online Q sort. Two were removed when it emerged that they had misunderstood parts of the task.

Analysis

The software tool PQMethod was used to conduct a Q Methodological Analysis of their responses, using the procedure outlined in Watts & Stenner (2012) [Horst 5.5 extraction followed by varimax rotation was used]. Three factors emerged that were both qualitatively and quantitatively distinct (all correlations between factor scores < .39). Each factor presents a different gestalt perspective from which some young people in the UK are currently engaging with concerns around climate change.

Participants whose viewpoints closely correlated with just one of the factors were then invited to participate in a focus group with others who held similar views. All participants were invited to consider what involvement or support they would like. The sessions were structured using Narrative Group Technique. 3 groups were held (online), one for each factor (5 participants for Factor 1, 4 for Factor 2, 2 for Factor 3). The responses will be used to inform guidance for Educational Psychologists.

Results

Factor 1 – Environmentally concerned citizens

I feel a high level of care and concern about the world and a strong connection with nature. I do not feel threatened by climate change and am not anxious that it will affect me personally, but I am concerned with how it will impact upon the natural world, animals, and how it will affect people in poorer countries. I value my education and learning about climate change has helped highlight to me how my life connects with and relies upon many other people and systems within the world.

I am well supported by others around me, and I feel comfortable to speak with my teachers, family, and friends about my concerns. I feel quite hopeful about initiatives to tackle climate change, particularly when I spend time around others who care about the planet, and the student strikes, technological progress, and my own faith/beliefs act as sources of hope for me. Additionally, it is important to me to try to be environmentally conscious in my own life (regardless of the wider impact) and I have thought about how I can make changes to my diet and consumption patterns to reduce my carbon footprint.

However, I also try to be non-judgmental of other people; I find it easy to relate to others with different views, try to avoid criticizing others for their environmental impact, and do not frame climate change in particularly moral or ethical terms. Whilst I feel that anger towards governments and oil companies is appropriate, I am not angry at older generations for their inaction on climate issues and fundamentally trust that people would reduce their environmental impact if it were made easier for them to do so.

Factor 2 – Fearful of the future

I feel a lot of fear about climate change, ruminate on it, and experience at least some background anxiety about it most of the time. I worry about whether I will be able to cope with the impact of potential climate catastrophes upon my life and I believe that we need to focus on stopping climate change now, rather than prioritizing immediate concerns around family and friends, day-to-day life, and maintaining our current standard of living. It feels to me that we are living in a state of denial, where we know what is happening to the planet but live our lives as if nothing needs changing.

News about climate change can distress me and I sometimes need to switch off from thinking about it. I don't feel any hope when I hear about climate change initiatives, technological 'fixes', any wildlife recovery during the Covid-19 lockdowns, or the possibility of mass behaviour change. Additionally, I am concerned that people will begin to lose interest in climate change. I can feel quite isolated in my worries and feel uncertain or ambivalent about discussing them with teachers, my family, or my friends.

I feel a lot of anger towards governments, oil companies, older generations, & climate change deniers. I see climate inaction as ethically unjustifiable and climate protests as a moral good. I am prepared to call-out others for their environmental impact, but I mostly value eco-friendly activity for the difference it makes rather than as an inherent good or something that makes me feel better (and I would like to travel the world and see places before they are ruined). I am primarily concerned about the impact of climate change on humans rather than animals and I do not feel particularly connected with nature.

Factor 3 – Frustration at what has been inherited

I feel frustrated with the world I am inheriting; I feel angry at older generations for letting this happen and believe that it was ethically wrong for people to delay measures to reduce carbon emissions. However, whilst I would like environmental initiatives to maintain our current way of life, a small part of me is excited to observe how society will change if things start to collapse due to climate breakdown.

The challenges we face due to climate change make our modern way of life appear absurd and I feel that we should be focusing now on adapting to the threats that my generation will face; this makes me question the relevance of my current education. However, the welfare of animals is important to me, and seeing some wildlife recover during the Covid-19 lockdowns gave me some hope. I tend to switch between feeling great and awful about the future, and sometimes feel fearful, but I feel cautious about discussing my feelings with my family or teachers, although I might discuss them with my friends.

I feel quite wary towards climate change activism; few people from my background appear concerned about climate change and I feel quite removed from the student strikes for climate and the values that they express (although at the same time, I can find it hard to relate to others who are completely unconcerned about the planet). Climate catastrophe feels inevitable (in part due to problems such as overpopulation), so I'm not particularly concerned about reducing my own ecological footprint and do not feel pressure from others to do so. However, I find it frustrating that the way the world works makes it difficult for people to be environmentally responsible, particularly when products should really be made to be ecologically friendly by default.

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