



**South Asians and Natural Green Spaces: The role of
Rural Green Spaces in the Psychological Wellbeing
of South Asian Muslim women in England**

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Authorship Declaration

The candidate, Mohammed Hamza, confirms that the work submitted is his own, except where work which has formed part of jointly authored publications has been included. The contributions of the candidate and the other authors to this work have been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

Chapter 4 is based in part on the following jointly authored publication:

Hamza, M., Edwards, R.C., Beaumont, J.D., De Pretto, L. and Torn, A., 2024. Access to natural green spaces and their associations with psychological wellbeing for South Asian people in the UK: A systematic literature review. *Social Science & Medicine*, p.117265.

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The candidate confirms that the contributions were primarily intellectual, and he took a principal role in the production and writing of the publications. The co-authors confirm

that their contribution was in guiding the research and reviewing drafts of the manuscripts.

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Abstract

South Asians in England face heightened physical and mental health challenges. The group faces constraints in accessing traditional health settings, such as mental health services and gyms, narrowing the pathways to achieving good health. Through three diverse and methodologically rigorous studies, this thesis provides fresh insights into how natural green spaces (NGS) can enhance South Asians' psychological wellbeing (PWB), recognised for their health-promoting properties.

The first study was a systematic literature review which followed PRISMA guidelines to assess existing research on South Asians' access to NGS and their PWB. Findings from 26 peer-reviewed papers revealed that NGS is important for PWB among South Asians in multiple ways and highlighted compounding geographical, social, personal, transport, and knowledge barriers to obtaining these benefits. Heightened challenges existed for people situated at the intersection of gender, religiosity and race, especially when accessing rural green spaces (RGS).

To further develop the literature on this topic, a second study was conducted, exploring the experiences of 23 South Asian Muslim women with RGS through in-depth semi-structured and walking interviews. A recursive thematic analysis highlighted that RGS were important for women to engage in physical activity and mindful practices, in ways that could not be achieved in urban settings such as gyms. The findings were discussed in relation to intersectionality, which highlighted that the PWB benefits often associated with nature can be hindered through race, ethnicity and gender.

Building on this, a third study was conducted with 600 South Asian Muslim women across England to assess the relationships among perceived access to RGS, engagement rate, and PWB. Through validated measures, structural equation modelling analysis revealed perceptions of access to RGS as crucial for South Asian Muslim women's PWB. Moderation analysis affirmed that identity visibility increases the importance of perceived access, while physical activity reduces it.

Overall, this thesis presents a trajectory of research through three distinct and credible methodologies. It highlights the importance of focusing specifically on marginalised groups, challenging existing nature and wellbeing frameworks that currently cater for White and privileged groups. Policy and practice should work to

diversify RGS users and usages, so that diverse groups feel comfortable engaging with them in various ways. Lastly, existing interventions must aim to enhance the groups' perceptions of access and recognise RGS as a potential avenue to combat South Asian Muslim women's health challenges.

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My thanks can never be complete without thanking Yasmeen Bibi, my mother, and Mohammed Qasim, my father. It is through your hard work for us that I have been afforded the privilege and opportunity to pursue this PhD. Thank you to my siblings, Maihda, Talha, Adam, and Harris. I pray we stay united. Harris, stay strong. I wish to have you back. I hope you read this one day.

Thank you to Samar Pervez, my wife, for her unwavering commitment, patience, and supportiveness throughout my studies and beyond. My marriage to you is my happiness, and you complete me. I could not have even dreamed of having a spouse like you.

To my boys, Dihyah Hamza Mohammed and Yahya Hamza Mohammed, you bring a smile to my face every time I look at you. I love watching you grow. Take this life one step at a time. Work hard and perform everything with goodness. My dream is to see you succeed in everything that you do.

“O humanity! Indeed, We created you from a male and a female, and made you into peoples and tribes so that you may get to know one another. Surely the most noble of you in the sight of Allah is the most righteous among you. Allah is truly All-Knowing, All-Aware.” (49:13, Holy Quran)

“Weigh with justice, and do not give short measure. He¹ laid out the earth for all beings. In it are fruit, palm trees with date stalks, and grain with husks, and aromatic

¹ Dr Thomas Cleary suggests that “the One who” is a more accurate translation of the term referring to God in this Qur’anic context. Earlier translations commonly used “He” due to the linguistic

plants. Then which of your Lord's favours will you 'humans and jinn' both deny?" (55:9-55:13, Holy Quran)

My gratitude ultimately belongs to my master, my caretaker, my lord, the creator of the heavens and the earth. All praise and worship belong to you. My purpose in life is solely to please you. Nothing is possible without your command. Thank you, God, for all the blessings in my life, whether I can see them or not. I dedicate my thesis to your path, in that you call us to appreciate you through your creation, and command us to uphold justice in all matters. My wish is to do both through this thesis.

limitations. However, Islamic theology holds that God is beyond human categories such as gender and transcends such distinctions.

Dissemination

Conference Presentations

Psychology Week Conference, Leeds Trinity University (November 4–8, 2024)

- Presented the findings of three research studies forming part of this thesis.

Singapore Conference on Applied Psychology, East Asia Research (December 4–5, 2024)

- Abstract for quantitative SEM study accepted.

Religion and Power Research Conference, British Sociological Association (July 5–7, 2023)

- Presented research and shared findings from the qualitative study.

Religion and Power Research Conference, British Sociological Association (July 8–10, 2024)

- Presented research and shared findings from the qualitative study.

Critical Research Conference, York St John University (July 7, 2022)

- Presented early-stage work from the developing thesis.

Speaking Engagement, Fever FM (2024)

- Discussed research themes and preliminary findings with the radio host.

Consultations and Knowledge Exchange

Consultations with Kiri Wood and Jamila Gaskin, Education, Engagement & Wellbeing Manager, Yorkshire Dales National Park Authority (October 2024)

- Provided insights on enhancing inclusivity for ethnic minority communities accessing the park.

Consultations with Abby Day, Yorkshire Dales National Park (July 2024)

- Offered recommendations on accessibility and inclusivity for South Asian communities.

Publications

Hamza, M., Edwards, R. C., Beaumont, J. D., De Pretto, L., & Torn, A. (2024). Access to natural green spaces and their associations with psychological wellbeing for South Asian people in the UK: A systematic literature review. *Social Science & Medicine*, 117265.

Hamza, M., Stride, A., & Quarmby, T. (2024). Exploring the experience of natural green space among South Asian Muslim people in the UK. *Leisure Studies*, 1–16.²

² This publication was based on my Master's by Research thesis, preceding this PhD, and informed some of the frameworks of the current thesis.

Manuscripts Under Review

Hamza, M., Downing, C., Torn, A., & De Pretto, L. (Under review). *Perceived access to rural green spaces and psychological wellbeing among South Asian Muslim women in England*. *Journal of Health Psychology*. (Based on Chapter 7)

Hamza, M., Torn, A., De Pretto, L., & Stride, A. (Under review). *Inclusive environmental planning for wellbeing: Understanding equity through South Asian Muslim women's experiences of rural green spaces*. *Journal of Environmental Planning and Management*. (Based on Chapter 6)

Open Data

The quantitative dataset underpinning Chapter 7 has been openly deposited on Zenodo:

Hamza, M. (2025). *Perceived Access to Rural Green Spaces and Psychological Wellbeing Dataset* [Data set]. Zenodo. <https://zenodo.org/records/14577475>

Registered Protocol

The review protocol of Chapter 4 has been published on PROSPERO:

Hamza, M., Edwards, R. C., Beaumont, J. D., De Pretto, L., & Torn, A. (2022). *Access to natural green spaces and their associations with psychological wellbeing for South Asian people in the UK: Systematic review protocol*. PROSPERO (ID: CRD42022353711).

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Preface

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of God, the Most Gracious, the Most Merciful.

This thesis represents my personal and academic journey into understanding nature and human wellbeing. The trajectory of this thesis begins with a broad focus on South Asians' access to natural green spaces (NGS) and psychological wellbeing (PWB), subsequent to my previous research (see Dissemination). However, when grappling with the literature, it became evident that a more focused exploration was needed in the context of rural green spaces (RGS), specifically for South Asian Muslim women. Whilst these focuses were specific, the findings of this thesis derive lessons for many people in the context of all natural environments.

At its core, this thesis emphasises the importance of nature in human life, at a time when environmental degradation, growing inequalities, materialism, superficiality and a detachment from nature are contaminating our world (Edwards & Larson, 2020). Whilst scholars argue that NGS provide numerous health benefits (Kaplan, 1995), this perspective frames these environments as supplementary to our lives, rather than as an essential element. As natural beings, our relationship with these spaces is fundamental, and inadequate interaction is a deficit. As a Muslim, I believe that these spaces are crucial to our being beyond the physical, as they provide opportunities to better connect our souls with the Creator through his creation, without the illusion of urban environments.

This exploration is inspired by my personal experiences. When I was younger, I spent much of my time playing outside my home, yet I rarely experienced visiting beyond my immediate community into the beautiful rural England. Like many in my community, the concept of exploring further afield did not cross my mind. When I was older, I paid occasional visits to natural environments with my friends. Since my undergraduate studies consisted of a predominantly White cohort, it was at this time that I was properly introduced to the outdoors and thus developed an interest. At the time, during a conversation with my dissertation supervisor, we queried why South Asians were not seen much in rural green spaces. My background in physical activity and my growing awareness of health inequalities fuelled this curiosity. I uncovered that NGS are inaccessible for many, particularly ethnic minorities, due to challenges

of belonging and marginalisation. Interestingly, I became more aware that my ethnic group is marginalised, as part of the largest minority group in the UK and classified as a vulnerable health group, when learning through academic literature. This thesis reflects the growth of my understanding as I address these issues.

As I delved deeper into this research, I became fascinated by the literature I uncovered about inequalities at multiple levels, from access to health resources to health outcomes. I find it unsettling how we are all born on this earth, but many people are oppressed on various levels for reasons out of their control (Collins, 1990). My journey is evolving and some days, I found myself questioning the necessity of my research and whether I can comfortably say that my work is important. I can now affirm the cruciality of my work that highlights how nature shapes human life and how inequitable access diminishes its potential for so many. Through different methodologies and multiple lenses, I seek to unpack the layered issues of access, identity, and wellbeing. I invite the reader to join me on this journey of discovery, reflection, and deepening appreciation for the essential, yet overlooked, role of nature in our lives and the pressing need for equity in its accessibility.

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2025

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List of Acronyms and Terms

Term	Acronym	Definition
Natural Green Spaces	NGS	Outdoor natural environments characterised by features such as grass, crops, trees, water bodies, plants, wildlife, ecological systems, and natural landforms.
Rural Green Spaces	RGS	Natural environments located outside urban areas, typically characterised by vegetation, open landscapes, and water bodies.
Urban Green Spaces	UGS	Natural or semi-natural environments within urban areas, including parks, gardens, and other vegetated spaces.
Systematic Literature Review	SLR	A method for identifying, evaluating, and synthesising existing research in a transparent, rigorous, and replicable manner.
Preferred Reporting Items for Systematic Reviews and Meta-Analyses	PRISMA	A reporting framework used to guide systematic literature reviews.
Population, Intervention, Comparison, Outcome, and Study Design	PICOs	A framework used to structure research questions and eligibility criteria for systematic literature reviews.
Sample, Phenomenon of Interest, Design, Evaluation, and Research Type	SPIDER	A framework used to define inclusion criteria for qualitative and mixed-methods systematic literature reviews.
Physical Activity	PA	Bodily movement produced by skeletal muscles that requires energy expenditure.
Mental Health	—	A state of emotional, psychological, and social wellbeing that influences how individuals think, feel, act, and cope with stress.
Physical Wellbeing	—	The optimal functioning of the body, including the absence of illness and the capacity to maintain physical health through supportive practices.
Psychological Wellbeing	PWB	A multidimensional construct reflecting positive functioning, emotional balance, and overall life satisfaction.
South Asian	—	Individuals whose ethnicity or ancestry originates from Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, or Sri Lanka.
Ethnic Minority	—	Subgroups within a wider population distinguished by shared cultural, ethnic, national, or religious characteristics.
Social Relatedness	—	A sense of feeling connected to, accepted by, and cared for by others.
Nature Connectedness	—	A sense of emotional and experiential connection with the natural world.
Identity Visibility	—	The extent to which individuals feel salient in a setting due to visible aspects of their identity.

1 Chapter 1 – General Introduction

1.1 Chapter Overview

This chapter sets the parameters of the current thesis by defining the key terms, such as natural green spaces (NGS) and rural green spaces (RGS). It then provides an overview of the role of such environments in people's psychological wellbeing (PWB), and overall quality of life. The chapter also highlights concerns regarding unequal access to NGS, with a particular focus on South Asians, linked to their limited access and health disparities.

1.2 Defining Natural Green Spaces

In recent times, there has been growing academic interest in how people interact with Natural Green Spaces (NGS). However, this work is characterised by inconsistent terminology. What some studies refer to as gardens (White et al., 2013), others frame as urban green spaces (Abd El Aziz, 2012; Egerer et al., 2019), nature spaces (Birch et al., 2020a) or even adventure spaces (Large & Schilar, 2018). While these contexts share similar characteristics, they are conceptualised differently, making it difficult to draw clear comparisons across studies. Taylor & Hochuli (2017) highlight this issue, noting that fewer than half of NGS studies clearly define their use of terms. This limits theoretical advancement because ideas cannot be refined, compared, or accumulated in a meaningful way across studies.

Whilst inconsistently defining NGS presents limitations in synthesising diverse research into a single field, it can also lead to conflicting ideas about which spaces are being referred to and how they are engaged with. For example, it poses challenges in understanding how often different groups engage with NGS. Similar issues exist in the field of physical activity, where surveys have overlooked diverse physical activities which were unacknowledged by Western researchers (Tedesqui et al., 2018). In adopting fixed and narrow contextual definitions, researchers neglect valuable experiences that fall outside of their own definitions (Stride et al., 2018b). Linking this to the current thesis, defining NGS as urban parks and countrysides risks overlooking people's experiences with local gardens, which may have significant study implications.

To help construct a unifying definition of NGS, Taylor and Hochuli (2017) noted that studies often focused on selective elements, from bodies of water, vegetation, forestry, trees, parks, gardens, natural formations, farms, coastal areas, and food crops. Moreover, the UK government defines NGS as green open spaces in and around urban areas, as well as in the wider countryside and coastal regions (Natural England, 2003, 2019a). Drawing from these frameworks, this thesis adopts a broad definition of NGS as outdoor, natural areas characterised by features such as grass, crops, trees, water, plants, wildlife, ecological systems, and natural landforms.

This thesis recognises NGS as an umbrella term which refers to the diverse natural environments that people can experience. For example, some participants may form connections with parks or allotments, while others may be motivated to visit countryside or mountainous spaces. Whilst NGS is used as a broader reference, it encompasses two distinct types of spaces. Urban green spaces refer to natural environments within urban areas, whilst rural green spaces (RGS) are those natural environments outside urban areas and also include features like vegetation and water bodies. RGS can include areas of natural beauty, countrysides, lakes and more. Focusing on either categorisation can lead to a more focused understanding of participants' experiences while recognising how experiences may differ in each space when synthesising literature. This approach enables the current thesis to move beyond narrow categorisations and account for the heterogeneity of how different groups perceive and engage with NGS and their types.

1.3 Natural Green Space and Psychological Wellbeing

Psychological wellbeing (PWB) is a multidimensional measure of people's positive functioning, emotional balance, and overall life satisfaction (Ryff, 2021; Seligman, 2011). Extensive literature reflects how NGS enhance people's PWB (De la Barrera et al., 2016; Natural England, 2017). For instance, Roe et al. (2017) asserted the idea that nature exposure leads to lower stress levels. This response is partly physiological, as seeing natural features like swaying trees and grass has been shown to trigger the release of stress-regulating hormones, leading to a sense of calm (Monti, 2017b; Xian et al., 2024; Zhang et al., 2015). Theorists argue that all humans belong naturally to this state, meaning that all people experience some affinity with nature (Fukano & Soga, 2025; Van den Born et al., 2001). This idea is referred to as the Biophilia

Hypothesis (Kellert & Wilson, 1993), which all people must fulfil to feel a sense of calmness and relaxation (Fukano & Soga, 2025; Heerwagen, 2009).

Nature restoration can be explained through the biological processes of the brain. The natural features of NGS can help release brain-derived neurotrophic factor, aiding the growth of the brain's hippocampus, thus enhancing learning and memory (Rhee et al., 2023). The parasympathetic nervous system adjusts to this growth, which reduces the risk of conditions like depression and acute stress. Indeed, good mental health is characterised by the absence of mental illness and the presence of positive wellbeing (World Health Organization, 2022). It is an important indicator of PWB, which reflects a broader dimension of human wellbeing (Al-Hendawi et al., 2024; Kellert & Wilson, 2008). Being in nature is important for both PWB and mental health as it helps people to minimise strenuous stimuli like screen usage (Anand & Cochrane, 2005; Byrne et al., 2009; Monti, 2017a; Rhee et al., 2023). This increases retention capabilities as well as feelings of restoration, helping the brain to relax and focus (Browning & Rigolon, 2019; Kaplan & Kaplan, 1989; Pretty et al., 2007; Rhee et al., 2023). Several theoretical frameworks encapsulate the benefits of engaging with nature. Ulrich's Stress Recovery Theory (1991) proposes that exposure to natural environments supports an innate psychophysiological response that reduces stress and supports emotional wellbeing. Similarly, Attention Restoration Theory (Kaplan & Kaplan, 1989) suggests that a person's attention becomes fatigued through everyday urban demands, and that natural environments facilitate attention recovery. Finally, the Biophilia hypothesis suggests that humans possess an innate tendency to affiliate with nature, resulting in feelings of satisfaction, connection, and wellbeing (Kellert & Wilson, 1993).

While NGS help users to experience better memory restoration, attention, and retention (McCormick, 2017), stress-inducing outdoor activities like mountain biking or rock climbing can lead to further mental wellbeing outcomes (Nugraha et al., 2024). Such activities trigger the release of cortisol, a stress-inducing hormone, which optimises the brain during fight-or-flight responses. Users who participate in outdoor activity also experience the release of a stress-relieving hormone, serotonin, which counteracts cortisol (Bunting et al., 2000; Nugraha et al., 2024). This regulates the hippocampus, resulting in overall improved stress regulation (Chang et al., 2019). Hence, such activities help people to better manage stress in their daily lives. This is

relevant to ethnic minority groups, who are more likely to experience stress, as discussed later (Roe et al., 2013).

Physical wellbeing is an important aspect of PWB (Fox, 1999; Wang et al., 2023). It is characterised by optimal functioning of the body, and the absence of disease and illness, that is achieved through practices which support physical health (Bull et al., 2020; Fox, 1999; World Health Organisation, 2010). NGS enhance physical wellbeing by encouraging users to engage in health-enhancing behaviours, such as physical activity (Caperchione et al., 2009; Emadian & Thompson, 2017; Eyre et al., 2015d; Gebel et al., 2007; Wang et al., 2023). Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (Department of Health and Social Care, 2023). It can be undertaken at moderate intensity, such as brisk walking that increases breathing rate, or at vigorous intensity, such as running, which leads to rapid and heavy breathing. The UK government recommend a minimum of 150 minutes of moderate to vigorous activity per week (Department of Health and Social Care, 2023). In this regard, De la Barrera (2016) revealed increased physical activity levels among people who visited green vegetation and natural open spaces. Scholars suggest that this is because such spaces are adaptable, convenient and attractive, motivating people to use them in physically demanding ways (Douglas et al., 2017; Hu et al., 2025). For instance, brisk walking is a common activity in NGS, which promotes muscular and cardiovascular endurance. Similarly, walking on rough terrain supports the growth of mineral density, strengthening the musculoskeletal system (Lin et al., 2021). Various ethnic minority groups who face heightened physical wellbeing challenges can utilise such activity (Bhatnagar et al., 2016).

Whilst NGS benefits users at the individual level, it also promotes community ties. For instance, NGS users often feel a sense of belonging in the visited environment (Bressane et al., 2024; Stodolska, 2015; Stodolska & Livengood, 2006; Stodolska & Yi, 2003). Those who visit their own neighbourhood NGS often feel positively about their own localities (Stodolska et al., 2017). This is important for immigrant groups and ethnic minorities, as NGS can be used to increase a sense of belonging and welcomeness, leading to better community integration (Monti, 2017a). For example, scholars have reported better engagement with neighbourhood parks, community services, and social movements for those who actively engage with their local NGS

(Bressane et al., 2024; Seeland et al., 2009). This is relevant for ethnic minority groups, who are often excluded and perceived as disconnected from a British way of life (Stronks & Agyemang, 2021).

1.4 Decline of Natural Green Spaces and Unequal Access

While NGS is important for people's PWB, they are underutilised (Natural England, 2019a; Walker, 2025; World Health Organization, 2016). A survey suggests that less than half (41.9%) of the UK population visit NGS once a week, while 16% never visit (Natural England, 2019a). Another survey suggests that 33% of children never engage (Natural England, 2019b). It can be argued that increased technological advancements and urbanisation have led people to engage in leisure practices away from natural environments (Cuijpers et al., 2023; Edwards & Larson, 2020; Robison & Ridenour, 2012). This diminishes PWB as regular use of technology and screen time overstimulates the brain, leading to mental exhaustion and reduced attention span (Dunckley, 2014; Ulrich et al., 1991; Walker, 2025).

III mental health has increased fivefold in the last decade (British Medical Association, 2023; Wu et al., 2023), which may be associated with the underutilisation of NGS. Concerns also exist around physical health, as deaths linked to physical inactivity have increased from 6% (World Health Organisation, 2010) to 7.2% (Katzmarzyk et al., 2022) worldwide. Physical activity supports people's wellbeing throughout their lives; however, half of the population becomes physically inactive when reaching the age of sixty (Grande et al., 2020). While numerous interventions aim to increase physical activity in the UK through formal settings like gyms (Corder et al., 2020), strategies should consider informal settings like NGS, particularly for groups who need it the most. For instance, increasing NGS access can enhance PWB for all (Ekenga et al., 2019), but each group face distinct barriers.

Ethnic minorities- groups within a broader population that are distinguished by shared cultural, ethnic, national, or religious characteristics -engage disproportionately with NGS than their White counterparts, often associated with lower distribution in their neighbourhoods (Friends of Earth, 2020; Natural England, 2020a; Nazroo, 2003; Smith et al., 2000; Sport England, 2015; Walker, 2025). Research suggests that approximately 40% of England's ethnic minorities reside in areas of inadequate greenery, compared to 14% of White residents (Friends of Earth, 2020). This means that ethnic minority residents are twice as likely to live in neighbourhoods deprived of

NGS as White residents (Friends of Earth, 2020). While this highlights the lack of NGS distribution in ethnic minority neighbourhoods, it is important to note that multiple factors influence how often people visit such spaces. Access is determined by various dimensions extending beyond distribution, including sociocultural factors like social support, representation, and personal circumstances (Wang et al., 2015), as will be revealed throughout this thesis. To support this point, one study found 42% of ethnic minorities visit their local NGS weekly, compared to 69% of White visitors of the same neighbourhood (Natural England, 2014). Another study on a diverse neighbourhood found 44.2% of visitors to NGS to be White, whilst only 25.7% were from an ethnic minority background (Natural England, 2019a). These statistics suggest that ethnic minorities struggle to access NGS regardless of their distribution due to multiple barriers that White people do not experience.

Whilst ethnic minorities face barriers to access localised NGS (i.e., urban green spaces), they also struggle to access rural green spaces (RGS). Rural areas are usually associated with White and middle-class male usership (Edwards, 2023; Neal, 2002) and often exclude ethnic minority groups (Burdsey, 2013; Edwards, 2023; Nayak, 2017). This is because RGS are represented and dominated mostly by privileged groups, and exclude those who do not share the same identity traits or practices (Burdsey, 2011; Byrne, 2012; Garland & Chakraborti, 2006; Thorogood et al., 2021). Limited access to both rural and local NGS creates a double disadvantage, reducing the opportunities for ethnic minority communities to interact meaningfully with nature. For instance, ethnic minorities comprise less than 1% of visitors to RGS (Natural England, 2019a; Welsh Government, 2024) and only 0.8% of board members across English Areas of Natural Beauty (Department for Environment Food & Rural Affairs, 2019).

In recognising the benefits of NGS engagement, the UK government have attempted to enhance access for diverse groups (Natural England, 2023, 2024). For instance, the Mosaic Model was designed to encourage ethnic minority's engagement with NGS through empowerment, networking, and advertising strategies (Natural England, 2014). Sport England (2015) sought to raise awareness of the diverse types of NGS available for diverse groups and encouraged engagement through activities such as outdoor physical exercise. The UK Government also made it a priority to enhance walking pathways and cycling routes, woodland access, and ensuring nobody

has to walk more than 15 minutes to reach NGS (Department for Environment Food & Rural Affairs, 2019; House of Commons, 2023). Despite these actions, statistics suggest that issues of inequitable access remain.

Community-based initiatives that derive from current policy often work to enhance access to NGS for ethnic minority groups (Slater, 2022). For instance, the social support networks provided through such initiatives play a pivotal role in facilitating engagement and encouraging shared experiences and group activities (Slater, 2022). However, these initiatives are not always targeted at the demographics that need them the most (Curry & Brown, 2010; Haqqani, 2023). This may be an oversight, as every community encounters unique barriers to accessing NGS, which subsequently influences their engagement rates and associated PWB (Dadvand et al., 2014a). To provide better access to NGS and maximise people's opportunities to lead healthier lives, research must gain a deeper understanding of the underlying reasons behind the barriers to engagement and what can be done to alleviate access, specific to each underrepresented group (Edwards, 2023; Kloek et al., 2016; Roe et al., 2017).

1.5 Focusing on South Asians and the Political Context of the UK

As previously discussed, while the majority of existing NGS research focuses broadly on generalised groups of 'ethnic minorities', there is a pressing need for a more nuanced and targeted approach. For instance, groups differ in their access levels (Natural England, 2019a), barriers faced (Boyd et al., 2018), and health challenges (Baldew et al., 2019; Bansal et al., 2022) across and within ethnic categories. In the current thesis, South Asians- people whose ethnicity or ancestry originates from Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka - are a focal point due to experiencing the worst NGS visitation rates (Ward et al., 2023), and concerns surrounding their wellbeing, as evidenced by high rates of obesity, diabetes, coronary diseases, and poor mental health (unpacked in Section 2.6) (Awan et al., 2022; Shah & Kanaya, 2014; Tirodkar et al., 2011). The demographic is often described as at risk (Mohammed Nawi et al., 2021), linked to ill health and challenges in accessing health care and health-enhancing contexts like gyms (Horne et al., 2018).

It is important to acknowledge that South Asians in England, and in other Western contexts, face compounding barriers in accessing broader health and leisure (Caperchione et al., 2009; Carrington et al., 1987; Eyler et al., 1998; Irshad et al., 2016; Nisar et al., 2022). For example, Walseth (2015) found that South Asian

students were subjected to alienation due to their cultural clothing. Fletcher (2014) revealed South Asian Muslim cricketers to struggle reconciling club drinking cultures with Islamic beliefs about abstaining from alcohol. Dagkas & Curry (2018) showed how South Asian Muslim girls felt hesitant in mixed-gender swimming classes. These studies highlight how Western leisure contexts cater for the White, non-Muslim majority and often exclude users with different beliefs and preferences. Furthermore, existing research tends to focus on formal settings like gyms and swimming pools, overlooking non-institutional settings like NGS. This is significant because NGS can help South Asians to experience better mental and physical wellbeing whilst avoiding some of the exclusionary practices inherent in more formalised settings.

While the first of the three studies in this thesis focuses broadly on South Asians within the general context of NGS, the second and third studies centre more specifically on South Asian Muslim women's RGS access. This is because South Asian Muslim women are often marginalised in health and leisure contexts (Bibi, 2018; Kay, 2006a; Stride et al., 2018b). They are also often associated with heightened health barriers to leisure, more so than non-Muslim women and South Asian men (Abdulwasi et al., 2018; Banga et al., 2020; Bibi, 2018). For instance, compounding challenges exist for South Asian women in comparison to South Asian men, shaped by their gendered identities (Stride et al., 2018b) Muslims, in comparison to non-Muslims, who face Islamophobia (Hamdonah, 2022). Indeed, their experiences represent a set of unique challenges tied to their multiple identities of gender, religion and race, explained in Chapter 5 (Crenshaw, 1989; Ho & Chang, 2021).

One of the prominent issues South Asians, and Muslims, including women, experience is the racial and Islamophobic tensions against South Asian communities, where discrimination and hostility persist (Muslim Council of Britain, 2015). This affects South Asians, who comprise 7.5% of the UK population and South Asian Muslims, who make up 4.3% (Muslim Council of Britain, 2015; Office for National Statistics, 2023). At times, certain events trigger violent outbursts, like bombings and economic/employment crises, where anger is usually directed at Muslims and visible minorities. For instance, during the writing of this thesis, Muslims and the broader South Asian community in the UK were violently targeted by right-wing groups after the tragic murder of three young girls in Southport. Similarly, in September 2025, far-

right groups' protests against immigration involved hatred against Muslims and South Asians (Godshaw & Singleton, 2025).

Data suggests that Muslim hate crimes increased by 300% since late 2023 (Home Office, 2024; Islamophobia Response Unit, 2024). Many Muslims are often stereotyped as terrorists or security threats, associated with their religious identities, and experience racial slurs and pathologisation, linked to their ethnic identities (McGinty et al., 2013; Warren, 2017). These tensions reflect broader societal attitudes, negatively impacting upon the lived experiences of South Asians, particularly Muslims and women, who may feel increasingly vulnerable and, as a result, less inclined to access public arenas such as NGS. The racism faced by South Asian Muslims in the UK is often overlooked or underrepresented in discussions around race and discrimination (Modood, 2023). This can be attributed to a policy which does not recognise Islamophobic incidents as an official form of racism, suggesting a gap in anti-discrimination policies (Modood, 2023). Some aspects of this thesis reveal the ways in which Islamophobia exists and how this impacts people's experiences of NGS and PWB.

Overall, this thesis aims to recognise how NGS access can be facilitated for South Asians and how it can be used to promote their PWB. It aims to fill a gap in understanding South Asian communities' engagement with NGS, particularly the demographic of Muslim women, where the focus narrows to RGS. This thesis moves beyond measuring NGS access superficially and contributes to understanding accessibility through holistic and interdisciplinary methods, and how that links to wellbeing for a marginalised community within the UK.

1.6 Thesis aims

- a) To identify the factors influencing access to natural green spaces (NGS) and their associations with psychological wellbeing (PWB) among South Asians in England.
- b) To explore South Asian Muslim women's access to rural green spaces (RGS) and examine how such access influences their psychological wellbeing (PWB)

1.7 Thesis Overview

Overall, this thesis presents a research trajectory in which each chapter builds upon and extends the insights of the preceding ones. It comprises three studies that employ distinct methodological approaches. Each study is presented sequentially as a separate chapter, outlining its introduction, methods, findings, and discussion. Specifically, Chapter 4 presents a systematic literature review examining South Asians' experiences with NGS in relation to the first thesis aim. This chapter provides an in-depth synthesis of existing research on access and its associations with PWB. Chapter 6 addresses the second thesis aim through a qualitative study using walking and semi-structured interviews to explore South Asian Muslim women's engagement with RGS. Finally, Chapter 7 extends this topic by testing the relationships between key variables identified in the earlier studies, applying them to a broader national sample through structural equation modelling.

Following the current chapter, Chapter 2 reviews scholarship on South Asian communities' experiences with NGS. It provides a general overview of the literature, highlighting the PWB benefits of engagement with nature. The chapter also examines factors influencing access to NGS and considers how intersecting identities may shape these experiences. Chapter 3 then outlines the general methodology, detailing the overarching research approach and the tools employed across the three studies. Chapter 5 follows the systematic literature review of Chapter 4 and introduces intersectionality as a key framework for understanding the experiences of marginalised groups. After the final empirical studies of Chapters 6 and 7, Chapter 8 synthesises findings across all three studies in a general discussion. It draws together key themes such as how RGS can be used to enhance PWB, and how access is influenced by multiple, intersecting dimensions of identity. Finally, Chapter 9 presents the overall conclusions of the thesis, summarising the main insights and discussing their theoretical and practical implications. It emphasises the importance of enhancing perceptions of access to RGS in order to maximise the associated wellbeing benefits.

1.8 Chapter Summary

This chapter introduced the thesis by providing a clear and operational definition of concepts focused on in this thesis, such as NGS and RGS. It then provided a background on the benefits of NGS and acknowledged its underutilisation. South Asian communities were then focused on, with details on their challenges to good

health and access to leisure. A clear rationale was established for examining their experiences with NGS, including an explanation of the specific nuances explored in this thesis. This rationale also outlined the shift in focus toward RGS and justified concentrating specifically on South Asian Muslim women in the second and third studies of this thesis. The next chapter presents a general literature review which synthesises existing literature on topics related to South Asian people's access to NGS.

2 Chapter 2 – General Literature Review

2.1 Chapter Overview

The previous chapter focused on natural green spaces (NGS) as a tool for supporting psychological wellbeing (PWB) among South Asian communities, who face heightened health challenges. Building on this, the current chapter provides a broader review of existing literature. Unlike the systematic literature review presented in Chapter 4, which synthesises evidence using a structured and rigorous framework, the present chapter provides a more exploratory review. It draws on various scholarly bodies of work relevant to the subject matter, allowing for a wider contextual understanding of the issues surrounding NGS, RGS, and the experiences of South Asian Muslim women.

This chapter first examines factors influencing access to NGS and explores how these spaces are associated with PWB. In doing so, it considers how sentiments, feelings of connectedness with nature, and spirituality shape individuals' experiences of NGS. The chapter then broadens its focus to the wider community-level benefits of NGS, such as its role in promoting social cohesion and integration. It is then stated that despite these benefits, urbanisation may have contributed to a decline in NGS engagement, which exacerbates current mental and physical health concerns. These issues are particularly pronounced among ethnic minority communities, who face geographical, practical, and safety barriers to accessing NGS. Women, especially, experience additional challenges linked to gender, further restricting their engagement.

These barriers are partly shaped by the perception that NGS are spaces for White, male, and middle-class participation, which can create a sense of exclusion for marginalised communities (Edwards et al., 2022). This chapter then turns its attention specifically to South Asian communities, outlining the unique health and societal challenges they encounter. It explores patterns of physical activity and leisure, with particular attention to the experiences of Muslim women. Finally, it is proposed that NGS could be a valuable and culturally adaptable setting for health-enhancing activities, offering a potential pathway to help address existing health disparities.

2.2 Natural Green Spaces' Associations with Psychological Wellbeing

Engaging with NGS is associated with positive PWB (Capaldi et al., 2014; Coldwell & Evans, 2018; Hartig et al., 1991; Kaplan & Kaplan, 1989; White et al., 2019). Feelings of happiness, joy, and overall positive affect increase for users who visit parks and gardens (McGuire et al., 2022). One study found that NGS on German university campuses can enhance positive mood for students (Foellmer et al., 2021). Similar conclusions derive for research on various demographics, such as adolescents (Zhang et al., 2020), and senior adults (Wu et al., 2023). However, less work focuses on ethnic minorities, who experience heightened challenges in accessing NGS and poorer mental health (Bansal et al., 2022).

NGS engagement can combat poor mental health by providing respite from stressful events (Bratman et al., 2012). Being in such spaces often secludes users from busy and built-up environments. This helps them to feel a sense of coherence, support, and retreat (Weimann et al., 2019). Scholars suggest that the natural features of NGS lower cortisol levels, which in turn lowers perceived stress (Barton et al., 2012; Barton & Rogerson, 2017). Literature reviews by Liu (2023), Reece et al. (2021), and Tran et al. (2022) affirm that those with better access to NGS experience a lower risk of depression and anxiety. Similarly, Chen et al. (2021) and White et al. (2021) conclude that NGS help to contribute to positive mental health outcomes in adults by reducing depression and anxiety symptoms. These studies reflect the importance of NGS in preventing and reducing certain psychiatric disorders.

Different types of NGS may be used in different ways and may exhibit distinct health-enhancing properties. Users may visit their local urban green spaces in ease for quick respite, or to catch up with friends or family (Watson & Ratna, 2011). Alternatively, individuals may visit rural green spaces (RGS) further afield to connect with nature in quieter environments or to conduct adventurous activities. Visiting RGS in such ways helps people to feel detached from responsibilities and the busyness of urbanity (Large & Schilar, 2018), leading to improved reported mood, resilience, and affect (Honey-Roses & Zapata, 2023; Rupprecht et al., 2015). Whilst research predominantly focuses on NGS as a whole, less work focuses on the distinctions between specific types, like RGS (Wyles et al., 2019). This is significant because people's experiences may vary depending on the type of NGS they engage with, and their PWB outcomes may differ accordingly, as explored further in Chapter 4.

Research on NGS, in general, shows that engagement helps people to feel less isolated. Astell-Burt et al. (2022) found a positive association between the presence of NGS in neighbourhoods and reduced loneliness across 22 studies. Similarly, White et al. (2013) found, through surveys, that those residing near such spaces felt more social support. This is significant because people who feel a sense of relatedness often experience better PWB (Jose et al., 2012). Furthermore, increasing overall societal access to NGS can facilitate better social cohesion within the UK, as suggested by a systematic literature review of 51 studies (Wan et al., 2021). Jennings & Bamkole (2019) explain that this is because NGS lead people to interact positively with each other. The aesthetic elements of NGS, like trees and flowers, increase the intimacy of interactions between users (Stodolska, 2015). This leads to a deeper appreciation among users, thus enhancing their social experiences (Monti, 2017a). Overall, this literature shows how NGS can strengthen inter-community ties among diverse groups in the UK (Hillier et al., 2016), which is relevant to ethnic minority groups who are often portrayed as detached from mainstream society (Wan et al., 2021).

Visiting NGS can motivate users to engage in health-enhancing behaviours like physical activity (Barton et al., 2012; Chen et al., 2021). Physical activity is a part of one's physical wellbeing, and is directly linked to positive PWB (Fox, 1999; Rodriguez-Ayllon et al., 2019). Developing muscular/cardiovascular endurance, strength, and coordination often leads people to feel better vitality (Nugraha et al., 2024; Thompson Coon et al., 2011). To highlight this, a study using accelerometers and questionnaires with 1223 participants found higher positive affect among those who engaged in more frequent physical activity (Costigan et al., 2019). NGS amplify these benefits (Rogerson et al., 2019), as the natural surroundings can boost the release of serotonin, compounding the PWB benefits (Nugraha et al., 2024; Ward et al., 2016). For example, one meta-analysis on NGS exercise revealed better self-esteem and mood among users conducting physical activity in NGS (Barton & Pretty, 2010). Encapsulating this, Sport England (2015) has associated NGS engagement with reduced risk of non-communicable diseases, lower body mass index, decreased risk of obesity, and an overall enhancement of PWB.

Numerous reviews have demonstrated that people who visit NGS are more likely to engage in physical activity, leading to better physical health than those who

remain in urban environments (Ding et al., 2011; Duncan et al., 2005; Gebel et al., 2007; Nugraha et al., 2024; Van Cauwenberg et al., 2011). A longitudinal study in Doetinchem measured physical activity levels from 1987-2012 and found that those with better access to NGS engaged in more physical activity, thus exhibiting better health outcomes (Picavet et al., 2016). This may be because people can use NGS for physical activity in more convenient and adaptable ways compared to formal contexts like gyms (Douglas et al., 2017). For instance, Hordyk et al. (2015) found that immigrants in Canada prefer NGS for physical activity due to the convenience of such space. This is significant because ethnic minorities struggle to access formal health contexts, discussed later in Section **Error! Reference source not found.**

2.3 Factors of Access to Natural Green Spaces

Since NGS engagement is associated with positive health (Poortinga et al., 2021; White et al., 2019), proximal access to NGS is often associated with good PWB (Roe et al., 2017; Tran et al., 2022; White et al., 2013; Zhang et al., 2020). For example, Lee & Maheswaran (2011) noted that people who resided near NGS reported lower levels of illness and loneliness in contrast to people who lived in urban areas. Such literature assumes that people with better proximal access to NGS experience heightened exposure. This is supported by Kothencz et al. (2017) who found that urban-based Hungarians with better proximal access felt more satisfied with NGS. However, exposure and proximity are two distinct concepts, as will be presented in this thesis.

Seminal nature and wellbeing frameworks depict exposure to nature as the mechanism through which psychological benefits emerge, rather than mere proximity (Kaplan & Kaplan, 1989; Kaplan, 1995; Ulrich, 1984; Ulrich et al., 1991). Whilst this assumption is upheld in more recent scholarship (Baceviciene & Jankauskiene, 2022; Birch et al., 2020a; Liu et al., 2022a; Vella-Brodrick & Gilowska, 2022; White et al., 2019), literature still relies on proximity to NGS as an indicator of PWB (Roe et al., 2017; Tran et al., 2022; White et al., 2013; Zhang et al., 2020). Synonymising proximity with exposure risks oversimplifies how engagement with nature supports psychological wellbeing, as it overlooks how individuals experience and engage with NGS.

Proximity may not always indicate how much an individual engages with NGS. Mustafa et al. (2023) measured proximal access to NGS for New York residents and

found it to only predict some engagement. Pot et al. (2021) argue that subjective perceptions of access are a more meaningful indicator of engagement with NGS and subsequent PWB rather than objective measures such as proximity. This is because objective access alone does not guarantee engagement, and individuals may live near NGS yet still not visit for several reasons. Engagement with NGS is shaped by perceptions of accessibility, including various factors of social conditions that influence the ability of individuals to engage with such spaces. For instance, knowledge is an important factor as Sang et al. (2016) found through postal surveys in Gothenburg that those who were more aware of NGS in their areas were more likely to visit them. That is not to say that proximity is irrelevant, as it can influence access. However, individuals who live near NGS may still be unable to use them due to social, cultural, or practical barriers, while those living further away may struggle to engage simply because of distance.

This thesis presents perceived access to NGS- an individual's perceptions in their ability to visit NGS- as a concept encompassing numerous aspects beyond proximity. Perceived access is multifaceted and intricate, influenced by multiple factors of human experience. One factor of NGS engagement is the sentimental value people associate with such spaces (Arnberger & Eder, 2012; Liu et al., 2020; Mayer & Frantz, 2004; Monti, 2017a). Authentic and memorable experiences can emerge from the presence of natural features and the lack of urban distractions (Rupprecht et al., 2015). This is often linked with healing and wellbeing, leading people to visit further (Garza-Teran et al., 2022; Lohr & Pearson-Mims, 2005). These sentiments are sometimes linked to childhood memories (Mullenbach et al., 2022; Thompson et al., 2008). One study found that a South Asian group frequented a particular NGS because of their memories there (Ratna, 2017). This human-nature relationship can support PWB, particularly during times of stress. Indeed, NGS can provide stability through reminiscing on positive memories, supporting sustained engagement (Corcoran, 2020; de Bell et al., 2017; Ramkissoon, 2020).

Nature connectedness- the sense of closeness people have with nature- also shapes NGS engagement (Chawla, 2020; Frost & Meyer, 2012). One study measuring engagement from 924 Lithuanian men and women found a positive association between nature connectedness and visitation rates (Baceviciene & Jankauskiene, 2022). Another study with 157 ethnically diverse students found nature connectedness

as a stronger predictor of engagement than safety perceptions (Taylor, 2018). Since people with stronger nature connectedness visit NGS more frequently, they also experience better PWB (Colléony et al., 2019; Freeman et al., 2019). This is supported by the study of Liu et al. (2020), who found better psychological restoration outcomes among NGS users who felt stronger nature connectedness. Considering this, environmental education has been associated with a better quality of life in minority groups as it can drive people's appreciation for nature (Ekenga et al., 2019).

Another factor influencing NGS visitation is spirituality. Spiritually inclined people often engage with NGS frequently (Ryff, 2021). Certain religious ideas encourage interactions with nature (Jay et al., 2012). Scholars such as Ryff (2021), Koehrsen (2021) and Briguglio et al. (2020) have explored the link between religious beliefs and NGS, finding that spiritual users develop heightened levels of appreciation of NGS. In this regard, Briguglio et al. (2020) found Roman Catholics to feel a sense of environmental stewardship, driven by their faith. Appreciation for NGS also exists among Muslims, as Islam encourages people to connect with God through nature (DeHanas, 2009). Indeed, religiosity is an important predictor of engagement with NGS, as explored by Kloek et al. (2017) and Buijs et al. (2009). However, most scholarship focuses mostly on spirituality broadly and more work needs to be done specifically with Muslims and their relationship with nature to reveal their insights.

For some groups, spirituality forms a central dimension of engagement with nature, shaping how natural settings are experienced as spaces of reflection, faith, and belonging (Ryff, 2021). For instance, Kaczyńska (2020) found that church gardens enhance users' contemplation of a higher power, and Ngulani & Shackleton (2019) found that their study sample felt enriched when adhering to religious practices in NGS. As discussed by Baur (2018), natural environments provide meaningful pathways for spiritual rejuvenation and contemplation, leading to enhanced feelings of spirituality. The links between NGS and spirituality present an alternative way of engagement than the motives often held by the mainstream population, who often visit NGS to enjoy nature (Stodolska, 2015; Stodolska et al., 2017). It is important to consider whether spirituality can increase and enhance NGS usage among many minority communities, particularly those with religious beliefs, helping to combat existing health disparities.

2.4 Declined Natural Green Space Usage and Existing Health Challenges

Whilst there are numerous advantages associated with NGS, access is reducing. Chapman (2022) analysed census, exposure, and access data by the UK Government (2020), Data Adaptive (n.d.), Natural England (2020b), and discovered that NGS in England had reduced by one third, leading to a 5% decrease in access over the last 20 years. Another report found that visits to NGS decreased by 9 million over the last two decades (Harding, 2022). A lack of nature visitation can also be attributed to sedentary lifestyles, where technology is relied on for leisure, inhibiting people's PWB (Cuijpers et al., 2023; Edwards & Larson, 2020; Robison & Ridenour, 2012). This is particularly problematic for disadvantaged communities, which already face compounding access challenges, discussed later in Section 2.5 (Taylor, 2023).

Current concerns also revolve around mental wellbeing. Ill mental health reports increased 150% between 2017 to 2022 (British Medical Association, 2023). This can be partly associated with the 2020 COVID-19 pandemic that caused psychological distress for many individuals, triggering a 25% increase in ill mental health issues worldwide (World Health Organisation, 2022). The pandemic limited socialising and movement, including visiting NGS, leading many to feel isolated and inactive (Robinson et al., 2022a). That said, ill mental health is more apparent in certain demographics, as more women experience poor mental health than men (European Institute for Gender Equality, 2021; Ngan et al., 2025; Wang et al., 2025). Furthermore, more ethnic minorities experience anxiety and depression than White demographics (Proto & Quintana-Domeque, 2021). Exacerbating these issues, ethnic minorities struggle to access formal mental health services due to stigma, cultural differences and language barriers (Raleigh, 2023). NGS can mitigate these concerns by supporting people's mental health as an additional avenue (Akaraci et al., 2020; Charles-Rodriguez et al., 2023; Ekkel & de Vries, 2017; Hunter et al., 2023; Wright et al., 2024).

Concerns also exist surrounding physical health. In the UK, 23% of adults and 81% of adolescents fail to meet formal physical activity guidelines (Department of Health and Social Care, 2023). This has adverse consequences on life expectancy, accounting for deaths 9% worldwide and 16% in the UK. Physical inactivity is a leading cause of illness, contributing to diabetes, high blood pressure, and certain types of cancer (Haileamlak, 2019; Katzmarzyk et al., 2022). Ethnic minority communities are

generally less active than the general population (Hackett et al., 2020; O'Connor et al., 2021). Regarding this, the UK Government (2022) highlighted ethnic minority groups as 29% less likely to engage in physical activity than their White counterparts. Physical inactivity could be addressed through increasing access to NGS (Hunter et al., 2023), as such spaces increase the pathways in which people can engage with physical activity, helping them to achieve 150 minutes of physical activity per week (Bull et al., 2020; Department of Health and Social Care, 2023).

2.5 Disadvantaged People Struggle to Access Natural Green Spaces

Disadvantaged communities are known to face exclusion from NGS in Western countries (The Health Foundation, 2024). One survey involving 16,812 participants revealed that those from lower-income families were less likely to visit NGS (Boyd et al., 2018). Hoffmann et al. (2017) conducted a NGS audit in Portugal and revealed inadequate park safety, lack of equipment/amenities and poor usability in deprived neighbourhoods. These issues are heightened for ethnic minorities, who are more likely to be from economically disadvantaged backgrounds (Aamodt et al., 2023; Tannerah et al., 2024). In a study involving satellite analysis across four Nordic cities, Aamodt et al. (2023) found ethnic minorities to experience limited access to NGS compared to their White counterparts. Whilst Aamodt et al., (2023) did not detail the specific ethnic minority groups included in their sample, Engelberg et al. (2016) sampled Black and Hispanic communities and found a negative association between NGS quality in ethnic minority communities across American neighbourhoods. Another study involving 582 American residents, including Asian and Black ethnic minorities, found that 10% felt that NGS were unreachable due to their distance (Stone et al., 2018). Lastly, a systematic literature review of 90 articles covering America, Asia, and Oceania found ethnically minoritised groups to face concerns of safety, transport, and proximity, hindering NGS access (Rigolon et al., 2021). These studies reflect stark inequalities in Western countries in regards to access to NGS for ethnic minority groups (Miller et al., 2022).

The issue of inequitable access to NGS is especially apparent in England. Friends of Earth (2020) highlights the disparities ethnic minorities face in accessing NGS, particularly those of lower-income backgrounds. When analysing residential data from the UK Government (2020), the Earth (2020) found 40% of Asian, Black and other ethnic minorities reside in the least green areas, in contrast to 14% of the White

population. This shows that ethnic minorities visit NGS less than their White counterparts (Public Health England, 2020). Supporting this, a government survey suggests that 69% of White people visit NGS weekly, compared to 42% of ethnic minorities (Natural England, 2014). Current NGS access and usage disparities are shaped by the socioeconomic issues ethnic minorities face (Lenneis & Agergaard, 2024). For instance, being unable to afford transportation and activity costs limits people in how they can engage with and visit NGS (Head et al., 2019). Highlighting this, Stone et al. (2018) found 48.3% of their ethnic minority sample in America refrained from visiting NGS due to financial constraints.

Another barrier ethnic minorities face is the lack of knowledge as to how and where to visit NGS. Stone et al. (2018) found that 20.4% of their ethnic minority sample felt unaware of how to access NGS. England based ethnic minority samples, including Black, Asian and mixed race people, have expressed the difficulties in accessing information, and signage, of where and how to access NGS (Edwards, 2021; Edwards et al., 2022; Slater, 2022). This is exacerbated by language barriers for non-English speakers (Robinson et al., 2022). Feeling unfamiliar about the norms, rules, locations, paths, and activities can impede access and enjoyment (Robinson et al., 2022), deterring people from visiting NGS (Clayton, 2012). This perpetuates the underrepresentation of ethnic minorities in NGS (Tannerah et al., 2024).

Feelings of unbelonging heighten when users cannot engage with NGS according to their preferences (Tannerah et al., 2024). Stone et al. (2018) found 14.4% of their ethnic minority sample in America refrained from visiting NGS due to feeling limited in how they can engage. A narrative systematic review found similar conclusions in the UK (Robinson et al., 2022b). Diverse communities engage with NGS in different ways. Some may prefer to either socialise, have a picnic, undertake sport, exercise, or a combination of these, whilst others may visit to enjoy nature or learn about history. Currently, minorities who engage with NGS in ways or dress in attire different to the White and middle-class often experience a sense of exclusion (Ho & Chang, 2021). For instance, visitors to RGS are often expected to be White, male, and dress in outdoor clothing (Burdsey, 2013; Stone et al., 2018). Users who dress and engage differently are seen to conflict with ideas of who belongs to those spaces. This leads many minority users to feel alienated, which deters them from engaging with NGS (Edwards, 2023; Loukaitou-Sideris, 2006). Encapsulating this,

Taylor (2018) found 43 Black and 68 other ethnic minority individuals in America to feel fearful of visiting NGS because of their identities, which were not expressed by the 46 White sample. Similar conclusions were derived from another sample of 732 mixed ethnic minority groups, who felt unwelcome in NGS due to their underrepresentation (Jorgensen et al., 2013). A lack of ethnic diversity, lighting, visibility, and surveillance can reduce the sense of safety felt by NGS users, leading to increased fears of racial abuse and overall safety perceptions for users (Robinson et al., 2022b).

Safety fears heighten in areas with high crime rates, deterring NGS engagement (Lane & Meeker, 2003; Vera-Gray & Kelly, 2020). One study, with 230 North Carolina-based participants, revealed a negative association between park visits and incidents of crime (Marquet et al., 2020). Unfortunately, most ethnic minorities live in crime-rife areas, challenging their NGS access (Lane & Meeker, 2003). For example, Williams et al. (2020) found that only 19% of Hispanic residents in the United States lived near low-crime NGS, whereas 59% resided close to high-crime parks. Ethnic minority groups are more susceptible to experiencing ill treatment because of their identity differences (Grinshteyn et al., 2020). Regarding this, a survey study about public safety, conducted by Nandi & Luthra (2016), found Asian and Black communities to experience more abuse and harassment than White people, particularly in less diverse neighbourhoods. NGS are not as diverse as they should be, often leading ethnic minorities to feel marginalised and subjected to abuse due to their differences (Natural England, 2019a).

The lack of diversity in an environment leads to perceptions of who belongs in that space and who does not, leading to racialised experiences (Puwar, 2004; Weber, 1998). People can feel reluctant to engage with the NGS due to fears of experiencing racial abuse. Interviews conducted in Leicester (Clayton, 2012; Madge, 1997) and in Sheffield (Woolley & Amin, 1999) revealed Pakistani individuals to feel racialised in certain spaces, deterring their visits. Recent diversity and inclusion discourse has challenged overt racial discrimination; however, bias and aggression still persist in subtle ways that are only known and experienced by ethnic minorities, which are often revealed in societal tensions, as discussed in Section 1.5. For instance, interviews conducted by Ward et al. (2023) focused on a sample of 40 White, Black, Mixed race, European, and Asian participants in Leeds and found that minorities felt a sense of

unwelcomeness and unease when visiting NGS. These feelings can be exacerbated by people's previous experiences, which fuel anticipations of being targeted for abuse. For instance, the study of Nandi and Luthra (2016) found that ethnic minorities anticipate racism more than they experience it. This can lead people to feel weary when visiting NGS. In this regard, White users report better satisfaction with parks, whilst ethnic minorities, particularly South Asians, often express feeling unwelcome in such spaces (Roberts et al., 2019).

Feelings of exclusion in NGS can heighten for females, who are already more vulnerable to abuse because of their femininity (Chen & Qiao, 2024; Green & Singleton, 2008; Green & Singleton, 2016; Lane & Meeker, 2003; Vera-Gray & Kelly, 2020). A UK survey suggests that 71% of women have faced sexual harassment (United Nations Women UK, 2021). Similarly, one controlled trial study in London found that women experience more fears in public urban spaces than men (Navarrete-Hernandez et al., 2021). Fears can amplify in NGS, which are less characterised by safety features such as lighting and surveillance than urban spaces (Rigolon, 2016). In this regard, one survey with 732 participants found that women felt more fearful in parks than men (Jorgensen et al., 2013). Similarly, Krenichyn's (2004) study revealed that women feel intimidated by aggressive male activity, leading to disengagement. This is because certain NGS might be perceived as more male-oriented, presenting activities associated with dominant masculine behaviours that deter women users (Green & Singleton, 2006, 2016; Topcu, 2020).

The differences between women's preferences and male-oriented spaces reflect a misalignment between the design of a space and the needs of its users (Topcu, 2020; Williams & Smith, 1983). Those whose preferences do not align with the practices of a space often feel unbelonging. For instance, a study found that 400 Iranian women reported high levels of discomfort and avoidance in spaces where men-centric activities dominated. This issue can exist in NGS too, as men and women may have differences in how they prefer NGS to be characterised. One UK survey, involving a sample of 479, found gender differences in NGS preferences in regards to having off-leash dog areas (49.8% women vs. 29.3% men), more lighting (82.1% women vs. 68.8% men), and pleasant views (64.6% women vs. 50% men) (Braçe et al., 2021). The availability of specific features influences who visits these environments and who does not. Since NGS are often demarcated by men, some women might visit

NGS less because they are less suited to their preferences (Colley & Irvine, 2018; Colley et al., 2022). For example, Colley et al. (2022) found that men are 1.136 times more likely to visit NGS weekly than women. This shows that NGS currently cater more for males.

Women who are juxtaposed with ethnic minority identities are less likely to visit NGS (Ordóñez-Barona, 2017; Robinson et al., 2022b). Women from ethnic minority backgrounds often feel less welcome in NGS compared to White, middle-class men due to an imbalance of representation and ideas about who belongs in that space (Phills et al., 2018; Watson, 2018). One part of this issue is that NGS are better distributed in White areas (Ferguson et al., 2018; Mueller et al., 2018), leading to an overrepresentation by White, middle-class men (Askins, 2009; Neal, 2002; Neal et al., 2021). On the contrary, NGS are poorly distributed in ethnic minority neighbourhoods, linked to their underrepresentation and outsider status in these spaces (Burdsey, 2011; Ho & Chang, 2021). This contributes to the ideas that such spaces are exclusive to White male groups (Slater, 2022), deterring ethnic minorities from visiting such spaces (Stone et al., 2018). The lack of diversity in NGS reproduces the racialisation of these environments (Burdsey, 2013; Neal, 2002; Thorogood et al., 2021), perpetuating ideas that minority users are unwelcome (Ho & Chang, 2021).

2.6 Health and Access Challenges Faced by South Asians

The reviewed literature reveals tendencies to homogenise findings related to various ethnic groups under the label of 'ethnic minority'. This approach implicitly positions White identity as the normative, unmarked category, while overlooking the distinct cultural backgrounds, values, and lived experiences of individual communities (Tannerah et al., 2024). It also obscures the needs and barriers faced by each community, which is important to acknowledge as each ethnic community exhibits unique ways, tastes and motivations to engage with NGS. For example, South Asian activity might differ from that preferred by African or Caribbean communities (Kloek et al., 2016). As such, a nuanced understanding of each ethnic group is essential in developing effective strategies to address the specific challenges each marginalised community faces in accessing NGS. For example, despite being the largest ethnic minority group in the UK (UK Government, 2020), South Asians visit NGS less than any other ethnic community (Natural England, 2014, 2017). One survey found that only 25.7% of a South Asian sample visited NGS weekly, compared to 44.2% of a

White sample (Natural England, 2017). This is concerning given the mental and physical health-related challenges experienced by South Asians, which could be alleviated through using NGS.

South Asian communities experience disproportionate physical health issues (Abdulwasi et al., 2018; Hayanga et al., 2023; Nazroo, 2003), associated with low levels of physical activity. For instance, South Asians are recorded as 2.63 times less active than their White counterparts (Mahmood et al., 2019). Another study found that only five out of 31 South Asian participants met the 150 weekly minutes of physical activity guidelines (Emadian & Thompson, 2017). Furthermore, the UK Government (2022) found only 53.6% of South Asian males (lower than the 59.8% male average) and 46.6% South Asian females (lower than the 63.1% female average) to achieve the minimum physical activity guidelines, reflecting South Asians as the least active ethnic group in the UK.

Associated with low levels of physical activity, South Asians experience significant physical health challenges (O'Connor et al., 2021). The National Child Measurement Programme found 25.3% of South Asian children to manifest obesity, which is more than any other ethnic group (NHS Digital, 2020). Moreover, 69.8% of South Asians exhibit unhealthy diets and concerning levels of physical inactivity (Emadian & Thompson, 2017). Thirty percent of South Asians experience hypertension, whilst 21% experience high cholesterol (Bhopal et al., 2014; Tandon et al., 2022; Tirodkar et al., 2011). South Asians are also 35% more likely to experience coronary disease than their White counterparts, as found in a nine-study meta-analysis by Zaman et al. (2013). They are also 3.7 times more likely to exhibit type 2 diabetes than the general population, as another meta-analysis of 20 articles revealed (Meeks et al., 2016). Lastly, one empirical study suggests 17% of UK South Asians manifest diabetes (Shah & Kanaya, 2014). These statistics reflect the stark physical health inequalities faced by South Asians.

South Asian communities also face significant mental health challenges (Hayanga et al., 2023; Karasz et al., 2019; Smith et al., 2000). A study of 523 England participants found South Asians to present poorer mental health indicators than any other ethnic group (Roe et al., 2016b). Moreover, a review of 21 qualitative studies found South Asians to experience high levels of emotional distress, which were worse amongst women (Awan et al., 2022). Indeed, South Asian women face more health

issues than any other ethnic and gendered group in England. Given these statistics, South Asians, particularly females, are often portrayed as a vulnerable group requiring health intervention (Banga et al., 2020; Bhopal, 2001; Horne et al., 2018; Tandon et al., 2022).

To address the mental and physical health concerns faced by South Asians, Iliodromiti et al. (2016) recommend that individuals should aim for 232 minutes of physical activity per week, which is 82 minutes more than general guidelines. However, conventional methods for health enhancement, like gyms and mental health services, struggle to meet the needs and preferences of diverse communities (Sharma et al., 2020). For example, a review of 174 studies revealed that formal health practitioners lack cultural awareness for South Asian care (Asthana et al., 2018). Compounding these challenges are the long waiting times and unfavourable outcomes South Asians face when admitted to the National Health Service mental health services, compared to any other ethnic group (Thomas, 2023). More health enhancement strategies are needed for South Asians beyond conventional methods (Ngan et al., 2025).

NGS could be used to address South Asians' health challenges (Birch et al., 2020a; Bowler et al., 2010; Gascon et al., 2015). These spaces encourage health-enhancing behaviours (Hordyk et al., 2015; Picavet et al., 2016; Wood et al., 2016) and contribute to positive wellbeing outcomes (Lyshol & Johansen, 2024). For example, NGS encourages physical activity, which reduces the risk of heart-related diseases by up to 50% (Jacob et al., 2023; Katzmarzyk et al., 2022; Spencer et al., 2020), and also enhances mental health (Hartig et al., 1991; Ulrich et al., 1991), which can reduce the load on public mental health services. As such, NGS should be seen as a significant pathway to combat the health inequities South Asians face. This chapter now turns to review South Asians' physical activity and leisure experiences more broadly, specifically the Muslim women demographic, and provides some insight into engagement preferences which may be applicable in the context of NGS.

2.7 South Asian Muslim Women's Engagement with Physical Activity and Leisure

Research has explored how South Asians engage with physical activity and leisure more broadly (Amara & Henry, 2014; Banga et al., 2020; Hornby-Turner et al., 2014; Horne et al., 2018; Iliodromiti et al., 2016; Irshad et al., 2016; Lawton et al., 2006;

Stodolska & Livengood, 2006). Much research focuses on the use of traditional sports and leisure settings, such as gyms, recreation centres and physical activity interventions (AbdulWasi et al., 2018; Banga et al., 2019; Condello et al., 2017). These studies may provide some insight into what motivates and discourages people from engaging with NGS. For instance, material barriers to physical activity, such as cost and proximity to recreational sites, may apply to NGS, as was discussed in Section 2.5 (Banga et al., 2019). Other research acknowledges how gender, religion and race function to shape engagement of physical activity and leisure (Ahmad et al., 2020; Azzarito & Macdonald, 2016). In this regard, scholars have shown how individuals must negotiate cultural and societal boundaries to undertake physical activity and leisure (Hamdonah, 2022; Ratna, 2016; Stride & Flintoff, 2017; Stride et al., 2018b).

South Asian Muslim women face compounding challenges to physical activity and leisure associated with their race, gender and religion (Hussain & Cunningham, 2023). For instance, scholars have argued that the said demographic is subjected to cultural expectations of femininity (Benn, 1996; Carroll & Hollinshead, 2017; Kahan, 2003). South Asian Muslim men are expected to work and provide for their families, whilst women manage household responsibilities and care for their families. These gender roles are prioritised over physical activity and leisure and are seen as inhibiting. Whilst this is no different to traditional Western nuclear family norms (Blackstone, 2003), they are often associated with South Asian culture (Jeffery & Qureshi, 2022; Kay, 2006a). South Asian Muslims are often pathologised and stereotyped as non-progressive, linked to existing ideas that they are incompatible with British values of liberty and progressiveness (Fleming, 1994; Jeffery & Qureshi, 2022). These ideas hinder South Asians' experiences of physical activity and leisure, as Phills et al. (2018) found in a UK sample of 52 that South Asians receive more prejudice than other ethnic groups, with South Asian women facing more negative stereotypes than White women.

Such ideas, that South Asian Muslim women are incompatible with British ideas of liberty, often amplify when individuals refrain from participating in activity that conflicts with their religious or cultural values. Western leisure contexts are often rigid and male-oriented and typically require individuals to conform to their established norms and practices (Hussain & Cunningham, 2023; Stride et al., 2018b). For example, sports clubs often lead members to associate with drinking cultures and

mixed-sex environments (Benn et al., 2010). Muslims in the past have disengaged with leisure environments that involve drinking alcohol (Fletcher, 2014), mixed-sex swimming (Hamzeh & Oliver, 2012), wearing revealing clothing (Azzarito & Hill, 2013), and intense sports during Ramadan fasting periods (Walseth, 2013). These issues highlight physical activity and leisure as exclusive to people who follow certain behaviours and practices. As such, South Asian Muslim women, who must already navigate their conflicting cultural, religious, and gendered identities, struggle to engage with these White and male-oriented physical activity and leisure settings. When they disengage, they are held accountable for being disinterested or for being non-progressive (Thorpe et al., 2022), removing responsibility from practitioners.

Many South Asian Muslim women are inadvertently led to confirm their stereotypes, regardless of whether they engage with physical activity and leisure or not (Azzarito & Hill, 2013; Benn, 1996; Bhachu, 2024; Kay, 2006b). When they engage with physical activity and leisure in Western male-centric ways, they symbolise shifting away from South Asian Muslim femininity and toward Western masculinity (Azzarito & Macdonald, 2016). Those who have been involved with sports have been labelled as unfeminine (Ahmad, 2011; Bhachu, 2024). This has led women to engage with physical activity and leisure secretly, to avoid being labelled as rebellious or conflicting with their own religious identities (Thorpe et al., 2022). Many have chosen to disengage to protect their family reputations and values (Caperchione et al., 2015; Hussain & Cunningham, 2023). On the other hand, the absence of traditional South Asian Muslim women in broad physical activity and leisure reinforces ideas that South Asian femininity is incompatible with Western engagement (Mirza & Meeto, 2018; Stride et al., 2018b). The narrative that cultural South Asian/Muslim women are disinterested with health has permeated throughout academia (Rozaitul et al., 2017).

2.8 Negotiating Religion, Gender, and Leisure among South Asian Muslim Women

Recent scholars have challenged the notion that South Asian Muslim women are disinterested in health and leisure by highlighting how individuals navigate physical activity and leisure in ways that challenge existing ideas surrounding them (Knez et al., 2012; Stride, 2014a; Stride et al., 2018b; Thorpe et al., 2022). Women have acknowledged their religious values as empowering and use them to challenge South Asian culture that constrains engagement with physical activity and leisure (Walseth,

2006, 2013; Walseth & Strandbu, 2014). For example, some have cited the Prophet and his wife Ayesha's regular engagement in running, archery, horseback riding, and swimming, challenging South Asian ideas that women are to remain indoors (Abd Rahim et al., 2019). Notably, Islam encourages physical activity and leisure whilst aligning with values of modesty and segregation (Tannerah et al., 2024)³.

Despite being motivated to engage in leisure, driven by their religious values, many South Asian Muslim women are challenged due to the narrow ways of Western engagement (Benn et al., 2011; Bhachu, 2024; Dagkas & Stathi, 2007; Ratna, 2016, 2018). For example, Islam stipulates covering one's body from the opposite sex, challenging Muslims to engage in physical activity and leisure that requires publicly revealing clothing (Agergaard, 2015). Many Muslim women prefer to align with this religious ordeal through segregation, or to loosely cover their heads, arms, and legs in order to remain unseen by the unrelated male gaze (Benn & Pfister, 2013; Hamzeh, 2011; Kay, 2006a; Soltani, 2021). These women prefer wearing Burqa's (full body covering), or Niqabs (full face covering), or Hijabs (hair covering), or a combination of these, to uphold their religious piety (Hamdonah, 2022). For most women, their level of covering is usually non-negotiable, including during physical activity and leisure (Walseth, 2006; 2015).

It is often deemed as conflicting with ideas of liberty to be covered, or segregated from the opposite sex, in Western physical activity and leisure contexts (Byng, 2010; Hamzeh, 2011; Soltani, 2021). Sport figures have previously criticised Hijab wearers for making visible statements of separation, portraying it's requirement as antithetical to Western ideas of liberty (Byng, 2010). Muslim women are thus perceived negatively in these contexts (Manejwala & Abu-Ras, 2019; Ratna, 2011) and stand out when engaging (Nakamura, 2002; Soltani, 2021). People have noted interwoven subtle values and practices that are omitted from physical activity and leisure settings, which lead them to feel out of place (Thorpe et al., 2022). This creates a predicament for pious South Asian Muslim women, who must choose between participating in a Westernised way or disengaging altogether (Bhachu, 2024; Samie, 2013). Many who align strongly with their religious identities choose to disengage

³ Segregation here refers to either physical segregation between men and women, or through covering the body.

(Walseth, 2006), negatively impacting their future skills and motivations to participate in physical activity and leisure (Lenneis & Pfister, 2017).

Other research reflects South Asian Muslim women re-negotiating their Islamic identities to engage with physical activity and leisure (Agergaard, 2015; Dagkas & Stathi, 2007; Ratna, 2016; Thorpe et al., 2022; Walseth, 2006, 2013). For example, some participate in mixed-sex physical activity and leisure contexts sub-optimally, so that their body shapes are less visible to the male gaze (Azzarito & Macdonald, 2016; Ratna, 2013). Research has noted how women's engagement is shaped by their interpretations of Islam, as some argue that physical sex segregation is a cultural value, and that their religious obligations allow them to participate in mixed environments as long as they are covered (Benn & Pfister, 2013; Walseth, 2013). These contrasting framings highlight how South Asian Muslim women's engagement is rarely represented on their own terms but is instead interpreted through external cultural or religious discourses. They are often framed as disengaged, with their religious requirements as accountable (Benn & Pfister, 2013; Walseth, 2006), or as engaged by virtue of Western liberties, often entailing them to reshape their own religious or cultural identities (Ahmad et al., 2020; Benn & Pfister, 2013; Knez et al., 2012; Walseth & Strandbu, 2014). Those who stand firm with their religious/cultural identities remain unframed in this discourse. Moreover, this framing positions Western engagement as static, epitomised, and unquestionable and perpetuates South Asian Muslim women as incompatible with Western leisure (Abbas, 2021; Fletcher, 2014). In other words, South Asian Muslim women remain categorised as either those who assimilate to engage in Western ways or as those who disengage because their religious identities contradict a Western way of engaging.

The discussion thus far critiques traditional physical activity and leisure environments as predominantly White and male oriented. However, it is important to acknowledge that some scholarship has focused on leisure and physical activity settings that cater for White women (Henderson, 1991; Leduc et al., 2021). This body of work has explored factors that facilitate women's engagement in sports classes, gyms, and recreation (Leduc et al., 2021; Segar et al., 2002), and has developed interventions aimed at supporting women's participation (Wallbank et al., 2022). Such leisure contexts often revolve around aligning participation with ideals of femininity, body image, and life aspirations (Azzarito, 2012). While these environments are frequently positioned as empowering and inclusive for women, they tend to privilege

White, middle-class, and non-Muslim categories of femininity. Although such interventions may address the gendered dimensions of participation and help to challenge male dominance within physical activity and leisure, they overlook the racialised and religiously specific experiences of South Asian Muslim women. This results in the cultural, religious, and racialised barriers faced by diverse women to remain unaddressed, further perpetuating the exclusionary norms of physical activity and leisure (Amara & Henry, 2014; Horne et al., 2018).

Challenging ideas around South Asian Muslim women, some research has focused on alternative settings to better understand what facilitates the group's engagement. For example, some choose to seek women-friendly environments to participate in physical activity comfortably (Rozaitul et al., 2017). Additionally, Stride (2014a) discovered that some South Asian Muslim girls utilised parks as inclusive spaces to partake in physical activity and leisure freely and in ways they preferred. This is significant because visiting parks/NGS also avoids some of the aforementioned obstacles mentioned previously, such as membership, cost, and clothing requirements (Daniel et al., 2018; King et al., 2000; Laar et al., 2019). Similarly, NGS is widely available to the public and offers a wide range of easily accessible opportunities to engage in activities that have been shown to improve physical and mental health for the general population (Thompson, 2002; Bhatnagar et al. 2016; Wood et al. 2019). However, despite these benefits and the identified need for South Asian communities to increase their health and leisure activity, NGS access appears to remain low (Roe et al., 2016b). Against this backdrop, the purpose of this thesis is to better understand how South Asians, specifically Muslim women, can access NGS/RGS and how such spaces can be used to enhance PWB.

2.9 Chapter Summary

Relying on proximity to NGS data as an indicator of wellbeing does not provide holistic insight into the benefits of nature engagement. Human behaviour and perceptions are important, as people may visit NGS to reminisce over childhood memories, which can also be interwoven with feelings of spirituality and connectedness with nature. The positive effect of engaging with NGS varies and is well-documented across various literature. These spaces enhance relationships between people and communities, which is particularly important for a diverse population in the UK. Additionally, the

adaptability and convenience of nature encourage health-enhancing activity, like physical activity, leading to healthier lifestyles.

It is problematic that the availability and usage of NGS broadly are declining due to factors related to geography and urban developments. Ethnic minorities are further disadvantaged in accessing NGS due to distributional and financial disparities, accentuated by factors related to safety, crime, transport, and cultural differences. This is concerning given that health challenges are more prevalent in ethnic minorities.

The challenges to access NGS faced by ethnic minorities represent a double-edged sword. On one side, ethnic minorities face sociocultural barriers. On the other side, NGS are often non-diverse, racialised and gendered environments. White middle-class men are often granted unconditional access to NGS, whilst ethnic minorities are unwelcome because of their identities. Females are further challenged due to heightened fears and a lack of inclusive design, reflecting an intersection of gender and race. It is important to note that scholars should refrain from homogenising various communities under the label of 'ethnic minority', and instead, consider the unique access factors each group faces. For example, South Asian people face challenges related to their mental and physical health, physical activity engagement, access to intervention, and access to NGS, raising concerns over other groups in the UK.

The intersection of race, gender, and religion presents unique challenges for South Asian Muslim women. In addition to geography, cost, cultural differences, and time, South Asian Muslim women are visible in physical activity and leisure settings, contradicting their preferences to remain invisible. Some research has challenged stereotypes that South Asian Muslim women are disinterested in physical activity and leisure by showing them engaging through re-negotiating their identities. However, these narratives have inadvertently portrayed Westernised physical activity and leisure as epitomised, positioning South Asian Muslim women as responsible for their own (dis)engagement. This thesis argues that physical activity and leisure are often narrowly defined and exclusive, deterring many South Asian Muslim women from engaging due to failing to meet their needs. In response to these limitations, NGS emerge as a viable alternative, offering a setting free from many constraints inherent in traditional physical activity and leisure environments, and could be used to address

the current health concerns faced by South Asian Muslim women. The following chapter presents an overview of the methodological approach within the thesis.

3 Chapter 3 – General Methodology

3.1 Chapter Overview

The previous chapter explored NGS as an important pathway to positive psychological wellbeing (PWB) for South Asians, who face heightened challenges to health. It was discussed how barriers increase for South Asian Muslim women, who are often restricted in health and leisure contexts. The current chapter details the methodology of this thesis. It explains the approach in the strategies involved across three studies, the methods used to collect and analyse data, and the position of the researcher in all of this.

3.2 Research Philosophy

Before detailing the methodological tools adopted, it is important to clarify the research paradigm underpinning this thesis. This would reveal the philosophical foundations which guided the research process (Guba, 1994). Reflecting on the paradigm contextualises the methodological decisions made throughout the research process (Davies & Fisher, 2018). These decisions can be critically evaluated for consistency within the chosen paradigm, ensuring the credibility, validity, and applicability of a study within its specific context and parameters (Guba, 1994).

A research paradigm is the combination of ontological, epistemological, and methodological positions (North, 2017). Ontology refers to the researcher's assumptions about the nature of reality, including what is to be studied and what reality is assumed, in the context of the research (Guarino et al., 2009). Epistemology relates to the nature of knowledge and the relationship between the researcher and the phenomena being studied (Fuller, 2002). Methodology is the process and tools used to generate knowledge (Seale, 1997). Several paradigms dominate social science research, with positivism and interpretivism being among the most prominent and distinct (Morris, 2018).

Positivism assumes that the social world can be studied in ways similar to natural sciences. It relies on the idea of cause and effect, and that human actions can be objectively measured, leading to the discovery of universal laws that predict behaviour (Guba & Lincoln, 1994). Researchers adopting a positivist approach often align with the ontological position of realism, which assumes that reality exists independently of human perceptions and that human experiences are predetermined

and observable (Guba & Lincoln, 1994; North, 2017). This paradigm often relies on quantitative methods such as surveys and statistical analysis to uncover relationships between various phenomena in the world (i.e., through variables) (Goldkuhl, 2012).

Interpretivism, by contrast, suggests that the social world cannot be studied in the same way as the natural world, and that individuals' behaviours and experiences are shaped by their own unique perceptions and interpretations (Guba & Lincoln, 1982, 1988, 1994). This aligns with the ontological assumption of idealism, which views reality as a construct of the human mind and is inseparable from individual interpretation (Tirone & Pedlar, 2000). Interpretivist research typically uses qualitative methods, such as interviews and discourse analysis, to explore individuals' subjective experiences and perspectives (Allison & Pomeroy, 2000; Goldkuhl, 2012).

While many scholars adopt either positivist or interpretivist paradigms, some suggest that relying on multiple approaches can enhance the understanding of human experiences. For instance, Teddlie (2003a) highlights that a mixed approach in studying race, religion, or gender can reveal how individuals navigate through their social conditions. Considering this, the current thesis employs multiple methodologies and approaches that align with ideas from both paradigms of interpretivism and positivism. For instance, the qualitative exploration of chapter 6 (discussed in Section 3.3.2) focuses on people's experiences through in-depth interviews, aligning with an interpretivist paradigm, whilst the quantitative analysis of Chapter 7 (discussed in Section 3.3.3) develops statistical inferences based on large demographic data, aligning with a positivist paradigm. Whilst the employment of these approaches reflects conflicting philosophical assumptions, they were deliberately selected to provide a more holistic understanding of the complexities of people's NGS experiences (Teddlie, 2003b). This approach, often termed methodological pluralism, allows for a richer analysis by acknowledging the strengths of each paradigm in addressing different aspects of the thesis questions (Moss & Haertel, 2016).

Methodological pluralism entails adopting multiple methods as supplementary and conflates the contradictions between positivism and interpretivism (Teddlie, 2003a). One paradigm that methodological pluralist scholars often align with is critical realism. Critical realists attempt to understand reality beyond one single perspective and use multiple methods to better understand complex phenomena, such as through triangulation (Archer et al., 2013; Collier, 1994). Whilst critical realism is useful in

revealing the mechanisms at both the individual and societal level, methods often revolve around understanding a single phenomenon (Archer et al., 2013). Rather, the research presented in this thesis follows a trajectory of interconnected studies, each informed and shaped by the findings of the previous.

The paradigm which aligns to the current thesis is pragmatism (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 1998). In pragmatism, the nature of inquiry determines which methods are used. Each research approach contributes to understanding a subject matter (Popkewitz, 2005). Pragmatists reject rigid views around philosophical dichotomies and encourage researchers to focus on methods that are most effective in addressing the chosen research questions (Dewey, 1998; Popkewitz, 2005). Here, the researcher's motivation for conducting research should inform the tools adopted, which is foundational to the study paradigm (Putnam, 1995; Putnam & Putnam, 2017). This means that the research question itself takes precedence in determining the methods used, rather than predefining a specific research philosophy before an investigation (Dewey, 1998).

In pragmatism, inquiry should be made in ways that benefit society (Kant, 1798/2006), and methods that are adequate in pragmatically answering the research question should be chosen (Moore, 1966). Pragmatist research is evaluated against how effectively the findings address the research issue (Dewey, 1998; Rorty et al., 2004). That said, some philosophical assumptions underpin pragmatism. For instance, researchers can assume an objective reality whilst acknowledging that understanding it is limited by human reconstruction (Gronow, 2011). Additionally, knowledge is always situated within a specific context, and its meaning emerges through interaction between the researcher, participants, and environment (Gronow, 2011).

This thesis adopts a pragmatist approach and engages with methodological pluralism to explore South Asian people's, particularly Muslim women's, experiences of NGS, specifically RGS. Pragmatism is particularly well-suited to this thesis because it offers the flexibility required to address the complex and multifaceted nature of human experiences through methods that are deemed as conflicting in their assumptions. Pragmatism encourages researchers to reflect on their own positionality and values to ensure that the marginalised groups' experiences are being reflected accurately, aligning with the theme of this thesis (Macdonald et al., 2002). Adopting this approach enables the current thesis to develop practical recommendations for

improving inclusivity and accessibility of NGS in an actionable way that leads to real-world improvements (Moore, 1966; Rorty et al., 2004).

3.3 Methodological Approach of the Thesis

Previous studies have quantified access to NGS, which often comprises participation rates of different ethnic minority communities (Boyd et al., 2018; Freeman et al., 2019; Kelly et al., 2016; Kloek et al., 2015; Nesbitt et al., 2019; Xiao et al., 2022). Such data can be used to highlight societal inequality through patterns of engagement. However, relying solely on statistics when attempting to understand people's NGS experiences is insufficient. Feelings, opinions, and experiences must also be considered to gain a better understanding of people's NGS engagement (Boyd et al. 2018). Both perspectives, when combined, can provide a more comprehensive insight into what can facilitate people's access to NGS.

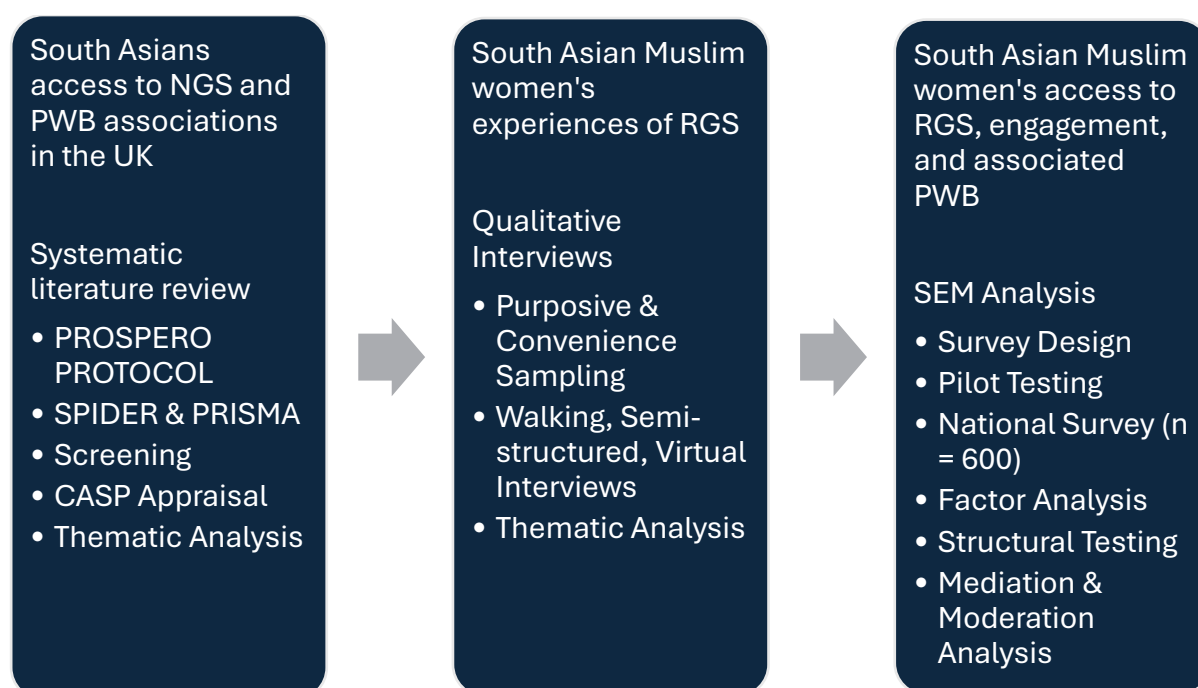
As noted previously, the research presented in this thesis follows a logical progression, with each phase of inquiry building on the issues and gaps identified in the preceding phase. The tools adopted in the study were guided by the nature of the inquiry (Moore, 1966). Interpretivist-aligned methods, such as qualitative interviews, and positivist methods, such as quantitative surveys, were employed to complement an overarching research approach. For example, interviews facilitate an in-depth exploration of individual perspectives, capturing the nuanced ways in which cultural, religious, and structural factors influence RGS engagement (Tashakkori & Teddlie, 1998). Based on these findings, surveys were used to reveal group trends and the relationships between concepts, such as the PWB benefits of RGS access, or South Asian Muslim women's perceived barriers (Tashakkori & Teddlie, 1998). Through pragmatism, the insights gained from one approach informed and enhanced the findings of the other (Yvonne Feilzer, 2010). This facilitated a deeper understanding of people's experiences with NGS, at the individual and group level, whilst acknowledging the limits to understanding the emerging frameworks (Macdonald et al., 2002).

The first study comprised a systematic literature review to synthesise existing knowledge on NGS access and PWB (discussed in Section 3.3.1 as an overview and Chapter 4 as an in-depth insight). The second study aimed to build on this review, through qualitatively exploring the subjective experiences of South Asian Muslim women with RGS (discussed in Section 3.3.2 as an overview and Chapter 7 as an in-

depth insight). Building on the qualitative findings, and to determine broader applicability and variable dynamics, a third study collected national-level survey data (discussed in Section 3.3.3 as an overview and Chapter 7 as an in-depth insight). Each study addresses the thesis's aims in different ways. The general focus and methods of each study used in this thesis are presented below in Figure 1.

Figure 1

The methods adopted across the three studies in this thesis



3.3.1 Study 1 - Systematic literature review

3.3.1.1 Search and Screening

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021) and was pre-registered on the [International prospective register of systematic reviews](#) - PROSPERO (ID: CRD42022353711).

The research questions of study 1 comprised:

- a) What are the inhibitors and enablers underlying South Asian people's access to NGS in the UK?
- b) How are NGS associated with PWB for South Asian people in the UK?

An electronic literature search was conducted on SAGE, Science Direct, and SCOPUS with a Boolean search string consisting of various terms (detailed in Section 4.3.3). All studies identified in the search were screened against predetermined criteria defined using the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, and Research type) (Methley et al., 2014) (detailed further in Section 4.3.2 and in Table 1). The search results were screened independently by two authors (MH, JB)⁴ at the title and abstract. Calculations were made regarding the consistency of independently including and excluding papers (McHugh, 2012), which revealed an agreement rate of 97%, and a Cohen's Kappa score of 0.45 (moderate). A discussion led to full consensus and guided the inclusion of numerous studies that were initially excluded by either reviewer. Another reviewer (LP) reviewed 10% of excluded articles, which were selected using a random number generator, and agreement was found to be 100%.

The remaining articles were then reviewed at full text by the first reviewer (MH) against the study criteria, and a randomly selected sample of 30% was reviewed by the second reviewer (RE). Interrater agreement reflected a 96.3% agreement with a Cohen's Kappa score of 0.62 (substantial), and full agreement was achieved upon discussion. A randomly selected 10% sample of the excluded papers was reviewed by a third reviewer (JB), who agreed 100%.

3.3.1.2 Critical Appraisal

At least two reviewers (MH, RE, JB) critically appraised all included studies using the appropriate Critical Appraisal Skills Programme (CASP) tool (CASP, 2018a, 2018b; Hong et al., 2018). A standardised score was calculated to allow comparison across studies regardless of design (discussed later in Section 4.3.5). Each study was attributed a rating of 'excellent' (=1), 'good' (≥ 0.8 to <1), 'moderate' (≥ 0.5 to <0.8), or 'poor' (<0.5) according to its score (Hong & Pluye, 2019). Interrater reliability was calculated to gauge the consistency of scoring between authors; interrater agreement was 93% and a Cohen's Kappa score of 0.72 (substantial). Full consensus was reached through discussion.

3.3.1.3 Data Extraction and Analysis

Data were independently extracted, coded, and thematically analysed by two authors (MH, RE) who followed a transparent and systematic approach that included cross-

⁴ The full names of all contributors are stated on page ii.

examination and discussions between steps. Data was repositied on the NVivo v20 software, where findings were manually analysed and compared.

Each paper's author names, publication year, study aims, study design, and sample characteristics were extracted and input into Table 2 (Section 4.4.2). Findings relating to South Asian people's access to NGS and PWB associations were coded inductively. This step included coding the author's interpretations of findings from the manuscripts, supported by the results of raw data, and assigning them to the corresponding research question.

Quantitative and qualitative data relating to each research question were pooled and thematically analysed according to the framework of Wang et al. (2015). A deductive coding approach was applied based on these thematic categories, with new categories added where necessary. PWB data were coded inductively. All coding decisions were compared between the two reviewers (MH, RE), with differences being resolved through discussion and in consultation with another reviewer (LP).

3.3.2 Study 2 – Exploring South Asian Muslim Women's Experiences of Rural Green Spaces

3.3.2.1 Design

Study 1 revealed that less work exists in the context of rural green spaces (RGS) and on South Asian Muslim women, who are often marginalised in leisure contexts (Bakali & Soubani, 2021). It was acknowledged that distinct types of NGS, such as RGS, could help the group to draw closer to the natural environment, enhance their PWB, and thus mitigate health concerns, supporting a qualitative exploration.

The purpose of the qualitative exploration was to establish the unique experiences of South Asian Muslim women in England. A qualitative design was employed, with participants being offered a choice between a walking interview and a semi-structured interview, in person or virtually. The type of interview chosen depended on various reasons discussed in Section 6.3.1. A semi-structured interview design helped to gain deeper insights into individual experiences, whilst allowing for comparisons to emerge for a group that is typically viewed in homogenous ways (Freymueller et al., 2024). Such interviews help researchers to explore the complexities of participants' experiences and perspectives (Sparkes & Smith, 2013). This approach is particularly useful for generating field notes, allowing the researcher to follow up with participants and ask additional questions to gain deeper insights.

3.3.2.2 Participants

The researcher interviewed 23 South Asian Muslim women who were diverse in their age, area of residence in England, employment status, socioeconomic background, religiosity, and birthplace. These differences of identity contribute to varied lived experiences. For instance, while some participants may pray five times a day, others may not pray at all. Similarly, the choice to wear a female head covering varied among participants. This means that each woman contributed to the study from their own unique and multifaceted identities, reflecting the importance of acknowledging each individual perspective. Furthermore, South Asian and Muslim are not homogeneous, and variations can exist within these categories as well. For instance, South Asians include Bengalis, Indians, and Pakistanis. Similarly, Muslims include Sunnis and Shias. Despite belonging to an often-homogenised group called 'South Asian Muslim women,' each participant's unique and nuanced identity markers intersect at multiple levels and contribute to their heterogeneity, as unpacked in Chapter 5 (Hill Collins, 1990a).

3.3.2.3 Procedure

Various mosques and community organisations in England revolving around mental health, hiking, and religion were approached to recruit participants through a convenience sampling method. These recruitment avenues were deemed effective due to their varied membership and included South Asian Muslim women of various ages, classes and backgrounds. After gaining approval from representatives of these organisations and securing ethical approval from the University's ethical committee (Ethics ID: PGR-FSHS-0074-2022), a leaflet was disseminated throughout these organisations. Individuals interested in participating contacted the primary researcher by email, who liaised with them to schedule an interview. Upon completion, a debrief sheet that included helplines was provided to each participant.

In relation to the walking interviews, the primary researcher liaised with the participant to agree on a time, meeting point, location and route. Safety was prioritised for both participant and researcher by conducting thorough risk assessments, checking the weather conditions, and meticulously planning before each interview. Participants were encouraged to lead the walks by navigating the path, thereby disrupting the power dynamics inherent in traditional interview styles (Glesne, 2016).

Overall, nine women opted for walking interviews, nine for semi-structured interviews in person, while five chose virtual interviews. Walking interviews generally

lasted longer, ranging from 47 to 88 minutes, while in-person semi-structured interviews varied from 30 to 76 minutes, and virtual interviews spanned 40 to 75 minutes. Each interview transcript was returned to the corresponding participant for verification of accuracy.

3.3.2.4 Data Analysis

The primary researcher applied a recursive six-phase reflexive thematic analysis to all the data (Braun & Clarke, 2008; Braun et al., 2023). Each interview was transcribed verbatim and then immersed in, with every woman's account being read numerous times. This aided understanding of individual experiences whilst also enabling the identification of initial themes. Relevant excerpts within each transcript were coded inductively with descriptive labels. Codes were analysed to form lower-order themes (i.e., subthemes). These subthemes were further clustered to form higher-order themes (i.e., themes). This resulted in the development of a hierarchical thematic framework. All themes, codes and excerpts were scrutinised to ensure accurate representation at all levels. Themes were labelled to reflect their data. Vivid excerpts reflecting each theme were selected to evidence the analytic narrative in relation to the research aims and surrounding literature.

3.3.2.5 Researcher Positionality

A positive researcher-participant relationship facilitates a deeper and sophisticated inquiry (Sparkes & Smith, 2013). Researchers should consider their positions, particularly when unequal power dynamics exist due to the researcher-participant dynamic and gender differences. Comfort can be achieved through approaching participants with solidarity, transforming data generation into mutually formed research. This was particularly important given the challenges South Asian Muslim women face in sharing their experiences with outsider researchers (Ahmad, 2020). Whilst the primary researcher, a South Asian Muslim man, recognised that his shared ethnic and religious identities granted him a sense of being an 'insider,' gender differences determined him to be an 'outsider.' Although steps were taken to accurately reflect participants' accounts, certain experiences relating to womanhood, including embodiment, safety, and gendered health practices, could not be fully represented through a male standpoint. This was an important epistemological boundary, which is reflexively considered throughout the research process. Lastly, shared and differing identities can manifest on various levels—such as employment,

family values, political beliefs, disability, and class—leading to varying levels of rapport with each participant.

3.3.3 Study 3 - Access to Rural Green Spaces and Rate of Engagement in Predicting Psychological Wellbeing for South Asian Muslim Women in England

The qualitative exploration of South Asian Muslim women's experiences with rural green spaces (RGS) revealed several key factors of geography, identity, and sociocultural dynamics influencing their access. These factors shaped their capacity to derive PWB benefits from RGS. Building on these findings, a cross-sectional correlational model was constructed to assess these access factors as predictors of PWB among South Asian Muslim women in England.

3.3.3.1 Participants

Data were collected between December 2023 and April 2024 using an online survey platform. The study sample comprised 600 self-identified South Asian Muslim women residing in England. All participants were aged 18 and above and reflected diversity in the areas of residence, employment, religiosity, income, family circumstances and time residing in England. A combination of convenience and purposive sampling methods was employed to recruit participants from various community groups, organisations, and social media platforms.

Leaflets containing a QR code and a link to access the study were disseminated digitally and in person. The inclusion criteria included participants who identified as South Asian, Muslim, female, and over the age of 18. The exclusion criteria were individuals outside of the said categories and those from vulnerable groups (e.g., people in emergency situations, those with mental incapacity). Upon accessing the survey link, participants were presented with a participant information sheet and consent form. Only those who provided informed consent could proceed to the survey. Participants could enter a prize draw as a token of appreciation, with gift cards ranging from £20 to £100. All participants were provided with a debrief sheet with helplines and researcher contact information at the end of the survey.

3.3.3.2 Measures

The study aim was to understand how rate of engagement with RGS, connectedness with nature, social ties, identity visibility, active engagement, and affective engagement influence the relationship between perceived access to RGS and PWB

for South Asian Muslim women in England. A 15–25-minute survey was developed on the Jisc Online Survey v2 platform, comprising multiple sections, each utilising validated and reliable scales to assess the constructs. All items were piloted and tested for their validity and reliability, as detailed in Chapter 6.

3.3.3.3 Analyses

Structural Equation Modelling (SEM) was performed using the Maximum Likelihood Estimation (MLE) technique to generate parameter estimates for the relationships between the latent constructs. SEM accounts for measurement errors in models more accurately than regression and is suitable for complex models (Kline, 2023). Furthermore, SEM allows for the simultaneous analysis of multiple relationships (Collier, 2020), which was needed to understand the interplay between perceived access, rate of engagement, and PWB. The data is publicly available at [Data Set Available Online](#). See [Monte Carlo Simulation Output Online](#) and Section 7.4.3 for more information on sample size.

3.4 Chapter Summary

This chapter outlined the methods adopted across three studies, involving a systematic literature review of South Asian people's experiences of NGS, a qualitative exploration of South Asian Muslim women's experiences of RGS, and a quantitative study measuring South Asian Muslim women's access to RGS and PWB. The following chapter presents the systematic literature review study in detail.

4 Chapter 4 – Study 1: Systematic literature review of South Asians' Access to Natural Green Spaces and Psychological Wellbeing Associations

4.1 Chapter Overview

The previous chapter outlined the methodological approaches of each research study in this thesis. The current chapter details a systematic literature review focusing on South Asian people's access to natural green spaces (NGS) and psychological wellbeing (PWB) associations. Details are provided on the review approach, search and selection strategy and data analysis. A thematic framework is offered, encapsulating NGS access factors inherent in existing research.

4.2 Introduction

NGS are associated with a wide range of physical and mental health benefits (De la Barrera et al., 2016; Keniger et al., 2013; Tzoulas et al., 2007). Earlier research in this area has demonstrated the significance of NGS in restoring attention (Kaplan & Kaplan, 1989) and affective states (Hartig et al., 1991) by comparing participants' experiences before and after exposure to NGS. More recently, Birch et al. (2020b) found that observing NGS features such as the swaying of trees and grass helps to mitigate stress. Scholars like Lyshol & Johansen (2024) indicate that those with greater access to NGS experience better self-perceived health. Numerous systematic reviews have summarised the positive associations between access to NGS and health and wellbeing (Van den Berg et al., 2015). Use of NGS can also enhance other health indicators of mental wellbeing, including spiritual wellbeing (Edwards et al., 2022) and social cohesion (Charles-Rodriguez et al., 2023). Considering their benefits, NGS are identified by the World Health Organization (2016, 2017) as a vital component of urban planning and public health strategies.

Fresh air, natural features, and open space can also encourage people to engage in physical activity (Douglas et al., 2017), in turn reducing sedentary time (Richardson et al., 2013). For example, a meta-analysis by Twohig-Bennett & Jones (2018) found NGS exposure to be associated with significant reductions in a wide range of physical-health related issues, including blood pressure, incidence of diabetes, and premature death. There are also links between the physical and mental health benefits of NGS. For example, NGS-facilitated goal-oriented engagement can foster a sense of accomplishment, leading to more positive self-perception (Grahn &

Stigsdotter, 2010). As such, the physical health benefits associated with NGS are linked to one's overall psychological wellbeing (PWB).

Unfortunately, a large body of research shows that ethnic minority communities lack equitable access to NGS in Western countries (Friends of Earth, 2020; Natural England, 2019a; Pinault et al., 2021), perpetuating health inequalities (Rogerson et al., 2019). As discussed in Section 2.5, 40% of individuals from ethnic minority communities reside in areas deprived of green space, in contrast to 14% of White individuals (Friends of Earth, 2020). Additionally, a survey found that 69% of participants from White backgrounds were regular visitors to NGS, compared to only 42% of those from ethnic minority backgrounds (Natural England, 2014). These results point to a clear disparity in both availability and usage of NGS.

In recognition of such ethnic disparities in access to NGS, a growing body of research has explored underlying barriers and opportunities. For example, White, middle-class individuals often experience better proximate access to NGS than minority ethnic communities (Natural England, 2019a). The lack of visible diversity in NGS can detract from minority users' sense of belonging (Kloek et al., 2016). Ethnic minority access to NGS is further constrained by transport unavailability, lack of knowledge of routes, safety concerns, and family-related responsibilities (Boyd et al., 2018; Hordyk et al., 2015). Recognising these challenges, political efforts have been made to improve NGS access for ethnic minorities in the UK. For example, as discussed in Section 2.5, the UK government has prioritised further enhancing access to NGS by providing more accessible and walkable routes (Department for Environment Food & Rural Affairs, 2019).

Despite these efforts, the use of NGS among minority ethnic communities remains disproportionately low in the UK (Natural England, 2019a). It can also be suggested that there is a lack of research on NGS access and PWB benefits experienced by distinct minority ethnic communities (Jay et al., 2012). Instead, minority communities are often homogenised under a single category (e.g., Black, Asian and Minority Ethnic – BAME), which obscures their diverse and unique challenges and lived experiences (Kloek et al., 2016). For example, South Asians may encounter cultural stigmas specific to their communities that disapprove of mixed-gender interactions, as well as racial stereotypes specific to South Asian culture, which hinder their access to certain leisure contexts (Daniel et al., 2018).

Further research is needed to explore NGS access and its associations with PWB among South Asian communities, where health conditions are disproportionately prevalent. As mentioned in Section 2.6, South Asians face an increased risk of heart attacks, coronary heart disease, and strokes than the general population (Daniel et al., 2018; Laar et al., 2019). They also experience heightened mental health challenges (Karasz et al., 2019) disproportionately to those from White British backgrounds (Proto & Quintana-Domeque, 2021). Exacerbating these issues is the fact that South Asian individuals experience prolonged waiting times and less favourable outcomes in comparison to White communities when referred to UK mental health services (Thomas, 2023). These health inequalities are particularly disconcerting considering that South Asian communities represent 9.6% of the English population, with the majority being of Indian, Pakistani and Bangladeshi backgrounds (Office for National Statistics, 2023).

Improving access to NGS could serve as a preventive measure against ill health and help reduce existing health disparities. For example, Mitchell & Popham (2008) found that increased exposure to NGS was associated with lower income deprivation-related health inequality in England. However, individuals of South Asian descent constitute less than 1% of visitors of NGS (Natural England, 2019b). Similarly, South Asians are the least likely to engage with NGS than other ethnic minority communities, and thus experience poorer mental health, a survey of 523 England-based participants found (Roe et al., 2016b). Due to South Asian communities' particularly low engagement with NGS and their pressing health concerns, enhancing our understanding of NGS access and PWB associations within these communities is paramount. Through a systematic review of literature in the UK, this research addresses the existing gap, seeking to provide valuable insights into the specific factors influencing access to NGS among South Asian communities and the PWB benefits associated with their use of these spaces.

4.3 Methodology

4.3.1 Review Protocol

With the concerns regarding South Asian people's limited accessibility to leisure and health contexts, and a paucity of research around NGS, a rigorous and systematic methodology was employed to help synthesise diverse research within a single focus. A systematic literature review examines, appraises, and synthesises the research that

has been conducted on a particular topic (Petticrew & Roberts, 2008). It is useful in clarifying existing research to understand current interventions, research, and practice (Petticrew & Roberts, 2008). This was relevant in the context of South Asian people and NGS, where limited research exists.

Prior to the study, a preliminary search was conducted to establish whether any similar systematic reviews involving South Asian people and NGS existed. Whilst there were no specific studies on the subject, there are reviews involving ethnic minorities in NGS (Robinson et al., 2022b) and South Asians' physical activity (Horne & Tierney, 2012), as well as PWB in the context of NGS among wider demographics (Van den Bosch & Sang, 2017). The current study differs from previous reviews as it focuses solely on South Asians in the context of NGS. It sets out to bridge the gap between previous reviews by exploring South Asian people's access to and PWB associations with NGS.

A systematic literature review can help understand access to NGS and PWB associations among South Asian communities through seven guiding principles (Popay et al., 2006): (1) define the research question or hypothesis; (2) identify the types of studies included in the review; and (3) conduct a thorough literature search to locate the studies; (4) screen the studies found and determine if they meet the inclusionary criteria; (5) critically evaluate the included studies; (6) synthesise the studies and evaluate their relevance in themes; and (7) disseminate the review's findings. Following these steps and aligning with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines ensured that all potential literature was considered in a systematic and replicable way (Popay et al., 2006).

PRISMA is a globally accepted and credible method of conducting systematic literature reviews (Liberati et al., 2009). While PRISMA guidelines and systematic literature reviews are commonly applied in medical and controlled trial research (Moher et al., 2009), their application for South Asians in NGS and associated PWB reflects a novel approach. In this context, PRISMA was employed for more than aggregating effect sizes and to synthesise diverse forms of data, including studies on human experience, geographical distribution, and health-related outcomes. This adaptation highlights the versatility of PRISMA and provides a framework for future

researchers investigating similar topics that may be complex. A checklist ensuring the alignment with PRISMA guidelines was completed and is presented in Appendix 1.

The research questions were formulated using the Population, Interest, Content (PICO) framework, which is integrated within PRISMA and offers a structured approach to frame the research questions (Lockwood et al., 2015). Based on the issues highlighted in the introduction, the PICO elements for this study were: 1) Population (South Asian people; those whose ethnicity or ancestry originates from Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka)⁵ (Office for National Statistics, 2023); 2) Interest (NGS); and 3) Content (access and PWB associations). The research questions were:

- a) What are the inhibitors and enablers underlying South Asian people's access to NGS within the UK?
- b) How are NGS associated with PWB for South Asian people in the UK?

Prior to conducting the search, a protocol was developed and registered on the [International prospective register of systematic reviews](#) - PROSPERO (ID: CRD42022353711). This protocol will be detailed next.

4.3.2 Defining the Focus of the Review

Before conducting a systematic literature review, it is essential to pre-define criteria that determine the scope and relevance of selected studies (Liberati et al., 2009). Setting these criteria supports a transparent and focused review process (Liberati et al., 2009). The adopted Sample, Phenomenon of Interest, Design, Evaluation, and Research Type (SPIDER) tool (Table 1) was useful in pre-establishing inclusion criteria for diverse research designs, including qualitative, quantitative and mixed methods (Methley et al., 2014). This was important considering the interdisciplinary focus of this review.

⁵ Whilst it is important to recognise that the label 'South Asian' includes the mentioned social categories, it must be noted that most South Asians in the UK comprise of Indians, Pakistanis, and Bangladeshis.

Table 1
SPIDER tool listing the study inclusion criteria

Criteria	
S	Studies were conducted with participants predominantly from South Asian backgrounds (>50% of study participants) and who are based in the UK.
P of I	Studies that draw conclusions about access to, or PWB outcomes associated with NGS.
D	Published and grey literature incorporating any research design which includes primary data.
E	Studies that report data on access to NGS (including underlying barriers and opportunities) and/or associations between NGS and PWB. NGS as defined as green open spaces in and around towns and cities, the wider countryside, and coastline encompassed by natural features such as grass, trees, crops.
R	Peer reviewed qualitative, quantitative, mixed methods studies and grey literature.

The SPIDER criteria were developed in alignment with the research questions. For instance, focusing solely on South Asians in the UK may help to address the challenges highlighted in Section 2.6, such as low access rates and high levels of physical and mental health challenges (Horne et al., 2018; Karasz et al., 2019). The review was limited to the UK due to the distinct sociocultural and policy context in which South Asians represent the largest ethnic minority group, yet continue to face persistent health inequalities and barriers to leisure access (Hamza et al., 2024; Tandon et al., 2022). Including study data from predominantly South Asian samples (>50%) ensured that the conclusions drawn are South Asian representative. It was also important that these conclusions were linked to PWB associations and/or access in the context of NGS, as defined in this study, to align with the focus of this review. Only peer-reviewed published studies were considered to ensure that this review's conclusions were being formed on studies that had undergone the peer review

process, minimising concerns surrounding the validity, reliability, and credibility of the findings, such as a lack of ethical approval or permissions to screen.

4.3.3 Search Strategy

All aspects of a systematic literature review should be replicable, to allow for comparison with future reviews (Stern et al., 2020). The search process should be comprehensive, ensuring that all relevant studies are considered at the time of the search. In this regard, Piper (2013) emphasises the importance of balancing the breadth and specificity of search terms, highlighting the challenge of screening large volumes of literature while avoiding the omission of relevant studies. Failing to include certain search terms can lead to skewed results and biased conclusions (Lipsey, 2001).

In recognising the multidisciplinary nature of the study focus, the primary researcher (MH) identified numerous search terms and databases in consultation with staff from the Leeds Trinity University library in July 2022. These were subsequently trialled. Keywords associated with specific NGS, such as “parks”, “seaside”, “forestry”, “dales”, and “mountains”, were input into various databases, including the Psychology and Behavioural Sciences Collection, JSTOR, PubMed, Medline, and Taylor & Francis Online. The databases and keywords were refined based on the relevance of the results (Appendix 2). The finalised electronic literature search was conducted in August 2022 through SAGE, Science Direct, and SCOPUS. The Boolean search string consisted of the following terms: ((“South Asian” OR “ethnic minority” OR race* OR bme OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengal) AND (“green space*” OR nature* OR rural* OR countryside OR adventure* OR outdoors OR mountain* OR hike*)). The search was adapted according to the requirements of each individual database (Appendix 3).

A search was also performed on Google Scholar to identify any missing but relevant studies. The search engine revealed approximately 1.6 million records. Whilst relevant articles were only observed over the first five pages, the researcher extracted results from the first 20 pages to enhance the study's rigour. Filters were applied to each database search to only display results published in the UK, from years 2005 to 2022. To ensure comprehensive documentation, the researcher noted all search and data collection procedures. This included records of: (1) the time periods searched; (2) databases accessed; (3) search engines used; (4) the number of search results

(hits); (5) the duration spent searching; and (6) the keywords employed (See Appendix 2 & Appendix 3, for example). The studies were identified through online databases, with access provided by Leeds Trinity University.

4.3.4 Selecting Studies with a Multi-Reviewer Approach

Researcher bias should be minimised to ensure an accurate representation of the current body of literature (Wang et al., 2020). Research highlights the advantages of involving multiple reviewers during the screening process. For instance, Edwards et al. (2002) found that an additional researcher can increase the studies included by 32%. Supporting this, Stoll et al. (2019) found that a single reviewer can overlook 13.4% of relevant studies. A double reviewer approach minimises the risk of excluding relevant literature when screening title and abstract (Waffenschmidt et al., 2019), and at full text (Ali & Petersen, 2014), as it mitigates for challenges related to interpretive inclusion criteria (Centre for Reviews and Dissemination, 2009).

Each screening stage involved multiple independent reviewers, with transparent and systematic inclusion decisions throughout the review. After retrieving the studies in September 2022, titles and abstracts were independently screened by two authors (MH, JB) to determine which papers contained data relevant to the study criteria. Articles with broader focuses, such as physical activity or walking, were also included, for the possibility that data existed on NGS. Studies with broader samples of ethnic minorities were included in case they contained South Asian participants. This liberal approach maximised the likelihood of capturing all relevant research (Ali & Petersen, 2014). Reviewers noted the reasons for exclusion. Most were excluded for being off topic.

To determine the consistency of initial screening between the two authors, interrater agreement was calculated (McHugh, 2012). Relative agreement rate was 97% with a Cohen's Kappa score of 0.45, indicating moderate agreement. Discrepancies were resolved through discussion, leading to the inclusion of most studies initially excluded by either reviewer. The differences observed during these discussions were attributed to ambiguity, synonymy, and polysemy within the search results. Screening diverse studies required a degree of interpretation to assess whether the articles contained data relevant to the study. For example, reviewers aimed to determine whether articles with titles referencing "leisure", or "physical activity" were likely to include data related to NGS, as these activities could occur when

in such spaces. The value of employing a dual-reviewer approach became more evident when four additional studies were included due to the involvement of a second reviewer. To ensure no relevant articles were overlooked, all 1,783 articles were rescreened, and no further studies were found to meet the inclusion criteria. As an added layer of rigour, the third researcher (LP) reviewed 10% of the excluded articles, selected using a random number generator. They reported a 100% agreement rate with the screening decisions.

The researchers screened the full text of remaining articles against the study criteria in November 2022. They evaluated each study based on whether their conclusions were drawn from data predominantly (>50%) representing individuals of South Asian background in the UK. The studies also needed to address associations with PWB or access to natural green spaces, as defined in this systematic literature review.

Whilst the primary author reviewed all 80 articles, the second reviewer independently screened a randomised 30% sample. This approach helped to balance the rigour of the study with the time constraints of supporting researchers (Wang et al., 2020). Initial interrater agreement showed a 96.3% consensus, with a Cohen's Kappa score of 0.62 (substantial). Through discussion, full agreement was reached, and it was determined that one paper had been initially excluded by the first author due to an oversight in identifying sample details that were later found in the paper's appendices (Slater, 2022). As an added layer of rigour, a randomly selected 10% of papers was reviewed by a third author (JB), who reflected an agreement rate of 100%. In the end, 21 studies were included for aligning with the SPIDER inclusion framework, and 60 studies were excluded for reasons such as being off topic, lacking a predominantly South Asian sample, or not drawing conclusions relevant to NGS.

The primary author conducted a grey literature search to ensure the inclusion of all potential literature (Briscoe et al., 2020). Forward and backward citation tracking is useful for identifying relevant literature, as it reveals studies that cite the existing literature or are referenced by them, expanding the pool of potentially relevant research (Briscoe et al., 2020). Mahood et al. (2014) emphasise the importance of searching grey literature to capture relevant studies that might not emerge during initial searches due to constraints of accessing all relevant databases. The literature identified from the citation searches was screened for full text (Appendix 4). An

additional five articles were included, with additional independent screening by the second reviewer (RC) revealing a 100% agreement. Indeed, the method of grey literature searching proved valuable for uncovering key studies which were missed in the initial database search (Briscoe et al., 2020).

4.3.5 Critical Appraisal of Included Studies

A systematic literature review should assess the quality of included studies for their credibility and relevance. The quality of a study often reflects its significance in meaning (Chandler et al., 2019), which can be determined through assessment of its ethical considerations, scope, focus, rationale, accuracy of results, and implications (Hong & Pluye, 2019). Whilst no study was excluded at the critical appraisal stage, as they were all in peer-reviewed published studies, the researcher aimed to highlight the methodological rigour and overall quality of each paper. This approach aligns with PRISMA guidelines and reflects the importance and relevance of the studies' findings.

Each included paper underwent an independent critical appraisal by at least two authors (i.e. from between MH, RE, JB) using a standardised Critical Appraisal Skills Programme (CASP) tool. Whilst the first author (MH) critically appraised all papers, the second reviewer (RC) focused on the qualitative studies while the third reviewer (JB) focused on the quantitative studies, in alignment with their own methodological specialisms. The appropriate CASP⁶ was employed according to each study design, and a mixed methods appraisal tool was adopted for mixed methods papers (CASP, 2018a, 2018b; Hong et al., 2018). Each paper was awarded one point for each CASP item achieved (See Appendix 5, Appendix 6, Appendix 7 for the critical appraisal). An average score was calculated by dividing total scores by the number of items in the CASP checklist, resulting in a standardised score that allowed for comparison across studies regardless of design. Based on these scores, each study was rated as 'excellent' (=1), 'good' (≥ 0.8 to <1), 'moderate' (≥ 0.5 to <0.8), or 'poor' (<0.5). These ratings were determined by the distribution of scores across all studies and thresholds reflecting the overall quality of the research (Hong & Pluye, 2019). The differences between each rater were calculated (Appendix 8) to gauge the consistency of item ratings between authors. Interrater agreement was 93% with a Cohen's Kappa score of 0.72 (substantial). Full consensus was reached through discussion.

⁶ The rating tools can be viewed by visiting the relevant websites as cited.

4.3.6 Data Extraction and Analysis

Two authors (MH, RE) independently extracted, coded, and thematically analysed all the data whilst following a transparent and systematic approach. The reviewers used NVivo v20 software as a repository to manually analyse and compare the findings. Before analysing conclusive data, both MH and RE independently extracted all details of the included studies and presented all author(s) names, publication year, study aim(s), study design, and sample characteristics in tabloid form (Table 2). Next, findings related to South Asian people's access to natural green spaces (NGS) and psychological wellbeing (PWB) associations were inductively coded. A comparison between data extracted by both reviewers revealed minimal differences, which led to a 100% agreement following a consultation with the fourth author (LDP).

The researchers linked all data, including quantitative and qualitative conclusions, to either of the research questions, and then thematically analysed (Harden & Thomas, 2008; Popay et al., 2006). For data on access to NGS, the framework of Wang et al. (2015) was applied, which characterises access to parks through five dimensions: physical (tangible and spatial aspects), social (communal and societal factors), personal (aspects related to individual preferences and motivations), transport (cost and availability of transportation), and knowledge (awareness and familiarity factors). The first and second reviewers applied a deductive coding approach based on these thematic categories, with new categories added where necessary. Data on PWB were coded inductively.

The entire process involved coding the authors' interpretations of the findings from the manuscripts, supported by the raw data, and linking them to the corresponding research questions. Coding the authors' interpretations alongside the raw data was essential for gaining a deeper understanding of the data's implications as framed by the authors themselves. This approach ensured that the findings remained within the context established by the researchers, preventing oversimplification or misrepresentation of the data. The analysis included checkpoints with cross-examination and discussions to ensure accuracy (Appendix 9). The individual thematic frameworks developed by the first (MH) and second (RE) authors were compared, revealing minimal differences, and were supported by discussions prior to the analysis (Lipsey, 2001). The final model was based on a 100% agreement, supported by consultation with all five reviewers involved in the study.

4.3.7 Reviewer Positionality

Researchers should recognise how their own biases, histories, and interests shape the entire research process (Bourke, 2014). Acknowledging the positionality of each author is crucial for transparency, as it helps to contextualise how research processes and conclusions have emerged from individual perspectives (Bourke, 2014). The researcher and four additional reviewers reflected diverse backgrounds, sex, gender, religion, race and subject specialism.

The primary researcher (MH) specialises in the field and is of South Asian heritage, giving him a nuanced professional and personal understanding of experiences and challenges faced by South Asian people, as an academic and ethnic insider. MH identified with many of the access barriers/opportunities and PWB associations highlighted in the review, allowing him to convey these insights amongst the research team during analysis. The second researcher was a White female postdoctoral researcher who provided an outsider's perspective, which contributed to a more objective analysis (Merriam et al., 2001). She also had a strong understanding of the factors underlying ethnic minorities' access to NGS, which aided in the research process. The third researcher was a White male lecturer and researcher in food and nutrition with substantial experience in conducting systematic literature reviews, guiding the research and rigour. He provided a perspective on angles related to health and wellbeing, influencing the emphasis on PWB outcomes. The fourth researcher was a senior lecturer in psychology, and an Italian female, who provided valuable insight into the psychological aspects of the study. The fifth researcher was a White female associate professor in psychology who also contributed to the research's psychological analysis. In addition to the primary researcher, the other reviewers were White with expertise in the subject matter or methodological aspects of this research and offered academically informed outsider perspectives, supporting a more objective analysis. Their positionality offered a distinct set of perspectives, skills, and potential sensitivities to the research.

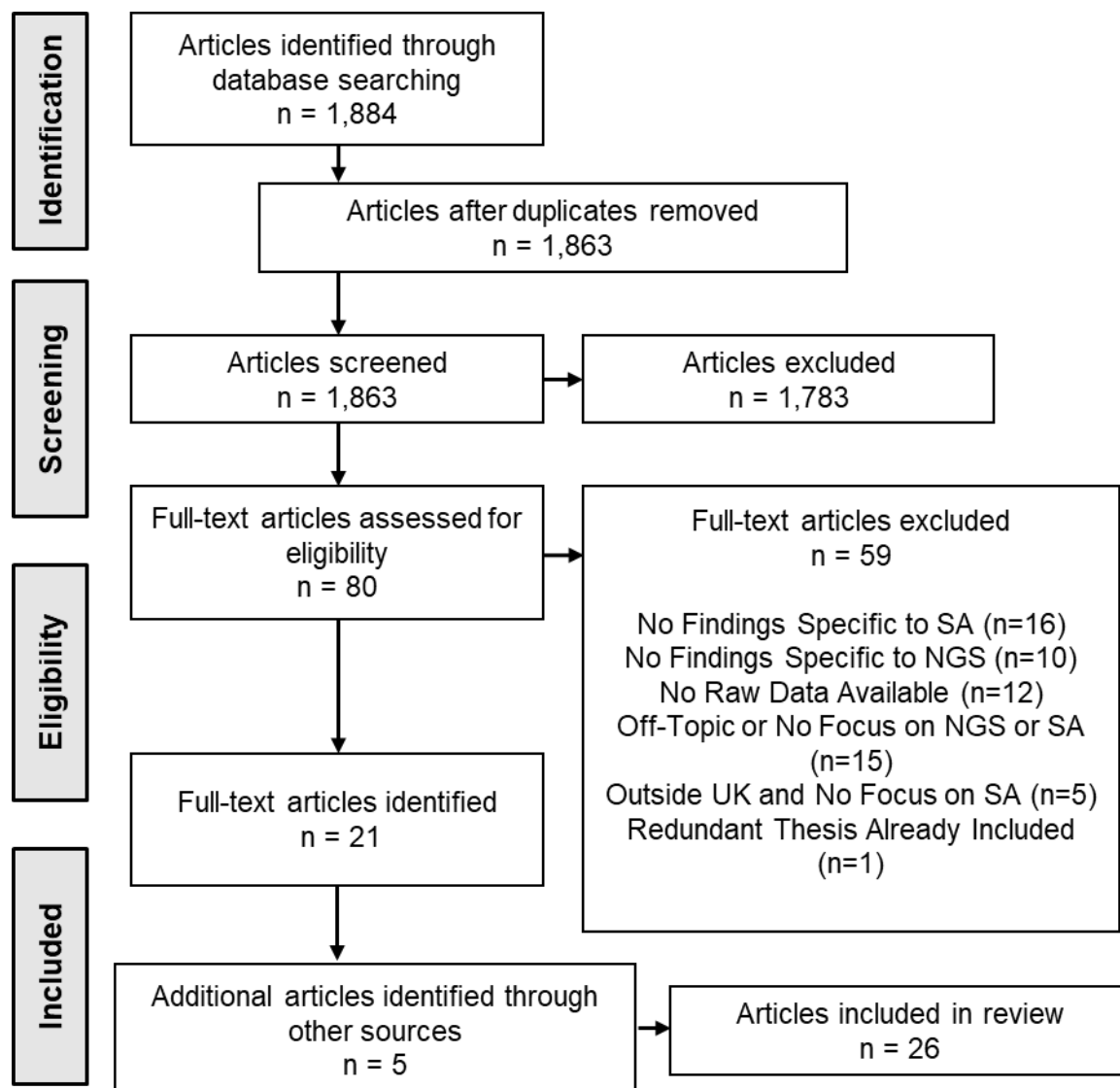
4.4 Results

4.4.1 Article Selection

To determine the inhibitors and enablers underlying South Asian people's access to NGS and their PWB associations within the UK, a search was conducted that yielded 1,884 records (Figure 2), of which 1,863 were excluded through screening. Five

additional papers were found through searching the reference lists and associated citations of the remaining 21 papers. A total of 26 papers were included in the review⁷.

Figure 2
PRISMA chart depicting the flow of literature into the review



⁷ Several studies that may have been relevant to the aims of this study were not included (Hamza et al., 2024; Palmer et al., 2025; Ward et al., 2023), as they were published after the search was conducted. The emergence of these new studies highlights the growing interest and concern in this topic area and suggests the need for a future systematic literature review to reassess the state of the evidence. This illustrates one of the advantages of the systematic review methodology, as it provides a criterion for which future research can be compared.

4.4.2 Overview of Studies

The 26 included studies varied substantially in their aims, methods, context, and participants (Table 2). In the UK, South Asian people's experiences and interactions with NGS have predominantly been explored in urban regions and disadvantaged neighbourhoods. Only three studies focused on rural areas (Garland & Chakraborti, 2006; Morris & O'Brien, 2011; Nayak, 2017). A variety of research methodologies were applied including quantitative surveys (n =6), satellite-based data analysis (n =5), individual interviews (n =18), focus group interviews (n =5), and environment auditing (conducted by researcher n =1, conducted by participants= 2, conducted by researcher and participant= 1) (Table 2). Most of the qualitative studies focused on identifying the diverse barriers and opportunities underlying NGS access, whilst quantitative studies concentrated more on proximal access to NGS and associations with PWB. After critically appraising each paper, five studies were deemed excellent, 18 good, and three as moderate (Table 2). Notably, five of the 15 qualitative studies lacked reporting on positionality, while seven did not detail their methods for data analysis (Appendix 5).

Table 2
Study characteristics of all papers included (n = 26)

ID	First author and year	Aims	Study design & Methods	Context	Quality score (CASP)
1	Cronin-de-Chavez et al. (2019b)	To explore structural and individual determinants of green space use amongst parents of young children in an urban, deprived, multi-cultural area situated in the North of England, UK.	Qualitative- Semi-structured interviews	Three multi-ethnic electoral wards in a large city (> 500,000 inhabitants) in the North of England	Good: .91
2	Comber et al. (2008)	To determine green space access in an English city using a network analysis in a geographical information system	Quantitative- network analysis	Leicester is in the English midlands and has a large and diverse ethnic minority population.	Moderate: .6

			Quantitative-satellite based greenness, NGS satisfaction audit (by participants) and baby weight measure		
3	Dadvand et al. (2014a)	To investigate the association between contact with green spaces and fetal growth and to explore how this association might be modified by ethnicity and indicators of individual and neighbourhood SES.		Based on 10,780 singleton live-births from the Born in Bradford cohort, UK (2007–2010).	Excellent: 1
4	(Edwards et al., 2022)	To understand the facilitators and barriers for Muslim communities accessing protected areas	Qualitative-semi-structured interviews	The London boroughs surrounding Walthamstow Wetlands contain some of the highest levels of ethnic diversity in the UK.	Good: .9
5	Eyre et al. (2015a)	To explore environmental influences on physical activity from a child's perspective	Qualitative-focus groups	Two schools in deprived wards of Coventry, England.	Good: .91
6	Eyre et al. (2015b)	To understand how children from a low socioeconomic area within the UK use their surrounding built environments for physical activity	Quantitative-GPS monitoring	Two most deprived wards in Coventry with similar socio-economic status, UK.	Good: .91
7	Ferguson et al. (2018)	To assess the distribution and quality of green spaces in the diverse city of Bradford	Quantitative-Neighbourhood Green Space Tool and Census data	The multi-ethnic and socioeconomically diverse city of Bradford, UK,	Excellent: 1
8	Garland & Chakraborti (2006)	To examine issues of racist victimisation in the rural arena	Qualitative-conclusions drawn from pre-existing interview and questionnaire data	Three rural counties of England - specifically Suffolk, east Northamptonshire, and north and south Warwickshire.	Moderate: .5
9	McEachan et al. (2018a)	To explore the associations between availability of, satisfaction with, and use of urban green space and mental wellbeing among children aged 4 years.	Quantitative-questionnaire, Normalised Difference Vegetation	Born in Bradford longitudinal cohort.	Excellent: 1

			Index, and NGS satisfaction audit (by participants) Quantitative- questionnaire and Normalised Difference Vegetation Index		
10	McEachan et al. (2016)	To explore whether residential 'greenness' and access to green space were associated with depressive symptoms among pregnant women.		Born in Bradford longitudinal cohort.	Good: .91
11	Morris & O'Brien (2011)	To evaluate projects aiming to encourage under-represented groups to use green space	Mixed methods- surveys and interviews	Five woodland projects: Greenwood CF, Great Western CF, Bedgebury, Haldon, Rosliston.	Good: .93
12	Morris et al. (2019)	To explore how walking groups find a place in women's lives.	Qualitative- Interviews and ethnographic field work	Walking groups in north-east England from mixed socioeconomical backgrounds. Within Sunderland, the British Bangladeshi population is predominantly concentrated in three main wards, two of which are in Sunderland East, the other in Sunderland West.	Good: .9
13	Nayak (2017)	To offer richly embodied account of racism and belonging based on the biographical testimonies of British Bangladeshi Muslim young women.	Qualitative- semi- structured interviews	The London Borough of Hackney which is in the Northeast of the city; Milton Keynes in South East England; and Oadby, a suburb of the city of Leicester in the English Midlands.	Good: .9
14	Neal et al. (2015)	To examine the relationships between park spaces and ethnically diverse local populations.	Qualitative- individual and group interviews		Good: .8
15	Ratna (2017)	To explore first generation Gujarati Indian men and women's experiences of walking.	Qualitative- mental mapping, photo-	Harrow in Northwest London has been twinned with Bhuj, a city in Gujarat.	Good: .8

			elicitation, participant observations and semi- structured interviews		
16	Rishbeth & Birch (2020)	To explore the extent to which urban nature reflects and informs transnational dynamics within the everyday lives of first generation migrants living in one city in the north of England. What does sitting outside mean for people experiencing marginalisation and exclusion in the city? In what ways is this meaning changed by corporate-led regeneration of urban public spaces, and shaped by urban design?	Qualitative-interviews	One city in the north of England.	Good: .9
17	Rishbeth & Rogaly (2017)		Qualitative-interviews	Case study of central square in Woolwich, south-east London.	Moderate: .5
18	Roberts et al. (2019)	To examine the associations between park features, park satisfaction and park use in a deprived and ethnically diverse sample in Bradford, UK.	Quantitative-park auditing (researcher and participant) and surveying	Bradford, located in an ethnically diverse and deprived city in the north of England, of which 50.1% of participants are South Asian.	Excellent: 1
19	Roe et al. (2016b)	To explore the relationship between general health and a range of individual, social and physical environmental predictors in deprived White British and BME groups living in ethnically diverse cities in England.	Quantitative-questionnaire's	Six ethnic groups living in the three of England's most ethnically mixed conurbations (i.e., London, Manchester and the Wolverhampton and Coventry area)	Good: 0.91
20	Scruton & Holland (2006)	To explore the meanings and values attached to grandfatherhood for a range of older men who have recently retired from paid employment.	Qualitative-semi-structured interviews	A large city in the North of England.	Good: .8
21	Slater (2022)	To investigate members of minority ethnic communities' motivations for visiting rural green spaces, perceptions of	Qualitative-walking and semi-structured interviews	Voluntary organisations of SADACCA, Boots and Beards, Sheffield Environmental	Good: .9

		rural green spaces and the role of community-based initiatives		Movement and SCOREscotland.	
22	Stride (2014a)	To explore the physical education and physical activity experiences of a group of South Asian, Muslim girls.	Qualitative-participatory methods, observations, focus groups and interviews	The study is based in a large, urban, co-educational, secondary school in Yorkshire, England that is diverse and in the top 10% of most deprived neighbourhoods in the UK.	Good: .9
23	Stride et al. (2018b)	To explore the physical education and physical activity experiences of a group of South Asian, Muslim girls.	Qualitative-participatory methods, observations, focus groups and interviews	The study is based in a large, urban, co-educational, secondary school in Yorkshire, England that is diverse and in the top 10% of most deprived neighbourhoods in the UK.	Good: .8
24	Sutcliffe (2018)	To explore how people construe their relationship with nature.	Qualitative-in depth interviews	England based.	Excellent: 1
25	Warren (2017)	To investigate the ways in which walking practices intersect with social difference, particularly in relation to faith, ethnicity and gender.	Qualitative-walking interviews and classroom exercise	The neighbourhood of Balsall Heath, an inner-city suburb located within the ward of Sparkbrook.	Good: .9
26	Wood et al. (2018)	To test the relationship between green space quality and restorative benefit in an inner city urban population in Bradford, United Kingdom.	Quantitative-face to face surveys and Natural Environment Scoring Tool (by researchers)	The three most deprived wards of Bradford (Little Horton, Bowling and Barkerend).	Excellent: 1

4.4.3 Sample Characteristics of the Studies

Studies displayed significant demographic diversity within the label 'South Asian', but several focused on samples from socioeconomically disadvantaged backgrounds (Appendix 10 details the included studies' sample characteristics). Demographic characteristics reports included age (88%), ethnicity (100%), religion (38%), sex or gender (96%), and socioeconomic background (73%). Studies also discussed a variety of wider characteristics (e.g., parenthood). Including diverse samples in this review was advantageous for capturing a broad range of relevant literature. However, it is important to note that subgroups within the broad category of "South Asian" may have different needs, preferences, and experiences. For example, women's experiences may differ from men's, and children's needs may differ from those of adults. Such experiences may not be fully captured in this review.

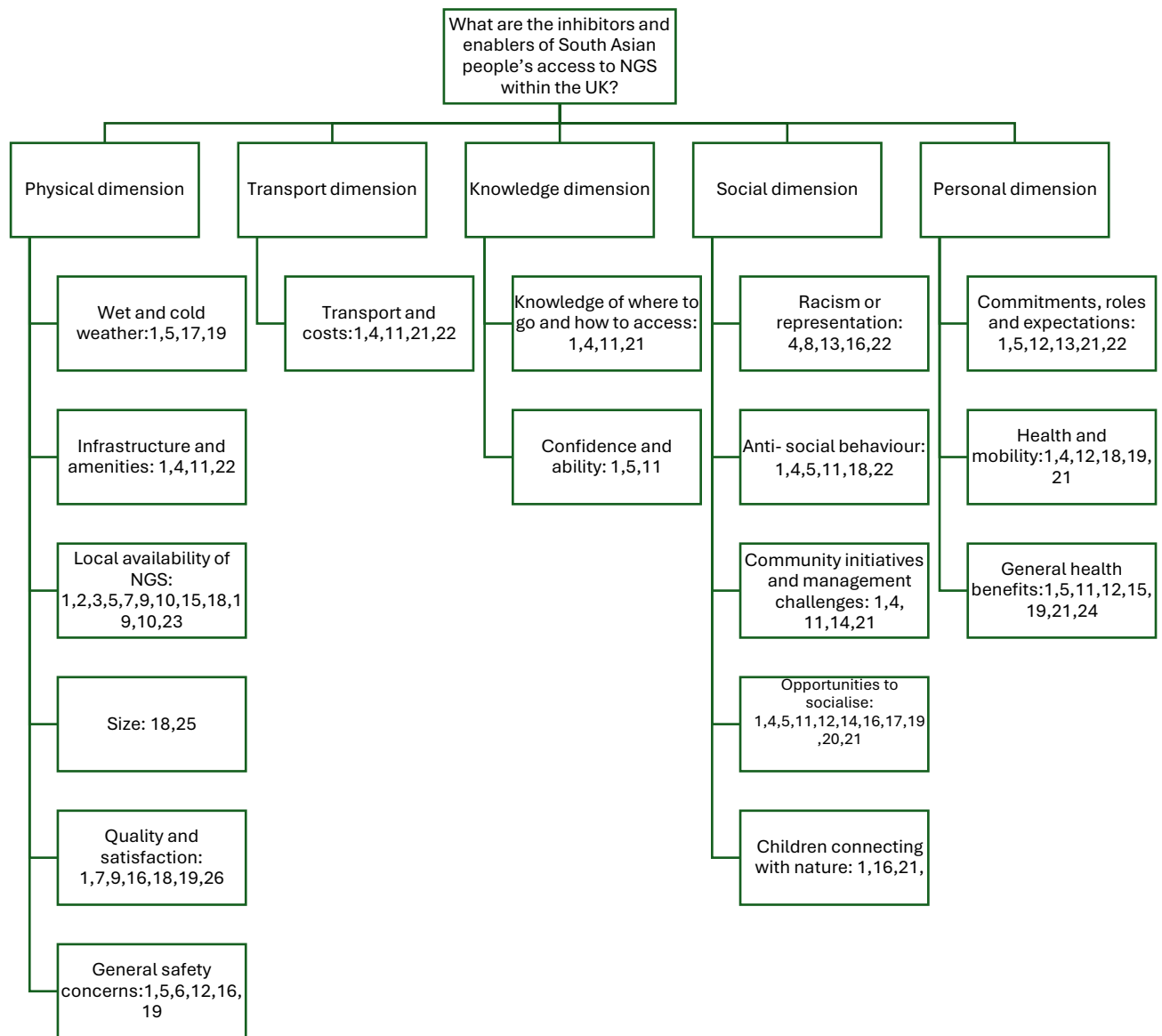
The exclusive focus on individuals from South Asian backgrounds was only evident in studies that specifically examined physical activity. No study focused exclusively on South Asians' access to NGS and PWB associations. Rather, most studies included participants from a variety of backgrounds, often collectively categorising them as 'ethnic minorities', but discussing data relating specifically to South Asians in their findings. Moreover, no study focused specifically on the context of South Asian Muslim women with a focus on NGS, which is concerning given their large focus in more formal leisure contexts like sporting environments (Thorpe et al., 2022). The following section presents results pertaining to access factors, whilst PWB associations are presented in Section 4.4.5.

4.4.4 Natural Green Spaces Access Factors

The included studies discussed a wide variety of interlinked access barriers and opportunities influencing South Asian people's access to NGS, such as proximal availability, quality and satisfaction, general safety concerns, opportunities to socialise, commitments, roles and expectations, and knowledge of NGS and their connections to PWB (Appendix 11 summarises each study's access factors). These barriers and opportunities aligned well with the dimensions of greenspace access in Wang et al.'s (2015) thematic framework (see Figure 3). Some studies (n =4) focused on NGS visitation, all of which reported lower NGS use among South Asian people in comparison to those from White backgrounds (Eyre et al., 2015b; McEachan et al., 2018a; Morris & O'Brien, 2011; Roberts et al., 2019).

Figure 3

Inhibitors and enablers of South Asian people's access to natural green space in the UK, mapped onto Wang et al. (2015)'s framework conceptualising dimensions of greenspace accessibility (n = 26)



4.4.4.1 Physical dimensions

Proximity was identified as a significant factor shaping access to NGS for South Asian communities (n = 11) (Comber et al., 2008; Cronin-de-Chavez et al., 2019b; Dadvand et al., 2014a; Eyre et al., 2015a; Ferguson et al., 2018; McEachan et al., 2016; McEachan et al., 2018a; Ratna, 2017; Roberts et al., 2019; Roe et al., 2016b; Stride et al., 2018b). South Asian people were found to experience poorer access to NGS than individuals from White backgrounds through geographical analysis (n = 7)

(Comber et al., 2008; Dadvand et al., 2014b; Eyre et al., 2015d; Ferguson et al., 2018; McEachan et al., 2016; McEachan et al., 2018b; Roe et al., 2016a). For example, Ferguson et al., (2018) found that neighbourhoods with large South Asian communities in Bradford exhibited a higher density of street trees but faced poorer access to NGS compared to neighbourhoods with a high proportion of White households: *“Neighbourhoods with a high proportion of Asian/Asian British residents and deprived households have less access to neighbourhood greenspaces.”* Similarly, in Leicester, where 43.4% of the population are South Asian (UK Government, 2020), regions with a higher proportion of South Asian residents were found to experience reduced access to nearby green features (McEachan et al., 2018a). Studies also suggested that South Asians experience poorer proximal access to NGS than other ethnic minority groups (n = 3) (Comber et al., 2008; McEachan et al., 2018a; Roe et al., 2016b), and further studies (n = 3) (Cronin-de-Chavez et al., 2019a; Ratna, 2017; Stride, 2014a) discussed proximity challenges through qualitative methods.

Beyond geographic accessibility, higher levels of perceived quality and satisfaction with NGS were associated with increased accessibility and usability (n = 7) (Cronin-de-Chavez et al., 2019b; Ferguson et al., 2018; McEachan et al., 2018a; Rishbeth & Birch, 2020; Roberts et al., 2019; Roe et al., 2016b; Wood et al., 2018). For example, two comparative quantitative papers (Ferguson et al., 2018; Roberts et al., 2019) found South Asians experienced poorer park satisfaction than those from White backgrounds,

“White British respondents (M = 2.26, SD = 0.83) reported significantly higher (p = 0.01) park satisfaction than Pakistani respondents (M=2.06, SD=0.85)”. “In the fully adjusted model, amenities and usability were positively related to park satisfaction.” (Roberts et al., 2019)

Natural features and larger open spaces were associated with greater NGS access and usability for South Asians (n = 4) (Cronin-de-Chavez et al., 2019b; Roberts et al., 2019; Warren, 2017; Wood et al., 2018). For example, Warren (2017) noted that size was particularly significant for Muslim women, and Roberts et al. (2019) found positive associations between size and usability, although ethnicity did not mediate this relationship. The presence of infrastructure/amenities was also found to facilitate access (n = 4) (Cronin-de-Chavez et al., 2019a; Edwards et al., 2022; Morris &

O'Brien, 2011; Stride, 2014a). This included the availability of social infrastructure (e.g., picnic tables), provision of prayer space, and access to halal food. Most papers explored physical dimensions of access qualitatively, but a quantitative analysis by Roberts et al. (2019) found the presence of amenities to be positively associated with usability through a survey on park satisfaction and use.

General safety concerns related to unfamiliarity with NGS, poor aesthetics, slippery surfaces, and litter were identified as inhibiting people's access to NGS (n = 6) (Cronin-de-Chavez et al., 2019b; Eyre et al., 2015a; Eyre et al., 2015b; Morris et al., 2019; Rishbeth & Birch, 2020; Roe et al., 2016b). For example, Cronin-de-Chavez et al. (2019b) report that: *"Issues raised included safety of play equipment, water features, traffic, broken walls, litter; slippery surfaces and muddy area."* Parents were deterred from accessing NGS due to concerns that their children might fall on slippery surfaces or become ill from the cold weather (n = 3) (Cronin-de-Chavez, 2019; Eyre, 2015; Rishbeth, 2021); typical wet and cold weather conditions in the UK also detracted from visitor experiences of NGS (n = 4) (Cronin-de-Chavez et al., 2019b; Eyre et al., 2015a; Rishbeth & Rogaly, 2017; Roe et al., 2016b).

4.4.4.2 Transport dimensions

Use of NGS was also influenced by cost and transport availability (n = 5) (Cronin-de-Chavez et al., 2019a; Edwards et al., 2022; Morris & O'Brien, 2011; Slater, 2022; Stride, 2014a). Key barriers in the access dimension included difficulties transporting children (Cronin-de-Chavez et al., 2019a; Morris & O'Brien, 2011), the cost of travel (Cronin-de-Chavez et al., 2019a; Morris & O'Brien, 2011; Slater, 2022), lack of car ownership (Cronin-de-Chavez et al., 2019a; Morris & O'Brien, 2011; Slater, 2022), and the burden of sharing travel with others (Morris & O'Brien, 2011). For example, Cronin-de-Chavez (2019) reported that:

"Impromptu, everyday trips to local greenspaces were of a different nature, when part of the family would make shorter visits to a local green space (often of poorer quality) that could be accessed on foot between school pick-ups or after school. This was partly because even where the household possessed a car, the mothers in the study mostly couldn't drive, making the time and cost of traveling to a further away green space too prohibitive."

4.4.4.3 Knowledge dimensions

A lack of knowledge relating to how to access NGS was highlighted as a barrier (n = 4) (Cronin-de-Chavez et al., 2019a; Edwards et al., 2022; Morris & O'Brien, 2011; Slater, 2022). Two of these studies (Morris & O'Brien, 2011; Slater, 2022) found that information shared through social networks mitigated such barriers and facilitated access. Edwards et al. (2022) also identified language barriers and inadequate provision of appropriate signage as obstacles. Lacking the ability to perform certain skills in NGS and a lack of confidence were also found to inhibit access to NGS (n = 3) (Cronin-de-Chavez et al., 2019b; Eyre et al., 2015a; Morris & O'Brien, 2011). For example, Cronin-de-Chavez et al. (2019) note that: *"Individual determinants preventing use included lack of knowledge about where to go, or how to get there and confidence in managing young children whilst outdoors."*

4.4.4.4 Social dimension

Fears of antisocial behaviour and crime were identified as inhibiting South Asian access to NGS (n = 6) (Cronin-de-Chavez et al., 2019a; Eyre et al., 2015c; Morris & O'Brien, 2011; Roberts et al., 2019; Stride, 2014a). The racialisation of NGS was particularly problematic, identified in several qualitative papers (n = 5) (Edwards et al., 2022; Garland & Chakraborti, 2006; Nayak, 2017; Rishbeth & Birch, 2020; Stride, 2014a). Two of these papers (Garland & Chakraborti, 2006; Nayak, 2017) discussed direct experiences of racial discrimination hindering access to NGS, and three papers (Edwards et al., 2022; Rishbeth & Rogaly, 2018; Stride et al., 2018b) suggested that people avoid visiting NGS when they were underrepresented within the space. For example, Rishbeth and Birch (2021) note:

"One of our participants, a young woman who wears a hijab, recounted an experience of feeling avoided in a park setting on account of her clothes—her experience of being judged while outdoors which quite differs from the 'not any rules in nature' perception held by Rojwan."

Fears were also associated with witnessing inappropriate language (Cronin-de-Chavez et al., 2019b), drugs (Eyre et al., 2015a), and off-leash dogs (Morris & O'Brien, 2011).

Out of the papers that focused on social dimensions of access (n = 11), organised community visits to NGS were found to facilitate access (n = 5) (Cronin-de-Chavez et al., 2019a; Edwards et al., 2022; Morris & O'Brien, 2011; Neal et al., 2015; Slater, 2022), but group management and costs associated with such visits were also

identified as challenges for management bodies (n = 4) (Cronin-de-Chavez et al., 2019b; Morris & O'Brien, 2011; Neal et al., 2015; Slater, 2022). Social companionship was identified as facilitating NGS access (n = 11) (Cronin-de-Chavez et al., 2019b; Edwards et al., 2022; Eyre et al., 2015a; Morris & O'Brien, 2011; Morris et al., 2019; Neal et al., 2015; Rishbeth & Birch, 2020; Rishbeth & Rogaly, 2017; Roe et al., 2016b; Scraton & Holland, 2006; Slater, 2022). Amongst these papers, the majority (n = 9) (Cronin-de-Chavez et al., 2019a; Edwards et al., 2022; Eyre et al., 2015c; Morris et al., 2019; Neal et al., 2015; Rishbeth & Rogaly, 2018; Roe et al., 2016a; Scraton & Holland, 2006; Slater, 2022) described how those from South Asian backgrounds often visited NGS to socialise with family, friends and the community. One paper (Morris & O'Brien, 2011) found South Asian women to draw confidence through visiting NGS with groups, another (Morris et al., 2019) identified how group walking could mitigate safety concerns, and two (Edwards et al., 2022; Neal et al., 2015) described how cultural/religious gatherings facilitated access. For example, one study employing walking interviews indicated that, *"Several participants mentioned how their relationships with family and friends drove their visits to rural green spaces"* (Slater, 2022). Another study that surveyed diverse ethnic groups highlighted, *"People of Indian origin are most likely to visit their local urban green space with someone."* (Roe et al., 2016b)

Finally, parental motivations for children to develop relationships with nature were identified as an enabler of NGS use (n =3) (Cronin-de-Chavez et al., 2019b; Rishbeth & Birch, 2020; Slater, 2022). These papers concluded that the benefits and enjoyment associated with these spaces were among the reasons driving parents to visit with their children.

4.4.4.5 Personal dimensions

Family ties and home responsibilities were identified as shaping access to NGS in different ways (n = 6) (Cronin-de-Chavez et al., 2019b; Eyre et al., 2015a; Morris et al., 2019; Nayak, 2017; Slater, 2022; Stride, 2014a). For instance, family commitments were found to limit participants' visitation (n = 3) (Cronin-de-Chavez et al., 2019a; Eyre et al., 2015c; Morris et al., 2019). Moreover, women were limited in their time for leisure activity due to cultural assumptions regarding gender roles (n = 2) (Stride, 2014a; Warren, 2017). Additionally, changes in life circumstances, through retirement and having children, were also found to shape how users engaged with NGS (n = 2)

(Ratna, 2017; Slater, 2022). For example, Slater (2022) writes: *“It was their children growing up and moving away that created new opportunities and motives to visit rural green spaces.”* In other cases, participants leveraged their family connections to visit NGS: *“It is noticeable that for many respondents the immediate family and extended kinship network are the most frequent resource girls and young women draw on when it comes to who they spend their leisure time with”* Nayak (2017).

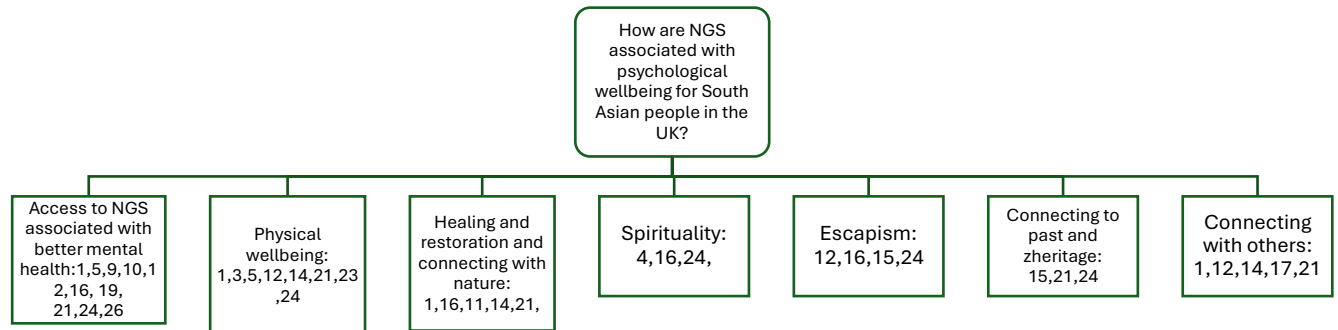
Mobility and health constraints or the use of pushchairs, and difficulties in navigating unpaved areas, were identified as inhibiting access to NGS (n = 6) (Cronin-de-Chavez et al., 2019b; Edwards et al., 2022; Morris et al., 2019; Roberts et al., 2019; Roe et al., 2016b; Slater, 2022). For example, through quantitative methods, Roberts et al. (2019) found unpathed areas to be significantly associated with a lack of NGS usability, whilst Cronin-de-Chavez et al. (2019b) derived similar conclusions through qualitative methods. Similarly, Roe et al. (2016) found proximal NGS access to be significantly positively associated with health and mobility indicators. Lastly, a desire to attain the health benefits associated with NGS drove engagement (n = 8), reflecting how knowledge of these benefits can enable access (Cronin-de-Chavez et al., 2019b; Eyre et al., 2015a; Morris & O'Brien, 2011; Morris et al., 2019; Ratna, 2017; Roe et al., 2016b; Slater, 2022; Sutcliffe, 2018).

4.4.5 Psychological Wellbeing Associations

Associations between NGS and enhanced PWB for South Asians in the UK (Figure 4) were evident across most papers (n = 18). Appendix 11. Summary of access factors and psychological wellbeing associations of each study summarises PWB data of each paper). In the quantitative studies reflecting this relationship, access to NGS was generally measured by geographical proximity. While most of the reviewed studies focused on aspects of mental health, a variety of additional factors associated with PWB were also identified as being positively associated with NGS access and use.

Figure 4

Associations between natural green space access and use and psychological wellbeing among South Asian people in the UK



Access to NGS was explicitly linked with positive PWB (n = 10) (Cronin-de-Chavez et al., 2019a; Eyre et al., 2015c; McEachan et al., 2016; McEachan et al., 2018b; Morris et al., 2019; Rishbeth & Birch, 2021; Roe et al., 2016a; Slater, 2022; Sutcliffe, 2018; Wood et al., 2018). Some of these studies described how engagement with NGS led to positive mental health outcomes through health-promoting behaviours, whereas other studies linked proximal access to NGS to certain mental health indicators, such as stress reduction and emotional regulation. One paper (Roe et al., 2016a) identified a significant positive correlation between general health indicators and access to NGS, one paper (McEachan et al., 2016) identified a significant negative correlation between access to NGS and depressive symptoms, two papers (Rishbeth & Rogaly, 2018; Wood et al., 2018) found that participants experienced better mental health after engaging with NGS, three papers (Cronin-de-Chavez et al., 2019a; Rishbeth & Birch, 2021; Slater, 2022) found individuals to experience a sense of healing and restoration from stress when visiting NGS, two papers (Morris et al., 2019; Wood et al., 2018) concluded that reduced access to NGS contributes to the poorer PWB experienced by South Asians in comparison to those from White backgrounds, and six papers (Cronin-de-Chavez et al., 2019a; McEachan et al., 2018b; Morris et al., 2019; Rishbeth & Birch, 2021; Slater, 2022; Sutcliffe, 2018) identified positive associations between access to NGS and positive mood. For example, McEachan et al. (2018) found that: *"The level of green space within a neighbourhood can have beneficial effects on mental wellbeing, independent of health*

behaviours, and therefore can benefit populations without requiring active behavioural change.”

Mental health outcomes related to NGS access were also explored between ethnic groups. Three studies (Eyre et al., 2015b; McEachan et al., 2016; Wood et al., 2018) found no statistical difference between ethnicity, and instead found socioeconomic factors to be influential. However, in these studies, South Asians experienced poorer PWB outcomes from NGS than those from White backgrounds due to the heightened accessibility challenges (Eyre et al., 2015d; McEachan et al., 2016; Wood et al., 2018). Three additional studies focusing on behavioural engagement with NGS highlighted the restorative role of NGS for South Asian users' mental health (Cronin-de-Chavez et al., 2019b; Rishbeth & Birch, 2020; Slater, 2022). For example, Rishbeth & Birch (2020) found that: *“Farida, a young female, spent time observing nature through a bedroom window as a way to build confidence during a period of ill health.”*

Access to NGS was also positively associated with good physical wellbeing, with participants feeling fitter and healthier after engaging with these environments (n = 8) (Cronin-de-Chavez et al., 2019b; Dadvand et al., 2014a; Eyre et al., 2015a; Morris et al., 2019; Neal et al., 2015; Slater, 2022; Stride et al., 2018b; Sutcliffe, 2018). Increasing fitness, losing weight, breathing in fresher air, and developing immunity were among the physical health-related associations individuals had experienced when engaging with NGS. One paper (Eyre et al., 2015d) found South Asian children to engage in higher rates of physical activity in NGS when compared to indoor environments, and thus experience enhanced physical health outcomes, including healthier Body Mass Index scores. This relationship is important to recognise as physical health is strongly related to one's PWB (Charles-Rodriguez et al., 2023). Related to this, Morris et al. (2019) writes:

“She said that she was glad to come out, and noted when it was raining on one walk that she even came out in the rain. She said this was because she wanted to socialise and also wanted to ‘lose weight.’”

One paper including data on NGS (McEachan et al., 2016) found South Asian participants were less likely to engage in physical activity compared to their White counterparts, leading to poorer physical wellbeing outcomes.

Studies identified several other dimensions of PWB that were associated with the use of NGS. Four papers described how visits to NGS helped users to escape from mundane schedules or urban life (n = 4) (Morris et al., 2019; Ratna, 2017; Rishbeth & Birch, 2020; Slater, 2022) and of these, two papers (Morris et al., 2019; Slater, 2022) described how individuals enjoyed visiting rural green spaces (RGS) to escape from the hustle and bustle of the city, and that these spaces offered different experiences than those of urbanity. Other findings indicate how users were able to connect better with nature through their visits (n = 5) (Cronin-de-Chavez et al., 2019b; Morris & O'Brien, 2011; Neal et al., 2015; Rishbeth & Birch, 2020; Slater, 2022). Moreover, users felt an increased sense of connectedness with other people through social interactions that took place in NGS (n = 5) (Cronin-de-Chavez et al., 2019b; Morris & O'Brien, 2011; Neal et al., 2015; Rishbeth & Rogaly, 2017; Slater, 2022). All five papers described how relationships or community bonds were enhanced through connecting with others in NGS. For example, Slater (2022) discussed:

“For some, accessing rural green spaces provided time for building family bonds:

‘Doing something like this together is quality family time’ (BF8). For others, visiting rural spaces allowed them to connect with new people and build social relationships.”

Some studies' participants' Islamic beliefs motivated their visits to NGS, with the natural environment helping them to foster a deeper sense of spirituality whilst in those environments (n = 3) (Edwards et al., 2022; Rishbeth & Birch, 2020; Sutcliffe, 2018). For instance, two papers (Rishbeth & Birch, 2021; Slater, 2022) recognised that visits to NGS offered opportunities for prayer among Muslims, and one paper (Sutcliffe, 2018) identified NGS as a source of spiritual perspective and reflection, thus enhancing spiritual experiences. Finally, three studies highlighted how South Asian participants became reminiscent of their childhood (in India, Pakistan, or the UK) when engaging with NGS (Ratna, 2017; Slater, 2022; Sutcliffe, 2018).

4.5 Discussion

4.5.1 South Asians' Access to Natural Green Spaces and Associated Psychological Wellbeing Benefits

This review describes significant inequities experienced by South Asians in the UK in regard to their NGS access. These inequalities are consistent with wider research highlighting racial and ethnic disparities in access to NGS (Boulton et al., 2018; Jay et al., 2012). The current review also highlighted the many associated barriers and opportunities underlying these disparities, which largely aligned with the framework constructed by Wang et al. (2015), conceptualising dimensions of greenspace accessibility. This framework draws some parallels with the social-ecological model, which reflects the dynamic interplay between people and their physical and social environments that shapes behaviour (Sallis et al., 2008). Overall, Wang et al. (2015)'s framework aided in identifying the many dimensions of green space access and the intersections between individual, social, and environmental factors that determine access to NGS for South Asian people in the UK and their relationship to PWB.

The included studies indicate that the physical characteristics of NGS are often critical for enhancing the experience of such spaces among South Asian communities. For example, the lack of adequate social infrastructure in NGS often misaligns with the social motivations many South Asians hold to visit NGS. It is more difficult for people with mobility impairments, pushchairs, and wheelchairs to visit certain NGS due to a lack of facilities and paths. Such barriers can exacerbate feelings of exclusion for people with disabilities or impairments (Corazon et al., 2019). Barriers related to mobility impairments are important to consider for South Asian communities, who face certain health challenges more commonly than the wider population (Gholap et al., 2011). These findings align with wider research emphasising the importance of family-friendly and physically accessible spaces (Navarrete-Hernandez et al., 2021). NGS can support more frequent family visits through enhanced design. For example, urban developers could include accessible paths leading to large open spaces designated for families to gather, and including supportive infrastructure (e.g., a sufficient number of benches and picnic tables). Such improvements could significantly enhance access for South Asian communities by creating physically accessible and culturally appropriate environments. This would also support people to balance home-related commitments, thereby easing the burden of gender and culture-related responsibilities, supporting users to integrate their family roles with leisure.

The current findings suggest that racial discrimination and safety concerns inhibit access to NGS. These results are well aligned with broader literature on the challenges that minority ethnic groups experience while visiting NGS (Ho & Chang, 2021). Although feelings of intimidation and safety concerns in NGS exist among wider populations (Navarrete-Hernandez et al., 2021), insecurities are amplified for ethnic minority groups due to differences in identity and racial tensions (Boyd et al., 2018). Racial prejudice and safety concerns lead to discomfort and detract from one's sense of belonging. This negatively impacts PWB both directly and indirectly through deterring visitation and thus limits the equitable distribution of the wellbeing benefits associated with nature. Enhancing inclusivity through increased representation and safety can create more welcoming and safe environments for all, meaning that recreational strategies should prioritise diversity and inclusion. For example, organising community events that celebrate cultural diversity and providing clear, accessible information in NGS could support more welcoming environments.

The results suggest that South Asian communities frequently face challenges such as geographic inequities, poor infrastructure, and a lack of preferable recreational opportunities. Transportation constraints and a lack of access to information on where and how to access NGS exacerbate issues of proximity. While such challenges are often shared with the general population in socio-economically disadvantaged areas (Boulton et al., 2018; Rigby et al., 2020), the barriers experienced by South Asian communities are exacerbated by factors associated with their ethnic identities. For instance, South Asian individuals may feel alienated in certain contexts due to the visibility of their identity, including their skin colour, which can be compounded by racial stereotypes and underrepresentation in NGS, leading them to feel unwelcome (Green & Singleton, 2016). Additionally, issues related to infrastructure and inaccessible paths are particularly problematic for South Asian communities who face health issues that impact mobility (Emadian & Thompson, 2017; Gholap et al., 2011). Economic disadvantages heighten these challenges as South Asian communities often experience higher levels of poverty, increasing the difficulties associated with travel costs and leading individuals to prioritise paid work over recreational activities (Laar et al., 2019).

This review highlights a variation of views and experiences of NGS across South Asian participants, associated with individual identities. For example, the results

demonstrate that fears associated with NGS are more prevalent in females than in males and are compounded by multiple factors of unfamiliarity with environments, distances of travelling alone as a female, lack of knowledge/confidence, presence of antisocial behaviour/crime, and lack of representation. Our review emphasises the systemic inequalities faced by South Asian communities at the intersection of their ethnic, religious, economic, and geographical identities (Crenshaw, 1989), highlighting the need to address these specific disparities to promote equitable access to nature and its associated health benefits. This discussion is built on in Chapter 5.

In addition to highlighting the factors underlying NGS accessibility, this review supports wider literature evidencing the relationship between NGS use and PWB (Raman et al., 2021). The reviewed studies indicate that stress reduction, enhanced emotional regulation, and better overall mental health are associated with NGS. These findings are consistent with research in the general population (Douglas et al., 2017). Indeed, connection with nature and natural features in NGS positively affect PWB through encouraging health-enhancing activity such as reflection (Rogerson et al., 2019). Visitors are given the opportunity to escape from the mundane schedules and stressful environments encountered in urban life, helping them to identify solutions for life's problems (Birch et al., 2020b). This aligns with wider frameworks depicting how NGS support the psychological restoration of users (Ulrich et al., 1991). Whilst the findings show how South Asians use NGS to improve mental health, they also highlight the unique dimensions of PWB associated with NGS influenced by South Asian cultural identity. For instance, NGS presents opportunities to connect with users' religious beliefs. Although previous work portrays NGS as restorative (Gascon et al., 2015), less research links spirituality to users' NGS engagement and PWB. Given that many South Asians hold religious beliefs, further research exploring the link between spirituality, wellbeing, and NGS is needed.

This review indicates that engaging with NGS can encourage health-promoting behaviours like exercise, which is strongly linked to PWB (Richardson et al., 2013). Whilst this finding is consistent with broader work on NGS (Rogerson et al., 2019), it holds particular significance in the context of South Asian communities in the UK. The said group exhibits disproportionately higher rates of health challenges such as mental health concerns, obesity, type 2 diabetes mellitus, and cardiovascular disease (Abu-Lughod, 2013; Alexander, 2008; Anand & Cochrane, 2005). Physical inactivity is a

major risk factor for these conditions, which NGS can help mitigate. However, as discussed throughout this study, South Asian communities face a multitude of challenges in accessing NGS, reducing the potential for harnessing NGS-PWB associations in public health policy. This review supports the idea that enhancing access to NGS for underrepresented groups could contribute to reducing current health inequalities (Boulton et al., 2018; Charles-Rodriguez et al., 2023).

When considering the methodologies employed in the reviewed studies, the quantitative approaches relied on geographic proximity to NGS as a measure of access, whilst none focused on frequency of visitation and behavioural engagement. As discussed in Section 2.3, synonymising geographic proximity with access to NGS overlooks the variety of barriers and opportunities South Asians face (Pot et al., 2021). This methodological limitation is also prevalent in quantitative research focusing on NGS in broader samples (Van den Berg et al., 2015). Future research could consider the diverse perspectives and needs of South Asian groups and focus on the multiplicity of factors influencing access to health-enhancing activity. Furthermore, this review emphasises the importance of considering subjective experiences when evaluating access to NGS. For example, broader leisure research has investigated South Asian people's individualised perspectives and experiences (Horne et al., 2018). Adopting similar approaches in the context of NGS would help understand how access could be facilitated in ways other than enhancing NGS proximity. Nonetheless, these findings provide valuable information on the barriers South Asian individuals encounter when accessing NGS and their importance to good PWB. Whilst these findings align to prior research (Gascon et al., 2015; Jay et al., 2012; Kloek et al., 2016), they highlight a unique set of experiences specific to intersectional identities. For instance, women and Muslims might face more barriers than men and non-Muslims.

4.5.2 Literature Gaps and Opportunities

Most studies were published after 2015, showing the nascent nature of research on South Asian's NGS interactions. The majority of these papers were deemed of good or excellent quality, reflecting the rigour involved in this field. However, only a few qualitative studies reported on the researcher's positionality (see Supplementary Material Table S3a). This omission is notable as researchers' biases, backgrounds, and preconceptions influence how data is collected, analysed, and interpreted. Important lessons emerge here when reflecting on the barriers associated with South

Asian communities, pertaining to the stereotypes that position them as disconnected from leisure and wellbeing activities, among the wider sociocultural challenges they face (Caperchione et al., 2015; Pullia et al., 2022). Authors should strive for reflexivity and transparency in their work to deconstruct stereotypes and provide insight into how diverse communities can be engaged with in ethical and sensitive ways (Duffy et al., 2021). For instance, the current review considered the author's positionality and how that may have influenced the conclusions.

As discussed in Section 4.3.1, a systematic literature review approach with PRISMA guidelines is often applied in medical and controlled trial research. The value of this approach was evident in its adaptability and rigour in exploring human experiences, particularly in the context of the under-researched area of South Asians and NGS. The findings of this study emphasise the value of systematically synthesising diverse evidence to uncover insights into cultural identity, NGS access, and PWB. The current review ensured transparency and replicability through a comprehensive evaluation of existing studies and bridged scholarship across diverse fields to highlight interdisciplinary perspectives. Future researchers should also employ similar research methodologies to enrich social science research, supporting the development of inclusive and evidence-based interventions for marginalised groups.

This review synthesised several quantitative, qualitative, and mixed-methods studies, focusing specifically on data from South Asian individuals or from samples which were over 50% South Asian. No included study focused solely on South Asian populations in relation to their access to NGS. This is problematic given this population's particular health challenges and the potential for NGS to support health-promoting behaviours. Although there is a substantial body of research exploring how ethnic minority communities use and benefit from NGS (Gascon et al., 2015), the exclusive focus on South Asian communities presented in this review adds unique insight to this body of knowledge, which tends to homogenise ethnic minority groups and thus obscure the specific issues faced by South Asians. For instance, this review identified the nuanced difficulties South Asians experience and their compounding effects on access, including inadequate infrastructure for prayer, racism, and a lack of halal food options. Further research focusing on South Asian people's experiences of NGS would help to further capture how access is shaped by factors of religious beliefs,

cultural stigma, gender, stereotypes, and health that have been presented in wider leisure and physical activity research. For instance, broader leisure research focuses on South Asian Muslim women's experiences of sporting contexts, considering their gender, race and religiosity (Lansburgh et al., 2022; Thorpe et al., 2022). A similar approach can be adopted in the context of NGS.

To help challenge existing stereotypes, it is critical to refrain from referring to distinct groups of people under broad umbrella terms. Kloeck et al. (2016) emphasise the need to recognise the diversity of identities and experiences that exist among different ethnic groups in their study of disparities in outdoor recreation practices between immigrants and non-immigrants. Understanding the unique experiences within and among South Asian communities is crucial for promoting equitable access to and utilisation of NGS, as well as for the development of associated policies and interventions. It must also be emphasised that South Asians themselves are not a homogeneous community. Indeed, intersectional factors such as gender, religion, geography, and socioeconomic level (Crenshaw, 1989), also affects one's ability to access NGS and should not be overlooked. Likewise, the label 'South Asian' refers to a wide range of cultures, languages, and traditions. It is important to recognise the diversity of this group, some of whom may have been underrepresented in the included studies, like non-English speakers.

There has been an emphasis on urban spaces in existing data on South Asian communities and NGS, overlooking their rural experiences, particularly in the context of PWB. Rural areas have distinct cultural and environmental dynamics from urban settings that support different perspectives and experiences. They also associate with distinct access barriers, opportunities, and PWB outcomes (Avery et al., 2020). For instance, rural green spaces (RGS) are known to enhance feelings of nature connectedness and escapism (Rupprecht et al., 2015). However, such environments are also known as sites of ethnic contestation and ingrained racism, leading to the exclusion of ethnic minorities (Garland & Chakraborti, 2006). Further research is needed on South Asian people's rural green space experiences to provide a more comprehensive understanding of the relationship between PWB, culture, ethnicity, and nature engagement. This gap is addressed in Chapter 6.

4.5.3 Strengths and Limitations

The current review systematically synthesised a range of studies adopting diverse methods, including samples of pregnant women, the elderly, children, and socioeconomically disadvantaged people, providing a holistic view of current research on South Asian people's access to NGS and PWB associations. Adhering to the PRISMA guidelines ensured a systematic and rigorous approach to this study, enhancing the reliability and validity of these findings. By including studies of diverse methodologies such as auditing, questionnaires, interviews, GPS monitoring and geographical data, NGS was found as crucial for South Asians' PWB in multiple ways. However, the review faced several limitations which limit the extent to which findings can be generalised. Firstly, the diversity of outcomes, samples, and measurement tools used across studies complicated direct comparisons between findings. Similarly, conclusions and recommendations may differ across subgroups, as the needs, barriers, and preferences may differ across age, migration status, gender and other identities. This suggests focusing on subgroup groups, where possible, to develop tailored and specific interventions. Publication bias also posed a potential issue in the context of quantitative studies, as studies with positive outcomes are generally more likely to be published. Furthermore, while the rationale and focus of this research justified limiting the review to studies published in the UK, this limits the applicability of the current findings to other countries. Lastly, although the search strategy was carefully developed through meticulous trials and testing, it is important to acknowledge its limitations. For example, some databases like Medline and PsycINFO were not included in the final search, due to their lack of relevant results; however, they may prove useful in future searches as the research evolves.

4.5.4 Conclusions

Overall, this review provides fresh insights into the multidimensional factors shaping access to NGS for South Asian people in the UK and the potential for these environments to promote PWB. The findings of the review on the positive associations between NGS engagement and PWB are consistent with a larger body of research on the benefits of NGS for mental health, which emphasise the healing, community-building, and nostalgic benefits of immersion in nature (Kaplan & Kaplan, 1989; Keniger et al., 2013; Ulrich et al., 1991). These findings suggest that adopting a holistic approach to addressing access inequalities and maximising the mental health benefits

of nature within public health policy and practice could contribute to addressing current health inequalities in the UK (Grant & Pollard, 2021).

The results of this review also highlight the need for strategies to increase South Asians' access to NGS so that they can benefit equitably from the PWB outcomes associated with these spaces. At the same time, developing interventions that promote engagement with NGS, South Asians' socio-cultural factors must be considered. For example, community-based activities and organised visits should make South Asians feel more welcome by celebrating specific South Asian cultures and traditions. Improving physical infrastructure, designing accessible paths, providing information on how to use these spaces, and cultivating a safe and inviting environment could further enhance access. Such actions could also enhance the inclusivity of NGS for many other underrepresented communities. This field of work could benefit from research that explores different types of NGS use and their impact on PWB. Research should also focus on South Asians' NGS access and PWB associations in rural areas, considering the intersectionality of their identities such as race, religion and gender.

4.6 Chapter Summary

This chapter presented a systematic literature review exploring South Asian people's engagement with NGS and the associated PWB outcomes. The review highlighted NGS as an important factor for the PWB of South Asian individuals, but access and engagement are shaped by a range of compounding barriers, including sociocultural norms, racialisation, and economic and spatial inequalities. It was found that recent research lacked focus specifically on RGS in the context of South Asian Muslim women. This highlights the need for a more intersectional exploration of how marginalised groups experience NGS. The next chapter addresses this gap by introducing intersectionality as a critical framework for examining how gender, ethnicity, religion, and other identity categories intersect to influence South Asian Muslim women's access to and experiences of RGS.

5 Chapter 5: Understanding South Asian Muslim Women's Access to Rural Green Spaces through Intersectionality

5.1 Chapter Overview

This chapter builds on the findings of the systematic literature review of Chapter 4 and establishes the remaining focus of the thesis on South Asian Muslim women. While previous research has identified general barriers to natural green spaces (NGS) access among ethnic minorities, and some with South Asians, limited attention has been paid to the specific experiences of South Asian Muslim women, particularly in the context of rural green spaces (RGS). This chapter introduces intersectionality as a critical lens through which to understand how multiple identities interact to shape women's access to and experiences of RGS. After exploring how intersectionality emerged as a framework, it is explored how overlapping social identities shape individual experiences of systemic inequality. This will set the basis for the following chapter, which aims to understand South Asian Muslim women's experiences with RGS.

5.2 Focusing on South Asian Muslim Women's Intersectionality

The previous chapter presented a systematic literature review which highlighted the compounding barriers South Asians face in accessing natural green spaces (NGS) related to numerous geographical, sociocultural, economic, and distributive factors. It also provided insights into the psychological wellbeing (PWB) benefits associated with NGS for South Asians. There was a lack of bespoke research focusing on South Asians' experiences with specific types of NGS, such as rural green spaces (RGS). This gap is notable because, while existing studies have demonstrated positive PWB outcomes linked to NGS, these effects may be distinct in RGS. Similarly, the needs and barriers faced by specific parts of South Asian communities, particularly South Asian Muslim women, are underexplored. This is significant because of the challenges the demographic experiences in leisure contexts, as was discussed in Section **Error! Reference source not found.**

South Asian Muslim women are often framed as frail, subordinated, in need of saving, and as disengaged from health and wellbeing activities (Azzarito & Hill, 2013; Bhopal, 1997; Ratna, 2024). This creates a complex dynamic concerning assumptions surrounding their identities. These perceptions stem from British colonial history, when

imperialist leaders portrayed South Asian cultures and their gender norms as inferior (Ali, 2006). Ali (2006) notes that South Asian women were depicted as oppressed by their men, submissive, and in need of Western intervention. This reinforced the idea that South Asian women were less capable of engaging in leisure and health activities (Moser et al., 2017; Ratna, 2024). Such colonial narratives created barriers for South Asian Muslim women, restricting their access to leisure activities even today (Bullock, 2007; Knez et al., 2012; Ratna, 2024).

In addition to negotiating with stereotypes facing them, South Asian Muslim women must navigate community expectations around modesty, family commitment, motherhood, honour, and gender segregation (Bhopal, 1997, 2019; Mahmood et al., 2022). These expectations shape the timings and types of leisure activities they can engage in, whilst also trying to balance various responsibilities in their lives. For instance, cultural expectations of modesty can limit participation in physical activity, while prioritising family responsibilities can restrict the time available (Ahmad, 2020). Moreover, women report feeling weary of being in mixed-gender spaces due to cultural expectations of segregation between genders (Agergaard, 2015; Lansburgh et al., 2022). Preferences for gender-segregated spaces may be informed by religious and cultural values, while the desire for culturally familiar environments can be shaped by historical experiences of marginalisation, colonality, and exclusion (Hussain, 2017; Ratna, 2024). This inevitably encourages people to socially distance themselves from predominantly White, male and non-Muslim environments (Hussain, 2017; Jeffery & Qureshi, 2022). It is important to emphasise that these values are neither universal nor static. Instead, they are shaped by people's individual understandings of diasporic identities, historical influences, and diverse interpretations of Islam, and therefore vary across and within South Asian communities.

Ultimately, a variety of factors, including those discussed in the aforementioned paragraph, shape expectations about South Asian Muslim women's behaviours, practices, and experiences of health and leisure, including RGS. More research is needed to centre their voices and experiences beyond the imposed narratives (Khatri, 2024), facilitating a more authentic understanding of their engagement with RGS. In this regard, an intersectionality approach considers how multiple and sometimes conflicting identities shape people's experiences, relevant to the religious, ethnic, and gendered identities of South Asian Muslim women (Crenshaw, 1989). This framework

can highlight how their relationship with RGS is influenced by broader processes of racialisation, Islamophobia, and sexism, in a context often dominated by White, middle-class, able-bodied men (Mowatt, 2022; Panelli et al., 2009). Narrowing the focus of this thesis from South Asians in general to South Asian Muslim women enables exploration of the unique challenges and opportunities experienced by this demographic, particularly those arising from the multiplicity of their identities, as outlined below.

5.3 Intersectionality as Inclusive Activism

Intersectionality is a thinking tool that helps reveal how individuals experience varying levels of privilege and disadvantage in society through the interaction of different layers of identity. Whilst intersectionality applies to many marginalised groups, it must be acknowledged how it emerged in the context of American Black women. Intersectionality increased in popularity after Black women experienced exclusion during several 20th-century activist movements. For example, traditional feminism focused on achieving White women's voting rights around the year 1920, but neglected the rights of Black people and Black women (Du Bois, 1903; Gage et al., 2021). Similarly, feminism in the 1960s achieved some equality between men and women in relation to equal pay, reproductive rights, and protection from domestic violence, but it sidelined race (Thornham, 2004). The Civil Rights Movement fought for racial equality between Black and White people (King et al., 1968). However, this movement was said to focus on men and ignored Black women's concerns of being oppressed in patriarchal systems, whilst also facing a backlash of unemployment as a result of their activism (Riches, 2017).

hooks (1989) helpfully highlights that the White supremacist beliefs of mainstream feminism and the patriarchal underpinnings of racial movements led to Black women being left unaccounted for between the two movements. For example, White feminism's tendency to universalise women's experiences overlooked Black women's distinct struggles, perpetuating their subordination. While White feminists advocated for the right to work outside the home, Black women's labour was exploited servicing the homes of White families, whilst simultaneously being domestically oppressed by men (hooks, 1981). To confront these issues, Anzaldúa & Moraga (1981) urged marginalised communities to challenge the oppressive structures inherent in their own communities, as this would help to confront White supremacy

through a solidarity approach. However, these ideas did not effectively resolve the compounding racism and sexism Black women faced.

Black feminism aimed to centre the experiences of Black women. It highlighted the multiple struggles Black women faced in relation to their racialisation and gendering, which were inadequately represented by both feminist and civil rights movements. Whilst key figures like Sojourner Truth (1851), Beal (1969), Anna Julia Cooper (1988), Cade (1970), and the Combahee River Collective (1977) voiced Black women's concerns before and during mainstream feminism, their ideas only became popular when Western activism acknowledged diversity (Gillis et al., 2004). The movement started specifically for Black women, and now offers a transformative vision for unveiling how systems of White supremacy, oppressive gendered structures, and colonialism are interconnected (Crenshaw, 1989).

The prominent legal and race scholar Kimberley Crenshaw (1989) articulated the essence of Black feminist theory when she investigated the employment discrimination case of DeGraffenreid versus General Motors of 1976. In the case, Emma DeGraffenreid claimed that General Motors denied her employment because she was a Black woman, constituting an act of race and gender discrimination. However, the court ruled that this was not discriminatory because General Motors hired both (White) women and Black (male) people. Crenshaw (1989) used this case to highlight the legal limitations in addressing the discrimination experienced by Black women because of their intersecting identities. She argued that policies exclude Black women's experiences because of their singular focus on gender or race, and that including them in existing frameworks fails to address their subordination. This is because Black women's experiences are more complex than the sum of racism and sexism and instead reflect an intersection of multiple identities.

Intersectionality is a theoretical and methodological approach that examines how interconnected systems of oppression and privilege, such as racism, sexism, classism, and others, operate across and within multiple identity categories, creating complex and specific forms of marginalisation (and advantage) (Crenshaw, 1989; Davis, 2008). It recognises that people can experience oppression because of one identity whilst also being privileged through another (Hill Collins et al., 2021; West & Fenstermaker, 1995). For instance, a White woman may be disadvantaged because of their gender but privileged because of their race. This means that a Black woman

may face different discrimination from White women because of her race, and different to Black men because of her gender. Similarly, she may share experiences with White women and Black men. That said, she will also have qualitatively different kinds of experiences from those of White women and Black men because of the intersections of her gendered and racial identities. The value of intersectionality is evident through its applicability to a variety of people's experiences, including Roma women victimised in human trafficking (Grigorovici, 2014), disabled Afghan women (Shajahan, 2021), and Iranian refugee women in America (Badran, 2013). Since intersectionality is particularly useful for distinct marginalised groups, it is applicable to South Asian Muslim women's experiences of NGS. The next section details some common principles used to guide intersectionality as a framework.

5.4 The Application of Intersectionality

The research presented in Chapter 6 is framed by six core principles of intersectionality (Hill Collins & Bilge, 2020; Weber, 1998). While they do not prescribe specific interview questions or coding steps, they shape the critical lens to help in understanding South Asian Muslim women's experiences with RGS. These principles include social inequality, power, social context, relationality, complexity, and social justice, and are outlined below.

Social inequality refers to the imbalance of group treatment in society. Each group experiences varying levels of access to resources according to their level of subordination and/or domination (Collins & Bilge, 2020). Marginalised groups often face limited access to resources, while dominant groups are disproportionately privileged. Current laws, policies, and institutional practices favour dominant groups and reinforce systemic barriers to economic and social mobility for marginalised communities (Weber, 1998). An example of social inequality is the unequal distribution of green spaces. Section 4.4.4.1 revealed that South Asian communities often have limited access to high-quality green spaces in their neighbourhoods, whereas predominantly White, middle-class areas tend to have an abundance of them (Ferguson et al., 2018). The lack of NGS access among ethnic minorities reduces their representation in those spaces, perpetuating ideas that White people belong in NGS (Byrne, 2012).

Power is the ability of individuals or groups to exert control and influence over other groups in ways that serve their own interests (Lorber, 1994). Dominant groups

often have authority over societal resources like education, health care, and wealth. In controlling these societal resources, significant barriers emerge for marginalised groups to thrive, which subsequently perpetuates dominant groups' ability to maintain their power (Harris, 1993). One group cannot exist without the other in this dynamic, as the dominant group relies on the exploitation of the subordinated group to maintain its level of resources, and the subordinated group relies on the dominant group for access to those resources (Harris, 1993). Considering this, power should be seen as a system of relationships between dominant and subordinate groups (Foucault, 1980). Identity is a social construction used by dominant groups to leverage power through associating biological characteristics like sex and race to define marginalised groups, suggesting that social hierarchies and rankings are natural and unchangeable (Yoder & Kahn, 1992). Moreover, power manifests at different levels. At the community level, local norms, policies, and practices can skew opportunities for particular groups (Yuval-Davis, 2006). At the institutional level, established practices and regulations can privilege some groups over others. At the individual level, people may exert control daily through behaviours such as discrimination, stereotyping, and microaggressions, such as those often experienced by South Asians, as found in Section 4.4.4.4 (Nayak, 2017).

Social context refers to the broader society in which individuals and groups operate, shaped by various factors such as political, cultural, and economic conditions (Weber, 1998). Intersectionality acknowledges that people's experiences are influenced by wider societal structures, and that identities are not isolated but interconnected with various systems of power and inequality (Omi & Winant, 2014). Systems of domination evolve to align with shifts in social, political, and cultural factors, impacting marginalised groups' experiences. This means that people's subordinations are often shaped by the political and economic objectives of those in power. Historical context is also important in this regard. Groups may be linked with certain ideas, stereotypes, affiliations, and social standings depending on their histories. For example, during the 1960s and 70s, many South Asian women in the UK were pushed into low-paid, undervalued domestic and factory work, reflecting racialised and gendered labour exploitation (Brah, 1987). Understanding the context of people's experiences helps to reveal why certain groups dominate and others are oppressed.

Relationality means to acknowledge the interconnected and interdependent nature of identity. Intersectionality challenges the tendency to view identity characteristics as isolated or distinct, instead recognising that individuals simultaneously navigate multiple, intersecting identities, such as race, class, gender, ability, and age, shaped by overlapping systems of oppression and privilege (Hill Collins, 1990a; hooks, 1981). For instance, the identity categories of each group provide them with some level of disadvantage or privilege. This means that identities are never experienced in isolation and are instead shaped in the context of multiple identities and contexts. For example, a South Asian Muslim woman might feel less safe travelling further afield due to her gender, and less safe than a White woman due to her ethnic and religious identities (Navarrete-Hernandez et al., 2021). These experiences are shaped by the interplay of various contexts across individual, interpersonal, institutional, and structural levels, which together form a unique level of disadvantage specific to the marginalised group (Crenshaw, 1989; Hill Collins, 1990a).

Complexity is to acknowledge that the interplay of identity and context is intricately interwoven, creating challenges in understanding social inequality. People's experiences are not easily categorised and clear-cut and are instead a product of a complex interplay of historical, cultural, and social dynamics that evolve over time and manifest at different levels and in various ways (Kelly et al., 2021). Moreover, identity cannot be reduced to fixed themes or moderating variables, and making oversimplifications about identity reinforces static views, often held by dominant groups, and overlooks the fluid and dynamic nature of lived experiences. Accordingly, this thesis, in Chapters 6 and 7, refrains from making cross-sectional comparisons between demographic groups and does not treat any single identity in isolation. Whilst cross-sectional comparisons could highlight differences between groups, they risk reinforcing dominant narratives about who is perceived as belonging in RGS, thus perpetuating exclusionary norms.

Social justice is at the heart of intersectional research. It means to pursue a fair society where everyone, regardless of identity, experiences fair treatment and opportunities (Guishard et al., 2018). Scholars should work to challenge systems of domination and voice the concerns of marginalised groups. Such groups are often excluded from the process of knowledge production, creating an imbalance where dominant narratives overshadow the lived experiences of oppressed groups (Hill

Collins, 1990a). For example, current psychological frameworks are often skewed by White, male and able-bodied samples (Schulson, 2020). By involving marginalised groups, this thesis can better account for the nuanced and unique experiences of diverse populations in existing frameworks (Bell Jr, 1980). As Hill Collins (1990) argues, the knowledge contributions of those who are marginalised are vital in understanding the processes of domination. This emphasises the importance of valuing diverse perspectives and challenging the objectivist notions of knowledge that are often held by dominant groups. Building on this lacuna, this thesis expands on the findings of the systematic literature review presented in Chapter 4 and focuses on South Asian Muslim women and their experiences with rural green spaces (RGS).

5.5 Chapter Summary

This chapter explored intersectionality as a lens for understanding South Asian Muslim women's experiences of RGS. It provided an overview of how intersectionality addresses the challenges faced by individuals who are subjugated due to multiple intersecting identities. The chapter also examined how intersectionality emerged and its central features. It included a brief discussion of Kimberlé Crenshaw's seminal work in the field. The next chapter presents a qualitative exploration of South Asian Muslim women's experiences of RGS, including discussions supported by an intersectionality framework.

6 Chapter 6 – Study 2: Exploring South Asian Muslim Women’s Experiences of Rural Green Spaces

6.1 Chapter Overview

The previous chapter examined intersectionality as a framework supporting the understanding of South Asian Muslim women’s experiences with rural green spaces (RGS). The current chapter presents a qualitative exploration. This chapter begins by introducing RGS as important for psychological wellbeing (PWB) among South Asian Muslim women. This is followed by a detailed methodology section that reflects on the researcher’s role and ethical considerations in an integrated fashion. The chapter then integrates the results and discussion in a combined section, concluding with some general research implications that are offered in a more operational way in Chapter 9.

6.2 Introduction

As found in the systematic literature review of Chapter 4, much existing research focuses on urban contexts, overlooking how Rural Green Spaces (RGS) - outdoor, natural areas or land away from cities that is encompassed by grass, crops, trees, water, plants, wildlife, ecological systems, and nature, such as mountains, areas of natural beauty, countrysides, lakes and more – may support PWB, especially among marginalised communities who face barriers like South Asian Muslim women. This is significant because RGS offer distinct restorative qualities that may support PWB in ways different to urban green spaces (Lolle, 2023; Rupprecht et al., 2015). For instance, many people choose to visit RGS instead of urban green spaces to better interact with nature, escape the city, and undertake challenging activities (Lolle, 2023; Rupprecht et al., 2015). Since RGS are away from the city and organically formed, they encourage individuals to disconnect from technology and daily stresses that may hinder their PWB (Kaplan & Kaplan, 1989; Vella-Brodrick & Gilowska, 2022). Visiting RGS leads to deeper connections with nature, family and friends, and supports spiritual reflection (White et al., 2021), all of which contribute to enhanced PWB (Coldwell & Evans, 2018). Furthermore, undertaking challenges in RGS leads people to feel a sense of achievement, increasing their perceived self-efficacy (Grahm & Stigsdotter, 2010). Likewise, the open and natural characteristics of RGS facilitate users to engage in health-enhancing behaviours such as physical activity (Barton et al., 2012), which is important to overall PWB (Seligman, 2011).

As demonstrated in this thesis, access to nature in the UK is not experienced equally. National policies and strategies promote green space for public wellbeing; however, opportunities to engage with nature are inhibited by social, economic, and cultural inequalities (Friends of Earth, 2020; Natural England, 2024; Wildlife and Countryside Link, 2024). For instance, RGS in England are traditionally associated with White, middle-class, male users, while visible minority groups are underrepresented as visitors (Edwards, 2023; Neal et al., 2021; Stone et al., 2018). This leaves many groups to miss out on the aforementioned benefits of engaging with RGS, including ethnic minority groups, who experience heightened mental and physical health challenges (Raleigh, 2023). Drawing on intersectionality (see Chapter 5), it can be argued that each marginalised group faces challenges unique to it. For instance, South Asians in England represent RGS the least, as a survey found only 25.7% of South Asian samples visited RGS weekly compared to 44.2% of White people (Natural England, 2019a). This is despite representing 9.3% of the UK population (Office for National Statistics, 2023). There are underlying reasons to explain such disparities, specific to this group. Similarly, experiencing multiple identity markers like religiosity and gender (in addition to race) poses additional challenges (Crenshaw, 1989).

Juxtaposed at the intersections of gender, religion, and race, South Asian Muslim women face compounding barriers to leisure settings, more than South Asian Muslim men, and White, non-Muslim women (Caperchione et al., 2015; Ratna, 2024; Stride et al., 2018a; Stride et al., 2018b). The demographic has previously reported compounding challenges related to proximity, cost, lack of travel options, unawareness of where and how to access settings, and a lack of time to access leisure (Caperchione et al., 2015). Additional barriers relate to the lack of gender-segregated spaces, conflicting expectations around immodest attire, and stereotypes suggesting that South Asian Muslim women are subordinated by men who do not permit them to engage in Western leisure (Green & Singleton, 2016) (see Section **Error! Reference source not found.**). Linked to this, South Asian Muslim women are portrayed as being disinterested in health and leisure, associated with their low levels of physical activity engagement (Bhatnagar et al., 2016). These ideas are particularly relevant when considering people's experiences in a space that is often described as White (i.e., RGS).

The health challenges South Asian Muslim women face highlights the importance of overcoming their barriers to NGS (Desai et al., 2021). Higher levels of cholesterol, diabetes, and poor mental health are more prevalent in South Asian women than South Asian men and White women, often associated with their lower levels of leisure and health activity (Bhatnagar et al., 2016). Their challenges in accessing formal mental health services, often attributed to language barriers and cultural incompetencies by practitioners, reduce their avenues to good wellbeing (Thomas, 2023). In this regard, RGS could be used in various ways for health-enhancing activity, helping to mitigate mental and physical wellbeing concerns.

Some research has revealed barriers faced by South Asians in NGS more broadly, but these are not specific to South Asian Muslim women nor are they exclusive to the context of RGS. For example, Section 4.5.1 noted barriers to accessing green spaces relating to the presence of antisocial behaviour/crime, lack of surveillance, a lack of quality green spaces (Cronin-de-Chavez et al., 2019b), and sociocultural issues of commitments to family and employment (Edwards et al., 2022). Moreover, research focusing on RGS, but with ethnic minorities more broadly, reveals barriers related to proximity, lack of representation, and feelings of unwelcomeness (Edwards et al., 2022). That said, this research includes South Asians as part of their broad ethnic minority samples, obscuring the challenges faced by South Asian Muslims specifically, including South Asian Muslim women. In this regard, Hamza et al. (2024) offer significant insights. In their study on natural green spaces (NGS) broadly, 20 South Asian Muslim men and women revealed a heightened exclusion faced by some women due to the visibility of their gendered, racial and religious identities. However, the small sample of women and broad focus meant that South Asian Muslim women's experiences of RGS needed exploring in more detail.

It is particularly important to explore South Asian Muslim women's engagement with RGS, given the extensive research in more formal health and leisure contexts and the challenges they face in accessing such facilities (discussed in Section **Error! Reference source not found.**) (Abdulwasi et al., 2018; Green & Singleton, 2008; Ratna, 2024). By focusing narrowly on gyms and leisure centres, these women's experiences of informal spaces like RGS are overlooked, thus neglecting alternative avenues for health enhancement. Unlike past studies that focused mainly on physical activity or urban contexts, this research examines RGS, which is rarely studied in

relation to this demographic. Moreover, the systematic literature review of Chapter 4 revealed (see Section 4.5.2) that research tends to focus either on PWB or access factors, and not both. This leads to an incomplete understanding of how access to RGS can support PWB. The identified gap must be filled to alleviate the health challenges faced by South Asian Muslim women. The study's significance lies in its unique focus on the relationship between PWB and access to RGS for South Asian Muslim women and highlights how RGS can promote health in this demographic.

The research was driven by two research questions:

1. What facilitates and hinders access to RGS for South Asian Muslim women?
2. How does RGS access facilitate PWB for South Asian Muslim women?

6.3 Methodology

6.3.1 Research design

The purpose of this study was to explore the subjective experiences of South Asian Muslim women with RGS (Dowling, 2004). As such, the study required methods that allowed participants to express their own experiences (Bryman, 2016; Gratton & Jones, 2014; Holloway, 1997). Qualitative inquiry allows human experiences to be explored in depth, and facilitates rich, insightful and unanticipated data to emerge (Sparkes & Smith, 2013). Through this approach, the participants' perceptions are central, with a focus on their unique perspectives and lived experiences (Stewart, 2014). A total of 23 South Asian Muslim women were recruited through diverse and relevant community networks across England and took part in walking or semi-structured interviews, virtually or in person, to explore their experiences of RGS. When delving into people's experiences, the researcher needs to be aware of their own presence in the research to acknowledge their influence on the findings.

6.3.2 Researcher Positionality

The researcher has a critical role throughout the research process as they influence the focus, the methods chosen, the participants selected, and how data is analysed (Chenail, 2011). The research can also be influenced in nuanced ways (Glesne, 2016; Primeau, 2003), as the researcher's own experiences and preconceptions shape the way in which narratives are interpreted (Bhopal, 2001; Glancy, 1993; Watson, 2018). This means that inquiring about an aspect of people's lives requires the researcher to reflect on their own biases and positionality (Adu-Ampong & Adams, 2019; Bourke,

2014). Similarly, it is important to recognise that each researcher and participant relationship is unique and while it has an impact on how data is generated, their identities cannot be changed (Ahmed et al., 2022; Glancy, 1993; Phills et al., 2018). A reflection of this can be useful in recognising the potential limitations of findings and ways to overcome these limitations in the future (Buetow & Zawaly, 2022).

When collecting qualitative data, the power dynamics between the researcher and participant(s) shapes what data emerges and how (Watson, 2018). For instance, the sense of ownership felt by a participant during an interview can influence how they share detail about their experiences (Anyan, 2013). A participant who feels at ease may be more likely to open up about their personal experiences (Watson, 2018). A positive relationship between the researcher and research participant allows for good rapport, leading to a deeper and more sophisticated inquiry (Majid et al., 2017; Sinha & Back, 2014). A participant who feels subordinated and judged by a researcher may feel reluctant to share specific experiences (Jaspal, 2009). Whilst a skilled interviewer can put participants at ease (Chenail, 2011), it is ultimately the differences and similarities between the researcher's and participant's identities that can shape how perspectives emerge (Ahmed et al., 2022; Colic-Peisker, 2004; Jaspal, 2009).

Researchers have noted the challenges South Asian Muslim women face in sharing their experiences. Many women have felt hesitant to participate due to the misrepresentation they have faced (Khatrri, 2024; Watson & Scraton, 2010). Concerns exist about how an English researcher will gather evidence to support their presupposed narratives (Brah & Clini, 2017). For example, previous leisure and race work has noted how researchers contribute towards stereotypes that South Asian girls are prevented from physical activity by their family members (Bhachu, 2024). This has led many South Asian Muslim women to feel cautious about expressing their opinions and values in fear that their views may be deemed as non-progressive (Bhachu, 2024; Green & Singleton, 2016; Mahdavi, 2014; Visweswaran, 2007; Watson, 2018). In this regard, Watson (2018) found that some South Asian Muslim women were uncomfortable in sharing their experiences with a White, middle-class and female researcher.

Collecting data from people with identity differences can be challenging due to outsider dynamics (Jaspal, 2009). However, similar issues can also exist contrariwise, as studies have found that some participants have felt uncomfortable and hesitant

when interviewed by someone with shared identities (Brah & Clini, 2017; Jordan-Zachery, 2007). Fears can arise from being judged for contradicting norms, values, and behaviours in shared practices or beliefs. This can often lead participants to become more restrictive about what they may share during interviews (Merriam et al., 2001). As such, shared and unshared identities should not be taken for granted within research. As a South Asian Muslim man, collecting data from South Asian Muslim women, I was cognisant of this.

Whilst sharing common ethnic and religious identities with research participants may not automatically result in positive and productive relationships (Markova, 2009), it may have aided me throughout the research process (Merriam et al., 2001). As Sparkes and Smith (2014) point out, being an insider can facilitate the research process. My South Asian Muslim background and advantages in accessing relevant social groups facilitated my access to potential participants in the research (Silverman, 2000; 2006 Sparkes and Smith, 2014). In other ways, being an insider helped me to gain some trust from the participants (Colic-Peisker, 2004; Fletcher, 2014; Jaspal, 2009; Markova, 2009). Similarly, sharing South Asian identities may have helped me resonate with the barriers faced by the participants, including racial and structural challenges.

Furthermore, being Muslim, like the participants, helped me to understand and respect the women's cultural and religious preferences. For instance, Muslim ideals of modesty involve abstaining visually, spatially and ethically from Islamically unlawful behaviours (Naik, 2014). It includes remaining covered from unrelated people of the opposite sex, which is often practised through wearing the headscarf and loose dressing (Hamzeh, 2011; Mernissi, 1987). Many Muslims interpret modesty to refrain from meeting with an unrelated male alone altogether (Hamzeh, 2011), which impacts my research. I had to approach participants in a sensitive way and include a variety of interview options where they could also attend with a chaperone. I acknowledged that I had to refrain from making any physical contact, maintain my distance, and keep conversation focused and appropriate. This helped the participants to feel more at ease, leading them to share more details about their experiences (Glesne, 2016). Furthermore, the difference in gender meant that, despite other shared aspects of identity and my efforts to understand the participants' experiences, my male identity ultimately inhibited me from fully comprehending the women's gendered experiences.

For instance, certain health experiences, emotions, and societal pressures may be difficult for me to empathise with, as they are rooted in gendered experiences I have never personally lived (Bourke, 2014). Similarly, participants may have framed their narratives in ways that felt respectful or appropriate given the context of being interviewed by a male researcher. Acknowledging this limitation is critical for transparency and reflexivity, as it highlights the experiential gap that may influence the interpretation of the data.

I was also aware that differences in identity exist between the researcher and participant at multiple levels. Differences exist between Islamic jurisprudence (i.e., Sunni, Shia) in addition to variations within the label of South Asian (Bengali, Indian, Pakistani). Another layer of difference is through different cultural practices, family circumstances, political beliefs, class, religion, disability, sexuality, and other identity characteristics (Hill Collins, 1990a). Despite being labelled as a 'South Asian Muslim woman', I anticipated that each participant's identity markers would intersect at multiple levels and contribute to their heterogeneity. That said, differences and similarities should not be equated to differences and similarities in beliefs, thoughts, opinions, and experiences (Glancy, 1993; Phills et al., 2018; Townsend & Cushion, 2021). When learning about the participants' experiences, I needed to expect and respect different beliefs and narratives. My own identity and experiences did not necessarily reflect those of the participants, regardless of whether they shared identities with me. This meant that I should not have assumed the privileges of others that I experience myself, such as being able to visit RGS and feeling relatively safe, which may be attributed to my male identity. I had to think deeply about my own identity and background, to better understand my role in the research process. I will offer some details about my background next.

I am a South Asian Muslim male researcher who was born and raised in a diverse town in Northern England. When younger, I occasionally visited RGS on a local and national level. My family and I would visit scenic areas, mainly the seaside, to spend time with immediate and extended family. Later, through personal choices, meeting new people, and working and studying in neighbouring cities, I developed a passion to engage with RGS. These circumstances and my multiple identities influenced my experiences with RGS in positive ways. My economic situation, knowledge, and ability allow me to visit many different types of RGS, and conduct various activities such as hiking, mountaineering, rock climbing, mountain biking,

kayaking and more. I visit these spaces to relax, challenge myself, connect with nature, and escape from everyday mundane life. Whilst my experiences were mostly positive, I face some challenges. When visiting more remote and unfamiliar RGS, I feel more conscious of my differences. For instance, sometimes I feel cognisant of the difference in my skin colour, and a sense of alienation during prayer times. I feel more aware of my wife, who wears the headscarf. This heightens when visiting an unfamiliar or White demarcated space, due to anticipating ill treatment. Although these emotions do not preclude my involvement with RGS, perhaps due to my privilege of being a male, I am particular about where I visit and with whom I visit.

I recognised that each participant would narrate their own experiences with RGS. I avoided going into each interview with preconceived judgments that may have biased me (or the interviewee) in any way (Brah & Phoenix, 2004). In adopting an open-minded approach, I hoped to embrace new and unexpected themes of discussion by carefully considering and understanding the participants' lives (Duffy et al., 2021; Markova, 2009). Related to this, bracketing is a concept that involves neglecting all of one's preconceptions to fully engage with participants' experiences (Chan et al., 2013). While it is often considered unfeasible to completely achieve bracketing, researchers should acknowledge how their perspectives influence the research process. Following the guidance of Schön (2017), I remained conscious of my role as both a researcher and an interpreter throughout the interviews and analysis, aiming to balance between bracketing and offering meaningful interpretations of participants' narratives.

6.3.3 Recruitment and Sampling

Since this study's focus was on South Asian Muslim women and their experiences of RGS, a purposive sampling method was adopted in the first instance (Sparkes & Smith, 2013). Convenience sampling (Gill, 2020; Schwartz et al., 2007) was also adopted to maximise reaching individuals who met the study criteria (Seale, 1997; Seale & Silverman, 1997; Wu et al., 2021). It helped that the researcher already had relationships with some community organisations whose members included South Asian Muslim women. These centres varied and were established for various reasons, such as hiking groups or mental health, while others were simply for general community or religious purposes. The centres were selected to recruit participants due to their varied membership, including South Asian Muslim women of various ages,

classes and backgrounds, reflected in the diversity within the sample. The inclusion criteria required participants to be South Asian Muslim women residing in the UK, while individuals under 18 or from vulnerable categories were excluded.

This study was granted ethical approval by the Leeds Trinity University Ethics Review Committee (Faculty of Social Science and Education). The researcher approached leaders of identified community centres and organisations for the study to be shared with individuals who met the inclusion criteria. These members held a variety of responsible positions and included leaders, imams, and event organisers. After receiving study information, they recognised the potential of the study and agreed to serve as gatekeepers for participant recruitment. Participants may have felt more at ease when contacting the researcher via their gatekeepers (Corra & Willer, 2002; Crowhurst, 2013; Wu et al., 2021). This may have aided in the recruitment of participants who may have otherwise been difficult to reach (Corra & Willer, 2002).

The gatekeepers of each community organisation distributed the study leaflet (Appendix 12) to their members. The leaflet circulated through various social media platforms, including WhatsApp, Facebook, and X (Sparkes & Smith, 2013). Individuals interested in participating in the study contacted the researcher via email. Each participant received the necessary consent form and information sheet, including the potential benefits and risks of participating, prior to their involvement (see Appendix 13). Each participant was given a consent form, tailored to their interview type, to sign and return before their involvement. This ensured that they fully understood the nature of their participation and consented to being involved in the research (see Appendix 14).

A total of 23 South Asian Muslim women were interviewed from various family backgrounds, ages, socioeconomic status and level of engagement with RGS. Collecting data from this many participants facilitated the study to delve into a range of diverse experiences (Braun & Clarke, 2021b; Gill, 2020). Most participants chose to share their experiences with the researcher in person. However, some South Asian Muslim women may not have felt comfortable in sharing their personal experiences with a male researcher (Bourke, 2014; Deitte et al., 2021) and as such, chose to participate virtually. The variation in how the participants were interviewed (discussed below in Section 6.3.4) and where they were recruited from helped to ensure that the study was representative of diverse individuals under the label of 'South Asian Muslim woman' (Seale & Silverman, 1997; Zubair et al., 2012). That said, it is acknowledged

that some women may have decided not to participate at all, whereas they may have consented if the researcher were female (Bhachu, 2024; Schwartz et al., 2007). As such, it is possible that a small portion of the population was underrepresented in the study, although this cannot be alleviated due to the identity of the researcher (Zubair et al., 2012).

6.3.4 Methods

Participants were given the option to participate in the study through a walking interview, or a semi-structured interview in person or virtually. Nine opted for walking interviews, where the researcher posed open-ended questions whilst walking in an environment that was pertinent to the research setting (Davies & Dwyer, 2007; Finlay & Bowman, 2017). Walking methods have often included a variety of creative methods for data collection, such as photovoice, mobile diaries, and mapping (O'Neill & Roberts, 2019). The current study asked participants to select a RGS area of their choice and to walk alongside the researcher who posed questions from the interview schedule. The primary researcher liaised with the participants to agree on a location accessible to both parties, considering proximity, to minimise the burden of travelling (Evans & Jones, 2011). The walking interviews took place in the RGS, which the participants were familiar with, such as moors, country parks, hills, woods, and trails. The researcher and participant liaised to agree on the distance of the walk, meeting place, routes, and timings. The routes were planned to finish at the meeting place, so that both the participant and researcher could return to their mode of transport with ease (Evans & Jones, 2011). Participants selected walking routes according to their own preferences, and took place in moors, peak areas, country parks and trails around England. The author kept reflexive field notes after each walk, which helped inform the interpretation of the findings.

Scholars have highlighted the value of walking interviews in social science research (Freymueller et al., 2024; Holton & Riley, 2014; Warren, 2017). Researchers argue that enquiring about participants' experiences while walking in NGS helps to emerge rich, contextualised, and insightful data (Anderson, 2004). This leads to a better understanding of the participants' narratives (Smith et al., 2014; Warren, 2017). Firstly, the rhythmic movement of the body, and the smells, tastes, and sights experienced whilst walking, help to free the imagination and enable thoughts to flow (Horgan et al., 2022; Jones et al., 2008; Kowalewski & Bartłomiejski, 2020). Moreover,

the change in direction or other prompts, such as obstacles, can spark interesting conversation (Anderson, 2004). Noticing particular features can prompt discussions, providing the researcher with a multi-sensory representation of the participants' relationships with RGS (Bates & Rhys-Taylor, 2017; O'Neill & Roberts, 2019). For instance, one participant, Salma, pointed to tall and thick trees from which she drew a sense of strength, helping the researcher to better understand her sentiment.

Linking this to the discussion on researcher positionality (Section 6.3.2), walking interviews also help to disrupt the power dynamics that often exist between the researcher and participant (Butz & Cook, 2018). In planning and leading on aspects of the walk, participants can feel a sense of ownership (Warren, 2017, 2021). In the current study, mutually planning the interview gave participants a role to play in their involvement, increasing the possibility of a positive relationship developing (Jamshed, 2014). This helped to break down the power relations that exist between the researcher and participant (Valentine, 2015; Watson & Scraton, 2010), particularly that which may exist between a female participant and male researcher (Watson and Scraton, 2001; Sparkes and Smith, 2014). This approach aimed to transform the meaning of data generation into mutually formed research (Freymueller et al., 2024).

In addition to the walking interviews, semi-structured interviews - online and in-person - were offered for those who felt uncomfortable walking with a male researcher, or for practical reasons, such as convenience and time. Nine participants opted for in-person semi-structured interviews, which are often used in social science research to gather in-depth insights into participants' experiences, perspectives, and meanings (Sparkes & Smith, 2013). The in-person semi-structured interviews took place in public but secluded spaces, such as in the corner of an open garden, a booth in a coffee shop, and a glass room of the library. This method balances structure and flexibility, allowing researchers to explore predefined topics while also adapting questions to follow the flow of the conversation. Similar to the walking interviews, semi-structured interviews also allowed the use of prompts and probes to adapt to each participant's discussion and learn more about their unique lives (Corra & Willer, 2002; Doody & Noonan, 2013; Hamdonah, 2022). Being seated during the interview facilitated the researcher to write notes effectively, and to revisit specific topics with ease (Allison & Pomeroy, 2000). That said, the semi-structured interviews felt more structured compared to the walking interviews (Sinha & Back, 2014), which often led to more

spontaneous discussion. Appendix 20 provides an overview on the analysis contributions of each interview type.

Virtual semi-structured interviews were also offered for women who did not want to meet with a male altogether due to their modesty, or for other reasons such as practicality or personal preferences (Weller, 2017). These took place on Microsoft Teams or a Zoom call. Virtual interviews are often regarded as a viable substitute for in-person interviews (Deitte et al., 2021). One scholar compared it with in-person interviews and discovered a similar number of themes, suggesting that the emerging data is not significantly different (Krouwel et al., 2019). This was also important to alleviate participants' concerns about virus transmission and ensure their comfort and safety during the research process, particularly in the aftermath of the COVID-19 pandemic (Patel et al., 2020). While in-person interviews fostered rapport and allowed for non-verbal communication, virtual interviews provided safe and comfortable spaces for women to share their experiences with reduced fear of judgment (Weller, 2017). For example, some women felt they could express themselves more openly when speaking from the comfort of their own homes, who would perhaps not have been able to participate otherwise (Deitte et al., 2021). In total, four women opted for virtual semi-structured interviews.

One single interview schedule was used in the study across all interview types (Appendix 15). This schedule was adapted from a previous study (Hamza et al., 2024), but tailored to suit the context of RGS. It consisted of various open-ended questions designed to gauge the participants' engagement, understandings, values and barriers associated with RGS. For example, questions included how often participants visit RGS, whom they engage with during these visits, and what might help them engage more. Utilising a predetermined interview schedule was important to facilitate questioning at depth, and reduced the need for follow-up interviews (Magaldi & Berler, 2020). It helped to maintain focus in each conversation (Magaldi & Berler, 2020), thus achieving the study's goals. Whilst pre-determined questions surrounding understandings, engagement, and value of RGS were included, the questions were open-ended to help related and unanticipated discussions to emerge (Bryman, 2016). Prompts and probes were used to encourage reflection, uncover further insights and ensure clarity in responses. This helped form a rich and insightful data set that reflected the sample's experiences of RGS (Sinha & Back, 2014). It also resulted in

interviews that were neither too long and burdensome, nor too short and insufficiently detailed (Doody & Noonan, 2013).

As depicted in Table 3 below, the walking interviews generally lasted longer, ranging from 47 to 88 minutes, while the in person semi-structured interviews varied from 30 to 76 minutes, and virtual interviews spanned 40 to 75 minutes. The in-person and virtual semi-structured interviews felt more structured, whilst the walking interviews were more spontaneous, and often entailed rich and broader discussions. Employing multiple interview types increased the scope for diverse data to emerge (see Appendix 20) (Allison & Pomeroy, 2000). All interviews were recorded through a Dictaphone device, which was also connected to a microphone during the walking interviews. Participants were informed that they could withdraw up to ten working days after the interview. Data were transferred to a password-protected computer, which only the researcher could access.

All participants were attributed with pseudonyms to protect their anonymity and were informed that they could attend the interview chaperoned. Some participants opted to attend with their friends or family members, as detailed in Table 3. It is acknowledged that the presence of chaperones may have influenced participants in various ways, including leading them to withhold certain views due to concerns about being judged. However, this option ultimately maximised participants' options and may have aligned with the cultural comfort of many South Asian Muslim women, who might feel uneasy meeting an unrelated male alone (Zempi, 2016). Lastly, the participant characteristics presented in Table 3 were selected because they are directly relevant to giving some idea as to how various social and cultural factors may influence access to and experiences of RGS. For example, indicators such as wearing a hijab, age, socioeconomic position, and family situation may shape women's experiences, motivations, and opportunities to engage with RGS.

Table 3
Details of Each Participant with their Interview Type and Length (n = 23)

Participant	Notes
Elizah	A 47-year-old from West Yorkshire who hardly visits green spaces, interviewed face-to-face whilst chaperoned; a married housewife with children who wears a headscarf (35 mins).

Jannah	A 46-year-old from London who sometimes visits, interviewed virtually without a chaperone; a divorced mother working in education who doesn't wear a headscarf (1 hr 15 mins).
Harissa	A woman in her 50s from Gloucestershire who visits regularly, interviewed while walking with her male colleague who was only there at the beginning and at the end; a divorced mother in public health who wears a headscarf (1 hr 10 mins).
Nergus	A woman in her late 30s from South Yorkshire who visits sometimes, interviewed virtually unchaperoned; a married nurse with children away from home who wears a headscarf (40 mins).
Safa	An 18-year-old from West Yorkshire who hardly visits, interviewed face-to-face chaperoned with female friend; a single student and part-time worker who wears a headscarf (40 mins).
Kulsoom	A 32-year-old from West Yorkshire who hardly visits, interviewed face-to-face unchaperoned; a recently married teacher who doesn't wear a headscarf (45 mins).
Imaan	A woman in her mid-30s from Lancashire who visits regularly, interviewed face-to-face unchaperoned; a married housewife with children who doesn't wear a headscarf (1 hr 16 mins).
Bushra	A 50-year-old from Nottinghamshire who visits regularly, interviewed while walking with adolescent daughter; a divorced mother and self-employed therapist who wears a headscarf (1 hr 28 mins).
Nadia	A 38-year-old from South Yorkshire who visits regularly, interviewed while walking unchaperoned; a divorced nutritionist who wears a headscarf (1 hr 15 mins).
Aliyah	A 29-year-old from Lancashire who visits regularly, interviewed while walking chaperoned with female friend; a single mental health professional who doesn't wear a headscarf (47 mins).
Serish	A woman in her late 30s from West Midlands who visits regularly, interviewed virtually unchaperoned; a married Islamic role model with children who wears a headscarf (44 mins).
Ayla	A 26-year-old from West Yorkshire who sometimes visits, interviewed while walking unchaperoned; a married teacher who wears a headscarf (1 hr).
Muminah	A 45-year-old from West Midlands who visits regularly, interviewed virtually unchaperoned; a single neuro-scientist who doesn't wear a headscarf (45 mins).
Zoya	A 48-year-old from Greater Manchester who visits regularly, interviewed while walking unchaperoned; a married self-employed mother with children who wears a headscarf (56 mins).
Naima	A 41-year-old from East Yorkshire who visits regularly, interviewed while walking with her husband present at the beginning and end; a married housewife with children who doesn't wear a headscarf (57 mins).
Marwah	A woman in her late 40s from Leicestershire who visits sometimes, interviewed virtually unchaperoned; a married mother working in inclusion/SEND who wears a headscarf (1 hr 7 mins).
Salma	A woman in her late 40s from West Yorkshire who visits regularly, interviewed while walking unchaperoned; a divorced self-employed mother with children who wears a headscarf (1 hr 3 mins).

Farah	A woman in her early 20s from West Yorkshire who never visits, interviewed face-to-face unchaperoned; a single student (1 hr 13 mins).
Soorat	A woman in her late 30s from Greater Manchester who visits regularly, interviewed while walking unchaperoned; a divorced finance professional with a child who doesn't wear a headscarf (1 hr 17 mins).
Zara	A woman in her late 20s from West Yorkshire who sometimes visits, interviewed face-to-face with her cousin sister; a married housewife with children who wears a headscarf (30 mins).
Alisha	A 21-year-old from West Yorkshire who hardly visits, interviewed face-to-face her cousin sister; a single student who recently started wearing a headscarf (45 mins).
Mehek	A woman in her late 40s from West Yorkshire who hardly visits, interviewed face-to-face with her daughter; a married early years teacher with children who wears a headscarf (42 mins).
Nosheen	A 55-year-old from West Yorkshire who sometimes visits, interviewed face-to-face unchaperoned; a married housewife with children who wears a headscarf (56 mins).

6.3.5 Transcription and Analysis

The procedure of analysing data influences the quality and credibility of a study (Braun & Clarke, 2022; Silverman, 2020; Watts, 2014). Researchers should be artistic, flexible, scholarly, intellectually rigorous, recursive and reflexive when analysing human experience (Braun & Clarke, 2008; Coffee & Atkinson, 1996; Smith & Sparkes, 2009; Thomas, 2003). The first consideration when analysing data is that the appropriate method should be adopted and executed rigorously to ensure that the data has been organised and represented in a way that reflects the participants' lives accurately (Gratton & Jones, 2014).

Given the practical and philosophical underpinnings of the current research, reflexive thematic analysis could reveal the participants' lives on an individual level and then draw comparisons across a sample of 23 individuals (Braun & Clarke, 2008; Braun et al., 2023). Reflexive thematic analysis facilitates the identification of patterns and themes across a data set to understand the diverse meanings and experiences of people (Silverman, 2020). This approach helped to account for individual differences, allowing for contradictory and unexpected results to emerge (Clarke & Braun, 2013). The researcher managed the data on NVivo v20 software as a repository. The manual analysis was conducted by alternating between digital coding within the software and physical organisation using Post-it notes. The researcher pooled data from all interview types to form a single dataset, which was then analysed.

Braun & Clarke (2008, 2021a) provide a detailed and flexible approach for analysing data. Steps to thematically analyse data include familiarisation, initial coding, thematic coding, revisiting data, naming themes, and writing up. In order to accurately interpret the participants' meanings, the analysis was recursive (Braun et al., 2023). The researcher began by manually transcribing each interview verbatim to prepare it for coding, whilst also facilitating an immersion into the data (Wellard & McKenna, 2001). The transcription process included participants' exact words, pauses, and notable non-verbal utterances (e.g., laughter, hesitations) where relevant to meaning (Wellard & McKenna, 2001). A consistent transcription style was followed to ensure uniformity, where conventions were included to represent pauses and emphasis in a simplified manner. Transcripts were typed by the researcher in Microsoft Word and subsequently imported into NVivo v20 for data management. Each transcript was re-checked by re-listening to the recordings in full to ensure accuracy and was then compared to field notes from each interview. This aided in gaining an understanding of the participants' experiences as well as anticipating possible themes in the data (Thomas, 2003). To ensure accuracy, each interview transcript was sent to the corresponding participant for review and confirmation. Although no participant raised concerns regarding the transcripts, this process served as a valuable step in verifying the credibility of the data.

All raw data were then attributed with codes that reflected their meaning (Appendix 16). For instance, a discussion centred around visiting RGS with friends was coded as 'going out exploring w friends'. No theoretical framework was applied during the analysis. Instead, relevant theories were engaged with during the discussion to interpret and contextualise the findings after analysis. This meant that the data were first analysed inductively, with codes generated directly from the participants' accounts, and then deductively, as existing codes were applied to relevant extracts. All codes and their associated data were reviewed and organised into categories to create sub-themes, which were then named (Appendix 17). Themes were categorised in numerous ways to construct lower-order themes that best fit the data, leading to a finalised set of categories. The sub-themes were then sorted through and organised into higher-order themes (Appendix 19). The higher-order themes were also named and defined (Appendix 18). All codes, sub-themes and themes were sifted through to ensure that the data were categorised correctly (Braun and Clarke, 2006). Vivid extracts were selected to capture the essence of each theme, which were

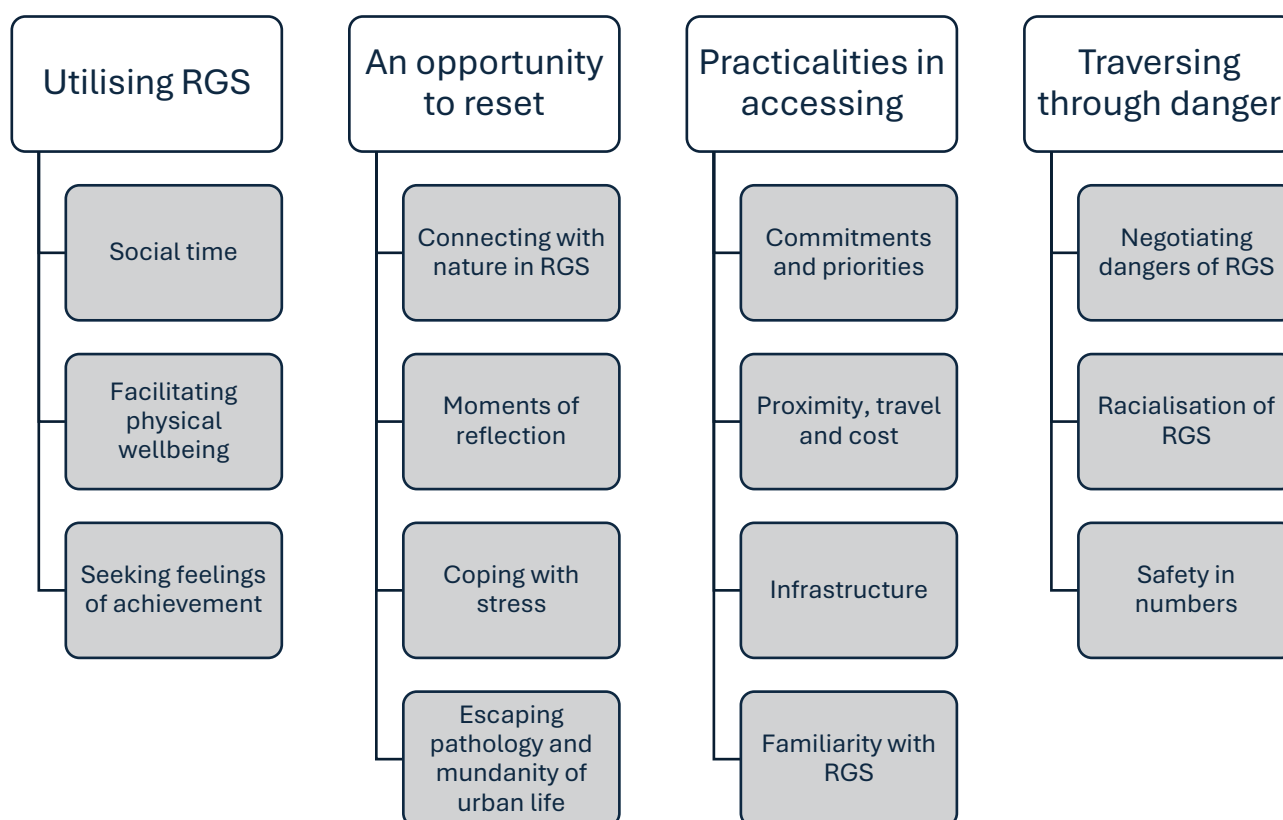
discussed in relation to the literature. Data from all interview types were integrated to provide a comparative and synthesised understanding of participants' experiences of RGS across different contexts.

6.4 Results and Discussion

This section presents the findings of a reflexive thematic analysis of 23 South Asian Muslim women's experiences of rural green spaces (RGS). Four overarching themes were constructed: utilising RGS, an opportunity to reset, practicalities in accessing RGS and traversing through danger, visualised in Figure 5 below.

Figure 5

Thematic map of the themes and sub-themes that emerged from the data



Each participant presented unique experiences and perspectives that led to an overall thematic framework. This section integrates both elements of the results and discussion and discusses each theme in turn, alongside the selected excerpts and relevant literature. Each section provides the number of participants who mentioned a

theme to illustrate its representation within the dataset; however, these figures did not influence the analysis, which was interpretivist in nature.

6.4.1 Utilising Rural Green Spaces

This first theme revolves around how the participants engaged with RGS. The South Asian Muslim women's activities varied, as 14 discussed hiking, four biking, one sailing, one climbing, three picnicking, and one ziplining, demonstrating the diverse ways in which RGS were associated by the participants. Overall, within this theme, the participants' types of engagement with RGS are categorised into three subthemes: social time, facilitating physical wellbeing, and undertaking challenges. Each is discussed in turn.

6.4.1.1 Social Time

Fifteen women discussed visiting RGS to socialise. The excerpts below demonstrate how the environmental characteristics of these spaces helped users to strengthen their bonds with those close to them.

“And it's amazing for my children as well because I feel that when we've got nothing, literally, we're just out without wi-fi, without television... I feel that we all connect so much... The most special times that we've actually had together. It's not when we've been spending loads and loads of money. It's been when we've been out and stripped everything back, been in nature, and just spend time quality, pure quality time together. And they're the memories my children still have today... Sometimes I could go to a place, and it just brings everything flooding back of a time when I visited this place with... family members or friends.” Bushra

“You see so many other families, but you feel close with your own family, so you wouldn't really go to a stranger.” Safa

“We went with all my cousins... every single family that you're close to. So, it was about like 30 to 40 of us all in Bolton out there... We had a barbecue, the ice cream and chilled out with the cars. And then we went on the steppingstones.” Alisha

These women's discussions show how RGS facilitated them in gathering and socialising with others, in large and small groups. This is particularly relevant for South Asians, who are often driven to broader leisure contexts when they can visit with family and friends (Bhatnagar et al., 2016; Mahmood et al., 2022). The women of the current study enjoyed close encounters with their loved ones in RGS, just like various broader ethnic minority groups (Slater, 2022). This was significant for Bushra with her four daughters, who visited RGS instead of the urban environment to build lasting memories. Bushra's account on 'stripping everything back' and experiencing 'pure quality time together' reflects the value of RGS as a way of bonding. This is helped by the absence of technology and urbanity there that often distract people from relationships (Kaźmierczak, 2013; Pomfret & Varley, 2019; Walker, 2025). Given nature's potential in strengthening relationships (Jennings & Bamkole, 2019; Latham & Layton, 2019), these findings highlight the importance of nature for social wellbeing.

Moreover, Safa's preference for walking down a mountain with her family reflects a desire to maintain her own network rather than expand it to strangers. While some studies suggest that more familiar urban environments encourage interaction between strangers (Rocheva et al., 2017; Seeland et al., 2009; Walker, 2025), this was not the case for Safa. Linking this with broader literature, it can be suggested that many ethnic minorities likely feel more at ease within their own circles compared to encountering unfamiliar, predominantly White faces, thus securing a sense of familiarity (Burdsey, 2013; Edwards, 2023).

6.4.1.2 Facilitating Physical Wellbeing

Nineteen participants discussed the convenience of visiting RGS to enhance their physical wellbeing. This is important considering that physical wellbeing contributes to an individual's PWB (Seligman, 2011).

"It's physical exercise... walking up different terrain, some areas are steep ... helps my arthritis." Bushra

"For me, fitness, because I don't do much else. And I used to go gym like three times a week ... So, I just cancelled membership, and I'm just sat on a desk five days a week... my only form of exercise really." Soorat

“The long walks you see, exercise is more of a common thing and you're okay with it... You're okay with going on walks, you're okay with nature.”
Safa

“You need the exercise... So, once I feel I've worked a good distance and I can feel my body can actually say oh, no more! Then, I know that I've pushed myself.” Serish

“[it's] more motivating to run around and plus I'd like to see what's up there so I might not follow a particular route.... It helps me to be a bit more adventurous.” Naima

These women attributed their visits to physical activity, like many NGS users (Costigan et al., 2019; Ding et al., 2011; Ekkel & de Vries, 2017; Leese & Al-Zubaidi, 2024; Markevych et al., 2017; Picavet et al., 2016). Their discussions signal how RGS encourage their physical activity. For Serish, RGS provided distant points to aim for, where progress could be visibly measurable. For Bushra, the physical conditions of RGS required mixed efforts to navigate through. For Naima, the diverse aesthetics provided pleasurable environments to run in. Moreover, Soorat's description of RGS as her only form of exercise reflects the reduced alternative avenues of enhancing physical wellbeing. Considering the health challenges South Asian Muslim women face associated with high levels of sedentary behaviour (Mahmood et al., 2019; Mohammed Nawi et al., 2021), RGS could help to mitigate for the barriers in accessing broader physical activity and leisure settings to enhance their wellbeing (Agergaard, 2015; Amara & Henry, 2014; Knez et al., 2012; Nisar et al., 2022). This is particularly important for the focused demographic, given the compounding challenges they face of time, cost, travel, and exclusion (Bibi, 2018; Mahmood et al., 2022; Stride et al., 2018b).

Indeed, RGS are vital for health enhancement, with studies demonstrating that exercise in natural environments leads to better wellbeing outcomes in comparison to urban or indoor settings (Currie et al., 2016; Dadvand et al., 2016; Leese & Al-Zubaidi, 2024). Exercising in such environments can better enhance cardiovascular fitness, muscular endurance, and bone development, as affirmed by Bushra (Bowler et al., 2010; Lin et al., 2021). Furthermore, exercise releases serotonin, especially in nature,

leading to better wellbeing outcomes, including enhanced emotional regulation (Barton et al., 2012; Dadvand et al., 2016). These findings come as no surprise, as previous research indicates that those who live nearer to NGS often experience better physical wellbeing (Hillsdon et al., 2006; Leese & Al-Zubaidi, 2024), and thus further emphasise their importance for the focused demographic.

6.4.1.3 Undertaking Challenge

Seventeen participants associated RGS with undertaking challenges.

“It gives me that... sense of achievement, if I climbed the hill... Otherwise I feel like I’m sat in front of the TV... do a hike, come back, then it feels ten times better sitting in front of the TV, you feel like you’ve earned it.... I did Blackstone Edge today. I’ve ticked that one off.” Soorat

“I remember sitting in hospital...I was on my own for ten days and the only thing that kept me going was the memories I had of the top of Snowdonia... I invested six weeks into myself making sure that I was recovering... I managed to climb Snowdon again with a group of 20 youngsters... even though the doctors had said it would probably be about a year or two years before I was sufficiently recovered.” Harissa

“Within eight months [of giving birth] I went and did mount Snowden. So, I took my husband and his friend and his wife, but I don’t think they understood the challenge that it presented as well because they aren’t very active and I think they’d been preparing by using the treadmill. But holding on to the treadmill on an incline, rowing or hiking incline, is very different to being on a treadmill... the weather is one way at the bottom, and you get to midway, and you get to top, then the weather is completely different... It’s almost a discipline in itself to know what you need, to get your waterproofs. You need to have the right shoes, need to have emergency equipment, stuff, you know, there’s no [mobile phone] signal up there... My legs were hurting, I saw them [mountain bikers carrying their bikes uphill] and I thought my God, I could do it.” Naima

Soorat visited RGS with a determination to avoid meaningless behaviours. Her

dichotomisation of sitting in front of the television versus ascending a peak reflects how RGS provided an opportunity to experience a heightened sense of self-worth. It is not uncommon to engage in challenging ways, as users from the broader population visit for outdoor and adventurous activities (Curry & Brown, 2010; Pomfret et al., 2023; Pomfret & Varley, 2019). Engaging with RGS in these ways enriches lives and helps to counter feelings of mundanity, particularly for those who live repetitive schedules in urban environments (Boniface, 2003; Pomfret et al., 2023). Pushing the boundaries of one's capabilities, marked by completing challenges in RGS, leads to a sense of fulfilment. This is because being in RGS with minimal amenities and navigating through difficult terrains whilst map reading, planning, and preparing, develops creativity, resilience, problem solving, and communication in ways different to urban life (Large & Schilar, 2018; Pomfret & Bramwell, 2016; Pomfret et al., 2023). This was important for these South Asian Muslim women who were actively looking to build their skills and confidence.

Visiting RGS helped these women to enhance their levels of self-efficacy. This was also shown through Naima's perseverance in continuing her struggles after witnessing others facing challenges. Indeed, RGS can develop the user's sense of achievement (Barton et al., 2012; Barton & Pretty, 2010; Zhang et al., 2023), which contributes to one's overall PWB (Seligman, 2011). That said, the notion of facing challenges resonates more deeply with South Asian Muslim women, who often face stereotypes and expectations surrounding their identity, particularly in Western leisure contexts, where they are often seen to be different, disinterested, and incompatible (Ahmad, 2020; Ali, 2006; Bhachu, 2024; Finney & Rishbeth, 2006; Green & Singleton, 2016). Despite facing such challenges, these women are active in countering assumptions of being disinterested in health and leisure and demonstrate motivations to engage on their own terms.

Challenging themselves through RGS empowered these women. Harissa reminisces on how her memory of conquering a mountain peak helped her to remain resilient during a distressing life stage. In embracing the same challenge again after her recovery, her discussions reflect RGS as a way of overcoming personal obstacles, both metaphorically and literally. Harissa emphasises the significance of overcoming her challenge in RGS by comparing her achievements to those of her younger and

healthier peers. These discussions reflect the PWB benefits gained from experiencing the natural environment, similar to the literature that highlights the therapeutic properties of nature (Nugraha et al., 2024; Poulsen et al., 2016; Stigsdotter et al., 2011). However, the importance of these benefits is accentuated for these women, who face heightened mental and physical health challenges (Sharma et al., 2020; Zaman et al., 2013).

6.4.2 An Opportunity to Reset

All the participants contributed to the theme of RGS being an opportunity to reset. This refers to a metaphorical and physical sense of escape, where being in nature helped these women to better connect with themselves.

6.4.2.1 Connecting With Nature

The first discussion revolves around being away from unnatural environments and being able to connect with nature. Naima and Bushra's excerpts below illustrate RGS as a means of reconnecting with the natural environment.

"I've got quite familiar with them [RGS]... they're extension of home now... There's a spot in Wales... the moment you cross that corner, you see this waterfall. And it's the way it falls... it just felt so beautiful.... and I would love to go back to that... I just couldn't not jump in." Bushra

"There's something about being lost in all of that earthiness, that greenery, that nature...the bright colour around or variations in the green.... you can see the impact of autumn and the impact of spring... the paths are muddier, the paths are dryer... you might encounter a field full of cows... you have to kind of learn about not going near a calf because a mother might just come racing at you. And its things you don't really need to worry about in day to day life where it kind of forces you to have to deal with that there." Naima

"I will bring a flask, and I'll sit on a stone and pour it into my bowls that I bring with me. Sounds funny, but it's just so therapeutic and different. You've got the carpet of the green fern there, and I like the smell of the earth." Salma

These findings show how users can feel a heightened sense of connectedness with nature in RGS. Naima's words convey a deep sensory engagement with the environment and an immersive experience. Her reference to the changing seasons suggests an awareness of the cyclical rhythms of nature, deepening her connection to the natural world. Indeed, the features, landscapes, greenery, wildlife and water of RGS reveal a beautiful aspect of the world for users who may be confined to urban environments day to day (Martin et al., 2020). Resonating with this, previous work on the general population found users to feel a better sense of nature connectedness in RGS as opposed to urban green spaces (Lolle, 2023; Rupprecht et al., 2015). Being able to observe, smell, hear and appreciate ecosystems directly can offer people an enhanced connection with the natural environment, in ways like these women discuss (Garza-Teran et al., 2022). For example, Salma and Bushra discuss how particular features in RGS drew them to constantly return, reflecting how increased exposure to these environments increases motivations to engage. These findings highlight the sentiments which may encourage South Asian Muslim women to engage with RGS.

6.4.2.2 Moments of reflection

Eighteen women discussed visiting RGS as an opportunity to reflect on their lives.

“That thinking can only happen when you're not rushing or worried about any commitment... I come out to visit them [RGS] and, you know, walk. It just helps me to develop those or make connections to my problems and find solutions for them... This is where the appreciation, the humbleness, everything comes in. And every time I just look around... there's no power except Allah. It really touches my heart. Like this is Allah's power. And who am I? What am I? Nothing.” Ayla

“There was a family of swans ... the mum was pregnant. I saw how much love the father swan put into protecting his little, the eggs... I used to go every day to see the family of swans... Allah's created such beautiful animals... When Allah says that they're your half, your spouses are the people who look after you... I was thinking he [the swan] loves his wife and children so much now he protects them from everything... they'd be going

down the canal and mummy and daddy Swan would be together and baby swans would be at the back.” Harissa

“I could just stand here for such a long time and just listen to the water and look at the trees around me and just ponder. I like looking at the plants, the wildlife.” Salma

Some participants linked the wildlife in RGS to their own lives. Harissa, a victim of domestic abuse, idolises the swan’s family dynamics and admires the father protecting his ducklings. In experiencing a different kind of toxic relationship herself, Harissa appreciates the Swan family dynamics. The participants’ discussions show how users can draw parallels with wildlife to feel moments of bliss and happiness, particularly when experiencing trauma. RGS are indeed therapeutic (Stigsdotter et al., 2011) and promote positive emotions for users (Cameron et al., 2020). Such spaces should be considered to help alleviate trauma, as recommended through broader findings (McGuire et al., 2022). This is significant as 3% of South Asian women experience domestic abuse (Office for National Statistics, 2023).

As alluded to by Ayla, the busyness and technological distractions of urban spaces inhibit people from mindful thought and reflection (Edwards & Larson, 2020; Robison & Ridenour, 2012). This negatively impacts PWB (Kaplan, 1995), which is concerning for South Asian Muslim women who already experience poor mental health (Awan et al., 2022) and live mostly in urban environments with little access to NGS (Ferguson et al., 2018). RGS helps people to reflect and draw solutions to life’s problems, supporting their psychological restoration (Grahm & Stigsdotter, 2010; McGuire et al., 2022). These findings highlight the importance of RGS for supporting South Asian Muslim women.

An interesting finding from these data is that wellbeing was linked to spirituality by ten women, and 13 discussed how engaging with RGS led them to feel more spiritual. This reflects an intersection of religion, as these women’s Islamic identities influenced their engagement (Crenshaw, 1989). Their observations in RGS were constantly linked to Islamic theology and led to positive feelings, aligning with broader work on nature and religion (Ramkissoon, 2020; Richardson et al., 2017). In Islam, the diversity, vastness, complexity, and order of RGS are attributed to the power and existence of the creator (Naik, 2014). These women manifested such ideas by

pondering over the creation, which led to feelings of insignificance, awe, and humility—all of which align with Islamic spirituality (Massad, 2020). The findings of this study fit within the broader literature that suggests religious people are often connected with natural environments (Briguglio et al., 2020; Ryff, 2021), experienced by South Asian Muslim women in addition to their gendered and ethnic identities. They also highlight the importance of catalysing religiosity to enhance PWB outcomes in nature.

6.4.2.3 Coping with Stress

This subtheme highlights the ways in which participants actively managed their mental health through mindful activity in RGS. A large part of dealing with stress is related to the participants' Islamic beliefs.

“I've just had this [cancer] diagnosis... I get a lot of solace and peace being in nature, you know, creation of God. I really find a lot of peace in that. ... I go through states where I might meet up with a friend, and we'll go for a walk through the woods.” Jannah

Muslims often associate RGS with the creation of God that is untouched by human intervention, linking them with peace and tranquillity (Gilliat-Ray & Bryant, 2011; Hamza et al., 2024). Such spaces facilitate individuals to ponder and connect with God, minimising their worldly stresses (Hamza et al., 2024). For some, like Jannah, RGS may even provide respite when going through grief (Birch et al., 2020a). These findings suggest that Islamic beliefs can encourage Muslim communities and South Asian women to engage with RGS.

All the women associated RGS with general mental health. They discussed feeling calmer, fresher, stronger and more confident after engaging with RGS.

“It was almost like an addiction, a habit, and [I] parked my car up where we've parked and I just come into the woods. I had to have that before I went home and faced everything that was going on in my life... And if I didn't do that, I was just lost all day... My routine was that I've got to go into the woods... Just take in the air, look at the colours, listen to the water... And then there were days that I couldn't do that... I'd just feel lost... I sort of rely on it in that sense, in a negative way.” Salma

“My mother passed away, and the first thing I did was just go get away from everyone and everything and go and camp. Literally, with my girls [and] just me. I had to cut everything out of my life. And that gave me so much peace and it gave me the ability to sort of process things in my own space and in an environment that I needed... it kind of leaves everything behind... Grounds me back to reality.” Bushra

Major life events, such as the death of a mother, increased the importance of RGS for Bushra. Indeed, RGS can offer a sense of seclusion for people who are in need of restoration and recovery (Birch et al., 2020a; Ulrich et al., 1991). This is evidenced by Bushra camping away and Salma seeking refuge in the woods. Being alone in RGS helped them to manage their emotions and feel a sense of restoration on their own terms. This shows how RGS can support positive mental health outcomes (White et al., 2021) and support stress reduction (Corcoran, 2020; Roe et al., 2017; White et al., 2013). These findings also support broader frameworks depicting nature as restorative (Kaplan & Kaplan, 1989). Furthermore, whilst ethnic minorities are reported to use natural environments to cope with stress and trauma (Birch et al., 2020), these excerpts reflect the intersectional experiences of South Asian Muslim women (Crenshaw, 2013). Given the various gendered and cultural expectations South Asian Muslim women experience, and the challenges they face in accessing formal leisure contexts (see Section **Error! Reference source not found.**), RGS may have provided a safe and secluded space to process emotions away from familial and community expectations. Their solitude enabled reflection and a sense of autonomy, away from their gendered and cultural obligations of caregiving, which often shape their everyday lives.

The women valued RGS as a tool to improve their mental health. Salma relied on such spaces to manage her stress. She was able to access them regularly due to experiencing local access, reflecting the importance of having adequate access to RGS for managing stress (Baceviciene & Jankauskiene, 2022; Rigolon et al., 2021). However, such privilege might not be afforded by everyone, as South Asian Muslim women are more likely to live in urban areas deprived of NGS (Karasz et al., 2019; Roe et al., 2016b). The inadequate access and poor health outcomes South Asians face in accessing formal mental health interventions mean that RGS must be made more accessible (Thomas, 2023).

6.4.2.4 Escapism

The women of this study associated RGS with escapism. Twenty-two participants discussed visiting RGS to escape from various pollutions of the city. Amongst these, eleven visited to escape poor air quality.

“There's something about being in a remote space. It's really grounding... There's no cars. There's no pollution.” Zoya

“Even if you go to the parks... the air is not fresh enough. But when you go out on the hills, especially because high up as well, the air is a lot fresher... So, make sure they [the group] go out there out there for about good 5-6 hours. To get the air in my lungs.” Serish

Serish's discussions highlight a desire to preserve her health by seeking clean, refreshing air in RGS, to distance herself from urban pollution. Many users of RGS hold similar motivations, including ethnic minorities (Irvine et al., 2013; Schipperijn et al., 2010), who visit RGS because of its clean air properties. This is significant for South Asian Muslim women who live in densely populated urban areas where access to clean air environments is limited (Roe et al., 2016b). The ecosystems of green spaces produce cleaner air than those of urban environments (Richardson et al., 2017), restoring users' respiratory system and, as such, contributing to feelings of vitality (Akaraci et al., 2020; Ekkel & de Vries, 2017). This shows how RGS can positively impact physical wellbeing in ways different to physical activity (Depledge et al., 2011), which are central in urban contexts like gyms. While this reflects a sense of escaping from urban environments, seven participants discussed visiting to escape from antisocial behaviour in urban parks.

“Urban parks... I associated them with like teenage yobs... I don't feel confident enough being there because these days kids can be quite... nasty.” Nadia

Nadia's experience with her local park was negative. Broader studies show how residents of lower socioeconomic neighbourhoods, particularly ethnic minorities, feel unsafe in their parks due to anti-social behaviour (Williams et al., 2020). This issue heightens for women, who are more vulnerable to abuse than men (Jorgensen et al., 2013). Guidance to make parks safer for women already includes better lighting,

dedicated spaces, more exits, and added surveillance (Barker & Fox, 2023). However, the intersection of gender, race, and religion of these women adds layers of vulnerability, meaning that more needs to be done to develop inclusive and safe spaces for all. For instance, while ethnic minority groups reside in areas of crime (Williams et al., 2020), Muslims also face increases in hate crimes and abuse (Jones & Unsworth, 2022). This next subtheme focuses on visiting RGS as a means of escaping from abuse.

“I kept thinking... I can't lose walking. And he kept, he was getting angrier and angrier. He was becoming more violent... I just couldn't give up walks... It was my sanity. It wasn't anything apart from just walking up a hill and walking back down the hill... I would just like a feeling of total freedom.”
Harissa

For Harissa, visiting RGS was an ongoing struggle of hard bargaining. She faced a difficult choice to either stay at home and endure mistreatment or to encounter more abuse for visiting RGS. This ended when she transcended from a position of subordination and shifted from selflessness to self-care. Visiting RGS symbolises a reclaim of authority over her own life. She justifies the repercussions of her separation by portraying her demand as reasonable. The sense of recovery she experiences by visiting her sanctuary reaffirms her decision. Leading on from this, ideas around escaping commitments and responsibilities, more broadly, emerged from seven women.

“You sort of get in prison with your daily routine because you have a job and then you have housework, and you have kids... your own daily tasks. Whereas when you go to areas like this... you could just for a split second, just leave all that behind you.” Marwah

As Marwa reflects, RGS offered a form of escapism, allowing her to momentarily detach from the pressures that weighed on her. Many users are shown to feel distant from their employment stresses, home commitments, and family responsibilities when visiting RGS (Large & Schilar, 2018). This escapism is particularly relevant for South Asian Muslim women who are often led to navigate the complexities of multiple cultural, familial, and gender expectations (Nisar et al., 2022; Ratna, 2024; Stride,

2014b). Whilst valuing their household responsibilities, many women, including South Asian and non-South Asian, feel confined by daily chores (Abu-Lughod, 2013; Lenneis & Pfister, 2017; Mahmood et al., 2022; Zaman, 1997). Taking a break from these responsibilities and visiting RGS can lead to feelings of nourishment. These findings highlight the intricate negotiations individuals make between selfless caregiving roles and personal desires, which are further unpicked below.

6.4.3 Practicalities in Accessing Rural Green Spaces

Twenty-one participants discussed multiple sociocultural and geographical factors that shaped their access to RGS, including their commitments, busy schedules, distance, physical accessibility and familiarity with those spaces.

6.4.3.1 Commitments and Priorities

Family duties emerged as a factor for 17 women's RGS engagement.

"I can't go too far because then I won't get back home in time to collect her [daughter] from school. So, we leave early in the morning because Mano has chess anyway at 7:30 on a Tuesday morning. So that's my day where I can go for a nice walk." Bushra

"I have this one day off, which I don't tend to, don't tell the kids' dad or the kids... And if I book a day off, I try and do it Friday'... we [Marwah and friends] do all the school runs and usually we clock in to work or that day because we're not working, we will meet at Bradgate park... we'll just do like a two, three hour trek... And we all rush back an hour or two before school run so we can just get some housework and clean... it is like a safe haven... this is my freedom." Marwah

Others' discussions revolved around having to prioritise life commitments over RGS.

"We loved it as kids. And then life takes over... So, for like 20 odd years I had been lying and looking out the window thinking, I really need to get out there, but not being able to have the support to, to go out with someone... t's really hard with the kids, when you're on your own." Zoya

“Yeah, more than working. You just, you've got this stress load on you that all the prices are going up. How am I going to be able to afford this and that? So, I think that's the biggest priority now. And then taking some time out for these RGS experiences... not a priority right now in my life.”

Kulsoom

“My lifestyle is just so busy... I've got a finite amount of time... I've got to try that and then just wind down at some point.... I wouldn't go necessarily for walks once it gets dark... It's just that I'm so tired then by the end of the day... I'm not prioritising it... but when I do go, I love it.” Jannah

Whilst family commitments shaped access to RGS for some, other women saw value in upholding them.

“Reduce those commitments? No... even in those commitments, there's blessing in them. If I'm caring for my mom... She's 89. You know, some part of me doesn't like to be too far from her because she's not well. So, I would not want to have a phone call, and I'm 4 hours away or 3 hours away or 2 hours away. You know, I'm up the road 5 minutes away... So, as much as I love all this stuff I'd like, I don't do it.” Nosheen

The data reflect the ways these women negotiated their commitments to balance their leisure and family lives. They upheld family responsibilities whilst making time for self-care. For instance, Bushra visited within certain time windows to balance her family responsibilities, Nosheen refrained from visiting further afield to remain prepared for her family's needs, and Marwah visited whilst others would presume that she was working. These data demonstrate that there is a group of South Asian Muslim women whose narrative is not founded on sentiments of captivity or subjugation, but rather on personal preferences. This idea challenges dominant Western notions of leisure as individualistic and detached from responsibility (Anderson et al., 2021). For these women, leisure is undertaken whilst abiding by care and obligation, negotiated rather than freely pursued. RGS are thus more than sites of emotional restoration (Sutcliffe, 2018), and instead are spaces where women balance their personal needs with caregiving roles.

Whilst some negotiated their care roles with RGS engagement, others framed them as outright barriers, as Zoya felt a sense of imprisonment in her home. This reflects a gendered dynamic where women are expected to stay at home (Bakali & Soubani, 2021; Rozaitul et al., 2017). Zoya idealises her engagement through a window, symbolic of her inability to visit RGS. The shift in circumstances, from a free childhood to being constrained, reflects how sociocultural factors, especially those related to evolving family dynamics, influence women's engagement with RGS over time. At a practical level, these findings highlight the significance of family members supporting each other's visits, particularly for these South Asian Muslim women. This is similar to other studies, which highlight the significance of family and friends in catalysing visits to broader leisure and physical activity for South Asians (Abdulwasi et al., 2018; Mahmood et al., 2022).

There seemed to be less flexibility in managing employment commitments. Nosheen, Kulsoom, and Jannah reveal barriers to access RGS due to their workloads. These challenges are particularly pronounced in economically disadvantaged communities, where most South Asian Muslim women reside (Friends of Earth, 2020), constraining people's time, travel options, and resources to access RGS. This reflects a class dynamic, where lower classes are unable to access RGS due to heightened cost, time, and employment challenges. Such issues are exacerbated by the UK's cost of living crisis and heightening expenses associated with leisure activities in general (Cretu et al., 2021). Individuals are often faced with the dilemma of engaging in RGS or preserving their capital amidst the escalating living costs, all while privileged groups remains advantaged in their access, perpetuating ideas that they belong in such spaces (Haqqani, 2023; Hill Collins, 1990b; Stride et al., 2018b).

6.4.3.2 Proximity, Travel and Cost

The data highlight the importance of proximal access to RGS. Some women could access localised spaces, whereas most found it challenging due to the travel and cost required.

"I love going to the lakes... when I can afford, and I've got family with me. Yeah. And then we can share the cost of travel and accommodation but usually get into places that are fairly cheap... or free to get to, and closer to home." Salma

“It's the distance, so far, it's not like I'm gonna go after work... gets dark as well. The days are short, and in the day, even on the days are long, you can't go after work because by the time that it takes an hour to drive anywhere... So, then you've only got your weekends...” Serish

“I tend to stick to all the...closer to home... I'm not driving for an hour to get there.... if I was a bit closer to Peak District, I'd be doing a lot more of that by myself.” Soorat

“We've also got the limit of the around 50 miles that you can't be away from your male guardian... sometimes I do I do break the rule. My husband knows where I am...” Naima

Nine women discussed barriers related to visiting RGS further afield, and eleven discussed being able to access RGS due to living on the outskirts of their areas. Salma's discussion resonates with wider literature, which highlights that those who live closer to green spaces could access them more frequently (Wang et al., 2015). Indeed, these access factors largely align with the framework of Wang et al. (2015), who establishes access through personal, social, transport, knowledge, and physical dimensions. That said, as Naima and Soorat describe, living in deprived urban areas, like most South Asian Muslim women do, forms a challenge for people to access RGS (Boyd et al., 2018; UK Government, 2020). South Asians are known to face barriers in accessing NGS due to a scarcity of it in their neighbourhoods (Boulton et al., 2018; Ferguson et al., 2018; Mueller et al., 2018; Nesbitt et al., 2019) and additional challenges exist for accessing RGS, reducing avenues to engage with nature.

South Asian Muslim women are compounded with socioeconomic challenges, and as such, travelling further afield can be complex (Hamdonah, 2022). For instance, while experiencing the cultural and gender-related responsibilities of caregivers, most South Asian Muslim women are also worse off socioeconomically (Aamodt et al., 2023). Costs and travel time significantly hinder these individuals' access (Spencer et al., 2020). However, as Salma emphasises, social networks can mitigate travel costs through visiting with family members. This reiterates previous literature on the value

of social networks in accessing RGS (Cramm et al., 2013; Grant et al., 2017; Walker, 2025; Wiltshire & Stevinson, 2018).

The challenges associated with proximity to RGS were not always associated with cost, as Serish reflects a distaste for travelling at night. Travelling in the dark can deter ethnic minorities due to heightened concerns of safety (Goodman et al., 2014; Navarrete-Hernandez et al., 2021), pronounced for women who are more prone to abuse than men because of their gendered identities (Avery et al., 2020). These challenges increase during the winter months when reduced daylight further limits leisure opportunities, particularly for South Asians, who often work longer and more physically demanding hours than their White counterparts (Jacob et al., 2023; Veal, 2020).

The issue of proximity becomes further nuanced when considering Islamic guidance for Muslim women's travel. It may be that many of these women preferred visiting with their family members to align with their Islamic beliefs that instruct women to travel chaperoned when travelling further than 50 miles⁸, posing an additional intersection. Little Western research touches on Muslim women travelling alone, although Tavakoli & Mura (2021) explore how American Muslim women move in accordance with their faith. The current findings accentuate the importance of appropriate travel options for Muslim women, by creating family-friendly spaces and transport that caters for Muslim women's needs in alignment with their faith.

6.4.3.3 Infrastructure

Nine participants identified barriers related to inadequate amenities and a lack of accessible routes for prams and wheelchairs. Of these, three discussed challenges related to infrastructure and public conveniences, reflected below.

“There's not enough public facilities like toilets... car parks get full and you can't get a parking space... And sometimes you have to pay a lot for the car parking... And sometimes the toilets are not working...” Serish

⁸ Naima reflects a single school of thought on Islamic Jurisprudence of travelling, a matter that is subject to complex discussion between Islamic scholars. Younas, S. (2016). *Can a Woman Travel Alone for More Than 48 Miles If There Is a Benefit?* Retrieved 13/01/2024 from <https://seekersguidance.org/answers/hanafi-fiqh/can-a-woman-travel-alone-for-more-than-48-miles-if-there-is-a-benefit/>.

Three discussed feeling deterred due to the presence of litter.

“When they're leaving their barbeque tins or you find paper bags and plastic bags lying around, that really pisses me off... You should be more considerate of the planet, of the earth.” Nosheen

Three discussed challenges related to accessible pathways.

“If I'm taking kids with me, it's hard. Because, if she doesn't want to walk, she'll have to be in pram, and if I can't take the pram, I can't go that place so sometimes... Same goes with wheelchair as well.” Zara

Serish's discussions highlight the difficulties individuals encounter when they are unable to access toilet facilities while visiting RGS. The unavailability of amenities can lead to dissatisfaction for many users, deterring their visits, particularly for those who may be reluctant to engage with RGS already. Moreover, the unavailability of accessible paths can exclude certain types of demographics (Dahlberg et al., 2022). The absence of wheelchair and pram-friendly paths can alienate people experiencing disabilities, or those caring for children, as highlighted by Zara. This reduces the PWB benefits RGS have to offer for people with mobility needs. Everyone should be able to access RGS equally, and creating accessible pathways may cater to individual mobility needs. However, this suggestion should be adhered to tentatively, as maintaining the environment's natural characteristics often drives people to visit RGS (Lolle, 2023; Rupprecht et al., 2015).

Nosheen detests the lack of care shown for the environment. The presence of litter can symbolise a lack of appreciation of the environment, which misaligns with people's values of caring for the earth. It can also signal antisocial behaviour, deterring visitation. Spreading awareness to deter littering can lead to more welcoming environments (Vargas-Hernández et al., 2017; Walker, 2025). Overall, these findings join others in asserting the importance of adequate infrastructure of toilets, carparks and signage as crucial factors of engaging with natural environments (Sugiyama et al., 2012; Sugiyama & Thompson, 2007; Vargas-Hernández et al., 2017), which are

particularly important for South Asian Muslim women's access, who already face compounding barriers.

6.4.3.4 Familiarity with Rural Green Spaces

Ten participants discussed feeling familiar with RGS as a factor in their visitation. Amongst these, nine highlighted challenges related to knowledge of how and where to access RGS.

"I don't know where to go. Where do I go? This is not something necessarily my mates are into... we have gone around Roundhay Park. We have done that as like a, you're putting on a bit of weight we should go for a walk. But that's about it." Alisha

"It takes some research and planning, but I can just go... I know I can find the information to do it and go and do it." Naima

Five participants felt a general lack of confidence in accessing RGS.

"I feel like there's something inside me from childhood that's still 'don't go here'... I think the furthest I've been this year is probably the Peak District... I don't know if it's a safety thing or it's just I just don't feel comfortable. I don't like going to places where I might get lost. I like to be at home." Farah

The participants' discussions revealed how visiting RGS requires knowledge of locations, transport, routes, navigation, planning and preparation. Those who are familiar with the locations and routes of RGS are more likely to visit (Farkić et al., 2020). This is demonstrated by Naima, who visits RGS regularly, facilitated by her knowledge of such spaces. Unfortunately, RGS knowledge is exclusively accessible for White middle-class men, while South Asian Muslim women must work harder to access it, factored by its' scarcity in their communities (Boyd et al., 2018). As highlighted in Chapter 2 (Section 2.5), knowledge, familiarity and confidence are key factors for access to urban green spaces (Jarvis et al., 2020; Wang, 2015; Wang et al., 2015). These factors may be more influential in the context of RGS due to additional challenges inherent in visiting them, linked to their proximity and demarcations of belonging to White people (Edwards, 2023; Stone et al., 2018).

Farah discussed disliking travelling to RGS. Her fears of getting lost in those spaces, due to her lack of information, led to discomfort. Having little information can lead to feelings of unfamiliarity, exclusion and discomfort about a place (Thorogood et al., 2021). Furthermore, Farah gravitated towards environments that were familiar and known to her, resonating with previous work that highlights how disadvantaged groups prefer staying within the vicinity of their own communities (Navarrete-Hernandez et al., 2021; Phillips et al., 2022). In this regard, some scholars suggest that users develop a strong emotional bond with the environments they frequent and where they feel a sense of safety and belonging (Rishbeth & Powell, 2013). This bond is particularly significant for South Asian Muslim women, who often face exclusion in Western leisure spaces, as it offers a sense of psychological refuge and belonging (Green & Singleton, 2008). By staying local to their own communities, women may choose to stay in areas where they feel a sense of psychological security through shared identity. This is especially important for individuals subordinated through multiple identities (McKenna et al., 2018), like South Asian Muslim women. For this group, travelling RGS further afield can equate to feelings of vulnerability due to being subjected to negative treatment and racialisation, discussed further below (Godshaw & Singleton, 2025; Thorogood et al., 2021).

6.4.4 Traversing through Danger

The following discussion highlights the fears a group of 23 South Asian Muslim women experienced because of their marginalised identities. Each subtheme magnifies one angle of these women's racialised experiences with RGS. These subthemes were constructed separately during the analysis (see Appendix 19) however, they interrelate. For instance, the dangers associated with visiting RGS connect closely to feelings of vulnerability stemming from the women's religious, gendered, and ethnic identities. Similarly, some participants described visiting RGS with others to mitigate these risks, reflecting the interconnected theme of safety in numbers.

6.4.4.1 Racialised Experiences

The below extracts represent the anticipation and experience of discrimination that seventeen individuals faced from RGS because of their South Asian, Muslim and women identities.

"I'll definitely have anybody walking past me look at me, at least because I stand out... As much as I love coming out to these rural green spaces, I do

have aspects of me which just inside are... not comfortable... I felt like I experienced that when I was in Blackcombe... They've not seen an Asian woman in hijab walking down a hill or um, it could be a surprised look, where they're starting to see a different someone from a different colour or someone from a different gender with being, well, head to toe covered, walking.... they were like, oh, you must be too warm... My hijab is my modesty... my spirituality." Ayla

"They look at you with curiosity or just like downright, what the hell are you doing in our territory, in our land kind of thing? I don't really care most of the time. If I do feel a little bit uncomfortable, I can always leave... as I've gotten older... it doesn't bother me." Nosheen

"This happened last Christmas. And we did Mam Tor... But it's nice to be with people who looked like me all together in the crowd, and they'd all come from all over the country for this hike. And afterwards [it] was all over the BBC news. In the news people were calling us, what did they call us? Things like wildebeest. And it's like we're out in the Serengeti. So, it took me quite a few days to not be upset." Naima

These excerpts illustrate that RGS continue to be perceived and experienced as predominantly White, middle-class, and male, leading to negative experiences for individuals like Ayla, Nosheen, and Naima during their visits. Labels such as 'wildebeest' reflect a colonial and subordinating tone, highlighting the dehumanisation of this group, and the power dynamics between White and ethnic groups. For instance, Naima recalled derogatory labels associating her walking group with migrating animals. These racial dynamics, which are prevalent in broader Western society, are pronounced in RGS due to its lack of diversity and the underrepresentation of ethnic minorities (Neal et al., 2021; Palmer et al., 2025; Ward et al., 2023). Such experiences are not limited to this cohort, as literature has examined the prevalence of ethnic minorities' racialisation in various outdoor settings (Boyd et al., 2018; Buijs et al., 2009; Jay et al., 2012; Stone et al., 2018). This is because racial abuse occurs more often in spaces of less diversity (Edwards, 2023; Nandi & Luthra, 2016). In the current study, eleven participants experienced rather overt forms of racial discrimination. For some

women, such as Nosheen, leaving RGS was appropriate when facing such abuse. This reflects how White middle-class men occupy RGS unconditionally, while South Asian Muslim women must navigate them carefully due to their identities (Burdsey, 2011; Panelli et al., 2009; Thorogood et al., 2021). In other words, South Asian Muslim women's visits to RGS are contingent on whether the Whiteness of RGS is reenacted and reinforced.

The subordination of these South Asian women heightens when considering their positions at the intersections of religion and gender. Women who wear the Hijab⁹, an outward expression of their Islamic identity, discussed their racialised experiences more frequently (see Appendix 20). This was shown in Ayla's reflection of the scrutiny she faced due to her clothing choices. She justifies her hijab as a marker of faith but also recognises that it may appear strange to the White RGS user, who might perceive it as a threat to their way of being. This leads to the increased visibility of these women, which can contribute to feelings of alienation (Nakamura, 2002; Soltani, 2021).

Wearing the Hijab through the heat on a mountain contrasts with Western ideals of leisure, which exclude those who do not align with its narrow parameters (Ahmad & Aziz, 2022; Maher & Thompson Tetreault, 1997). Associated with their differences in clothing and engagement, these women are confronted with ideas of frailty, disempowerment, and a lack of autonomy (Massad, 2020). For example, wearing the hijab, which symbolises submission to God, conflicts with Western ideals of liberation and individualism, where women can dress in revealing clothing (Beck, 1980). This tension, when placed in contrast with Whiteness, reinforces the perception that Muslim women are unliberated and oppressed (Askins, 2009). These findings are reflective of broader dynamics that pathologise South Asian Muslim women as incompatible with Western ideals that permeate through RGS (Askins, 2009; Burdsey, 2013; Panelli et al., 2009). They also reflect the subordination of South Asian Muslim women and the dominance of Whiteness in RGS, as articulated in previous research (Neal, 2002; Neal et al., 2021).

Nine women discussed feelings of uneasiness, hesitancy, and irritation due to their discrimination. It is unfortunate that spaces positively associated with PWB for the general population (Currie et al., 2016; Richardson et al., 2017) initiate negative

⁹ Hijab is an Arabic word which refers to that which covers. It is generally used to refer to headscarf for women in South Asian communities.

emotions for some users. This could mean that social exclusion and identity can hinder the PWB benefits associated with RGS. Leading on from this, Naima and Nosheen's reflections on overcoming their treatment highlight the resilience South Asian Muslim women require to access RGS. That said, these women were not passive recipients of this abuse, as thirteen actively challenged the norms and preconceptions associated with their engagement. For instance, Ayla criticised questions about her hijab, and Naima purposefully visited in large groups, each asserting their rights to access RGS. The next section further explores how these participants negotiated dangers in RGS.

6.4.4.2 Feelings of Vulnerability

Eighteen participants discussed feeling vulnerable in RGS due to their identities and negotiated ways to feel safer.

"You get a little bit panicky that you can't make your way and it's getting a bit late... if the light was failing, I wouldn't go down a beaten path.... you never know what strange men, or people, are wandering around in these places... But otherwise, I feel quite safe... especially when you see other people on the same path and even if it's another woman that's walking in the opposite direction behind you... you hear horror stories of women being murdered, killed, or have you, in the woods." Muminah

"Being a female, being alone out in a secluded area... there's a risk that somebody could attack me... if something was to happen to me here, who would know where I am... I made an effort then to show my sisters [the spaces].... if anything was to happen... they might... look down by the river or in the woods." Salma

"I think he was going to pull my headscarf off as soon as I turn around. He looks at me and just pretended that he was on his phone like this, and just carried on walking... it was like, just a somber reminder that, you know, people like that are around and if there's just two of you, they will feel quite brazen to do something to you." Nadia

“I'd avoid going into towns [referring to RGS] which are not touristy... because you get more of a mix of people in the tourist area, and you'll be probably a bit safer and... avoid certain areas.” Bushra

In her awareness of who dominates these spaces, Muminah unveils a gendered process of pursuing safety. Like ten other women, she recalled a sense of vulnerability, particularly when light was fading, while navigating the unfamiliar territory of RGS. Studies show how women experience more fear of abuse than men in public spaces, associated with them actually experiencing higher rates of violence because of their femininity (Navarrete-Hernandez et al., 2021). Little or no surveillance increases vulnerability for women (Kilgour & Parker, 2013; Peng et al., 2023). In relation to these findings, Green and Singleton (2016) point to how cultural stereotyping and gendered Islamophobia compound fears, as Muslim women are often led to feel targeted. These women experienced similar dynamics, where their racial, religious and gendered identities disadvantaged their access to RGS in ways that would be different from White women and South Asian men (Allen-Collinson, 2022; Lewis et al., 2015).

Nadia highlights a sense of fear of being targeted because of her Hijab, which Muslim women have experienced numerous times in Western countries (Giordano, 2019). The conflict between Western liberalism and Islamic ideas of submitting to God reflects a broader predicament for Muslim women who are expected to assimilate with the West by removing their Hijab, or to exile. Similar dynamics exist in France, another Western country, where policy restricts Muslim women from wearing the Hijab. More locally, this narrative resonates with Bangladeshi Hijabi girls' accounts, who were also racially abused in Sunderland, UK (Nayak, 2010, 2017). These narratives, and their constant reminders, may deter South Asian Muslim women from visiting RGS, reinforcing those spaces as White (Vera-Gray & Kelly, 2020).

Fears of experiencing racism in RGS led these women to meticulously plan for the risks they faced. For instance, Salma communicated her visits to her family members, Muminah observed women walkers in RGS, and Bushra learnt about the safest RGS to visit. Indeed, these women took charge of their own safety, similar to other women who navigate risky spaces to engage in leisure on their own terms (Bhatnagar et al., 2021; Green & Singleton, 2008; Green & Singleton, 2016). These findings also resonate with ideas that people experience stronger place attachment when they can feel a sense of agency and control within such environments (Rishbeth

& Powell, 2013). The findings show that exercising agency and control, even within contexts of fear and marginalisation, can lead to a sense of belonging, helping South Asian Muslim women to reclaim RGS as spaces of wellbeing.

6.4.4.3 Safety in Numbers

All 23 women discussed feeling comfortable visiting RGS with family and friends.

“I feel safer when I come with a friend. And sometimes it's an English friend because I wear the hijab... I fit in more when I'm with them. I don't stand out like a sore thumb because sometimes I am aware that if I go on my own, I'm going to stand out a little bit more and I might get glances.” Salma

“I'm with my husband as a man; I'm a lot more comfortable.... I just wouldn't feel comfortable going by myself... I would like to go with a bunch of girls.” Ayla

“The problem with the Ramblers was that... the non-Muslim thing where you just feel a little bit inhibited... would these guys understand if I wanted to stop and do my salat [prayer]? And would they understand if I wanted to do wudhu [washing ritual]? that kind of stuff and its just general conversations that you have when you walk with a group of people... Then, I found Maryam.. I felt really comfortable because as a Muslim woman as well... I could just be myself... it's actually a lot safer as well... There's always safety in numbers.” Zoya

While all 23 women shared experiences of visiting RGS accompanied, twelve shared instances of visiting alone to familiar spaces. Visits to further and unfamiliar RGS were generally undertaken with groups, including men, indicating a preference to ensure safety through numbers or by masculinity. These women disliked visiting RGS alone due to the associated risks. Instead, they visited RGS with other people to mitigate feelings of vulnerability and minimise the risk of being subjected to abuse. The importance of the company was emphasised by 15 women, who adapted their RGS visits to suit the availability of friends and family. This highlights the importance of social networks in accessing RGS. Research in broader leisure contexts also

emphasises the importance of social networks, but for reasons related to socialising and maintaining reputation rather than to mitigate safety concerns (Dadvand et al., 2016; Navarrete-Hernandez et al., 2021; Wesely & Gaarder, 2004; Whiting et al., 2017). The current study joins Hamza et al. (2024) to suggest that social networks are pivotal for RGS access for reasons including safety.

Leading on from this, the value of social networks sometimes hinged on those who are often dominant in RGS. Salma's account illustrates a troubling dynamic where she felt more accepted and less vulnerable when accompanied by White friends. In her example, access to RGS was made easier through White friends, who were insiders because of their ethnic identity, reflecting racial privilege. This illustrates how racial visibility shapes one's sense of belonging, which may exist differently for White women. The concern here is for those who may not be exposed to RGS through their own networks, as it can be used to enhance perceived accessibility. Furthermore, this finding highlights a societal-level disadvantage experienced by visible minorities, where underrepresentation limits people's opportunities to engage with RGS (Hill Collins, 1990). The racialisation of these spaces is reinforced by White, often middle-class, forms of participation (Hill Collins, 1990). Such norms implicitly exclude practices such as wearing a hijab, thereby marginalising Muslim women and framing them as 'others'.

Community initiatives are effective in prompting visits for ethnic minorities (Slater, 2022). However, these initiatives are not always accommodating to everyone's needs and preferences. For example, Zoya, who joined a walking group, felt constrained to practice her religion in a predominantly non-Muslim/mixed-gender group. This is because the washing ritual before prayer necessitates a washing of the head, requiring women to reveal their hair. Muslim women prefer to remain covered from men, which can be challenging in mixed-sex groups. Subsequently, these women preferred companionship with those who understood their needs. Considering this, community initiatives should consider religious and cultural differences and should be warm and welcoming to diverse practices and behaviours. Lessons are to be taken from leisure research, which highlights the importance of involving mosques in interventions to facilitate South Asian Muslim women's physical activity (Horne et al., 2018; Irshad et al., 2016). These findings encourage existing groups to consider how Muslim females' requirements can be fulfilled in more practical ways.

6.5 Conclusion

This study explored 23 South Asian Muslim women's experiences of RGS. The methodology adopted in this study provides some lessons for future scholars looking to engage in research with South Asian Muslim women or other marginalised groups. By incorporating inclusivity through a more considerate and bespoke approach (as discussed in Section 6.3.2), one South Asian Muslim male researcher was able to work with 23 South Asian Muslim women to gather and analyse a breadth of insightful, diverse and rich data. This was achieved by offering a variety of interview styles whilst also acknowledging Muslim women's preferences for modesty. The value of this is evident from the analysis (see Table 3 & Appendix 20), as each interview format contributed different perspectives to the findings, offering contributions to the exploration of South Asian Muslim women's experiences in RGS. For instance, the walking interviews emphasised physical, emotional, and spiritual attachments with nature, and unveiled in situ and personal stories tied closely with RGS. Conversely, face-to-face interviews, while more structured, provided insight into more retrospective social and cultural aspects that shaped their access to RGS, such as commitment, infrastructure, and safety concerns. Virtual interviews helped to accommodate participants' preferences regarding in-person meetings.

These findings capture the unique and nuanced experiences of 23 South Asian Muslim women, shaped by the intersection of gender, religion, and race. Whilst previous research has explored issues related to gender, race, class, or religion in isolation, this study reflects how the women of this study experienced these dimensions at the same time. For instance, their connection between wellbeing and connecting with God was tied to their Islamic beliefs, reflecting a religious dynamic, while barriers related to motherhood showed a gendered dimension. As Hill Collins (1990) argues, these axes of identity do not operate alone. Family commitments, for example, were gendered and ethnic, reflecting how culture intertwines with familial responsibility in South Asian communities. Similarly, the women's subordination within RGS was not solely based on gender exclusion, but was informed by the intersection of their gendered, religious, and ethnic identities, thus amplifying their marginalisation. This study revealed the multiplicity of South Asian Muslim women's experiences based on each of their identities. That said, there are other layers of identity and differences within the said identities, which have not been elaborated on in this study.

RGS are an important catalyst in supporting these South Asian Muslim women's PWB in various ways. In social ways, RGS was important in facilitating their relationships with family and friends. The characteristics of these spaces helped to enhance the women's social interactions, which led them to better connect with their loved ones and strengthen their bonds. Similarly, engaging with RGS offered the participants a sense of calmness, strength, confidence, solace, respite, freedom, and time to reflect on their lives. RGS were particularly important for users who experienced trauma, as they could heal on their own terms. For instance, when experiencing abuse and bereavement, RGS offered these women the affordance of time and space to contemplate. These reflective behaviours were often enhanced when knowing that being in RGS was a way to be closer to God. This is because God could be better appreciated and connected with when away from the distractions of urban environments.

RGS facilitated the participants' physical health, thus enhancing their physical wellbeing and subsequently, their PWB (Charles-Rodriguez et al., 2023). The pleasing aesthetics, feelings of freedom, adaptable environment, and anticipation of distances led the participants to enjoy physical activity in RGS. This was, in some ways, inclusive as the South Asian Muslim women could be active according to their own preferences. It was also effective for individuals who had proximal access to RGS and did not have a gym membership. These findings demonstrate that RGS could be used as an alternative to more formal fitness spaces such as leisure centres and gyms. Whilst RGS represented an avenue to good physical wellbeing through physical activity, it was also an opportunity to enhance wellbeing through the clean air it provided, by being away from urban pollutants. These findings confirm that RGS is facilitative to physical health and assert the importance of natural environments as conducive to physical, spiritual, mental and social wellbeing, leading to overall enhanced PWB (Garza-Teran et al., 2022; McGuire et al., 2022). Many of these PWB aspects align to the model of PERMA (Positive emotions, Relationships, Meaning, Achievement), a framework established by Seligman (2011). This is particularly resonant to South Asian Muslim women who face heightened health challenges but are inhibited in their access, as explored further in Chapter 7.

This study depicted various material accessibility factors that influence and often determine South Asian Muslim women's engagement with RGS. The intersecting

identities of these women in relation to the spaces they visited presented a unique set of access factors, some of which are applicable to broader leisure contexts. For instance, availability, proximity, transport, and knowledge were all key to visiting RGS. Having to travel further out to RGS meant that these women required more time, cost and effort to access those spaces. This was particularly inhibiting to those who lacked the time and financial resources for access. These findings accentuate the importance of considering geographical residence and socioeconomic backgrounds of individuals when evaluating access and assert that various factors must be considered. For instance, these access factors largely aligned with the framework of Wang et al. (2015) as applied in Chapter 4, which establishes access through personal, social, transport, knowledge, and physical dimensions. Furthermore, the current study reflects that many women had to navigate around their family commitments to visit RGS. These findings highlight an interplay between personal preferences, commitments, and cultural expectations which influence individuals' engagement with RGS. In navigating the expectations around them, these women made choices to accommodate their commitments while seeking the health benefits provided by these spaces. Indeed, it was these women who took charge and ownership over managing their family responsibilities and engagement with RGS.

Leading on from this, the participants navigated their RGS engagement to align with their Islamic beliefs. Visiting in groups, with female friends or male relatives, helped to align with Islamic stipulations that prohibit women from travelling far alone. This provides further perspective on Muslim women's travel choices and reflects the ownership these women had over their own preferences to engage with RGS in an Islamic way. That said, although these choices resemble the autonomy these women had over their own engagement with RGS, there were instances when their engagement was shaped by factors out of their control. For instance, this study elaborated on how South Asian Muslim women still face constant risk of various types of abuse when visiting RGS due to being different from those who dominate RGS.

These women experienced fears of endangerment in RGS, which were heightened for those who visited alone. The risks they faced were tied to the intersection of their gendered, ethnic and religious identities. For instance, women were subjected to negative treatment when wearing the hijab, reflecting a gendered and religious identity. Moreover, the abuse did not stop when visiting in large groups,

when their ethnic identities were more salient. These findings resemble the constant predicament South Asian Muslim women face in Western leisure contexts. Their vulnerabilities as women make them fearful when visiting alone, and when they visit in large groups to enhance their safety, others actively associate their presence with their ethnic identities and deem it a threat to the White way of engaging. These layers of gendered and racial identities create a multitude of challenges, highlighting the multifaceted nature of the barriers individuals encounter when their identities are visible (Hill Collins, 1990a). These findings reveal the persistent racialisation of RGS, where difference is highlighted and seen as a threat to the dominance of White males.

In searching for more comfortable and alternative spaces, and by visiting with other people, these women actively facilitated their own access to RGS. For instance, some leveraged their social networks to visit unfamiliar RGS, thus mitigating the risks they faced. Further steps to feel safer included visiting in daylight and to RGSs that were more familiar and represented by others with shared identities. Overall, these findings reflect the risks South Asian Muslim women face in RGS and the ways they navigate through those environments. They emphasise the importance of acknowledging the intersectionality of identity and space when addressing issues around RGS and their engagement. Ultimately, experiences of racialisation and identity exclusion can limit the PWB benefits that South Asian Muslim women derive from these environments.

It is important to note that the present study did not compare different types of RGS, as the aim was to explore South Asian Muslim women's experiences and perceptions of access to RGS, which was not previously studied adequately. Future research could build on this work by exploring how specific characteristics of RGS, like openness, terrain, or proximity to water, can shape perceptions of safety, belonging, and PWB for diverse users. Furthermore, whilst this study provides valuable qualitative insights into how South Asian Muslim women experience and navigate RGS, the findings are based on a group of 23 people's subjective accounts. The conclusions offered from this study could be related to broader datasets to offer generalisations. The following quantitative study (Chapter 7) builds on these insights by examining the identified relationships across a larger population sample.

6.6 Chapter Summary

This chapter examined 23 South Asian Muslim women's experiences of RGS, drawing on semi-structured and walking interviews. The findings revealed that engagement with RGS was shaped by compounding factors of sociocultural expectations, religious identity, safety concerns, and racialised exclusion. Intersectionality emerged as a valuable lens, highlighting how overlapping dimensions of race, gender, and religion influenced both access and experiences. These qualitative insights inform the next chapter, which translates these key themes into a statistical model tested on a nationwide sample to explore wider patterns of access, engagement, and PWB.

7 Chapter 7 – Study 3: Perceived Access to Rural Green Spaces and Psychological Wellbeing among South Asian Muslim Women

7.1 Chapter Overview

The previous chapter explored 23 South Asian Muslim women's experiences of RGS through walking and semi-structured interviews. A reflexive thematic analysis revealed the value of such spaces for these women's PWB and how their access was inhibited because of their intersecting identities. Building on these insights, the current chapter presents a quantitative study that investigates the relationship between key variables that emerged from the women's narratives. The current chapter begins by establishing the significance of rural green spaces (RGS) for the psychological wellbeing (PWB) of South Asian Muslim women. The findings of the qualitative study are then considered as to how they translate into the model being tested, followed by a detailed methodology section outlining the research design, instruments used, and analytical procedures. The chapter concludes with the presentation of results and a discussion of the findings.

7.2 Introduction

As stated throughout this thesis, access to RGS is disproportionately occupied by White middle-class men in England (Palmer et al., 2025). It was highlighted in the previous chapter (see Section 6.2) that less than 25.7% of South Asian Muslim women visit RGS once a week (Natural England, 2019a), and represent less than 1% of visitors to RGS (Natural England, 2019b). These statistics reflect disproportionate access, given that South Asians are the largest ethnic minority group in the UK (Office for National Statistics, 2023). They also reflect a call for concern, given that 30% of South Asian female samples exhibit hypertension, and 21% experience high cholesterol (Tandon et al., 2022). One relevant study found South Asian women to present poorer mental health indicators than any other group, linked to their poor access to natural environments (Roe et al., 2016b).

South Asian Muslim women face multiple challenges in accessing traditional health and leisure settings (such as gyms, mental health services, and leisure centres), narrowing their pathways to achieve good health (as discussed in Section **Error! Reference source not found.**). While factors relating to proximity, cost, time, and travel (Caperchione et al., 2015) influence access to health and leisure, additional

barriers are tied to the intersection of gender and religion. These include a lack of gender-segregated spaces, conflicting expectations around immodest attire, and stereotypes of being detached from health activity (Eaton, 2015). Some South Asian Muslim women also struggle to access mental health services within the National Health Service, associated with cultural differences and language barriers (Thomas, 2023). As argued in the previous chapters, RGS should be seen as a viable pathway alternative to enhance health and wellbeing among the demographic (Hamza et al., 2024), helping to mitigate widespread mental and physical health concerns.

It was highlighted in Chapter 6 that visits to RGS were crucial for South Asian Muslim women's psychological wellbeing (PWB), as they provided a sense of escape from urbanity, were organically formed, and embodied natural elements. Wider literature shows how RGS helps people to interact with nature, escape the city, exercise, and undertake challenging activities (Coldwell & Evans, 2018). They can also foster deeper connections with nature, enhance social interactions with family and friends, and support spiritual reflection (White et al., 2021). Likewise, the open and natural characteristics of RGS facilitate users to engage in health-enhancing behaviours such as physical activity (Morris et al., 2019; Thompson Coon et al., 2011). Indeed, nature engagement can enhance overall PWB in various ways (Gascon et al., 2015; Seligman, 2011). The current study sets out to determine the applicability of these findings in the context of South Asian Muslim women and RGS.

This study resonates with some principles of intersectionality (Crenshaw, 1989) in the sense that it aims to address the current nature and PWB frameworks skewed by White middle-class male samples (Schulson, 2020). Framing health and leisure through the perspective of White, middle-class males reinforces narrow ideals of leisure, RGS, and health, that only Western modes of engagement styles and attire are acceptable. This challenges minority groups' access. Similarly, in overlooking marginalised groups' experiences, current frameworks fail to account for the distinct relationships that minority groups have with leisure and RGS. For instance, previous surveys have measured physical activity engagement through narrow definitions and have neglected distinct contexts like homes and RGS (Houlihan & Green, 2009).

Overlooking people's health experiences of alternative spaces purports ideas that they are disinterested in leisure activity (Bhatnagar et al., 2016). Addressing this, the current research fills a gap by considering informal settings like RGS to establish

how they can promote health. The focal group was selected to explore more effective avenues for supporting their wellbeing, as South Asian Muslim women are a marginalised population who experience compounded challenges related to their intersecting identities. The significance of this research lies in its unique focus on the relationship between PWB and access to RGS whilst accounting for rate of engagement, amongst a sample of South Asian Muslim women. This research also addresses the gap in scholarship on South Asian samples within the context of RGS, as revealed in the systematic literature review of Chapter 4.

7.3 Building a Conceptual Framework for Rural Green Spaces and Psychological Wellbeing for South Asian Muslim Women

The Stress Recovery Theory (Ulrich et al., 1991) emphasises the positive effects of nature exposure, suggesting that access to RGS serves as a predictor of PWB. Ulrich's Stress Recovery Theory (1991) posits that people experience an innate psychophysiological response when exposed to nature, leading to reduced stress and better emotional wellbeing. After experiencing sensory stimulation of natural features, such as vegetation, water, or natural light, the brain activates the parasympathetic nervous system, leading to decreased heart rate, blood pressure, and muscle tension. This also influences PWB, as exposure to nature evokes positive affective states and suppresses negative emotions like anxiety, anger, or fear. Subsequently, users feel a sense of psychological and physiological balance more quickly than when in urban or artificial environments. In Chapters 6 and 4, women reflected on how visiting NGS helped them cope with stress and regulate their emotions. They described feeling calm and solace when in RGS, better than in urban environments. For example, one participant sought solitude in such spaces during crises, explaining that "my mother passed away, and the first thing I did was just go get away from everyone and everything and go and camp..." (Bushra). Such accounts present RGS visits as alleviating acute stress and providing emotional relief. Even in less difficult situations, women noted they felt "calmer, fresher, stronger and more confident" after engaging with RGS, using these spaces to heal and cope with daily pressures.

Broader literature also suggests that RGS is directly linked to enhanced PWB through various dimensions outlined by the PERMA framework—Emotions, Engagement, Relationships, Meaning, and Accomplishment (Butler & Kern, 2016; Gascon et al., 2015). These observations align strongly with the Stress Recovery

Theory, in that simply being in natural environments is therapeutic and reduces stress. They also support Ulrich's (1991) idea that nature exposure can predict improved mental wellbeing, which provides a framework for engagement with RGS to predict PWB in the current study.

Kaplan's Attention Restoration Theory (1995) complements the Stress Recovery Theory and focuses on cognitive fatigue and revitalisation from nature. Attention Restoration Theory suggests that directed attention (i.e., the mental resource used to concentrate and ignore distractions) depletes and fatigues through everyday life in urban environments. The stimuli of nature (like flowing water, wildlife, or greenery) engage the mind effortlessly, facilitating people's attention to recover from the depletion caused by urban lifestyles. The four properties which characterise Attention Restoration Theory were evident in Chapter 6, inherent in the theme 'an opportunity to reset'. These are fascination (engaging stimuli), being away (a sense of escaping from routine), extent (the scope to feel immersed), and compatibility (feeling comfortable and aligned). For instance, Ayla explained that "thinking can only happen when you're not rushing or worried about any commitment... I come out to visit [the woods] and... walk. It just helps me... make connections to my problems and find solutions for them..." – highlighting how being in nature promoted mindful reflection and problem solving.

7.3.1 Perceived Access to RGS is a Multidimensional Concept linked to Psychological Wellbeing

While the aforementioned theories suggest that engagement with RGS is important, Chapter 4 revealed that current research on ethnic minorities focuses on the wellbeing benefits associated with proximal access to the natural environment (Roe et al., 2016b), neglecting the role of actual visits- subsequently referred to as rate of engagement. These studies frequently assume a direct relationship between spatial proximity and PWB, equating the ability to access nature with actual exposure (Dimitrova & Dzhambov, 2017). Scholars base this idea on the assumption that access and engagement both link to PWB through their correlation. However, whilst PWB may positively link with proximal access to nature, it does not guarantee material engagement. To demonstrate this, Jarvis et al. (2020) found only a weak relationship between proximal access to green spaces and rate of engagement.

This distinction is important to consider because this thesis proposes that the ability to visit RGS and rate of engagement are two conceptually distinct constructs (Pot et al., 2021). For example, perceived access better links with rate of engagement and PWB than spatial proximity alone, which ignores human experience (Pot et al., 2021). Similarly, Chapter 6 found that the women's engagement with RGS allowed them to reflect and connect with the natural environment and therefore experience better PWB. This aligns with the Attention Restoration Theory (Kaplan, 1995), which highlights engagement with nature as key to restoration and wellbeing. By treating perceived access and rate of engagement as distinct predictors of PWB, this study addresses a research gap and contributes to understanding the dynamic between perceived access and rate of engagement with RGS and their roles in influencing PWB.

Leading on from this, perceived access is multi-dimensional and is hypothesised to correlate with rate of engagement, which in turn influences PWB. Throughout this thesis, various dimensions, like spatial accessibility, perceived safety, transport, knowledge, and broader factors, have been noted to shape the capacity in which people can access RGS, collectively defining perceived access (Wang et al., 2015). In Chapter 6, the women spoke about these exact factors that influenced their perceived access to RGS, thus impacting their engagement. These also echo the study of Chapter 4, which revealed similar factors as shaping engagement, and that the PWB benefits gained from RGS are inhibited by access barriers (Wang et al., 2015). In the current study, perceived access refers to an individual's subjective assessment of how able they are to access RGS. While it may be informed by objective factors such as distance or transport availability, it ultimately reflects a personal interpretation of accessibility rather than physical proximity alone. This approach aligns to Pot et al. (2021) who recognise the multiple factors that affect how individuals experience and benefit from nature exposure.

Overall, the current study recognises rate of engagement with RGS as predicted by perceived access- a variable including physical, transport, knowledge, social, and personal dimensions- and as a predictor of PWB. On these bases, this study tested a mediation model, where perceived access links with PWB through rate of engagement. This aligns with the notion that participants make use of their perceived access to RGS, leading to visits that contribute to enhanced PWB. It also

aligns to the Theory of Planned Behaviour (Ajzen, 1991), in that perceived behavioural control (represented by perceived access) links to actual behaviour (rate of engagement) before affecting PWB. Further variables in this model for South Asian Muslim women are discussed below.

7.3.2 Nature Connectedness and Social Relatedness Enhance the Relationship Between Perceived Access and Rate of Engagement

Nature connectedness refers to the affinity people feel towards the natural environment (Mayer & Frantz, 2004). This is important to consider for South Asian Muslim women who may feel driven to visit RGS due to their nature connectedness. In this regard, the Biophilia hypothesis (Kellert & Wilson, 1993) proposes that people are drawn to green spaces due to their inherent affinity for nature. Biophilia often manifests in activities like walking and feeling a sense of belonging in RGS, or feeling an emotional attachment to landscapes or animals, and a spiritual preference for nature's beauty. Broader research highlights parallels between people's affinity with nature, level of visitation to natural areas, and their perceived access (Mayer & Frantz, 2004).

The systematic literature review of Chapter 4 affirmed that users visit RGS to reconnect with their memories of nature in rural Pakistan. Similarly, the qualitative exploration of Chapter 6 revealed that the South Asian Muslim women were more inclined to engage with RGS when they could experience the earth's seasons and ecology in its original form. Many women valued the rural greenery as it was perceived as divinely created and untouched by humans. Jannah said, "I get a lot of solace and peace being in nature, you know, creation of God.", linking her emotional calm to the sacred quality of the landscape. Consistent with the biophilia hypothesis, the women's inclinations to green spaces were more than utility purposes and centred around fulfilling their affinity for nature, resonating with Islamic teachings that emphasise connecting with nature and environmental stewardship (Ozdemir, 2003).

Given this, nature connectedness may act as a moderator, influencing the strength of the relationship between perceived access to RGS and rate of engagement. This suggests that individuals with higher levels of connectedness are more likely to view green spaces as emotionally and spiritually rewarding, thus feeling more motivated to make use of that access by engaging. This aligns with research that suggests a strong association between connection to nature and engagement

with natural environments (Howell et al., 2011). Including nature connectedness as a moderator captures the role of personal meaning and value in shaping engagement with RGS (Howell et al., 2011). Nature connectedness is hypothesised to strengthen the relationship between perceived access and rate of engagement.

Social relatedness refers to the level of interaction individuals experience with their family members and friends (Lubben et al., 2006). Previous research has shown that South Asian Muslim women are more likely to engage in broader leisure activities when they experience strong social ties (Chen & Qiao, 2024; Irshad et al., 2016). The findings from Chapters 4 and 6 further demonstrated that users often engaged with RGS through their social networks of friends, family members and community groups. These social ties helped to overcome barriers of cost, familiarity and safety they faced, enabling them to make better use of their perceived access to engage with RGS. Placing social relatedness between perceived access and rate of engagement aligns with ideas that increased social networks can facilitate South Asian Muslim women to capitalise on their perceived access and engage more with RGS. Social relatedness is hypothesised to strengthen the relationship between perceived access and rate of engagement.

7.3.3 Identity Visibility Weakens the Psychological Wellbeing Benefits of Rural Green Space Engagement

Identity visibility refers to the extent to which participants' intersecting ethnic, gendered, and religious identities are perceived as visible or marked (Hussain & Cunningham, 2023; Tolaymat & Moradi, 2011). Research suggests that those who feel visibly different are more likely to experience discrimination or exclusion, negatively impacting their PWB (Eaton, 2015). For example, South Asian Muslim women have been subject to abuse in RGS due to the saliency of their skin colour, headscarves, and femininity (Hamza et al., 2024). Similarly, Chapter 6 revealed that South Asian Muslim women often felt alienated and susceptible to abuse because of their dress, appearance and behaviours. These experiences evoked negative emotions that undermined the PWB benefits gained from RGS. While engaging with RGS can promote PWB, those with visibly marked identities may not benefit the same as individuals whose identities are unmarked and align more closely with the norms associated with such spaces (Warren et al., 2014). Placing identity visibility as a moderator between engagement with RGS and PWB reflects the idea that visible

identities can diminish the PWB outcomes typically associated with RGS engagement for South Asian Muslim women (Bakali & Soubani, 2021). Identity visibility is hypothesised to weaken the relationship between rate of engagement and PWB.

7.3.4 Active and Affective Engagement Strengthen the Psychological Wellbeing Benefits of Rural Green Space Engagement

Active engagement in this study refers to physical activity like exercising, brisk walking, and climbing carried out within RGS. This is crucial for South Asian Muslim women, who face barriers in accessing more formal physical activity settings (Caperchione et al., 2015). Research suggests that physical activity in natural settings enhances positive emotions more effectively than activity in urban environments (Pretty et al., 2005). Being surrounded by nature when conducting physical activity can elicit emotions of renewal and positive involvement, and decrease tension, anger, and sadness (Thompson Coon et al., 2011). In this regard, Chapter 4 showed that participants used RGS as spaces for movement and exercise, which contributed to a sense of improved health. Similarly, Chapter 6 revealed that the women experienced feelings of satisfaction and achievement when conducting physical activity in RGS, positively impacting their PWB. These findings suggest that exercise supports the benefits experienced from visiting RGS (Fox, 1999). Active engagement is hypothesised to strengthen the positive relationship between rate of engagement and PWB, such that individuals who are more physically active in RGS experience greater wellbeing benefits.

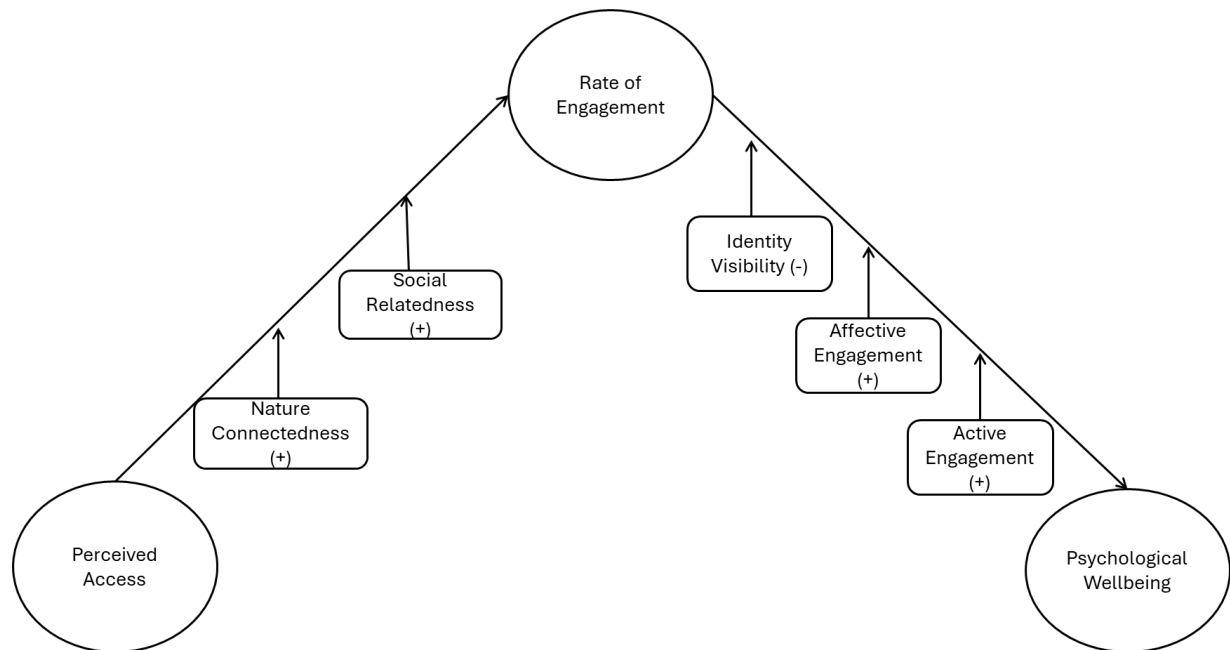
Affective engagement in this study refers to mindful activity like reminiscing on past memories, reflecting, regulating emotions, and coping with stress whilst in RGS. This type of engagement is particularly relevant for South Asian Muslim women, who face disproportionately high levels of poor mental health and often encounter barriers in accessing formal mental health services (Thomas, 2023). As shown in Chapter 6, participants used RGS in affective ways to support their mental health and emotional wellbeing. Wider research also supports this, showing that individuals who use RGS for restoration and recovery report higher levels of health, life satisfaction, and overall PWB (Bruehlman-Senecal et al., 2016; Korpela et al., 2020). These findings suggest that mindful and affective use of RGS compounds the PWB benefits of engagement. Affective engagement in RGS is hypothesised to strengthen the positive relationship

between rate of engagement and PWB, such that those who engage affectively experience greater wellbeing benefits.

Figure 6 illustrates the full model below.

Figure 6

Model depicting hypothesised relationships between all variables in this study



Overall, existing nature and wellbeing frameworks are skewed to White, Western populations, limiting applicability among ethnically diverse groups. This narrows theoretical generalisability and overlooks how intersectional factors such as race, religion, and gender shape experiences of nature (Collins, 2022). The current study addresses this gap by developing evidence from the experiences of South Asian Muslim women, a group underrepresented in environmental psychology research, in the context of RGS (Anderson et al., 2021; Schulson, 2020). Furthermore, access to nature is often synonymised with proximity, which neglects subjective experiences that determine how much people feel able to visit and thus benefit from these spaces (see Section 2.3). By incorporating multiple factors of perceived access, this study provides a holistic view of accessibility. Additionally, only engagement or perceived access are often focused on in existing papers (Mullenbach et al., 2022; Roe et al., 2017). This research differentiates them conceptually and examines their separate effects on wellbeing. Finally, as South Asian Muslim women often face barriers to participating in formal health-enhancing settings (like gyms and sports), this study explores RGS as an alternative context for supporting PWB. This study was conducted to answer the following research question:

How do perceived access and engagement with rural green spaces (RGS) influence the psychological wellbeing (PWB) of South Asian Muslim women in England?

7.4 Methods

7.4.1 Participants

The study employed a combination of convenience and purposive sampling to recruit participants from various community groups, organisations, and social media platforms. The researcher disseminated leaflets with a QR code and link, online and in person, for individuals to access the study. The inclusion criteria included participants who identified as South Asian, Muslim, female, and over the age of 18. The exclusion criteria were individuals outside of the said categories and those from vulnerable groups (e.g., people in emergency situations, those with mental incapacity). Participants were offered the opportunity to enter a prize draw as a token of appreciation, with prizes including five £20 gift cards, two £50 gift cards, and one £100 gift card. The final study sample comprised 600 self-identified South Asian Muslim women residing in England. All participants were aged 18 and above and reflected

diversity in area of residence, employment, religiosity, income, family circumstances and time residing in England (see Table 4).

Table 4
Demographic characteristics of the study sample (n = 600)

Variable	Category	N	Mean (SD) or Percentage
Age (years)		600	35.93 (SD: 10.401)
	Young Adults (18-24)	87	14.5%
	Adults (25 to 34)	198	33%
	Middle-aged Adults (35-44)	190	31.7%
	Older Adults (45-54)	99	16.5%
	Seniors (>54)	26	4.3%
South Asia Heritage	Afghanistan	12	2.0%
	Bangladesh	116	19.3%
	Bhutan	1	0.2%
	India	95	15.8%
	Nepal	5	0.8%
	Pakistan	343	57.2%
	Sri Lanka	15	2.5%
	Other	13	2.2%
Urban/Rural Area	Urban area	533	88.8%
	Rural area	67	11.2%
Family Circumstances	Single, no children	134	22.3%
	Single, with children	23	3.8%
	Married/In a relationship, no children	77	12.8%
	Married/In a relationship, with children	310	51.7%
	Divorced/Separated/Widowed, no children	7	1.2%
	Divorced/Separated/Widowed, with children	32	5.3%

	Prefer not to say	16	2.7%
Employment Status	Unemployed	126	21.0%
	Student	47	7.8%
	Part time employed	154	25.7%
	Full time employed	261	43.5%
	Student who is also employed	12	2.0%
Physical Health Disabilities	Yes	115	19.2%
	No	485	80.8%
Mental Health Disabilities	Yes	206	34.3%
	No	391	65.2%
Born in the UK	Yes	455	75.8%
	No	145	24.2%
Generational Connection to South Asia	First Generation: Immigrant	101	16.8%
	Second Generation: Parents immigrated	317	52.8%
	Third Generation: Grandparents immigrated	152	25.3%
	Fourth Generation: Great-grandparents immigrated	16	2.7%
	Other	14	2.3%
English as First Language	Yes	421	70.2%
	No	179	29.8%
Frequency of Praying Salah	Never	22	3.7%
	Sometimes	145	24.2%
	Most of the time	162	27.0%
	5 times daily	271	45.2%
Total Household Income (GBP/month)		553	Average: £3668.11 (SD: £3515.248)
	Lowest Quintile (<£1500)	139	23.2%
	Second Quintile (£1501 to £2330)	85	14.2%
	Middle Quintile (£2331 to £3500)	156	26.0%
	Fourth Quintile (£3501 to £5250)	89	14.8%

	Highest Quintile (>£5251)	84	14.0%
Private Vehicle Ownership	Yes	450	75.0%
	No	150	25.0%

A visual map of the sample's residence data was created by inputting participants' postcodes into QGIS (v3) software, using open-source base map layers from OpenStreetMap. The map presented below in Figure 7 illustrates the spatial spread of participants in the current study. The widespread distribution reflects the geographic diversity of the sample and supports the national generalisability of the findings in this study.

Figure 7

Visualised geographical distribution of survey participants throughout England (n = 600)



7.4.2 Design

The study employed a cross-sectional correlational design to explore the relationship between perceived access to rural green spaces (RGS) and psychological wellbeing (PWB) among South Asian Muslim women in England. A quantitative approach facilitated the investigation of the mediating variable of rate of engagement between perceived access and PWB, and the moderating effects of nature connectedness, social relatedness, identity visibility, active engagement, and affective engagement on this relationship. While the cross-sectional nature of this study reduces the possibility

of causal inference, the analyses provide insight as to how each variable statistically predicts other variables within the model. This reflects statistical prediction and not causal prediction. The findings thus highlight associations between perceived access, engagement, and PWB and provide insight into causal pathways that could exist, which can be tested through future longitudinal research. The researcher developed a 15-to-25-minute survey on the Jisc Online Survey v2 platform, comprising multiple sections, each utilising validated and reliable scales to assess the constructs.

The key measures are outlined below in the same order they appeared in the survey. While the measures included a mix of response formats (e.g., 1–5 and 1–7 Likert-type scales), these were retained in their original form to preserve the validity of each instrument. This variation is common in multi-scale survey research (He et al., 2020). Since all analyses were conducted within a structural equation modelling framework using standardised coefficients, differences in response ranges do not affect the comparability of the constructs. Furthermore, the existing psychometric properties of the original scales are reported below. It is important to recognise that these may not transfer directly to the current study, which focuses on South Asian Muslim women and their experiences of RGS. To address this, the measures were piloted (see Section 7.4.4) to assess their reliability and validity within this specific context. Further tests of validity are presented in Section 7.5.4 as part of the main analysis.

7.4.2.1.1 Demographic Information

Participants provided demographic information, including age, specific heritage, employment status, area of residence, household income, disability, time in England, and frequency of prayer.

7.4.2.1.2 Rate of Engagement

To measure rate of engagement with RGS, a scale previously used in the context of urban green space engagement was adapted for RGS visits (Hong et al., 2019). For example, the item “How many times have you visited an urban green space (e.g., park, garden, forest) in the past two weeks?” was rephrased to “How many times have you visited a rural green space (e.g., country park, garden, forest) in the past two weeks?”. In addition, ten items were developed to assess the participants’ frequency of specific types of RGS. Here, participants indicated 1 (I have never visited this type of rural green space) to 7 (once a week or more) for various RGS locations. An example type

of RGS was “Countrysides, farmlands, and rural landscapes (e.g., Lake District in Cumbria, The Peak District in Derbyshire, The Cotswolds in Gloucestershire)”. The final scale included 13 items questioning the recency and frequency of visits to RGS. Duration was excluded as an indicator to prevent overlap with frequency and to align with prior evidence indicating that visit frequency, rather than duration, is a stronger predictor of PWB (Biedenweg et al., 2017). Overall, items revolved around time spent in, visits in the last month, and the different kinds of RGS visited. Participants were asked about their visits in the past month rather than the past week, to more accurately capture engagement patterns, as individuals may not have visited within a given week but might visit regularly across the month.

7.4.2.1.3 Active Engagement

A six-item scale was developed to understand how often participants engage with physical activity during their time in RGS. The items were based on the findings in Chapter 6 where participants described engaging in various physical activity in RGS. The scale consisted of 6 items related to how often participants undertake physical activities- brisk walking, jogging, challenging tasks- when in RGS. For example, participants rated activities such as “Brisk walking (e.g., walking quickly)” from 1 (never) to 5 (all the time). The reliability and validity of this scale and all others were tested through piloting.

7.4.2.1.4 Affective Engagement

A five-item scale was created to measure how often participants engage with affective activity during their visits to RGS. The items were based on the findings of Chapter 6 where participants described engaging in various mindfulness activity in RGS. The scale consisted of 5 items related to various affective activities- mindfulness, meditation, reflection- when in RGS.

7.4.2.1.5 Perceived Access to Rural Green Spaces

To measure perceived access, Wang et al. (2015) used a 5-point Likert-scale ($\alpha = .850$), initially designed for access to parks, which was adapted to focus on South Asian Muslim women’s access to RGS. Whilst no items were added, some items were rephrased to focus on RGS as opposed to parks, like in the original measure. For example, the item “How would you rate your overall ease of access to this park?” was rephrased to “How would you rate your overall ease of access to rural green spaces?”. The final scale consisted of 22 items focusing on four dimensions of access to RGS,

including proximity, safety, knowledge and general access factors. For instance, the dimension of perceived safety included items around perceptions of illegal activity, dangers and general perceptions about the safety of RGS, which were reverse coded to align with the other items.

This scale assessed participants' cognitive judgments about their ability to access RGS rather than objective or structural accessibility or their actual engagement. Although responses may show the internalisation of external and structural constraints, the construct was conceptualised as a subjective measure. Perceived access was therefore treated as a cognitive variable expected to measure participants' overall sense of accessibility. Participants indicated their level of agreement from 1 to 5 for each item on the scale.

7.4.2.1.6 Identity Visibility

To measure identity visibility, a validated 7-point Likert-scale measuring religious visibility ($\alpha = .78$) was adapted and extended to apply to South Asian Muslim women's experiences in RGS (Tolaymat & Moradi, 2011). For example, the item "How frequently do you wear Hijab (loose clothing and headscarf)" was amended to "How frequently do you wear an Islamic headscarf (e.g., hijab, chador, burqa, etc.) when visiting RGS?". Additional items, considering the racial visibility of South Asian Muslim women in RGS, were added. For example, participants were asked how likely they agree (1 to 7) on items such as "My South Asian Muslim female identity is noticeable to others in rural green spaces". The final scale comprised nine items focusing on the type of attire, levels of modesty, hijab type, skin colour and feelings of difference to represent the intersection of race, religion, and gender for South Asian Muslim women.

7.4.2.1.7 Connectedness with Nature

A standardised and well-established 5-point Likert-scale was employed to gauge participants' connection to the natural world (Mayer & Frantz, 2004). The original scale consists of 14 items linked to feelings of affinity with the natural environment. It demonstrates good internal consistency and has been employed across diverse populations ($\alpha = .84$) (Frantz & Mayer, 2014; Mayer & Frantz, 2004). While some scholars have debated whether the scale primarily reflects an emotional connection to nature or a more cognitive attitude (Perrin & Benassi, 2009), it remains one of the most established and psychometrically sound measures of nature connectedness. Its use

was therefore considered appropriate for exploring connections to nature in the current study.

7.4.2.1.8 Social Relatedness

The standardised and well-established 6-point Likert-scale of Lubben Social Network Scale – short form (LSNS-6) was used to conceptualise participants' social relatedness (Lubben et al., 2006). The LSNS-6 consists of 6 items related to participants' level of interactions with family and friends. This scale demonstrates high internal reliability and has been adopted in diverse contexts ($\alpha = .83$) (Kuru Alici & Kalanlar, 2021; Lubben et al., 2006).

7.4.2.1.9 Psychological Wellbeing

PWB was measured through items from the PERMA scale (positive negative emotions, engagement, relationships, meaning, and accomplishment) (Butler & Kern, 2016; Seligman, 2011). This 11-point Likert-scale is recognised as a valid tool used to measure PWB in diverse contexts (de Carvalho et al., 2023; Magare et al., 2022; Ryan et al., 2019) and consists of 22 items that exhibit good internal reliability ($\alpha = .94$). It is appropriate to use in the current study, as all PERMA aspects have been linked positively with engaging with nature (Bowler et al., 2010).

7.4.3 Sample

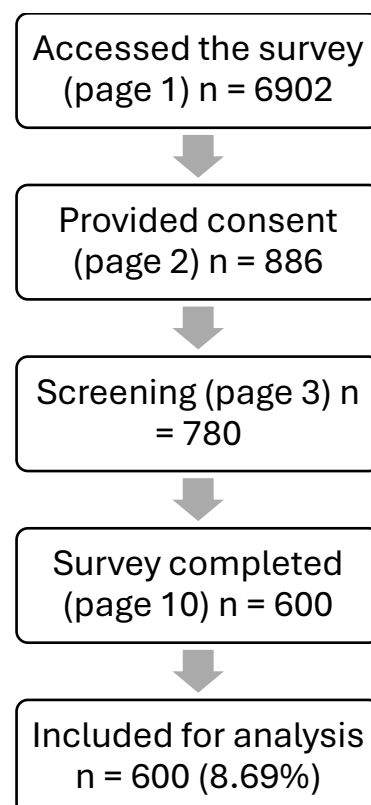
A pragmatic approach was adopted to determine sample size, considering both statistical and practical factors. South Asian women represent a minority population in England, which poses inherent challenges to recruiting a large number of these participants. Monte Carlo methods are recommended in SEM because they use repeated simulations to estimate statistical power for complex models, accounting for factors such as sample size, effect sizes, and model complexity (James, 1980). A Monte Carlo simulation of the current SEM approach was conducted, which demonstrated that a sample of 600 participants provides sufficient power to test statistical predictors (see [Monte Carlo Simulation Output Online](#)). This sample size balances the need for adequate power with the practical constraints of recruiting participants from a minority population (Nassiuma, 2001).

A minimum sample of 500 participants was targeted to ensure sufficient statistical power for conducting structural equation modelling (SEM) (Kline, 2023). For instance, Hair et al. (2010) suggest recruiting at least five participants per indicator. While the total number of items in the survey was 97, the researcher was aware that

the use of item parcelling to create construct indicators meant that no analysis included more than 18 indicators. With a minimum sample size of 500 participants, the guidelines were exceeded, whilst also aligning with general recommendations for a sample of 500 for SEM models (Collier, 2020).

The study used a convenience sampling approach. No formal sampling frame of South Asian Muslim women in England exists, so recruitment was conducted via social media, mosques, community groups, and women's empowerment networks that included this demographic. To ensure eligibility, a screening question was included at the start of the survey asking participants to confirm that they self-identified as South Asian Muslim women. Although self-selecting participation poses some limits on representativeness, the sample provides meaningful insights from methods that were available in the study and contributes to understanding trends within the broader demographic (Nassiuma, 2001).

Figure 8
Flow of Participants Through the Online Survey



7.4.4 Pilot Test

Before data collection, a pilot study ($n = 43$) was conducted to assess the validity and reliability of the measures used in the study. The piloting sample size reflected the number of South Asian Muslim women who were available and willing to participate within the time frame of the piloting phase. Piloting is important to identify potential issues with item clarity, response formats, and survey flow, and to ensure that adapted or newly developed measures are understandable and relevant to the target population (van Teijlingen & Hundley, 2002). All scales demonstrated acceptable reliability ($\alpha > .7$) (scores are presented later in Table 5) and validity through respondent feedback except for identity visibility, which initially reflected poor internal consistency, indicating inconsistent item behaviour ($\alpha = -.74$).

The items were reviewed and refined to ensure alignment with the intended construct. The researcher consulted with survey participants and experts in the field to enhance the clarity and relevance of the identity visibility items. For example, items were added to increase the robustness of the scale. Additional piloting ($n = 50$) revealed that the refined scale exhibited acceptable internal consistency ($\alpha > .7$), and respondent feedback revealed that the items effectively represented the intended measure with appropriate phrasing. This iterative piloting process facilitated the overall robustness of each scale, ensuring that all measures were both valid and reliable for the main study.

7.4.5 Procedure

This study adopted a cross-sectional survey design, collecting self-reported data at a single time point. The purpose was to collect data from a population for whom a paucity of prior quantitative evidence exists and to provide an initial exploration of the associations between perceived access to RGS, engagement, and PWB among South Asian Muslim women. The study was advertised through Facebook, X, specific community groups, mosques, and women's empowerment networks that included South Asian Muslim women in England. The survey was accessible through the Jisc Online Surveys v2 platform, and participants could complete it at their convenience. Upon accessing the survey link, participants were presented with an information sheet and a consent form. Only those who provided informed consent could proceed to the survey. Measurements were administered in the order of rate of engagement, active

engagement, affective engagement, identity visibility, perceived access, nature connectedness, social relatedness, and PWB and were all in English.

7.4.6 Analysis

SPSS v29 was used for the preliminary analyses. Descriptive statistics were calculated for all variables, including means, standard deviations, frequencies, and percentages, to highlight the sample's engagement with RGS and their PWB. Each scale was assessed for its Internal consistency using Cronbach's alpha (α). A Cronbach's alpha value above .70 was considered acceptable for internal consistency (Considine et al., 2005). AMOS v29 was used for the formal analysis. Confirmatory factor analysis (CFA) was employed to validate the measurement of each latent construct. Model fit was assessed using acceptable model fit thresholds described later in Section 7.5.4 (Hu & Bentler, 1999).

Structural Equation Modelling (SEM) was selected as the most appropriate analytic approach because the study involved multiple latent constructs and aimed to test complex direct and indirect pathways between them (Collier, 2020). SEM was performed using the Maximum Likelihood Estimation (MLE) technique to generate parameter estimates for the relationships between the latent constructs. SEM accounts for measurement errors in data more accurately than regression models and is suitable for complex models (Kline, 2023). Furthermore, SEM allows for the simultaneous analysis of multiple relationships (Collier, 2020), which was needed to understand the interplay between perceived access, rate of engagement, and PWB, and the mediation effect of rate of engagement. In this case, mediation analysis was performed using Bootstrapping techniques to assess the direct and indirect effect of perceived access on PWB through rate of engagement. Overall, SEM was selected because the study aimed to model latent constructs (e.g., psychological wellbeing, nature connectedness) while accounting for measurement error, and to examine multiple direct and indirect pathways simultaneously, which could not be adequately captured through simpler regression or mediation models (van Teijlingen & Hundley, 2002).

Moderation analysis was conducted iteratively by adding composite interaction terms to the existing model. To test for moderation effects, interaction terms were created for each moderator variable and entered individually into separate models within the latent construct framework. This approach is known as a mixed-model

method, which balances the accuracy of results with the labour involved in the analysis by including the moderators as composite variables whilst maintaining the latency of other variables (Collier, 2020). In this method, probing of high and low levels of the moderator is only performed when the interaction term is significant.

While this study examined the role of perceived access to RGS on South Asian Muslim women's PWB, it did not aim to isolate the independent effect of nature itself from that of active or affective engagement. These forms of engagement within RGS were operationalised as moderating variables in the model, designed to determine how such activity influences the relationship between perceived access and PWB. Therefore, the findings should be interpreted as representing the combined and interactive benefits of engaging in physical and affective activity within nature, rather than the independent effects of either factor alone.

7.4.7 Ethics

Participants were informed of the voluntary nature of their participation and right to withdraw until data analysis. The data was anonymised, and confidentiality was maintained, guided by the General Data Protection Regulations. All participants were provided with a debrief sheet with helplines and researcher contact information at the end of the survey. This study was approved by the Leeds Trinity University Ethics Committee (Ethics ID: PGR-FSSE-0269-2023).

7.5 Results

7.5.1 Data Preparation and Testing Assumptions

7.5.1.1 Data Screening

The data was examined for faulty and impermissible responses in alignment with Collier (2020). First, the researcher examined each scale's values and whilst some were high, they fitted within the expected range of responses. Then, the data was scrutinised for any yes-sayers using the standard deviation function in Microsoft Excel. All responses were found to be acceptable. Lastly, all variables were standardised as z-scores and then sorted to identify any irregularities. All data seemed consistent and acceptable when compared across scales.

Data screening revealed no missing data for indicators of the main model. However, as expected, some data was missing regarding optional demographic data

of income (7.83%), and postcode (4.67%), which had no influence on the analysis. Missing data was also apparent on indicators of the moderators of affective activity (2.33%) and active activity (2.33%) due to survey logic, i.e., for those who indicated they never visited RGS. The researcher imputed such scores with values of 1 (i.e., never conducting such activity in RGS), reflecting the assumption that these individuals never visit RGS. Additionally, 14 missing values for the identity visibility scale (0.67%) were imputed using the scale average.

7.5.2 Preliminary Analysis

7.5.2.1 Descriptives

600 participants completed the survey through online social media platforms of Facebook, Instagram, X platforms, and various in-person organisations around England. Data was collected between December 2023 and April 2024. All responses were retained, as preliminary testing confirmed normality across the dataset. All variable indicators were analysed to determine descriptive statistics. Table 5 presents the sample's means, standard deviations (SD), range, and Cronbach's alpha scores for each construct measured.

Table 5

Descriptive statistics across all measures of perceived access, perceived safety, rate of engagement, psychological wellbeing, and the hypothesised moderators

	M	SD	Range	α
Perceived Access				.73
General Access Factors	3.42	0.67	1 - 4	
Knowledge	2.89	1.06	1 - 4	
Proximity	3.14	0.93	1 - 4	
Perceived Safety	3.03	0.82	1 - 4	.81
Rate of Engagement				.79
Variety of RGS Visited	2.53	1.08	1 - 7	
Frequency of Visits	4.00	1.53	1 - 7	
Recency of Visits	2.42	1.55	1 - 7	
Psychological Wellbeing				.90

Positive and Negative Emotions	6.45	1.74	1 – 11	
Engagement	6.98	2.18	1 – 11	
Relationships	6.97	2.56	1 – 11	
Meaning	7.19	2.52	1 – 11	
Achievement	6.74	2.11	1 – 11	
Health	6.27	2.56	1 - 11	
Moderators				
Active Engagement	1.73	0.64	1 - 5	.79
Identity Visibility	4.55	1.09	1 - 7	.79
Affective Engagement	2.75	.99	1 - 5	.87
Nature Connectedness	3.67	.53	1 - 5	.80
Social Relatedness	3.90	1.42	1 - 7	.83

Note. α = Cronbach's alpha.

The means, standard deviations, range, and internal consistency were computed for all study variables (see Table 6 below). Measures of perceived access, perceived safety¹⁰, rate of engagement, psychological wellbeing (PWB), and the hypothesised moderators exhibited acceptable variability and internal consistency. Perceived access factors showed moderate variation, with general access factors demonstrating higher mean scores compared to knowledge and proximity. Perceived safety was reported at a moderate level and showed strong reliability. Rate of engagement indicators reflected a range of participation levels, with frequency of visits generally higher than variety and recency of visits. PWB variables exhibited relatively high mean scores across all subscales, with strong internal consistency. The hypothesised moderators of active engagement and identity visibility also demonstrated acceptable reliability. Identity visibility had a relatively higher mean than active engagement and suggested variability in participants' perceived representation. Affective engagement was relatively high. Participants reported moderate nature connectedness with low variability, and moderate social relatedness with greater variability.

¹⁰ Perceived safety is referred to as a distinct variable here due to later emerging as its own variable during the confirmatory factor analysis, later discussed in Factor Validation.

7.5.2.1 Correlations

Table 6

Pearson's correlations between perceived access, rate of engagement, psychological wellbeing indicators, and measures of nature connectedness, social relatedness, identity visibility, affective engagement, and active engagement

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Positive Emotions	—																	
2. Engagement	.45**	—																
3. Relationships	.65**	.63**	—															
4. Meaning	.66**	.71**	.79**	—														
5. Achievement	.51**	.68**	.65**	.79**	—													
6. Health	.51**	.44**	.49**	.55**	.55**	—												
7. Perceived Safety	.25**	.21**	.25**	.25**	.20**	.19**	—											
8. Proximity	.16**	.179**	.12**	.16**	.160**	.15**	.05	—										
9. Knowledge	.23**	.141**	.18**	.18**	.19**	.24**	.17**	.46**	—									
10. General Access Factors	.41**	.291**	.36**	.36**	.34**	.44**	.25**	.49**	.57**	—								
11. Frequency of Visits	.20**	.30**	.20**	.26**	.25**	.24**	.19**	.38**	.35**	.43**	—							
12. Recency of Visits	.15**	.17**	.08	.15**	.12**	.18**	.08	.35**	.37**	.36**	.68**	—						
13. Variety of RGS Visited	.16**	.23**	.18**	.20**	.18**	.20**	.14**	.31**	.35**	.37**	.52**	.47**	—					
14. Identity Visibility	-.01	.07	.06	.05	.04	-.02	-.08*	-.16**	-.12**	-.12**	-.06	-.08*	-.03	—				
15. Nature Connectedness	.12**	.26**	.17**	.22**	.17**	.11**	.07	.12**	.18**	.19**	.23**	.16**	.20**	-.04	—			
16. Social Relatedness	.38**	.33**	.47**	.39**	.35**	.24**	.16**	.14**	.14**	.31**	.17**	.09*	.18**	-.05	.18**	—		
17. Affective Engagement	.09*	.28**	.19**	.25**	.22**	.19**	.01	.15**	.23**	.30**	.39**	.30**	.39**	.05	.31**	.14**	—	

15. Active Engagement	.16**	.12**	.11**	.13**	.13**	.25**	.04	.19**	.28**	.28**	.34**	.41**	.54**	.04	.08	.11**	.41*	—

Interestingly, the positive correlation between identity visibility and perceptions of people danger (reverse coded) aligns with ideas that heightened visibility can lead to fears of being abused. Additionally, identity visibility exhibited significant negative correlations with all perceived access factors, indicating that visibly marked South Asian Muslim women face greater barriers to access RGS. Nature connectedness and social relatedness exhibited positive relationships with the indicators of perceived access, rate of engagement, and PWB, suggesting that people with more social relatedness and nature connectedness visit RGS more frequently, experience better access and PWB.

Table 5 also suggests that individuals who are more social and naturally inclined feel more perceived safety, evidenced by the positive relationships between nature connectedness and perceptions of danger from others, and between social relatedness and perceived safety indicators. Lastly, both affective engagement and active engagement in RGS positively correlated with each other, and with indicators from the constructs perceived access, rate of engagement, and PWB. These relationships align with the broader literature highlighting the positive effects of health-enhancing activities in RGS (Thompson Coon et al., 2011).

7.5.3 Testing for Multicollinearity and Normality before the Formal Analyses

Parametric SEM analysis techniques require normal data distributions that exhibit linear relationships with no multicollinearity between variables (Kline, 2023). The correlation analysis revealed significant and positive relationships between all indicators and each construct. No correlation value exceeded .85, indicating non-multicollinearity (see Table 2). Moreover, the researcher applied the variance inflation factor (VIF) diagnostics to the model and found acceptable values ($VIF < 10$). The data met the collinearity assumptions of SEM.

Data normality was visually inspected through P-P plots and scatter plots of error variance. All variance of errors appeared random, and homoscedasticity was not apparent within the data. Univariate normality was assessed by investigating data distribution. Acceptable normality was achieved as the dataset was within the thresholds of skewness (between -2 and 2), and kurtosis (between -7 and 7) (Collier, 2020). The histograms, box plots and Q-Q plots appeared normal (Kline, 2023).

Multivariate normality tests revealed slight departures from normality within the data. The researcher tested whether Maximum Likelihood Estimation (MLE) was

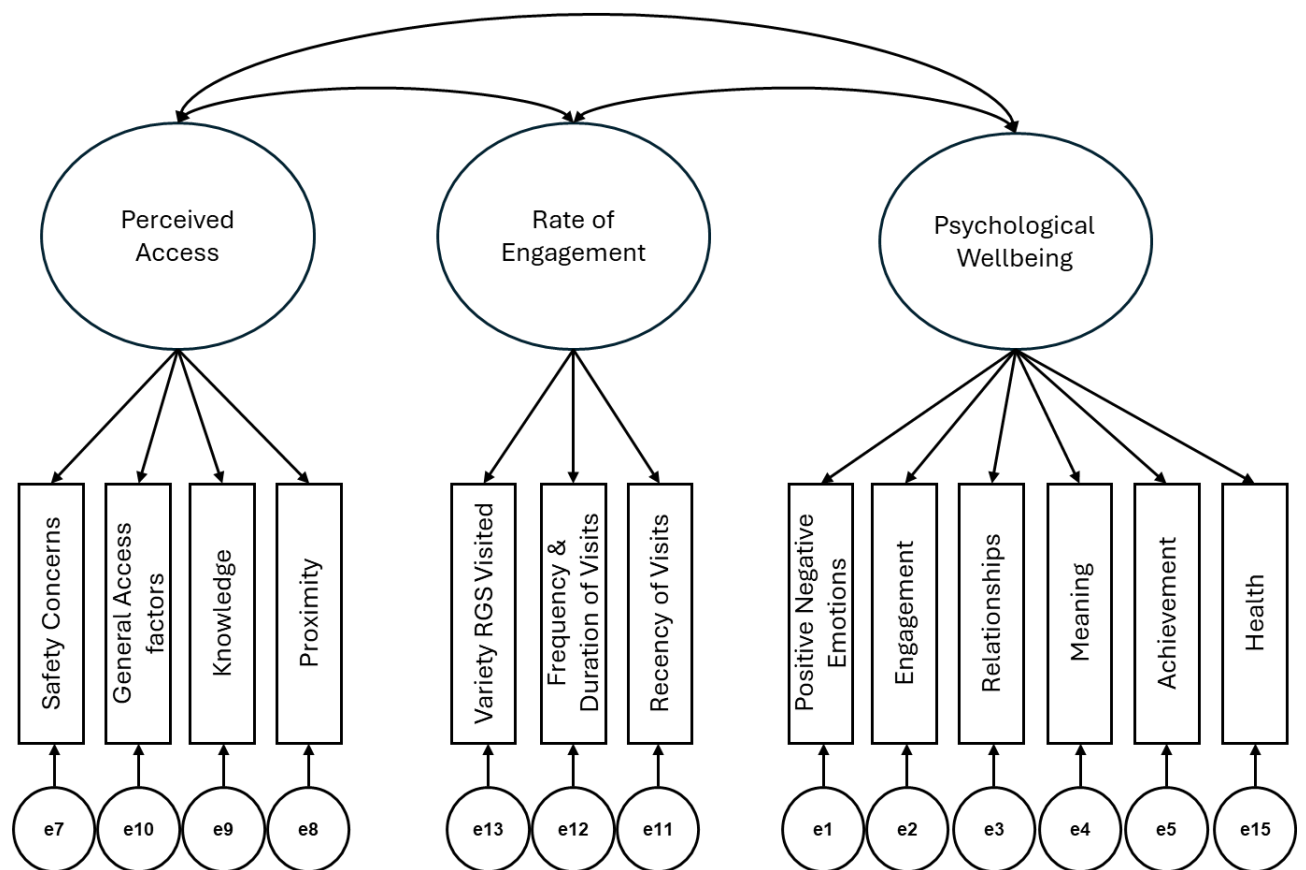
robust to these deviations through various sensitivity analysis techniques. First, outliers were removed after inspecting Mahalanobis distances but then retained because they reduced data variability, worsened model fit and had little influence on the estimation output. Second, non-parametric estimates were employed, such as Unweighted Least Squares and Asymptotic Distribution-Free analyses. These techniques yielded poorer model fit estimates without significantly influencing the estimation output, normality, and Mahalanobis values (Kline, 2023). Lastly, bootstrapping ($n = 5000$, $CI = 95\%$) techniques were conducted and yielded the same results as MLE. It was concluded that MLE was robust and reliable to account for the data deviation.

Common method bias was tested through regressing paths from all indicators to a common method variable in the model. Since the χ^2 value was worse with the variable factor, there was no substantial concern for common method bias in the current research.

7.5.4 Factor Validation

Before examining the hypothesised relationships between PWB, perceived access, and rate of engagement, a confirmatory factor analysis (CFA) model was specified to assess the construct validity of each measure. For parsimony, survey items were combined into 'parcelled indicators'. For example, three items related to achievement on the PERMA scale were combined to form one parcelled indicator of 'achievement'. This was loaded onto PWB in the model alongside other parcelled indicators of positive and negative emotions, engagement, relationships, meaning, and health. Similarly, the construct of perceived access was loaded onto by parcelled indicators of general access factors, knowledge, proximity, and perceived safety. Finally, the construct of rate of engagement was loaded onto by parcelled indicators of the variety of RGS visited, frequency of visits, and recency of visits. The researcher evaluated model fit with established thresholds: standardised root mean square residual (SRMR) < 0.08 , root mean square error of approximation (RMSEA) < 0.08 , chi-square/degrees of freedom (PCMIN/DF) < 5 , comparative fit index (CFI) > 0.95 , goodness-of-fit index (GFI) > 0.95 , and Tucker-Lewis index (TLI) > 0.95 (Hu & Bentler, 1999; Kline, 2023; Shevlin & Miles, 1998).

Figure 9
Original measurement model



Upon initially evaluating the model, it was found that the fit statistics indicated poor model fit: $\chi^2(62) = 308.76$, PCMIN/DF = 4.98, GFI = .92, RMR = .06, TLI = .92, CFI = .94, RMSEA = .08, SRMR = .06. The researcher examined the modification indices to identify ways to improve model fit. Covariances were added incrementally which were theoretically justified and improved the model fit. These iterations are documented in Table 7 below.

Table 7
Respecifying the measurement model

Iteration	Details	Theoretical support	Fit statistics
First Respecification:	Covariance added between the error terms of Positive Negative Emotions (e1) and Achievement (e5).	Individuals experiencing positive emotions tend to report higher achievement (Lyubomirsky et al., 2005).	$\chi^2= 279.55$, DF = 61, PCMIN/DF = 4.58, GFI = .93, RMR = .06, TLI = .93, CFI = .94, RMSEA = .08, SRMR = .06
Second Respecification:	Covariance added between the error terms of Relationships (e3) and Achievement (e5).	Stronger social relationships can enhance achievement in various spheres (Wentzel, 1998).	$\chi^2=251.71$, DF = 59, PCMIN/DF = 4.20, GFI = .94, RMR = .06, TLI = .93, CFI = .95, RMSEA = .07, SRMR = .06
Third Respecification:	Covariance added between the error terms of Positive Negative Emotions (e1) and Engagement (e2).	Positive emotions are often associated with higher engagement levels (Fredrickson, 2001)	$\chi^2=219.68$, DF = 60, PCMIN/DF = 3.72, GFI = .94, RMR = .06, TLI = .93, CFI = .96, RMSEA = .07, SRMR = .06

Despite model fit improvements, poor model fit necessitated further respecification to the model. Perceived safety was identified to load poorly onto perceived access in the CFA output (0.27). As such, perceived safety was removed from the perceived access construct and specified as an independent latent variable. Survey items related to perceived safety were loaded onto this construct as individual (unparcelled) indicators.

(Table 8). A re-evaluation of the model revealed poor fit statistics initially, but these improved after respecifying the model with an additional covariance (see Table 8 below).

Table 8
Respecifying perceived safety as a latent variable in the model

Iteration	Details	Theoretical support	Fit statistics
Fourth Respecification:	Re-specified the model with Perceived Safety as a separate construct (the parcelled indicator of perceived safety was un-parcelled from perceived safety and used to form the indicators for the new construct of Perceived Safety).	Perceived safety influences PWB (Obrenovic et al., 2020).	$\chi^2=503.18$, DF = 110, PCMIN/DF = 4.57, GFI = .91, RMR = .05, TLI = .90, CFI = .92, RMSEA = .08, SRMR = .05
Fifth Respecification:	Added a covariance between Safety concerns (e15) and feelings of Unsafety (e16),	Concerns and feelings of unsafety represent personal dimensions of perceived safety (Bogar & Beyer, 2016).	$\chi^2=316.28$, DF = 109, PCMIN/DF = 2.90, GFI = .94, RMR = .05, TLI = .95, CFI = .96, RMSEA = .06, SRMR = .05

The final measurement model had good model fit. The chi-squared difference test between the third specification (initial model) and the fifth specification (final model) indicated that the final model fit the data significantly better than the initial model: $\chi^2(49) = 96.60$, $p < .05$, with a critical value of 66.34. Next, the researcher determined

the factor loadings of each variable. The factor loading estimates are presented in Table 9 below.

Table 9

Confirmatory factor analysis results for psychological wellbeing, perceived access, rate of engagement and perceived safety constructs

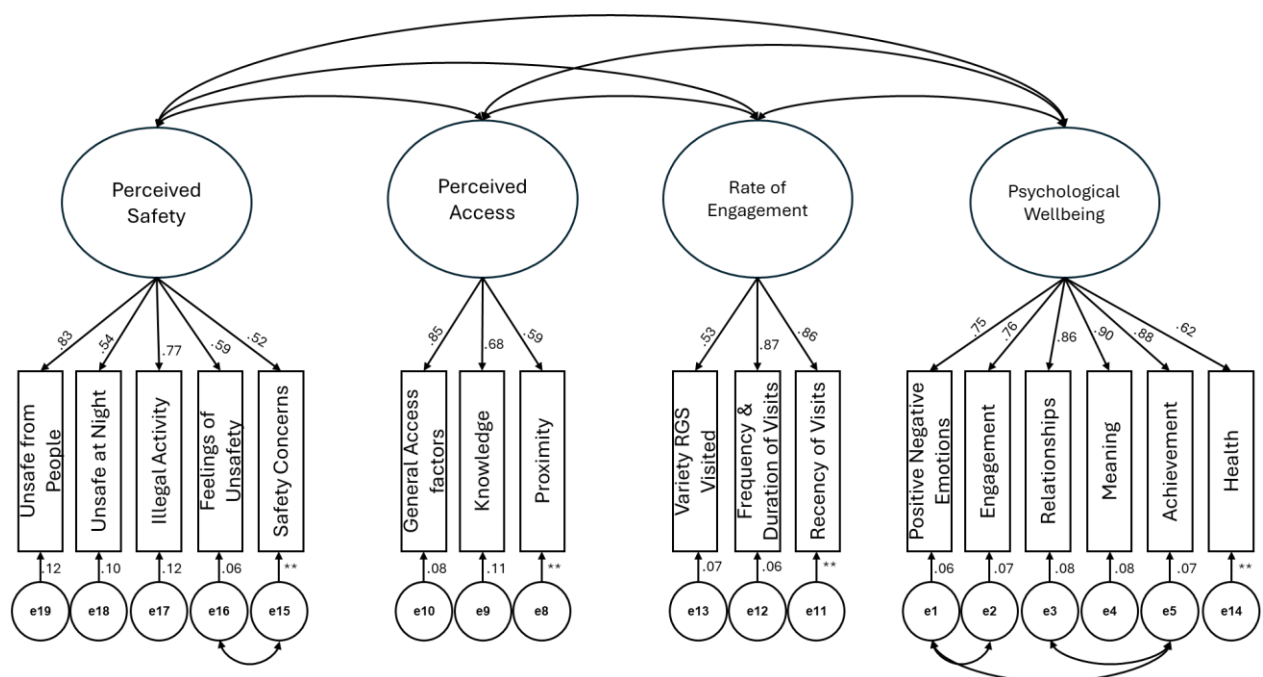
Construct	Standardised Factor Loading	Unstandardized Factor Loading	SE	C.R. (109)	p
Psychological Wellbeing (PERMA) (CR = 0.91)					
Positive Negative Emotions	0.75	1.22	0.08	15.20	<.001
Engagement	0.77	1.24	0.08	15.62	<.001
Relationships	0.86	1.39	0.08	16.80	<.001
Meaning	0.90	1.47	0.08	17.65	<.001
Achievement	0.87	1.42	0.08	16.86	<.001
Health	0.62	1.00	—	—	—
Perceived Access (CR = 0.76)					
Proximity	0.62	1.00	—	—	—
Knowledge	0.69	1.12	0.09	12.71	<.001
General Access Factors	0.83	1.34	0.10	13.57	<.001
Rate of Engagement (CR = 0.80)					
Recency of Visits	0.87	1.00	—	—	—
Frequency & Duration of Visits	0.78	0.90	0.05	17.87	<.001
Variety of RGS Visited	0.61	0.71	0.05	14.46	<.001
Perceived Safety (CR = 0.79)					

Safety Concerns	0.52	0.62	0.05	11.76	<.001
Feelings of Unsafety	0.59	0.71	0.05	13.49	<.001
Illegal Activity	0.77	0.93	0.06	16.82	<.001
Unsafe at Night	0.54	0.65	0.05	12.37	<.001
Unsafe from People	0.83	1.00	—	—	—

Note: CR= Composite Reliability. C.R.= Critical Ratio

The final model (Figure 10) reflected good model fit: $\chi^2 = 316.28$, $DF = 109$, $PCMIN/DF = 2.90$, $GFI = .94$, $RMR = .05$, $TLI = .95$, $CFI = .96$, $RMSEA = .06$, $SRMR = .05$. This model was tested structurally, as detailed next.

Figure 10
Final measurement model



7.5.4.1 Convergent and Discriminant Validity Testing

Before testing the structural model, Average Variance Extracted (AVE) values were calculated for each construct to assess convergent validity among the indicators across variables and revealed all values to be acceptable (AVE > 0.6) (Fornell & Larcker, 1981). Discriminant validity- shared variance between constructs- was also assessed by calculating the squared t-values for each pair of constructs. Since these values were significantly less than the average variance extracted values, there was no concern for discriminant validity. Lastly, the Heterotrait-Monotrait test was employed to accurately measure the discriminant validity between constructs and found all values to be within the acceptable range (< 0.85) (Henseler et al., 2015).

7.5.4.2 The Relationship between Perceived Access, Perceived Safety, Rate of Engagement, and Psychological Wellbeing

Maximum Likelihood Estimation (MLE) was employed to test a structural model consisting of the constructs perceived access, perceived safety, rate of engagement, and PWB. The paths between these constructs were specified as: perceived access to rate of engagement, perceived access to PWB, and rate of engagement to PWB. Perceived safety was also regressed onto PWB, aligning with the original hypothesis that perceived safety links to PWB, but was now separate from perceived access due to its poor factor loading. The results are presented in Table 10 below.

Table 10

Coefficient estimates of the paths between perceived access, perceived safety, rate of engagement, and psychological wellbeing

Relationship	Standardized Estimate	Unstandardized Estimate	t (110)
Perceived Access → Psychological Wellbeing	0.38	0.38	5.35
Perceived Access → Rate of Engagement	0.64	0.90	10.97
Rate of Engagement → Psychological Wellbeing	0.01	0.01	0.24
Perceived Safety → Psychological Wellbeing	0.20	0.15	4.15

Note. t = t-value. R² = squared multiple correlation. R² values: Rate of Engagement = 0.41, Psychological Wellbeing = 0.23.

The structural model fit was good: $\chi^2 = 316.58$, DF = 110, PCMIN/DF = 2.90, GFI = .94, RMR = .05, TLI = .95, CFI = .96, RMSEA = .06, SRMR = .05. The analysis revealed all hypothesised direct relationships as significant except for between rate of engagement and PWB. Perceived access exhibited a significant positive moderate relationship with PWB ($\beta = 0.38$, $t(109) = 5.35$, $p < .01$). Perceived access also had a significantly positive strong relationship with rate of engagement ($\beta = 0.90$, $t(109) = 10.97$, $p < .01$). Perceived safety reflected a significantly positive weak relationship with PWB ($\beta = 0.20$, $t(109) = 4.15$, $p < .01$). However, rate of engagement did not significantly predict PWB whilst accounting for perceived access and perceived safety in the model ($\beta = 0.01$, $t(109) = 0.24$, $p = .81$). The investigation into potential issues affecting the variable rate of engagement, such as measurement errors or external factors, revealed no significant concerns.

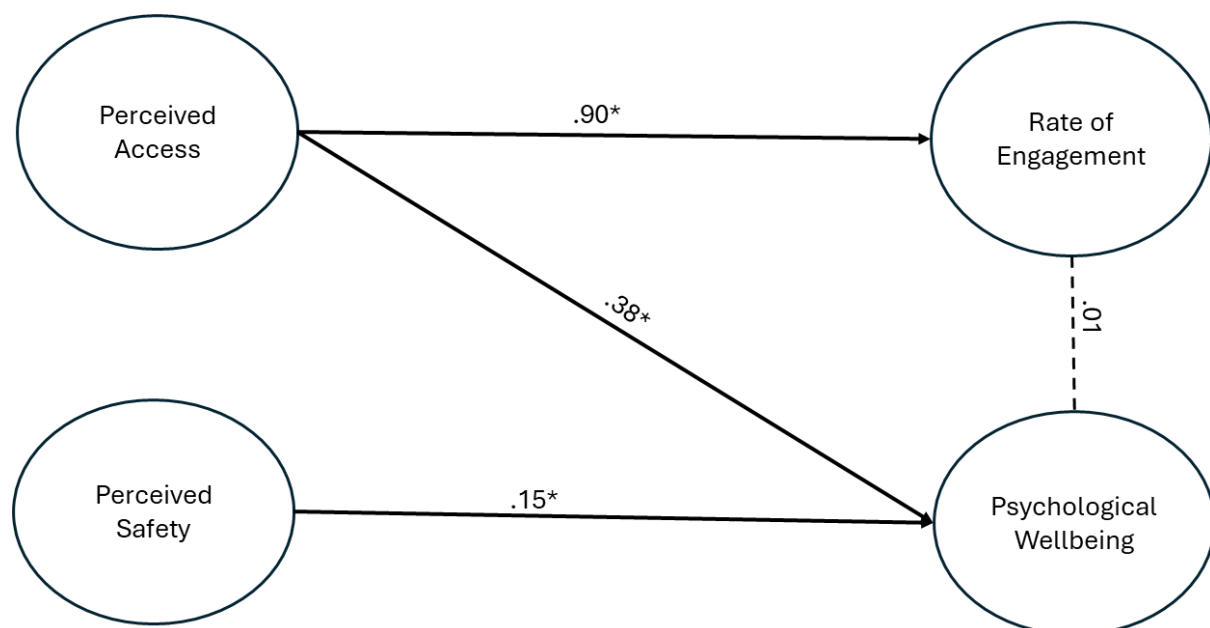
7.5.4.3 The Mediating Effect of Rate of Engagement on the Relationship Between Perceived Access and Psychological Wellbeing

To test whether rate of engagement mediates the relationship between perceived access and PWB, the direct and indirect effect of perceived access on PWB through rate of engagement was assessed. Perceived access had a significant direct effect on

psychological wellbeing (PWB). However, the indirect effect was nonsignificant ($\beta = .01$, unstandardized = .01), and the 95% confidence interval ranged from -0.10 to 0.01, $p = .85$, indicating a nonsignificant indirect effect. Thus, a mediation effect was not supported, suggesting that the relationship between perceived access and PWB was primarily driven by a strong direct effect ($\beta = 1.11$). The final model is presented in Figure 11.

Figure 11

Unstandardised estimates between perceived access, rate of engagement, and psychological wellbeing for South Asian Muslim women ($n = 600$)



7.5.4.4 Testing the Moderation Effects in the Model

While it was initially hypothesised that identity visibility, active engagement, and affective engagement would moderate the relationship between rate of engagement and PWB, the hypotheses were adjusted to test these moderations on the direct relationship between perceived access and PWB due to the nonsignificant relationship observed between rate of engagement and PWB. The hypotheses regarding social relatedness and nature connectedness moderating the relationship between perceived access and the rate of engagement remained unchanged, as this relationship was found to be significant.

7.5.4.5 The Moderation Effect of Nature Connectedness and Social Relatedness in the relationship between Perceived Access and Rate of Engagement

When nature connectedness was included in the model, the fit was acceptable: $\chi^2(139) = 363.70$, PCMIN/DF = 2.62, GFI = .94, RMR = .05, TLI = .95, CFI = .96, RMSEA = .07, SRMR = .05. The direct effect of nature connectedness was significant, $\beta = .20$, SE = .07, CR = 2.53, $p < .01$. When testing for moderation, the interaction effect was not statistically significant, $\beta = -.01$, SE = .03, $t(139) = -.26$, $p = .80$. These results indicate that nature connectedness does not moderate the relationship between perceived access and rate of engagement.

When including social relatedness in the model instead, the fit was acceptable $\chi^2 = 43.68$, DF = 139, PCMIN/DF = 3.19, RMR = .07, GFI = .93, TLI = .93, CFI = .94, RMSEA = .06, SRMR = .06. Social relatedness had a nonsignificant direct effect on rate of engagement, with an unstandardised estimate of -.03 (standardised $\beta = -.05$), S.E. = .03, $t(139) = -1.15$, $p = .71$. When testing for moderation, the interaction effect was nonsignificant, .03, standardised $\beta = .05$, SE = .03, CR = 1.14, $p = .14$. These results indicate that social connectedness does not moderate the relationship between perceived access and rate of engagement.

7.5.4.6 Testing the Moderation effect of Identity Visibility, Active Engagement, and Affective Engagement in the relationship between Perceived Access and Psychological Wellbeing

When identity visibility was included in the model, the fit was acceptable: $\chi^2(139) = 350.15$, PCMIN/DF = 2.52, RMR = .05, GFI = .94, TLI = .95, CFI = .96, RMSEA = .05, SRMR = .05. The direct effect of identity visibility on psychological wellbeing (PWB) was significant, with an unstandardised estimate of 0.07 ($\beta = 0.13$), SE = .22, $t(139) = 3.25$, $p < .01$. The interaction between identity visibility and perceived access was also significant and positive for PWB, with an unstandardised estimate of 0.06 ($\beta = 0.09$), SE = .03, $t(139) = 2.40$, $p = .02$. To probe this interaction, the researcher examined its effects at different levels of identity visibility. At high levels, identity visibility statistically strengthened the relationship between perceived access and PWB, with an unstandardised estimate of 0.58 ($\beta = 0.62$), SE = .08, CR = 7.15, $p < .01$. At lower

levels, identity visibility weakened this relationship, with an unstandardised estimate of 0.40 ($\beta = 0.42$), $SE = .08$, $CR = 5.33$. The moderation plot is presented below.

Figure 12

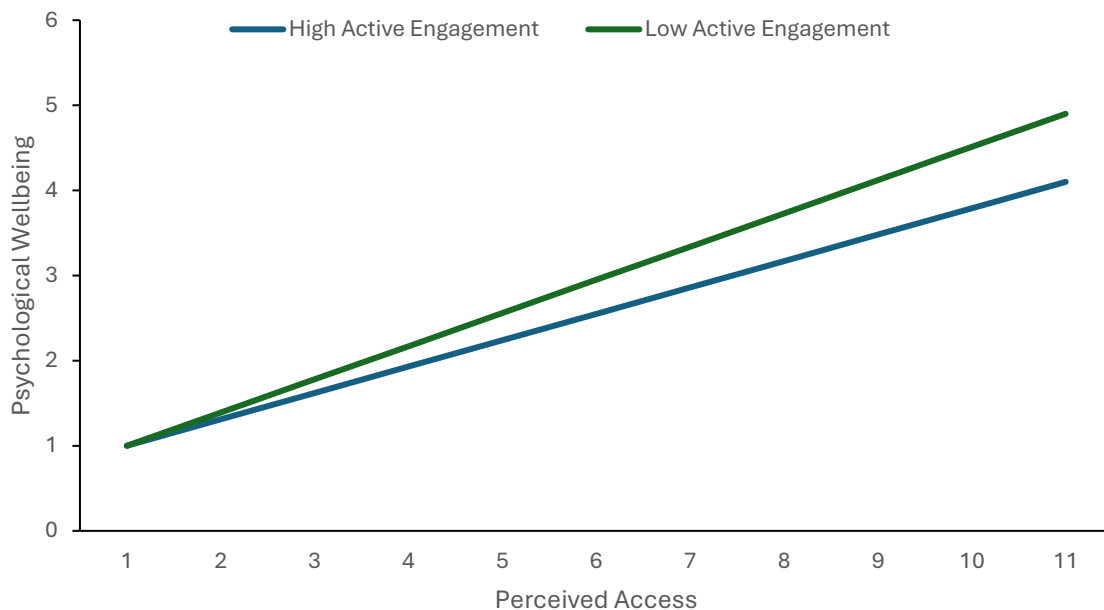
Identity visibility moderating the relationship between perceived access and psychological wellbeing



When active engagement was included in the model, the fit was: $\chi^2(139) = 539.28$, $PCMIN/DF = 3.88$, $RMR = .05$, $GFI = .92$, $TLI = .91$, $CFI = .92$, $RMSEA = .07$, $SRMR = .06$. The direct relationship between active engagement and PWB was nonsignificant, with an unstandardised estimate of -0.02 ($\beta = -0.02$), $SE = .04$, $t(139) = -0.50$, $p = .62$. The interaction between active engagement and perceived access was significant and positive for PWB, with an unstandardized estimate of 0.09 ($\beta = 0.08$), $SE = .05$, $t(139) = 2.04$, $p = .04$. To probe this interaction, the researcher examined the effects at different levels of active engagement. At low levels, active engagement strengthened the relationship between perceived access and PWB, with an unstandardized estimate of 0.39 ($\beta = 0.49$), $SE = .08$, $t(139) = 4.85$, $p < .01$. This relationship was weaker at high levels, with an unstandardised estimate of 0.31 ($\beta = 0.65$), $SE = .10$, $t(139) = 6.12$, $p < .01$. The plot is shown below.

Figure 13

Active engagement moderating the relationship between perceived access and psychological wellbeing



When affective engagement was included in the model, the fit was acceptable: $\chi^2(139) = 451.23$, PCMIN/DF = 3.25, RMR = .05, GFI = .93, TLI = .93, CFI = .94, RMSEA = .06, SRMR = .05. Affective engagement had a significant and positive direct relationship with PWB, with an unstandardised estimate of 0.35 ($\beta = 0.34$), SE = .06, $t(139) = 6.25$, $p < .01$. However, the interaction between affective engagement and perceived access on PWB was not statistically significant, with an unstandardized estimate of 0.05 ($\beta = 0.06$), SE = .03, $t(139) = 1.51$, $p = .13$.

7.5.4.7 Summary of Results

Overall, perceived access exhibited significant positive associations with both rate of engagement ($\beta = 0.90$) and PWB ($\beta = 0.38$). Perceived safety also statistically predicted PWB ($\beta = 0.20$). However, rate of engagement did not significantly predict PWB when accounting for perceived access and safety. Mediation analysis suggested that rate of engagement does not mediate the relationship between perceived access and PWB. Identity visibility and active engagement both statistically strengthened the positive relationship between perceived access and PWB. Social relatedness and nature connectedness did not statistically moderate the relationship between

perceived access to RGS and PWB. Overall, the model fit was good, supporting these findings.

7.6 Discussion

This study sought to examine the relationships between perceived level of access to rural green spaces (RGS), psychological wellbeing (PWB), rate of engagement with RGS, connectedness with nature, social relatedness, identity visibility, active engagement, and affective engagement for South Asian Muslim women in England. These variables were measured with validated scales through an online survey questionnaire that was distributed throughout England and completed by a sample of 600. All measures exhibited good validity and reliability. The model aligned with the theoretical findings of Chapter 6 and was supported by the wider literature, as outlined in Section **Error! Reference source not found.** Multiple fit indices were evaluated, and sensitivity checks were performed to assess robustness. Taken together, these steps ensured that the model was not data-driven and was statistically and conceptually justified, thus enhancing the applicability and generalisability of the findings in the context of South Asian Muslim women (Kyriazos, 2018).

During the Confirmatory Factor Analysis, perceived safety exhibited poor factor loading on the latent construct of perceived access. Perceived safety was therefore modelled as a separate latent construct from perceived access, with relevant survey items loaded as indicators. This specification contributed to a good model fit. The initial conceptualisation of perceived access, derived from Wang et al. (2015), incorporated perceived safety as a subdimension of various access factors to urban parks. However, the findings of the present study suggest that perceived safety is a distinct construct from perceived access, specifically in the context of RGS for South Asian Muslim women in England. The idea that perceived safety positively relates to PWB fits in with broader literature, as Valsaraj & Nayak (2017) and Sarriera et al. (2021) suggest significant links between perceived safety and PWB with broader samples. In the context of the current study, this finding highlights the importance of contextual nuances in the applicability of theoretical concepts across different populations and settings. Perceived safety may be important for PWB, particularly amongst a group who are often exposed to safety risks due to their gendered, religious, and ethnic identities (Hamza et al., 2024). Further analysis could examine the interplay between

perceived safety and rate of engagement, which was beyond the current study's scope.

As expected, perceived access moderately predicted PWB, and strongly predicted rate of engagement in the statistical model. Perceived safety moderately predicted PWB, while the relationship between rate of engagement and PWB was nonsignificant in the statistical model. Moreover, rate of engagement did not mediate the effect of perceived access on PWB, which was contrary to the researcher's expectations. This could mean that RGS engagement frequency does not explain PWB differences among people. These findings add nuance to wider literature, which suggests that exposure to the natural environment links to better PWB and instead suggests that feeling able to visit is more important for PWB than actual visits, when considering perceived access in the model.

7.6.1 Perceived Access to Rural Green Spaces links to Rate of Engagement and Psychological Wellbeing

The current analysis revealed important findings in the relationships between perceived access to RGS, rate of engagement and PWB among South Asian Muslim women in England. As per expectations, it was found that perceived access to RGS could strongly predict the PWB of South Asian Muslim women, showing that feeling able to engage with RGS matters more than retrospective visits. This could be because South Asian Muslim women's PWB benefits from RGS access are contingent on feelings of belonging and being able to access. These findings show the importance of considering perceptions when evaluating the wellbeing benefits that diverse communities obtain from RGS. The positive relationship between perceived access and PWB aligns with broader work on the associations between perceptions of access to natural environments more broadly and PWB (McGuire et al., 2022).

Furthermore, the positive relationship between perceived access and rate of engagement with RGS was expected and aligns with the model of Wang et al. (2015), who illustrate access to urban parks as multidimensional. This could mean that those who experience better perceived access to NGS are more likely to visit. The current findings bring applicability of this framework to the context of South Asian Muslim women's RGS access in England. Beyond perceived access, a substantial body of work emphasises the PWB benefits of being in natural environments (Martin et al., 2020; Ulrich et al., 1991). However, research rarely measures access, engagement

and PWB in a single model. Addressing this, the current study measured engagement with RGS as distinct from perceived access by measuring frequency of visits to RGS (Pot et al., 2021). It was important to understand how engagement and perceptions of access could enhance PWB for South Asian Muslim women. Upon reflection, this approach provided a comprehensive and accurate means to understand the dynamics between access and actual engagement in influencing PWB.

While it was found that perceived access significantly links to both rate of engagement and PWB, rate of engagement did not significantly predict PWB in this model. While existing literature does not consider both rate of engagement and perceived access as distinct variables (Comber et al., 2008; Roberts et al., 2019; Roe et al., 2016b), many studies may only report significant results due to the existing issue of publication bias. It is plausible that some studies, like the current one, measured rate of engagement but chose not to report the results due to their nonsignificant findings. This potential lack of transparency might have resulted in an incomplete scholarly understanding of the dynamics between access, engagement, and PWB. Addressing this issue highlights the need for greater openness in reporting and paves the way for further exploration in this area. Nonetheless, the current findings suggest that perceived access is a variable better linked to PWB than rate of engagement with RGS, which does not influence the effect of perceived access on PWB. This contradicts the assumption that perceived access to RGS enhances PWB through visiting those spaces, by capitalising on one's access.

Three possibilities can be considered to explain why perceived access relates to PWB, but rate of engagement does not. First, feeling able to access RGS may be linked to experiencing a psychological sense of security, which relates with PWB better than actual engagement levels. Secondly, individuals who perceive better access to RGS might also have the ability to engage more with broader green spaces such as gardens, parks, and allotments. Engagement with those spaces frequently might affect their PWB more significantly than their rate of engagement with RGS. This notion resonates with broader statistics reflecting South Asian Muslim women as less frequent visitors to RGS (Natural England, 2019a). Instead, they might engage with localised or community spaces, as well as with mental health and leisure facilities that are more accessible and culturally familiar, reflecting the influence of access related factors and affordances (Caperchione et al., 2015; Wendel et al., 2012). Lastly, when

observing the correlation matrix, the model reflects a strong positive relationship between both active and affective styles of engagement with PWB. This raises questions about whether specific aspects of access or engagement contribute to PWB, or whether quality, type and nature of engagement are contributors. In any case, these findings suggest that enhancing access to RGS would also mitigate access barriers to broader leisure and health settings.

7.6.2 Perceived Access may be Important for Psychological Wellbeing Regardless of Nature Connectedness, Social Relatedness, and Affective Engagement Levels

Understanding nature connectedness was crucial for examining how connectedness with nature influences visits to RGS, particularly for a group facing compounding access challenges related to proximity, race, travel, and cost (Hamza et al., 2024). The analysis revealed positive correlations observed between nature connectedness and the indicators of both perceived access and rate of engagement. However, no evidence in the current study revealed that nature connectedness moderates the relationship between perceived access and rate of engagement with RGS among South Asian Muslim women in England. There could be several reasons for this. Firstly, as Martin et al. (2020) and Teixeira et al. (2023) suggest, nature connected individuals tend to engage with a variety of natural environments, leading individuals to benefit from multiple natural environments, in turn reducing the effect of access to RGS. Secondly, individuals with high perceived access may engage with RGS regardless of their level of nature connectedness. This highlights the critical role of perceived access in promoting engagement with RGS and suggests a need for further research to explore its broader implications.

The analysis revealed positive correlations between social relatedness and all indicators of perceived access and rate of engagement. However, there was no substantial evidence that social relatedness influences the relationship between perceived access and rate of engagement with RGS for South Asian Muslim women in England. This was surprising given that several studies reveal positive links between social relatedness and access to leisure (Chen & Qiao, 2024; Jennings & Bamkole, 2019; Kaźmierczak, 2013; Van den Berg et al., 2019). Several explanations can be considered. Firstly, individuals with higher levels of social relatedness have more opportunities to engage with broader leisure and health contexts (Gatrell et al., 2004). As such, its influence on RGS engagement may be distributed across multiple

environments rather than specifically to the focused context, diminishing any pronounced effect for accessing RGS. Secondly, individuals with any level of perceived access might engage with RGS regardless of their level of social relatedness. This reflects the crucial role of perceived access in facilitating engagement with RGS and highlights a need for further research to explore its broader implications.

Affective engagement with RGS was important to understand for South Asian Muslim women who face prevailing mental health concerns and are challenged in accessing formalised mental health care (Roe et al., 2017; Thomas, 2023). Affective engagement had a direct positive impact on PWB. This aligns with previous research demonstrating that affective engagement enhances wellbeing by increasing relaxation, reducing stress, and promoting positive emotions (Djernis et al., 2019). However, the current study lacks evidence that affective engagement moderates the relationship between perceived access and PWB. This suggests that affective engagement independently benefits PWB; however, it does not significantly alter the effect of perceived access to RGS on PWB. This finding contrasts with expectations based on prior literature, where mindfulness in nature was argued to increase the effect of perceived access on PWB (see Section 7.5.4.5) (Richardson et al., 2022). One possible explanation for the lack of moderation effect is that affective engagement may provide PWB benefits independent of perceived access. Another explanation is that some individuals may engage in affective activity in urban green spaces, private gardens, or even indoor settings with plants, reducing their dependency on RGS for their PWB. Finally, for many individuals, the type and quality of engagement may be more crucial than frequency of visits in determining PWB outcomes. Since affective engagement was not found to moderate the relationship between perceived access and PWB, this requires further exploration.

7.6.3 Higher Levels of Identity Visibility and Lower Levels of Active Engagement Statistically Strengthen the Relationship between Perceived Access for Psychological Wellbeing

Identity visibility was important to measure, given the PWB and RGS access challenges faced by South Asian Muslim women, linked to their visible identities (Hamza et al., 2024). Understanding this relationship was important to reveal what inhibits visible minorities from experiencing the PWB benefits of RGS. It was found that identity visibility statistically strengthens the relationship between perceived

access and PWB. This suggests that the effect of perceived access on PWB is stronger for those with high identity visibility. This could be interpreted as individuals who are more visibly marked rely more on perceived access to RGS for their PWB, thus needing better perceived accessibility before they can reap RGS's PWB benefits. Visible individuals may feel a sense of otherness and danger associated with the risks they face because of their intersecting identities (Hamza et al., 2024). This idea is supported by the negative correlation observed between identity visibility and perceived safety. Conversely, less visible South Asian Muslim women might already experience a stronger sense of belonging and welcome to RGS, thus experiencing better PWB even at lower levels of perceived access.

It is also interesting to note the positive relationship between identity visibility and all PWB indicators. Regarding this, previous research suggests that Muslim women who maintain their visibility exhibit greater emotional resilience regardless of their access to RGS. This is linked to their persistent visibility in predominantly White settings and their adaptation to experiences of subordination (Eaton, 2015). These findings reflect the importance of identity visibility in shaping the RGS experiences of South Asian Muslim women in England. They also signal for further efforts to enhance the inclusivity of RGS for those who are currently underrepresented in such environments. For example, policymakers can promote RGS as a diverse space among its users, helping people from different identity categories to feel welcomed. This is important as research consistently shows that individuals who experience a stronger sense of belonging within social settings report higher levels of PWB (Brance et al., 2023).

Active engagement in RGS was important to measure for South Asian Muslim women who face alarming rates of physical health challenges (Awan et al., 2022; NHS Digital, 2020; Sharma et al., 2020; Tandon et al., 2022). The current findings suggest that the relationship between perceived access and PWB is stronger for those who are less physically active in RGS. This could mean that those who engage less in physical activity in RGS rely more on their perceived access for their PWB, accentuating its importance for people with sedentary lifestyles. Users who engage in physical activity might experience sufficient wellbeing benefits, reducing the impact of perceived access on their PWB. This reflects a threshold effect and aligns with broader work that highlights the compounding PWB benefits of physical activity in RGS (Bowler

et al., 2010). Supporting this idea, active engagement exhibited positive relationships with all PWB and rate of engagement indicators, suggesting that users are more likely to engage with physical activity when visiting RGS, and experience better PWB. These findings align with broader literature that demonstrates physical activity in NGS as conducive to PWB (Eyre et al., 2015b) and support the argument insinuated throughout this thesis that RGS is a viable pathway to undertake physical activity for South Asian Muslim women who might not otherwise be inclined to physical activity, helping to combat their current physical health concerns.

7.6.4 Nature and Psychological Wellbeing Frameworks Must Account for Perceptions of Access and Identity Marginalisation

The Stress Recovery Theory (Ulrich et al., 1991) suggests that exposure to nature triggers a stress-reducing response. In the current study, rate of engagement was retrospectively measured and did not statistically predict PWB when perceived access was included in the model. This may appear to challenge Stress Recovery Theory by implying that visits to RGS do not contribute to stress relief. However, it suggests that counting previous visits is not enough to capture the kind of restorative contact that the theory describes. Instead, the ways in which people engage with RGS are important in maximising the benefit they derive from these spaces. For instance, affective engagement showed a positive relationship with PWB. This means that those women who engaged in contemplative and affective ways reaped more of the stress-recovery benefits Ulrich (1991) outlined. Similarly, the strengthening moderation of active engagement between perceived access and PWB suggests that those who engage in physical activity rely less on their perceptions of access to RGS for their PWB. This could be because women who feel able to move freely and in comfortable ways are more likely to benefit directly from nature's stress recovery effects as opposed to their perceptions of access.

Leading on from this, the current findings suggest that feeling able to engage with RGS comfortably enhances PWB. The moderation by identity visibility suggests that those with less visibility are less dependent on their perceptions of access to RGS for their PWB. These results extend the Stress Recovery Theory by revealing important nuances associated with intersectionality. Since the need for perceived access is more pronounced when identity visibility increases, feeling alienated or more visible in RGS introduces a stress that disrupts the recovery process associated with

nature engagement. These findings support the Stress Recovery Theory's idea that nature enhances PWB through stress relief and suggest that restoration depends on the sense of safety, belonging, and inclusion felt when in RGS. It is crucial to develop a welcoming and inclusive atmosphere for all to realise nature's stress-recovery potential.

The Attention Restoration Theory (Kaplan & Kaplan, 1989) posits that time spent in nature replenishes directed attention. In the current study, rate of engagement did not statistically predict PWB when perceived access was included in the model. This suggests that retrospectively measuring rate of engagement may not sufficiently capture the restorative processes outlined by the Attention Restoration Theory. Instead, the positive relationship between perceived access and PWB highlights the role of psychological freedom in promoting attentional restoration. Feeling able to visit RGS may alleviate mental fatigue, even without frequent visits. This shifts the importance of physical exposure to the feeling of being able to observe natural stimuli. Similarly, the direct relationship between affective engagement and PWB reinforces the Attention Restoration Theory's tenet of quality of engagement, rather than the quantity of exposure. These findings underline the importance of enhancing perceived access and positive health behaviours among South Asian Muslim women. Finally, the moderation analysis reveals that identity visibility increases the level of reliance on perceived access for restoration. In line with the earlier discussion on Stress Recovery Theory, these findings extend Attention Restoration Theory by showing that social and psychological barriers, like identity visibility and social exclusion, can limit the restorative benefits associated with feeling able to engage with RGS.

The Biophilia hypothesis suggests that all humans experience natural inclinations to affiliate with nature, resulting in feelings of satisfaction and wellbeing (Kellert & Wilson, 1993). The positive relationship between perceived access and PWB extends this hypothesis by suggesting that feeling the ability to engage with RGS may be important for Biophilic benefits to materialise. Similarly, nature connectedness was directly associated with better PWB, suggesting that those with a stronger affinity with nature experience better wellbeing. These findings, alongside the nonsignificant relationship between rate of engagement and PWB (when perceived access was included in the model), suggest that the number of visits to RGS may not be as

influential as the perceived ability to access them. This highlights the importance of believing one can visit RGS to enable the positive effects linked to Biophilia.

The analysis also highlighted the importance of incorporating intersectionality into the Biophilia framework. The moderation of identity visibility between perceived access and PWB suggests that biophilic benefits do not occur in isolation to the social world. For visibly marked individuals, better access is needed to achieve relative wellbeing benefits. For example, South Asian Muslim women may limit their engagement with RGS when fearing how their identities are perceived and treated. This demonstrates how social barriers can suppress biophilia outcomes, which parallel earlier discussions on the Attention Restoration Theory and the Stress Recovery Theory. Overall, the findings support the Biophilia Hypothesis in showing that women with better access to nature report greater wellbeing and extend it by proposing that the opportunity to achieve biophilia's benefits is shaped by identity visibility.

Overall, the results in this study provide insight into the nature-wellbeing frameworks discussed. For the Stress Recovery Theory, the results show that meaningful, affective and active engagement in RGS promotes stress relief, but this relies on women feeling safe and welcome in those spaces. For the Attention Restoration Theory, the evidence suggests that nature offers mental respite, but this restoration is disrupted when identity visibility limits one's ability to disengage from daily stressors, i.e., through limited ability to visit RGS. In relation to the Biophilia hypothesis, the positive links between nature connectedness, social relatedness, and PWB show an innate inclination towards nature that is undermined by experiences of social exclusion. Together, these insights reveal that while the Stress Recovery Theory, the Attention Restoration Theory, and the Biophilia hypothesis provide valuable insight into the human and nature dynamic, they overlook the role of intersecting identities in shaping who benefits from nature. Considering this, interventions must move beyond physical provision and actively encourage inclusion, safety, and acceptance within RGS for South Asian Muslim women.

7.6.5 Opportunities for Further Research

Several opportunities for future research emerge from this study. Firstly, it is important to acknowledge that this study did not distinguish between the wellbeing outcomes derived purely from exposure to nature compared to those of physical and active engagement. Rather, physical activity in RGS was examined as a moderator linking

perceived access to RGS and PWB. While this approach reflects a flux dynamic between nature exposure and movement, future research should consider isolating these factors to reveal the sole contribution of nature to PWB.

Secondly, the reliance on self-reported measures can introduce social desirability bias, particularly given the focus on South Asian Muslim women, who often contend with negative societal narratives (Knez et al., 2012). Future studies can expand beyond focusing on South Asians as in the current study, and consider collecting data from randomised samples, including the said demographic. Moreover, while the current sample size of 600 was substantial, it may not capture the full diversity within South Asian Muslim women, particularly those who were unable to participate due to English language barriers. Future studies should consider accessing diverse sub-groups by disseminating translated or interpreted surveys. Lastly, as this cross-sectional study was the first attempt to map this out, further work should look at this longitudinally to strengthen causal inferences.

7.6.6 Study Implications

This study highlights the importance of increasing perceived access to RGS, which can challenge current health concerns surrounding South Asian Muslim women. While the implementations of these implications are provided in Chapter 9, some general implications are presented here. Firstly, in taking heed from perceived access being validated as a multidimensional scale, access could be enhanced by addressing the cultural, social, environmental, and economic barriers this group faces. Since perceived safety emerged as an independent dimension influencing PWB, this emphasises the need for public health initiatives to address safety concerns of RGS, particularly for South Asian Muslim women. Wang et al.'s (2015) framework for conceptualising access to green spaces proved valuable in conceptualising these dimensions, and future research should consider using similar frameworks to better understand access to natural environments for different groups.

In the current study, measuring rate of engagement and perceived access as separate and distinct variables linked with PWB proved valuable. Future scholars should test similar models in other Western countries like Canada or America to establish how green spaces impact PWB for marginalised groups in various relevant contexts. The nonsignificant relationship between rate of engagement and PWB, when accounting for perceived access in the model, leads to further questions about the

large body of research highlighting the benefits of interacting with nature (Ulrich, 1984). Further exploration is warranted regarding whether perceived access to RGS enhances accessibility to a broader range of spaces, including urban green spaces, and whether it is the rate of engagement or types of engagement that contribute to PWB. Similarly, future scholars should investigate how the RGS PWB benefits may differ from urban green spaces, as suggested by Wyles et al. (2019). In any case, this study asserts the importance of enhancing perceptions of access for South Asian Muslim women in England.

The findings of this study suggest that encouraging physical activity in RGS may be important for PWB. Many South Asian Muslim women may feel challenged to engage in leisure activities regularly (Azzarito & Macdonald, 2016; Hamzeh, 2011; Thorpe et al., 2022). The current findings support ideas of developing RGS initiatives tailored to individuals with varying physical activity levels. For example, those who are less physically active but rely more heavily on their perceived access to RGS for their wellbeing, could benefit from interventions that highlight RGS as appealing and health-enhancing spaces. Conversely, those already inclined towards physical activity may be encouraged to engage in diverse options that support sustainable and meaningful use of RGS. These individuals could also act as role models, helping to inspire others within their communities to become more active. In doing so, the wellbeing benefits of RGS could be maximised for South Asian Muslim women across different levels of engagement. In relation to this, Chapter 9 provides details on how government and community organisations can develop socially engaging and culturally relevant interventions that appeal to South Asian Muslim women.

These findings also highlight the importance of encouraging affective engagement in RGS to enhance wellbeing irrespective of perceived access levels. Community initiatives should incorporate mindfulness activities, nature appreciation programs, and culturally tailored engagement strategies to increase the emotional connection South Asian Muslim women experience with nature. Such initiatives must be welcoming for all by recognising the diverse ways people engage with RGS and reflecting the breadth of user demographics. Finally, initiatives should consider the role of identity visibility. Generalised support structures may be adequate for those with lower visibility to feel welcomed in RGS. However, those with higher visibility may benefit from more targeted initiatives that enhance their sense of belonging and

acceptance within these spaces. Overall, these findings highlight the importance of diversifying user representation in RGS to normalise the presence of different and visible individuals, thereby ensuring that everyone feels comfortable and welcome.

Overall, this study offers unique contributions to both academia and practice by extending current nature and wellbeing frameworks through the inclusion of a highly underrepresented demographic—South Asian Muslim women. The study highlights how intersectionality informs existing frameworks by showing how identity, belonging, and perceptions could shape PWB. It also conceptualises perceived access as a multidimensional construct, demonstrating that access is more than mere physical proximity and is influenced by social, cultural, and psychological factors.

7.6.7 Conclusion

This study provides valuable insights into the dynamics between perceived access to RGS, rate of engagement, and PWB for South Asian Muslim women in England. The study employed established scales like PERMA and Wang et al.'s (2015) accessibility framework to develop a complex model representing the RGS experiences of South Asian Muslim women. In doing so, a comprehensive understanding of access to, and engagement with, environments that often present significant barriers for visible minorities was established. Perceived access and perceived safety were presented as statistical predictors of the frequency and duration of engagement with RGS. However, rate of engagement was not found to influence PWB in this model. Whilst this relationship requires exploring further, this study emphasises the need for interventions to focus on enhancing cultural, social, and environmental perceptions of access to RGS for the said demographic. Interventions could also introduce health-enhancing activities in RGS to South Asian Muslim women, to maximise the PWB benefits of their engagement. This would help to address the current mental and physical health challenges they face.

This study contributes to the growing corpus of literature on health and wellbeing predictors among marginalised groups, illustrating how cultural identity shapes the PWB outcomes gained from RGS. Future research should build on these findings to explore complex models of health and wellbeing among specific populations, in the context of green spaces, to form relevant and practical solutions to combat health and access inequity. Specifically, future research could refine this model by exploring additional psychological factors of cultural norms or community

cohesion to clarify how engagement with RGS influences PWB for South Asian Muslim women and/or other marginalised groups. This relationship can be understood through longitudinal and mixed-methods studies to establish causal pathways and the lived experiences behind these relationships. Similarly, this framework could be applied to other minoritised groups. By tailoring the identity visibility scale to ensure its validity for each focused population, researchers could assess the nature–access dynamics across diverse groups.

Regarding theoretical contributions, these findings show that the restorative benefits of RGS depend on feeling a sense of social inclusion. Only in welcoming and inclusive environments can nature's stress recovery (Ulrich et al., 1991) potential benefit for users from marginalised groups. The Attention Restoration Theory (Kaplan & Kaplan, 1989) must account for how social-psychological barriers can inhibit the potential for nature to replenish people's directed attention. Likewise, the application of the Biophilia Hypothesis (Kellert & Wilson, 1993) should consider how the effect of biophilic responses is shaped by the degree of social inclusion felt by users. Overall, the study extends these theories by suggesting that they should incorporate intersectionality to acknowledge how identity shapes the benefits people derive from nature.

7.6.8 Chapter Summary

This chapter presented a structural equational model analysis, which found perceived access as an important variable linked with PWB based on data from 600 South Asian Muslim women. Moderation analysis revealed active engagement and identity visibility as important factors for policy makers to consider, helping to maximise the PWB benefits of RGS. The next chapter synthesises the findings from all three studies and discusses them in the context of broader literature.

8 Chapter 8: General Discussion

8.1 Chapter Overview

Chapter 8 synthesises the key findings from this thesis by discussing the insights from the systematic literature review, walking and semi-structured interviews, and structural equation modelling (SEM) analysis. The chapter starts out by revisiting the terms adopted and then evaluates the methods employed in this thesis. It then provides a critical discussion of how rural green spaces (RGS) influence psychological wellbeing (PWB) among South Asian Muslim women in England, highlighting the structural and social barriers that shape access and experiences. After this, the chapter adds insight into existing nature and wellbeing frameworks by integrating an intersectional lens, accounting for how race, gender, and religion interact to shape the restorative potential of RGS.

8.2 The Importance of Defining Research Parameters When Collecting Data

From the outset, this thesis identified various terms and definitions describing natural green spaces (NGS), and highlighted the challenges associated with synthesising existing research due to inconsistencies in terminology. The current thesis addressed these concerns by adhering to the terms NGS, urban green spaces, and RGS, defined in Section 1.2. Distinguishing between these NGS categories was important as people often experience RGS differently from urban green spaces (Hamza et al., 2024; Rupprecht et al., 2015). For instance, as found in Sections 4.4.5 and 6.4.2.1, RGS tend to offer people a better sense of immersion in nature and opportunities for escapism.

Whilst these terms and their distinctions helped to categorise people's experiences of NGS, they also helped to focus more closely on specific types of NGS. For example, the systematic literature review of Chapter 4 revealed existing research predominantly focused on urban green spaces and less on RGS. This imbalance informed the rationale for focusing on RGS experiences in Chapter 6. This exploration provided an elaborate image of the RGS barriers and PWB associations South Asian Muslim women experience, which would have otherwise been overlooked if focused on NGS more broadly. For instance, the qualitative findings of Chapter 6 provided a comprehensive picture of how the racialisation of RGS undermines the PWB benefits that minoritised individuals gain from RGS.

Building on this, clearly defining RGS ensured a shared understanding between the researcher and participants regarding their engagement with these spaces. This facilitated meaningful, context-specific discussions in Chapter 6. The use of this terminology also ensured consistency across the different studies and supported the development of a quantitative model focused specifically on RGS. For example, the SEM analysis captured the participants' engagement with a range of RGS, aligning with the types of spaces identified in both the qualitative study and the systematic literature review. Including a variety of RGS helped to account for the participants' RGS engagement in diverse settings, thereby addressing the critiques raised in Section 1.2 about how narrow definitions overlook meaningful experiences (Taylor & Hochuli, 2017).

8.3 The Value of Multiple Methods in this Thesis

The methodologies employed in this thesis provide a comprehensive understanding of the relationship between access to RGS and PWB among South Asian Muslim women in England. By including a systematic literature review, qualitative exploration, and SEM, the thesis addresses a significant gap in existing literature and offers valuable insights into the factors influencing engagement with nature and PWB for South Asian Muslim women. Each method contributed to an overall holistic understanding of the research topic that no single method could achieve independently (Tashakkori & Teddlie, 1998).

The systematic literature review served as an important starting point to synthesise existing literature, helping to identify patterns, gaps, and methodological limitations in existing studies on NGS and PWB for South Asians. Such protocols are often adopted in the medical field with quantitative data (Morton et al., 2011). However, its niche application in synthesising literature on access to and PWB associations with NGS proved useful. For instance, it was found that access to nature is often reduced to geographic proximity in the quantitative research (Roe et al., 2016b), which fails to capture the multifaceted barriers that limit engagement. Furthermore, the systematic literature review revealed a paucity of research on RGS and in relation to the intersections of race, religion, and gender, thereby providing a strong rationale for the focus on South Asian Muslim women's RGS engagement in this thesis.

In response to the literature identified in the systematic literature review, interviews were undertaken to explore the RGS experiences of 23 South Asian Muslim

women. Walking interviews allowed the researcher to capture rich and contextually grounded narratives and encouraged the participants to connect with the environment in an emotional way (Anderson, 2004). This offered the researcher in situ insights into how nature influenced the participants' PWB. This approach also broke down barriers between the researcher and participant, enabling a more reciprocal dialogue that led to deeper discussions about mental health and personal challenges. For instance, some participants referred to specific features and landmarks, and how they found solace in their emotional connections to them.

Semi-structured interviews, in person and virtual, were adopted and offered complementary advantages to the walking ones. For instance, the semi-structured interviews offered a more retrospective perspective to unveil practical factors like infrastructure, life commitments, and social and cultural barriers to engagement (Appendix 20. Participants (n = 23) contributions to each theme constructed in the thematic analysis (Page 93)). The virtual interviews provided an alternative and inclusive option for women who preferred not to meet a male, or, due to time constraints, to meet in person (Sparkes & Smith, 2013). Virtual interviews lacked the depth of in-situ methods but helped to gather perspectives from a more diverse group of participants who might otherwise have been excluded. Together, these diverse methods ensured a comprehensive qualitative understanding of the challenges and opportunities South Asian Muslim women face in engaging with RGS (Watson & Scraton, 2010), setting up the approach for the subsequent quantitative study of Chapter 7.

The SEM analysis offered a broader statistical insight into the relationship between RGS and PWB for South Asian Muslim women, offering evidence-based solutions with broader inferences. The strength of SEM lies in incorporating multiple variables, testing both direct and indirect relationships, and allowing for assessment of the model fit (Collier, 2020). SEM provided a way to examine the relationships between perceived access to RGS, frequency of engagement, and PWB simultaneously, while controlling for measurement error in the observed variables. In adopting a strong sample size (n = 600), the study achieved good statistical power, ensuring the robustness of the findings. The results revealed a good statistical model fit and affirmed the themes and insights that emerged from the qualitative interviews of Chapter 6 through factor validation. Moreover, the quantitative approach in Chapter

7 supplemented the qualitative findings of Chapter 6. For instance, whilst the qualitative study suggested that engagement with RGS may be important for PWB, the quantitative study extended this by revealing that perceived access may be an important link for PWB, rather than retrospectively counting frequency of visits. Altogether, the three studies within this thesis provide a holistic and multidisciplinary insights that enrich existing understandings of South Asian Muslim women's access to RGS and PWB.

8.4 Rural Green Spaces Could Enhance the Psychological Wellbeing of South Asian Muslim Women

From the outset of this thesis, it was recognised that South Asians, particularly Muslim women, face disproportionately higher rates of physical health conditions alongside barriers in accessing conventional health and leisure settings (Karasz et al., 2019; Zaman et al., 2013). It was envisaged that RGS would offer a potential pathway to improve health outcomes for South Asians, particularly Muslim women, recognising the value of physical activity in RGS for promoting PWB (Barton & Rogerson, 2017; Rogerson et al., 2019). The systematic literature review confirmed that NGS provides stress reduction and emotional regulation properties for South Asians. Whilst this was important when considering the mental health challenges prevalent in the demographic (Karasz et al., 2019), the systematic literature review highlighted that previous research labelled multiple groups as 'ethnic minorities', obscuring the differences between specific marginalised groups (Kloek et al., 2016). In response, this thesis adopted a more focused approach by examining how RGS may support the PWB of South Asian Muslim women specifically. This focus addressed a gap in the literature and concerns surrounding South Asian Muslim women's health and leisure by exploring how RGS could be used to enhance their PWB.

Chapter 6 affirmed ideas that RGS enhances PWB for South Asian Muslim women, but in distinct ways. For instance, the spiritual aspect of RGS reflects a broader usage beyond nature enjoyment (Rishbeth & Birch, 2020). In this regard, Sponsel (2012) writes about the concept of spiritual ecology, where nature is a sacred space for individuals to seek a meaningful life and to heal their emotions. This idea resonated with the South Asian Muslim women in this thesis. Whilst this represents an intersection of South Asian Muslim women's identities, it also shows how RGS provided relief from notable challenges like family responsibilities and stereotypes

(Kokab et al., 2020; Stride & Flintoff, 2017) by offering an alternative setting to engage in health-enhancing activity, like mindfulness, on their own terms and often through their spirituality. In some ways, these findings align with the Stress Recovery Theory (Ulrich et al., 1991) and suggest that RGS help South Asian Muslim women to feel emotional solace and stress relief. The SEM study extended these findings by showing that users who feel able to visit RGS experience better PWB. That said, the direct link between rate of engagement and PWB was nonsignificant when perceived access was included in the model, which shows that simply visiting RGS more frequently may not enhance PWB unless individuals feel psychologically safe, culturally accepted, and connected during those visits, as indicated by their perceived access (Richardson et al., 2022).

The idea of quality over quantity resonates with the Attention Restoration Theory (Kaplan & Kaplan, 1989), which suggests that restoration depends less on the sole quantity of nature exposure and more on how much attention is given to nature (i.e., quality of engagement). For instance, mindful experiences in nature enhance restoration. Considering this, the findings from the SEM study, qualitative exploration, and systematic literature review all suggest that individuals with perceived access use RGS in a more conducive way, as users feel more comfortable and confident interacting with nature more freely and in a manner that maximises the restorative and wellbeing benefits (Stone et al., 2018). These findings reflect accessibility as an important factor for interventions to consider, and perhaps more importantly, the quality of engagement once access has taken place.

Overall, each study presented in this thesis offers distinct insights into access and PWB for South Asian Muslim women, whilst establishing the barriers and facilitators the group faces. These findings resonate with some barriers South Asian Muslim women face, previously noted in leisure contexts as a lack of gender segregation, strict dress codes and time (Dagkas & Quarmby, 2012). This thesis extends previous research by showing that whilst RGS is an alternative and valuable context for PWB for South Asian Muslim women, the visibility of their intersecting identities subjects them to racialisation, leading to the undermining of the relationship between access and PWB. This discussion now turns to how nature connectedness, spirituality, and physical activity significantly shape South Asian Muslim women's experiences with RGS.

8.4.1 Nature Connectedness and the Quality of RGS Engagement among South Asian Muslim Women

The systematic literature review revealed that South Asians often visit NGS to connect with nature, with some being driven to resonate with their Pakistani homelands (Sutcliffe, 2018). The qualitative study extended these findings by suggesting that nature connectedness drove users' RGS experiences, leading them to prefer them over urban green spaces (Rupprecht et al., 2015). This thesis presents how nature connectedness and engagement with RGS can lead to immense PWB benefits (Martin et al., 2020) for South Asian Muslim women, who often experience pressures from various cultural and societal factors (Karasz et al., 2019). More work needs to be done in relation to the differences in PWB benefits associated with urban green spaces compared to RGS (Wyles et al., 2019), significant for South Asian Muslim women who mostly reside in disadvantaged neighbourhoods (Friends of Earth, 2020). Extending these findings, Chapter 7 found that nature connectedness did not influence the relationship between perceived access and rate of engagement. Since nature connectedness statistically predicted all indicators of perceived access, PWB, and rate of engagement, it can be suggested that nature connectedness may enhance quality of engagement and thus PWB, supported by Chapter 6's findings and broader literature (Wood et al., 2018).

These findings assert the Biophilia hypothesis, which suggests that all humans are inclined to engage with nature, with interactions contributing to enhanced PWB (Kellert & Wilson, 1993). The findings of Chapter 7 suggests that the effect of Biophilia should be explored in situ, as opposed to after visits have taken place. This means that asking about retrospective visits in a survey might not accurately capture the quality of the Biophilic experience. Moreover, subjective experiences of accessibility may be better linked to wellbeing than frequency of use alone, as evidenced by the positive relationship between perceived access and PWB (Grinde & Patil, 2009). Overall, these findings support a more complex framework in which emotional aspects of nature connectedness and perceptions of access may be important for PWB (Baceviciene & Jankauskiene, 2022; Frost & Meyer, 2012).

8.4.2 Rural Green Spaces and Spirituality

The systematic literature review confirmed the restorative benefits of NGS for South Asians (Rishbeth & Rogaly, 2017). However, less work was found to focus on the links between Islamic beliefs and nature connectedness. This was notable given the

significant 6.5% Muslims in the UK (Office for National Statistics, 2023) and the importance Islam often places in South Asian people's relationship with nature (Gilliat-Ray & Bryant, 2011). Similarly, research in the field of health and leisure focusing on South Asian Muslim women also overlooks the significance of Islamic spirituality (Azzarito & Macdonald, 2016; Dagkas & Curry, 2018; Watson & Scraton, 2010). Through the qualitative study, this thesis adds insight to such literature by revealing RGS as a place of spiritual sanctuary for Muslims who can connect with their faith whilst simultaneously maintaining their health.

The importance of RGS for Muslim spirituality is accentuated when considering the challenges leisure centres and gyms pose in relation to observing Islamic requirements, such as sex segregation and modest clothing (as was discussed in Section **Error! Reference source not found.**). In Chapter 6, the natural environment was related to spiritual awe and humility, where God's presence was felt, leading to a profound connection with the divine. This reflects a type of nature connectedness that religious people, including Muslims, resonate with, and shows how engagement is shaped by religious identities. Policy makers should consider these findings and acknowledge that religious beliefs can encourage meaningful engagement with RGS. Doing so may be useful in addressing inequitable access and prevailing health concerns, which many Muslims in England face (Asthana et al., 2018; Friends of Earth, 2020).

In acknowledging the spiritual benefits of RGS alongside physical ones, this thesis extends notions of what constitutes health and wellbeing. This is important because spiritual wellbeing is frequently overlooked in traditional health research (Zhang et al., 2020). The women of this thesis expand the meaning of PWB beyond physical activity and general mindfulness, reflecting RGS as places where South Asian Muslim women can experience spiritual and mental nourishment in ways more than leisure centres and gyms. This highlights the importance of broadening the scope of health research to include non-traditional spaces where women can engage in physical and mental wellbeing activities, leading to wider scopes for health and leisure.

8.4.3 Physical Activity in Rural Green Spaces

The systematic literature review identified physical activity as enhancing the PWB benefits accrued through natural green spaces (NGS) (Eyre et al., 2015b; Morris et al., 2019). The qualitative study added to these findings by revealing that RGS were

preferable to formal physical activity settings like gyms for some Muslim women. RGS reduced, for example, formal attire requirements, language barriers, drinking practices, and mixed-gender mixing issues that are present in conventional settings (Dagkas & Curry, 2018). These findings consolidate broader work suggesting NGS as convenient for physical activity because of their aesthetic appeal, flexibility, and convenience (Liu et al., 2022b; Tran et al., 2022). These findings were extended by the SEM analysis, which found that while facilitating physical activity in RGS enhances PWB outcomes, it can also mitigate for lower levels of perceived access.

The findings from multiple methods in this thesis join previous research to challenge stereotypical narratives about South Asian Muslim women concerning their engagement with physical activity and health (Bullock, 2007; Stride, 2014b). Through engagement with RGS, these women actively negotiate their personal and family commitments to make time for leisure. This shows South Asian women as active maintainers of their physical health, but in alternative environments that match their preferences and where they can engage on their own terms. For instance, the findings from this thesis revealed that users can feel spiritual and connect with their family members, and that RGS offer freedom from rigid membership practices and attire that are often present in conventional health and leisure centres (Banga et al., 2020). RGS also offered calmness and nature, which may not be encountered often in conventional and urban spaces (Daniel et al., 2018). The significance of RGS lies in its opportunities to conduct physical activity while also adhering to one's cultural and religious values, making it a more comfortable and supportive environment for South Asian Muslim women's health needs. These spaces should be leveraged as part of a broader strategy to address health disparities and improve PWB among marginalised communities (Wang et al., 2025).

8.5 Access is Multidimensional and Shaped by Group Identity and Place

Early in this thesis, the systematic literature review in Chapter 4 revealed NGS access inequities faced by South Asians in England (Comber et al., 2008; Ferguson et al., 2018; McEachan et al., 2016; McEachan et al., 2018a). However, existing papers focused mainly on geographical influences and grouped together findings from various demographics (Edwards et al., 2022), thus limiting the scope for applicable interventions. Chapters 6 and 7 sought to explore South Asian Muslim women's experiences with RGS, recognising their potential health benefits. Given the

underrepresentation of this group in RGS, the presence of compounding barriers was anticipated (Natural England, 2019b).

The findings from this thesis reflect how the concept of perceived access is multifaceted and contextual and cannot be reduced to a singular lens of geography. In Chapter 4, Wang et al.'s (2015) helped to consider distance barriers, social experiences, time constraints due to family responsibilities, transportation difficulties, cost, lack of awareness and the racialisation of RGS framework. In Chapter 6, similar barriers were found to restrict engagement and access to RGS for South Asian Muslim women, inhibiting them from experiencing self-care and positive PWB. Building on the systematic literature review, Chapter 6 revealed identity visibility as a significant factor of nature access, unaccounted for in Wang et al.'s (2015) framework applied in Chapter 4. To integrate both identity–nature and access–wellbeing frameworks within a single study, Chapter 7 revealed the moderating role of identity visibility in the relationship between perceived access and PWB. This reflects the importance of accounting for people's identity in nature and wellbeing frameworks, challenging existing frameworks skewed with White demographics, which assume a universal experience of nature (Crawford, 2019; Schulson, 2020).

In addition to the systematic literature review of Chapter 4, Wang et al.'s (2015) access scale helped to account for various factors of transportation, proximity, family commitments, mobility issues, cultural norms, and safety concerns in the SEM study of Chapter 7. The factor analysis results strengthened the argument made in Chapter 4 to understand perceived access through multiple dimensions and reveal applicability for South Asian Muslim women who face multiple challenges. That said, perceived safety was found to influence South Asian Muslim women's experiences of RGS and PWB as a separate and distinct concept. This idea aligns with the qualitative themes highlighting the fears women faced in Chapter 6, which greatly shaped their experiences. Together, these findings reflect the importance of including research on specific marginalised groups (Collins, 1990). The intersecting identities of religiosity, gender, and race set a unique set of challenges for people to face when accessing RGS, including experiencing vulnerability and fear (Poortinga et al., 2021), shaping people's wellbeing from nature.

Another lesson here is that perceived access should be considered as an important indicator of engagement rather than through sole indicators like proximity. Access is complex and multidimensional, which is shaped by a variety of human experiences, including physical proximity, cultural norms, safety concerns, and logistical barriers (Wang et al., 2015). All three studies support the applicability of Wang et al.'s (2015) framework within the UK, especially in the context of RGS, and for South Asian Muslim women, and extend it by suggesting perceived safety should be treated as a separate concept. Future research should continue to build upon similar models to measure access to NGS for various demographics, considering how multiple factors may influence engagement with natural green spaces. Safety concerns of RGS within South Asian communities should be treated as a significant factor of access and PWB.

8.5.1 Compounding Sociocultural and Geographical Dynamics Inhibit Access to Rural Green Spaces

Qualitative and quantitative evidence from this thesis reveals compounding factors, including family roles, lack of infrastructure, and geographical constraints, as barriers to RGS for South Asian Muslim women. Together, these studies assert existing ideas of inequitable access to RGS and portray who is entitled to leisure and who struggles accessing it (Crenshaw, 2013). Each study provides an elaborate insight in understanding these barriers. For instance, Chapter 4 identified caregiving responsibilities where women prioritised household duties over leisure (Slater, 2022). The qualitative study added to this by revealing that rather than passively accepting these constraints, women actively negotiated family support by scheduling visits around childcare. Whilst these negotiations reflect a level of agency, they highlight multiple and compounding factors that marginalised groups must navigate to access RGS.

Physical infrastructure emerged as one axis of exclusion in the studies of this thesis. Broken paths, uneven terrain, and the absence of basic amenities such as toilets or parking inhibited engagement of NGS in South Asian neighbourhoods (Cronin-de-Chavez et al., 2019b). This is further significant when considering the chronic health conditions and mobility issues many South Asians face (Shah & Kanaya, 2014). All three studies highlight health as integral to the accessibility of RGS (i.e., through mobility) for South Asian Muslim women. These findings highlight the importance of physical infrastructure in NGS and RGS to enhance accessibility. Public

health bodies should use these findings to enhance physical infrastructure to alleviate access and thus combat health challenges for South Asians, including South Asian Muslim women. Geographical factors compound the sociocultural and infrastructural barriers South Asian Muslim women face. Living in socioeconomically deprived areas with limited local natural green space reduces opportunities for regular contact with nature, while distance from RGS amplifies existing constraints related to safety, transport, and cost. These compounded barriers shape engagement and perceptions of access, which in turn influence PWB. Collectively, the findings of this thesis suggest that RGS accessibility requires a combination of strategies that include enhancing infrastructure such as public toilets, parking, and pathways, family-inclusive programming, and affordable, safe transport options throughout the seasons.

Beyond the tangible factors, lack of information and confidence emerged as barriers for South Asian Muslim women. Across the three studies, limited knowledge of routes, destinations, and expected practices within RGS were shown to lead to feelings of unfamiliarity, which in turn undermine confidence to engage with these spaces. These social barriers interact with more tangible constraints, like distance and transport, by shaping how accessible RGS are perceived to be, regardless of their physical availability. These insights suggest that policymakers should initiate co-constructed and community-led initiatives that enable South Asian Muslim women to work together with local organisations to identify facilitators of access. For instance, specific mosques and community centres can be targeted to display information about accessing, which can be used to overcome more rigid barriers like proximity.

8.6 The Importance of Social Experiences in Rural Green Spaces for South Asian Muslim Women

Research suggests that natural environments become more accessible through existing social networks (Wang et al., 2015). However, Chapter 4 and Chapter 6 suggest that while South Asian communities socialise in NGS, many of these spaces lack the infrastructure and design features such as communal seating, sheltered gathering spots, or family-friendly pathways needed to support users' social motivations (Cronin-de-Chavez et al., 2019b). This limits the full potential of localised NGS, reducing opportunities for social interaction that are critical to enhancing PWB (Seligman, 2011). Chapter 6, focusing on RGS, reinforced the importance of socialising for bonding and memory-making, escaping from technological distractions and urban pressures, and found that visiting with others helped mitigate costs, travel

difficulties, and safety concerns. Building on these insights, the SEM analyses found that companionship significantly enhances both perceived access to RGS and PWB. That said, perceptions of access itself was a strong statistical predictor of engagement, regardless of one's level of social relatedness.

Collectively, the findings of this thesis resonate with broader literature that highlights companionship in RGS as important for social wellbeing (Wendel et al., 2012; White et al., 2013; White et al., 2021; World Health Organization, 2016). They extend existing notions by emphasising the importance of social dimensions to enhance South Asian Muslim women's perceived accessibility to RGS. To facilitate the social dimension of these spaces, adding communal seating or organising group programmes would help many individuals to balance or merge their leisure and family commitments. This would enable women to use RGS alongside their social networks, thus enhancing PWB while supporting sustained engagement (Awan et al., 2022; Bansal et al., 2022; Karasz et al., 2019).

8.6.1 Tailored Initiatives Addressing Social Factors Shaping South Asian Muslim Women's Access to Rural Green Spaces

Building on the idea of social aspects enhancing South Asian Muslim women's RGS experiences, this thesis highlights the significance of tailored initiatives in improving access. The systematic literature review identified community visits to RGS as facilitative for South Asian communities, particularly women. (Cronin-de-Chavez et al., 2019; Edwards et al., 2022; Morris et al., 2019). The qualitative results of Chapter 6 extended these findings by emphasising the role of social networks in enabling safe access to RGS for those at the intersection of gender, religion, and race. These findings together highlight that group visits provide a sense of security, particularly for women who might feel vulnerable when visiting alone (Hamza et al., 2024b).

The qualitative study also revealed that community groups inadvertently exclude certain users, leading some women to feel alienated when visiting RGS. Given that 6.5% of the UK population is Muslim, this highlights the need for Muslim-friendly groups which acknowledge and respect cultural and religious practices (Office for National Statistics, 2023). Supporting this, the SEM findings also revealed broader factors of feeling welcome, diversity, companionship, confidence, and knowledge as factors that influence access, regardless of the social relatedness South Asian Muslim women feel. This means that whilst social relatedness might be important for many

South Asian Muslim women, as per the systematic literature review and qualitative study, more important factors like knowledge, confidence, and transport account for engagement and PWB.

8.7 Identity Impedes the Experiences of South Asian Muslim Women

All three studies affirmed ideas that NGS are racialised as White, middle-class and male spaces (Cronin-de-Chavez et al., 2019b), affecting South Asians' engagement with NGS. This undermines South Asians' access, who face compounding barriers of poor NGS distribution in their areas, costs to travel and lack of time (Ferguson et al., 2018; McEachan et al., 2018a). Indeed, multiple factors contribute to the underrepresentation of South Asians in NGS, perpetuating ideas that they do not belong there. Subsequently, risk and racialisation amplify in RGS, associated with the lack of diversity of users and a corresponding overrepresentation of White males. The discrimination South Asian Muslim women experience is distinct from that of White women or South Asian men, highlighting the intersection of their identities. For instance, dressing in Islamic female clothing is a visible marker of gendered and religious difference in RGS (Lenneis & Agergaard, 2024). While dressing modestly is symbolic of adhering to their faith, South Asian Muslim women face fears of physical safety, anticipation of violence, or discrimination during visits. This highlights the existing demarcations of RGS (Stone et al., 2018), that seek to exclude users based on gender, race and religious differences, thus inhibiting their experiences.

Despite these challenges, South Asian Muslim women were shown to actively navigate the safety risks associated with RGS in Chapter 6, adding to previous work on the demographic's urban leisure experiences of risk (Green & Singleton, 2016). While strategies of searching for safety may be common among many women (Stark et al., 2022), they held particular significance for the current thesis' participants, who often face increased risks and abuse because of their multiple and marginalised identities (Home Office, 2024). Whilst some women visited with other people to mitigate their vulnerability as females, group visits increased the saliency of their ethnic identities, also subjecting them to emotional distress. This reflected a constant struggle for visibly marked South Asian Muslim women, undermining the restorative potential of RGS.

Chapter 7's analysis added insight to these findings by suggesting that individuals with visible identities relied more on perceived access to RGS for their

PWB, while also experiencing reduced perceptions of safety of these environments. While much of the existing literature assumes that engagement with nature produces uniformly positive outcomes (Joye & Van den Berg, 2011; Pretty et al., 2005; White et al., 2019), the findings of this thesis reveal a more complex reality. An interplay between visibility, perceived risk, and access highlights the ongoing challenges faced by visibly marked South Asian Muslim women in RGS, suggesting the need for more inclusive and supportive natural environments to support people's PWB. Policy and practice should aim to address diversity and inclusion in RGS to disrupt existing ideas that RGS cater exclusively to White male groups.

8.8 Understanding Access to Natural and Rural Green Spaces Through Intersectionality

Chapter 4 highlights the importance of recognising the diversity within South Asian communities and the complex factors that affect NGS access associated with each intersection of identity. . The chapter concluded by suggesting that researchers must avoid reducing distinct communities to homogeneous groups (such as 'ethnic minorities') and address marginalised groups' needs separately. This thesis evolved to reveal how the intersecting influences of gender, religion, geography, cultural practices, family dynamics, access to resources and socioeconomic status intersect to create different kinds of experiences for different South Asian Muslim women. Understanding this helps to create policies that are both inclusive and effective in promoting health among South Asian Muslim women, as interventions can be tailored to suit different kinds of people.

Acknowledging intersectionality when understanding access to RGS and PWB helped to centre South Asian Muslim women as a marginalised group, who were previously unfocused on in nature research (Crenshaw, 1989). An intersectional lens helped the study to reveal multiple factors that simultaneously challenged South Asian Muslim women's engagement, shaped by the convergence of gender, race, and religion (Collins 1990). For example, the visibility of their gender, religion, and race positioned them as out of place. At the same time, expectations around motherhood and family caregiving, associated with their cultural and gender norms, limited the time and freedom for their leisure outside the home. The ongoing struggle in navigating these barriers meant that these women sought stress relief and spiritual connection in RGS as acts of self-care within their multiple constraints. Their experiences overall

were not due to gender, race, or religion alone but rather reflected an intersectional experience of a space historically not designed for them.

The SEM analysis aligned with intersectionality in the sense that a model was tested solely with South Asian Muslim women (Hill Collins & Bilge, 2020). This approach resonated with calls from Hill Collins (1990b) to shift dominant narratives by producing knowledge from and for the perspective of marginalised groups. This was needed to challenge existing frameworks that are based on data from unmarked groups. For instance, nature and PWB models largely rely on White samples in the global North (Pollet & Saxton, 2019). Indeed, this thesis contributes to existing intersectionality scholarship by expanding it into the context of rural settings and offering insights into how multiple layers of disadvantage shape the experiences of South Asian Muslim women in these spaces, relevant for policy, practice, and research (Hill Collins & Bilge, 2020).

Leading on from this, intersectionality adds theoretical depth to the existing nature and PWB frameworks (Crenshaw, 1989), such as the Stress Recovery Theory by Ulrich et al. (1991), the Attention Restoration Theory (Kaplan & Kaplan, 1989), and the Biophilia Hypothesis (Kellert & Wilson, 1993). Intersectionality offers these frameworks a means to consider identity as an axis of experience. It extends current frameworks by revealing that the restorative benefits of RGS may not always be available to all groups and can be reduced through marginalisation, undermining the effects of nature for subordinated groups. This means that the health benefits associated with RGS are not universally accessible or uniformly experienced and are shaped by sociocultural contexts and social identities (Joye & De Block, 2011).

The findings of this thesis suggest that nature and PWB frameworks must consider how racialised features, cultural clothing, and religious dress (such as the hijab) increase the visibility of users in predominantly White RGS. This visibility often leads to stares and feelings of surveillance, which reduces people's sense of safety, subsequently disrupting the conditions needed for psychological restoration (Kaplan, 1995). Such racialised and gendered experiences contrast with those of White women, who may face gendered assumptions but not racialisation, and South Asian Muslim men, who are less likely to be subjected to the same gendered expectations but still face Islamophobic assumptions. This means that for South Asian Muslim women,

access to RGS is about navigating through social and emotional risk, showing how marginalisation can interfere with the relationship between stress recovery and attentional restoration with nature (Kaplan, 1995; Ulrich, 1984).

Overall, the findings of this thesis highlight how the benefits of nature are unevenly distributed and accessed regardless of exposure, reflecting intersectionality as vital to existing nature and PWB frameworks. They provide an explanation of the findings of Dadvand et al. (2014a) and Ferguson et al. (2018), who found South Asians to benefit less from their neighbourhood NGS than their White counterparts, regardless of quality. Existing frameworks need to consider perceived accessibility, sociocultural inclusivity, and perceived safety as key factors influencing the relationship between nature exposure and PWB. Incorporating intersectionality into nature and wellbeing frameworks would provide a more accurate picture of how particular demographics experience nature, shaped by their multiple identities.

8.9 Chapter Summary

This chapter presented multidimensional insights into the ways South Asian Muslim women engage with RGS and how these engagements support or hinder PWB. It explored how perceived access to RGS is shaped by compounding geographic, cultural, social, and safety factors. Furthermore, the chapter reflected how experiences of spiritual connection, social interaction, and physical activity in RGS can enhance engagement and PWB, but also that they differ across groups and cannot be assumed as universally experienced. Furthermore, it positioned RGS as a valuable health-promoting environment for South Asian Muslim women, but only when they are socially included and feel safe. Finally, the chapter extended nature and PWB theories such as Stress Recovery Theory, Attention Restoration Theory, and the Biophilia Hypothesis by highlighting that restorative outcomes are not uniformly experienced by marginalised groups.

9 Chapter 9: General Conclusions

9.1 Chapter Overview

The previous chapter presented findings from the systematic literature review, walking and semi-structured interviews, and the SEM analysis, and discussed them in relation to broader frameworks. Chapter 9 concludes the thesis by synthesising the numerous insights gained by exploring South Asians' experiences with natural green spaces (NGS), specifically Muslim women's engagement with rural green spaces (RGS), and their associations with psychological wellbeing (PWB). It provides a summary of findings, including how intersecting identities shape people's experiences with RGS, challenging assumptions that all users experience the same nature of the PWB relationship. The chapter then offers key implications for policy and future research, particularly specific to health equity, inclusive programme design, and using intersectional approaches to better understand access to RGS.

9.2 Key Findings and Theoretical Contributions

This thesis makes significant contributions to understanding South Asian communities' access to natural green spaces (NGS), particularly rural green spaces (RGS), and their associations with psychological wellbeing (PWB). While the initial focus was on South Asians more broadly and on NGS in general, the research subsequently concentrated on South Asian Muslim women and RGS to address the paucity of literature on this demographic, who experience multiple intersecting identities and have often been represented through constrained or stereotyped narratives about their engagement in leisure and physical activity. Accordingly, these conclusions apply to South Asians' experiences of NGS, with an emphasis on South Asian Muslim women's interactions with RGS.

First, this thesis challenges previous stereotypes surrounding South Asian Muslim women as disinterested in their health and reluctant to engage in leisure activities (Knez et al., 2012; Phills et al., 2018). It demonstrates South Asian Muslim women as active agents in maintaining their health through alternative means, such as engagement with RGS, rather than being passive or disengaged from their wellbeing. They are shown to sustain their PWB through culturally and socially meaningful forms of nature engagement. This thesis illustrated how women are led to navigate structural, spatial, and cultural constraints to engage with RGS on their own

terms, to improve their PWB, but are often challenged by identity, culture, and environment factors.

Second, this thesis advances understanding of the nature-wellbeing relationship by suggesting that RGS can be recognised as an effective method for enhancing physical and mental health for South Asians, on the condition that they can engage comfortably. The studies together highlight how RGS can support PWB when engagement is suited to users' cultural identities, comfort and perceptions of belonging. This means that the health benefits associated with RGS are dependent on the quality of user's experiences within these spaces. For instance, feeling comfortable to engage in religious and spiritual behaviour in RGS may enhance the nature experiences of South Asian Muslim women, particularly in the context of RGS, thus improving their PWB outcomes.

Third, adopting an intersectional lens, this thesis demonstrates how access to RGS is shaped by the interplay of gender, ethnicity, religion, health, geography, and socioeconomic position (Crenshaw, 2013). These intersecting identities produce multiple barriers that limit both access to RGS and the wellbeing benefits derived from them. In this regard, this thesis highlights the limitations of current nature and wellbeing frameworks, like the Attention Restoration Theory (Kaplan & Kaplan, 1989), Stress Recovery Theory (Ulrich et al., 1991), and the Biophilia Hypothesis (Kellert & Wilson, 2008) which overlook the differences in marginalised groups' PWB outcomes from nature.

Lastly, the thesis distinguishes between engagement with RGS and perceived access to RGS. In applying Wang et al.'s (2015) multidimensional framework of perceived access, the thesis demonstrates that PWB is more strongly associated with individuals' sense of capabilities, safety perceptions, and confidence to visit RGS than mere frequency of visits alone. This finding builds on existing nature-wellbeing frameworks by highlighting the societal conditions that shape people's experiences with nature, particularly for marginalised groups. For South Asian Muslim women in particular, feeling able to visit RGS was more strongly associated with PWB than the frequency of actual visits, reflecting how feelings of access may be significant for PWB than the act of engagement itself. In this regard, the current thesis extends the Attention Restoration Theory (Kaplan & Kaplan, 1989), Stress Recovery Theory

(Ulrich et al., 1991), and the Biophilia Hypothesis (Kellert & Wilson, 2008) to consider how perceptions of being able to engage with nature influence people's engagement with nature, thus determining their PWB from such spaces.

9.3 Practical Implications

This thesis sets several implications for policy and practice to consider, to enhance the usage of RGS, improve equitable access, and thus maximise impact on PWB for all. Existing public health frameworks, well placed to embed the following implications, include the World Health Organisation's Healthy Cities model (World Health Organisation, 2025) and the National Health Service Mental Health Implementation Plan (National Health Service, 2019). Within the Healthy Cities framework (World Health Organisation, 2025), the current thesis highlights how perceptions of access to RGS are crucial for supporting people's PWB, which is especially relevant to marginalised groups who often experience poor PWB. Acknowledging perceptions of access within the existing framework could help practitioners to embed environmental and equity components into their practice. This would help to recognise how access factors such as geography, culture and identity shape access and engagement. In relation to the Mental Health Implementation Plan (National Health Service, 2019), RGS could be used to enhance community-based and preventative approaches to PWB. RGS can be recognised as informal and non-clinical environments that complement existing services, particularly through social prescribing. In these programmes, time spent in nature can be recommended as part of mental health care.

The implications of this thesis also align with the UK Government's 25 Year Plan (Department for Environment Food & Rural Affairs, 2018; Natural England, 2023, 2024), which emphasises equal access to nature for all communities. Similarly, Sport England's Uniting the Movement strategy (Sport England, n.d.) highlights the need to tackle inequalities in physical activity through NGS. Organisations such as the Ramblers, Natural England, the National Trust, and Sport England are well-positioned to operationalise the following suggestions. Their good reach, resources, and expertise can help to ensure that RGSs are welcoming and reflective of the UK's diverse communities. Similarly, these organisations have the power to shift the narrative of who belongs to RGS and widen the scope of the ways they can be engaged with, thereby welcoming diverse users and usages. When RGS become more inclusive to one group, it will become more inclusive for all (Finney & Rishbeth,

2006). For instance, improving design and signage to accommodate Muslim women, through welcoming modest dress and family-friendly routes, can also benefit parents with young children, older adults, and individuals from other minority groups. This means that these implications have the potential to drive positive change by enhancing equity and inclusivity across diverse communities in the UK.

Before prioritising RGS, policymakers should first focus on enhancing access to NGS more broadly within South Asian communities, as these spaces also play a significant role in supporting PWB (Hamza et al., 2024). Improving access needs to be a reciprocal process where policymakers co-construct initiatives with local communities to ensure cultural relevance. For example, South Asians' values, religiosity, and social preferences should be integrated into the design and management of NGS. Incorporating features such as prayer spaces, segregated areas (for family gatherings), culturally sensitive signage, and improved lighting and security to address safety concerns can help communities to feel more welcome. Collaboration with South Asian community leaders, local cultural groups, and faith organisations can help to implement these features, thus enhancing the welcomeness and inclusivity of NGS.

Regarding access to RGS, this thesis identified several intersectional barriers that challenge participation. Health promoters must address the spatial and cultural exclusion experienced by South Asian Muslim women and other marginalised groups in culturally appropriate and context-specific ways. This requires actively challenging the structural and social conditions that limit access that were identified in this thesis, such as safety risk, feelings of exclusion, and distance. Health promotion professionals can collaborate with urban planners, local authorities, and community leaders to co-design green spaces that reflect cultural diversity, safety, and belonging. Health promoters should also work to build trust within communities through communication and representation that truly reflects the South Asian Muslim women's needs and preferences.

Policy makers should focus on increasing perceived accessibility. Better perceived access would indeed lead to better engagement, as found across all three studies in this thesis. Professionals must work to enhance perceptions of knowledge, familiarity, and awareness of RGS among South Asian communities. This could

include disseminating information about such spaces throughout local community centres and mosques. Furthermore, policy should improve information on planning, preparation, networks, transport and availability of different RGS that are in reach of these communities. For instance, bus routes can be organised from urban spaces to various RGS. The buses can be spacious and family-friendly with sectioned seating to allow women and families their own privacy. This would encourage individuals from diverse backgrounds to explore and benefit from these spaces, leading to better representation of diverse groups of people in RGS, and thus combating current disparities of access faced by ethnic minorities.

The women in this thesis were subjected to abuse and experienced heightened fears due to their intersecting identities. Policy and practice must address issues of safety. They could do this by integrating lighting, clear signage, and accessible pathways, wherever possible, in certain RGS to facilitate access. Similarly, educational initiatives could be implemented in broader communities to raise awareness and prevent harassment against people whose identities are apparent through their skin colour, clothing, femininity, or a combination of these. Implementing these factors would lead to better inclusivity and accessibility to RGS for all individuals, regardless of their gender, race, or religion. However, real societal change can only occur if existing legal racial frameworks are refined. Current racial equality legislation often fails to recognise how religious identities can also be racialised, leading to the marginalisation of religiously visible groups. The definition of racism within existing policies should include religious identities alongside racial. As Modood (2023) argues, redefining racialisation to explicitly include religion would allow Islamophobia and similar forms of prejudice to be addressed within broader anti-racist policy. Doing so would enable policymakers to treat religious discrimination as similar to racism, ensuring more comprehensive protection and equality for all communities, which is currently inadequately addressed (Modood, 2016, 2023).

Policy makers should work to diversify the uses of RGS. Organisations like the National Trust can support this through advertising the diverse users and usages of RGS. Currently, such spaces are demarcated to be used to appreciate nature and undertake physical challenges, and are associated with high financial costs (Stone et al., 2018). If the existing usage scopes are extended for socialising, religious contemplation, and mental health, then a wider audience, including South Asian

Muslim women, may be more inclined to visit. For instance, mosques and community centres could host community cultural days, guided reflective walks, or family wellbeing programmes that emphasise relaxation, spirituality, and togetherness, rather than competition or endurance. Engaging in such ways could indeed help South Asian Muslim women to balance their family commitments with leisure time, so that families can visit together. Similarly, healthcare providers, community organisations, and environmental groups could collaborate to create tailored initiatives that encourage regular use of RGS whilst advocating for them to improve mental health. This would help deconstruct existing demarcations of RGS and motivate users from different backgrounds to visit, particularly those who may not have been inclined previously. This can lead users to make RGS a part of their lives, maximising the PWB benefits these spaces have to offer.

Linked to the idea of PWB in RGS, policy and practice should formally recognise that RGS can effectively improve health outcomes, especially for ethnic minorities who face barriers in accessing more formal physical activity spaces. Public health organisations should actively encourage engagement with these spaces and recognise the health benefits they offer. Physical activity, mindfulness, and spiritual reflection are some of the ways RGS could be seen as promoting health. Further initiatives could include culturally appropriate health programs, such as outdoor fitness classes, guided nature walks, or mindfulness sessions, specifically designed for South Asian Muslim women, led by women, addressing both cultural and practical needs. This would support the health of marginalised groups and develop more inclusive public health strategies, thus reducing the workload on public health bodies like the National Health Service.

9.4 Directions for Future Research

This thesis highlights the importance of using diverse research methods to capture the complexity of participants' experiences (Tashakkori & Teddlie, 1998). The methodological combination of a systematic literature review, qualitative interviews (including walking interviews), and a structural equation model (SEM) provided a comprehensive understanding of the relationship between RGS and PWB and offers a model for future studies seeking to engage marginalised groups in an ethical and robust way. The systematic literature review revealed gaps in existing knowledge and identified the need for the second study. The walking interviews provided a rich

understanding of participants' lived experiences, to better fathom their interactions with RGS in real time. Finally, the structural equation model (SEM) helped to test complex relationships between perceived access, engagement, and PWB at a national level, thus extending and strengthening the qualitative insights. Together, these complementary methods reinforced preceding findings while expanding their empirical and theoretical contributions. That said, it is important to recognise that measures beyond self-reporting could have enhanced the quantitative phase of this thesis. Future studies could combine objective data such as GPS tracking, environmental audits, and physiological indicators, like heart rate, alongside qualitative and survey data to create RGS access and PWB models. Additionally, longitudinal studies could be employed to establish causal relationships, offering stronger evidence on the long-term benefits of RGS access and how these benefits emerge.

The findings of this thesis demonstrate that RGS are underutilised but can be valuable for promoting PWB, particularly among marginalised groups, such as South Asian Muslim women. Learning from this thesis, future researchers should expand the scope of health, currently recognised as through traditional settings like gyms and mental health services, and actively explore how alternative spaces like RGS can support the health and PWB of marginalised groups, particularly South Asian Muslim women. If health is conceptualised more broadly, effective health-enhancing strategies can emerge in unexpected ways. This can address existing health epidemics in ways that acknowledge the unique cultural, religious, and social contexts of various minority populations in the ever-evolving and diverse country of England (and globally).

Leading on from this, scholars should further explore access to NGS and RGS for specific marginalised communities through intersectionality. Academics should refrain from homogenising groups under the label "ethnic minorities" (Kloek et al., 2016). Doing so would help to better acknowledge how various cultural, religious, and social factors influence engagement and PWB and help to capture the nuanced experiences of each group. Gaining deeper insight into the RGS experiences of varied communities would, in turn, help to inform policies and practices that facilitate equitable access and maximise the wellbeing benefits of these environments. Here, the aim is to develop robust frameworks that cater for demographics beyond those

that which is currently overrepresented by White male samples from the global north (Pollet & Saxton, 2019).

To properly develop robust and broadly applicable wellbeing frameworks, researchers should employ various sampling techniques to capture the heterogeneity of human experience. For instance, scholars should reach non-English speaking communities by addressing language differences. Similarly, inclusive sampling methods could consider differences in age groups, migration status, including both rural and urban residents, to recruit more diverse samples. Such inclusive sampling would help researchers to unveil additional aspects of identity, such as age, migration history, and social class, and offer insight as to how they shape experiences of NGS and PWB. This would lead to a more comprehensive understanding of how distinct communities engage with NGS and what influences their PWB, revealing dynamics that are hidden when looking at one identity in isolation. For example, exploring differences between UK-born, first-generation migrants, or those with more recent migration experiences may reveal how familiarity with rural environments, language proficiency, and perceptions of safety and belonging influence the relationship between perceived access to RGS and PWB. Whilst migration was not an analytical focus of this thesis, it suggests a critical direction for future research to better understand how minority groups experience RGS and PWB. Similarly, exploring the experiences of younger South Asians could provide a richer understanding of how generational factors influence NGS access and health behaviours.

Building on the findings of this thesis, future research should move beyond observational designs and test ways to enhance RGS access and PWB among marginalised groups through interventions. These could consist of community-based walking programmes, Muslim friendly nature activities, and group visits including South Asian Muslim women designed to reduce safety concerns, improve confidence, and enhance a sense of belonging with RGS. Evaluating these interventions using pre and post-designs would help to develop causal evidence of how perceived access to RGS can be used to enhance wellbeing. These insights can be further developed through evaluating targeted programmes. Such interventions can apply the principles of enhancing perceived access, addressing safety and cultural belonging, and promoting community engagement to assess their effectiveness in practical contexts. Quantitative insights can be supplemented by focus group intervention workshops,

where members of local communities can meet with organisation stakeholders to reveal how their NGS access and PWB outcomes can be enhanced.

Finally, this thesis revealed that frameworks such as the Attention Restoration Theory (Kaplan & Kaplan, 1989), the Stress Recovery Theory (Ulrich et al., 1991), and the Biophilia Hypothesis (Kellert & Wilson, 2008) becomes more complex when applied to groups with intersectional identities such as South Asian Muslim women. This is due to the interplay of people's identities, including their race, religion and gender, which shapes their experiences. Whilst some aspects of this may manifest in personal preferences, the visible markers of race, religion, and gender shapes how people are treated in RGS, and ultimately the PWB they derive from RGS. Future research should therefore take an intersectional approach when applying these theories, to better understand how the links between nature and PWB may differ for marginalised groups based on their identity categories. This would allow for a more nuanced understanding of how environmental factors affect PWB in diverse communities.

9.5 Closing Remarks

This thesis has contributed to understanding how access to NGS and RGS influences PWB among South Asians, particularly South Asian Muslim women, who experience compounding social, cultural, and spatial barriers linked to their racial, religious, and gendered identities. It has been shown that perceived access is specific to the group and is a multifaceted concept that determines how individuals feel able, entitled, and safe to visit RGS, which in turn shapes their engagement with and the PWB benefits derived from nature. This research extends existing frameworks of nature and wellbeing by demonstrating that access is more than physical proximity and is shaped by identity, belonging, and inclusion.

The thesis has also challenged narratives that portray South Asian Muslim women as detached from leisure, instead illustrating the diverse ways in which they engage with nature on their own terms. Through its findings, this work emphasises designing NGS and managing RGS so that they are culturally inclusive, equitable, and accessible for all users, ensuring that everyone can benefit from these environments fairly. When policy and practice move towards creating spaces that are welcoming, restorative, and reflective of England's diversity, people from all backgrounds can

perceive, experience, and value nature in ways that support their PWB. Ultimately, this thesis calls for a broader understanding of both health and nature, recognising that wellbeing is inseparable from equitable access to the natural environment.

9.6 Chapter Summary

This chapter concluded by arguing that RGS have the potential to promote PWB for South Asians, including Muslim women, particularly through spiritual engagement, social bonding, and physical activity. However, these benefits are contingent on perceptions of access, which include factors of cultural safety, geographic proximity, and infrastructure. This thesis extends existing literature by demonstrating that PWB outcomes do not automatically emerge from exposure to NGS but are shaped by access and intersectional factors. It suggests that intersectionality should be accounted for in existing nature and PWB models among future researchers. Access can be alleviated to various types of NGS by prioritising perceptions of accessibility and identity diversity. This chapter suggests that policymakers develop co-constructed and community-led interventions to facilitate access to RGS for health-enhancing activity and highlights the need to combat existing inequalities in accessing nature. Finally, it offers guidance to future researchers to consider diverse samples and methodologies to scrutinise existing nature-wellbeing frameworks. The reference list is provided next, followed by the appendices.

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Appendix 1. PRISMA checklist (Page 69)

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1, 4,
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1 - 3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	1, 2
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2, 3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	3/4/5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	3
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	3
Risk of bias in individual	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this	3

studies		was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N/A
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	3
Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	11
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	3/4/5
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	4 – 7, Table 2 main text, and Supporting material S2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	N/A
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	6
Synthesis of results	21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency	7 - 10
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	7 - 10

Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	10, 11
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A

Appendix 2. Trial of various keywords into different databases (Page 71)

Testing keywords on all databases suggested by librarian and other databases I think might be relevant-

As you can imagine, it was tricky coming up with key words as there was three integral aspects of studies the systematic literature review was concerned with (i.e., the demographic, the connection with NGS, and the context of that/natural green spaces it self).

My first set of key words were constructed without any consultation- and was just in line with my prior knowledge of the literature. These were as follows:

5 JUNE 22- OLD key words prior to consultation with librarian

“South Asian” OR “South Asians” OR “Muslim” OR “Muslims” “Indian” OR “Bengali” OR Bengalis” OR “Bangladeshi” OR “Pakistani”

AND “Rural” OR “Rurality” OR “Green space” OR “Outdoors” OR “Forests” OR “Moor” OR “Moors” OR “Abbey” OR “River” OR “Rivers” OR “Wood” OR “Woods” OR “Forestry” OR “Forest” OR “Waterfalls” OR “Suburban” OR “Countryside” OR “Parks” OR “Country park” OR “Country parks” OR “Lake” OR “Lake District” OR “Dales” OR “Outdoor Recreation” OR “Vegetation” OR “Coastal area” OR “Coast” OR “Beach” OR “Seaside” OR “Ecosystem” OR “Farming” OR “Rocks” OR “Dales” OR “Adventure” OR “Adventure activities” OR “Mountains” OR “Mountaineering” OR “Hiking” OR “Walking” OR “Walks” OR “Hikes” OR “Abseiling” OR “Expedition” OR “Orienteering” OR “Climbing” OR “Kayaking” OR “Canoeing” OR “Leisure” AND “UK” or “United Kingdom” or “Britain” or “British” or “England” OR “Scotland” OR “Ireland” OR “Wales” OR “Welsh” OR “English” OR Scottish”

After consulting with the librarian, it was suggested to constantly refine keywords through running various searches. Thus, I ran a lot of searches in a lot of databases while constantly changing the keywords in all of the relevant databases. This can be seen in the (very messy atm) table below. The terms used in the 'keywords used' column match the stated number of results in the 'results found' column in the first line. Any additional stated number of 'results found' within the column are linked to the keywords used in the form of a *comment* due to the limited space in the table (in some cases it is matched by the colour red- I need to organise this to make it more understandable). Nevertheless, this was the second stage in finding out my keywords (after consultation with librarian).

Database	Keywords used	Results found
Scopus -	15 document results TITLE-ABS-KEY(Participation OR engagement OR experience OR challenges OR understandings OR perceptions OR barriers OR access OR facilitator AND Leisure OR adventure OR hiking OR activity OR walking OR Park OR outdoors OR Green space OR rural AND South Asian OR ethnic minority OR race	15- 3 relevant in first page

	OR bme OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali) AND (LIMIT-TO (AFFILCOUNTRY,"United Kingdom")	
	TITLE-ABS-KEY((Gender OR female OR women OR South Asian OR ethnic minority OR race OR bme OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali AND unequal OR participation OR engagement OR participation OR experience OR challenges OR understandings OR perceptions OR barriers OR access OR facilitator AND leisure OR adventure OR hiking OR activity OR walking OR Park OR outdoors OR Green space OR rural OR beach OR swimming OR countryside OR mountains OR climbing OR recreation OR landscape OR nature) AND (LIMIT-TO (AFFILCOUNTRY,"United Kingdom"))	49 results- 5 relevant in total
Diversity Collection (Proquest)	not(South Asian OR muslim OR indian OR bengali OR bangladeshi OR pakistani OR Marginalised groups OR race OR ethnicity OR bame) AND not(rural OR green space OR outdoor OR forest OR moor OR river OR wood OR waterfall OR suburban OR countryside OR park OR Country park OR lake OR dales OR outdoor OR recreation OR vegetation OR coast OR beach OR seaside OR farm OR rocks OR adventure OR mountain OR hiking OR walking OR abseiling OR expedition OR orienteering OR climbing OR kayaking OR canoeing OR leisure) AND loc.Exact("United Kingdom UK" OR "United Kingdom")	Found 410 412 1 relevant in first five pages 273 not much relevance
Humanities International Complete	South Asian OR muslim OR indian OR bengali OR bangladeshi OR pakistani OR race OR ethnicity OR bame OR gender OR Marginalised groups or women OR female AND rural OR Green space OR outdoor OR forest OR moor OR river OR wood OR waterfall OR suburban OR countryside OR park OR Country park OR lake OR dales OR outdoor OR recreation OR vegetation OR coast OR beach OR seaside OR farm OR rocks OR adventure OR mountain OR hiking OR walking OR abseiling OR expedition OR orienteering OR climbing OR kayaking OR canoeing OR leisure IN united kingdom or uk or england or britain	2389 2397 0 relevance in first 150 results NO RELEVANCE LATEST WORDS SHOULDN'T USE THIS
JSTOR	South Asian OR muslim OR indian OR bengali OR bangladeshi OR pakistani OR race OR ethnicity OR bame OR gender OR Marginalised groups or WOMEN AND green space OR rural OR outdoors AND united kingdom or uk or england or Britain Keep old	ARTICLES AND BOOKS ONLY FROM 2005 1 RELEVANT IN 2 PAGES 1742 RESULTS LATEST CHECK- SAME WORDS- 160 RESULTS SOME RELEVANCY FRO 205 USE this !
Psychology & Behavioural Sciences Collection	South Asian OR muslim OR indian OR bengali OR bangladeshi OR pakistani OR race OR ethnicity OR bame OR gender AND rural OR Green space OR outdoor OR forest OR moor OR river OR waterfall OR suburban OR countryside OR park OR Country park OR lake OR dales OR outdoors OR recreation OR coastal OR beach OR seaside OR farm OR rocks OR adventure OR mountain OR hiking OR walking OR abseiling OR orienteering OR climbing OR kayaking OR canoeing OR leisure AND united kingdom or uk or england or britain	INITIAL SEARCH 324K! Using keywords on the left- 1510 results 0 relevance in 150 first results DON'T USE THIS
Sage Journals	Results: 1 – 20 of 1827 for [All south] AND [(All asian] OR [All muslim] OR [All indian] OR [All bengali] OR [All bangladeshi] OR [All pakistani] OR [All race] OR [All ethnicity] OR [All bame] OR [All gender]] AND [(All rural] OR [All green]] AND [(All space] OR [All outdoors] OR [All forests] OR [All moor] OR [All rivers] OR [All waterfalls] OR [All suburban] OR [All countryside] OR [All park] OR [All country]] AND [(All park] OR [All lake] OR [All dales] OR [All outdoors] OR [All recreation] OR [All coastal] OR [All beach] OR [All seaside] OR [All farm] OR [All rocks] OR [All adventure"] OR [All mountain"] OR [All hiking] OR [All walking] OR [All abseiling] OR [All orienteering] OR [All climbing] OR [All kayaking] OR [All canoeing] OR [All leisure]] AND [All united kingdom or uk or england or britain]	From 2005 1827 found 8 relevant in first 3 pages 97 found 1713 found VERY RELEVANT SAME SEARCH IN ONE BAR no country
Science Direct	Title abstract keywords- South Asian OR Muslim AND challenges OR barriers OR facilitators AND United Kingdom OR UK OR exclusion AND Title- Leisure OR adventure OR hiking OR walking OR Green space OR rural 2005-2022	(Results for the terms used I the comments of each search) - 1m results - 300k results - 27k results - 97k results - 31 results - 408 results decent search?

		1321 results (4 relevant in first page) USE THE 408 PERHAPS
Taylor & Francis Online	955 results for search: [[Abstract: leisure] OR [Abstract: adventure] OR [Abstract: hiking] OR [Abstract: walking] OR [Abstract: park] OR [Abstract: outdoors] OR [Abstract: greenspace] OR [Abstract: rural] AND [Abstract: south]]] AND [[Abstract: asian] OR [Abstract: muslim] OR [Abstract: pakistani] OR [Abstract: bangladeshi] OR [Abstract: indian] OR [Abstract: bengali]]] AND [Article Type: Article Abstract: Leisure OR adventure OR hiking OR walking OR Park OR outdoors OR Greenspace OR rural AND South Asian OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali 3 relevant in first page]	50k (for terms that are SAME AS SCIENCE DIRECT) 81 results for search: [[Publication Title: leisure] OR [Publication Title: adventure] OR [Publication Title: hiking] OR [Publication Title: walking] OR [Publication Title: greenspace] OR [[Publication Title: rural] AND [Publication Title: south]]] AND [[Publication Title: asian] OR [Publication Title: muslim]] 935 results for search: [[Abstract: leisure] OR [Abstract: adventure] OR [Abstract: hiking] OR [Abstract: walking] OR [Abstract: greenspace] OR [[Abstract: rural] AND [Abstract: south]]] AND [[Abstract: asian] OR [Abstract: muslim]]
Wiley Online Library	SOME RELEVANCY FOR- SEPARATE BOXESS FOR ACTUAL SEARCH	102 RESULTS 618 results - Leisure OR adventure OR hiking OR walking OR Park OR outdoors OR Greenspace OR rural" in Abstract and "South Asian OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali" in Abstract

After refining the keywords through my searches, I ended up with the below key words (due to the number of results and relevancy of results).

Gender OR female OR women OR South Asian OR ethnic minority OR race OR bme OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali AND exclusion OR unequal OR racialisation OR participation OR engagement OR participation OR experience OR challenges OR understandings OR perceptions OR barriers OR access OR facilitator AND leisure OR adventure OR hiking OR activity OR walking OR Park OR outdoors OR Green space OR rural OR beach OR swimming OR countryside OR mountain OR climbing OR recreation OR landscape OR nature

Key words (Filters in UK and from 2005)

The number of results from the most (so far) relevant databases are seen in the table (using the above keywords):

However, looking at the results, and also by consulting with my supervisors, it was advised to include the psychological aspect (i.e, therapy) , as well as the sociological/ecological aspect (i.e., access/racialisation) within the search terms (highlighted). It was thought (I thought) that we could include all studies and then manually select the demographic the studies were on, based on how much studies emerged on each demo-

Database	Results found
Scopus	49/ 1700 In new
JSTOR	205 CHECK THIS ONE? NOT USING NOW 270722
Sage Journals	1713 / 591 IN NEW- SEPARATE BUT ABSTRACT
Science direct	409 CHECK THIS ONE? < 207 but fewer and refined booleon because of site limits- also selective journals that are relevant!
Taylor & Francis	935/ 1360 IN NEW – SEPARATE BUT ABSTRACT
Wiley Online Library	618/ 842 IN NEW get rid- first 5 no relevance OKAY

was nothing to include then just south Asian and so on and so forth.). Hence, the search terms then became as follows:

perception OR preference OR participation engagement OR experience OR understanding OR challenge OR barriers OR inhibitors OR access OR facilitator OR elicit OR unequal OR racialisation OR whiteness OR belonging OR wellbeing OR emotion OR restorative OR therapy OR affect OR effect OR connection OR connectedness OR psychological OR attachment AND green spaces OR nature OR rural OR countryside OR park OR adventure OR leisure OR outdoors OR landscape OR mountain OR climbing biking hiking OR walking OR running OR beach OR blue space OR water

However, I soon realised that the highlighted terms might limit the studies that could be found through the search (because they would limit to only those with such words in the title/abstract). Furthermore, there were no keywords included that related to the target population (which actually drove a big rationale for the study). As a result, I reasoned that as long as the terms include the identity of the participants (i.e., the target population) and the context of the study (i.e., green spaces), we could manually select studies that meet the study criteria (i.e., with focus on mental wellbeing, and access and etc.)

south AND asian OR ethnic AND minority OR race* OR bme* OR muslim OR pakistani OR bangladeshi OR indian OR bengali AND green AND space* OR nature* OR rural* OR countryside OR park OR adventure* OR outdoors OR landscape OR mountain* OR hike* OR walk* OR running OR seaside OR blue AND space

graphic (for example: start of at south Asian Muslim females and if there was nothing to include, then include studies on south Asian females, but if there

Of course, the search differed across the various databases used, due to the limits posed by their search engines. The variation in what ACTUAL search terms were used to collect the literature we have currently is shown below:

LATER SEARCHES MADE ON 29/07//2022

SCOPUS-

south AND asian OR ethnic AND minority OR race* OR bme* OR muslim OR pakistani OR bangladeshi OR indian OR bengali AND green AND space* OR nature* OR rural* OR countryside OR park OR adventure* OR outdoors OR landscape OR mountain* OR hike* OR walk* OR running OR seaside OR blue AND space AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (AFFILCOUNTRY , "United Kingdom")) AND (LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "EART") OR LIMIT-TO (SUBJAREA , "PSYC")) AND (LIMIT-TO (PUBYEAR , 2023) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Results- 1438

Science direct

Terms- United kingdom OR England OR uk

Year: 2005-2022

Title, abstract, keywords: south AND asian OR ethnic AND minority OR race OR bme OR muslim

Title: Park OR outdoors OR rural OR water OR nature OR countryside OR mountain OR green AND space

Results- 179

SAGE-

Terms

[[[Title south] AND [Title asian]] OR [[Title ethnic] AND [Title minority]] OR [Title race*] OR [Title bme*] OR [Title muslim] OR [Title pakistani] OR [Title bangladeshi] OR [Title indian] OR [Title bengali]] AND [[[Title green] AND [Title space*]] OR [Title nature*] OR [Title rural*] OR [Title countryside] OR [Title park] OR [Title adventure*] OR [Title outdoors] OR [Title landscape] OR [Title mountain*] OR [Title hike*] OR [Title walk*] OR [Title running] OR [Title seaside] OR [[Title blue] AND [Title space]]] AND [[All uk] OR [All united]] AND [[All kingdom] OR [All england]]

Since 2005 RESEARCH ARTICLES ONLY

Results- 67

15/08/22

GOOGLE SCHOLAR

south AND asian OR ethnic AND minority OR race* OR bme* OR muslim OR pakistani OR bangladeshi OR indian OR bengali AND green AND space* OR nature* OR rural* OR countryside OR adventure* OR outdoors OR mountain* OR hike*

from 2005

only first 20 pages downloaded-

Results- 200

TOTAL

1884 FOUND

21 duplicates removed- 1863 remain

That's it, that's the (simplified but yet still quite messy) way of how we came about the keywords we are currently using.

IGNORE (LINKS FOR WILEY ONLINE LIBRARY LAST SEARCHES)

[SAVE SEARCH](#)

Appendix 3. Amendments to search according to each database (Page 71)

THESE SEARCHES MADE ON 29/07/2022

SCOPUS-

south AND [asian](#) OR ethnic AND minority OR race* OR [bme](#)* OR muslim OR pakistani OR bangladeshi OR indian OR [bengali](#) AND green AND space* OR nature* OR rural* OR countryside OR park OR adventure* OR outdoors OR landscape OR mountain* OR hike* OR walk* OR running OR seaside OR blue AND space AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (AFFILCOUNTRY , "United Kingdom")) AND (LIMIT-TO (SUBJAREA , "SOC")) OR LIMIT-TO (SUBJAREA , "MED")) OR LIMIT-TO (SUBJAREA , "ENVI")) OR LIMIT-TO (SUBJAREA , "ARTS")) OR LIMIT-TO (SUBJAREA , "EART")) OR LIMIT-TO (SUBJAREA , "PSYC")) AND (LIMIT-TO (PUBYEAR , 2023) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005))

Results- 1438

Science direct

Terms- [United kingdom](#) OR England OR [uk](#)

Year: 2005-2022

Title, abstract, keywords: south AND [asian](#) OR ethnic AND minority OR race OR [bme](#) OR [muslim](#)

Title: Park OR outdoors OR rural OR water OR nature OR countryside OR mountain OR green AND space

Results- 179

SAGE-

Terms

South and Asian OR ethnic AND minority OR race* OR [bme](#)* OR [muslim](#) OR [pakistani](#) OR [bangladeshi](#) OR [indian](#) OR [bengali](#) AND green AND space* OR nature* OR rural* OR countryside OR park OR adventure* OR outdoors OR mountain* OR hike* OR walk* OR running OR seaside OR blue AND space AND [uk](#) OR united AND kingdom OR [england](#)

[[[Title south] AND [Title [asian](#)]] OR [[Title ethnic] AND [Title minority]] OR [Title race*] OR [Title [bme](#)*] OR [Title [muslim](#)] OR [Title [pakistani](#)] OR [Title [bangladeshi](#)] OR [Title [indian](#)] OR [Title [bengali](#)]] AND [[[Title green] AND [Title space*]] OR [Title nature*] OR [Title rural*] OR [Title countryside] OR [Title park] OR [Title adventure*] OR [Title outdoors] OR

[Title landscape] OR [Title mountain*] OR [Title hike*] OR [Title walk*] OR [Title running] OR [Title seaside] OR [[Title blue] AND [Title space*]] AND [[All [uk](#)] OR [All united]] AND [[All kingdom] OR [All [england](#)]]

Since 2005 RESEARCH ARTICLES ONLY

Results- 67

15/08/22

GOOGLE SCHOLAR

south AND [asian](#) OR ethnic AND minority OR race* OR [bme](#)* OR [muslim](#) OR [pakistani](#) OR [bangladeshi](#) OR [indian](#) OR [bengali](#) AND green AND space* OR nature* OR rural* OR countryside OR adventure* OR outdoors OR mountain* OR hike*

from 2005

only first 20 pages downloaded-

Results- 200

TOTAL

1884 FOUND

21 duplicates removed- 1863 remain

Amalgamated:

("South Asian" OR "ethnic minority" OR race* OR [bme](#) OR Muslim OR Pakistani OR Bangladeshi OR Indian OR Bengali) AND ("green space*" OR nature OR rural* OR countryside OR adventure* OR outdoors OR mountain* OR hike*).

Appendix 4. Part results from forward and backward citation search (Page 71)

Included article	Reference list searching	Citation searching (first 10 pages)
14. Comber, A., Brunsdon, C., & Green, E. (2008). Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups. <i>Landscape and urban Planning</i> , 86(1), 103-114.	0	1 already inc Otherwise 0
19. Davdand, P., Wright, J., Martinez, D., Basagaña, X., McEachan, R. R. C., Gidlow, C. J., de Boer, K., Grobstein, R., & Nieuwenhuijsen, M. J. (2014). Inequality, green spaces, and pregnant women: roles of ethnicity and individual and neighbourhood socioeconomic status. <i>Environment International</i> , 71, 101-108.	Natural England. Monitor of engagement with the natural environment: the national survey on people and the natural environment. Natural England Commissioned Reports. Sheffield: Natural England; 2013.	McEachan, R.R.C., Prady, S.L., Smith, G., Fairley, L., Cobbe, B., Gidlow, C., Wright, J., Davdand, P., Van Gent, D. and Nieuwenhuijsen, M.J., 2016. The association between green space and depressive symptoms in pregnant women: moderating roles of socioeconomic status and physical activity. <i>J Epidemiol Community Health</i> , 70(3), pp.253-259. Cronin-de Chavez, A., Islam, S. and McEachan, R.R., 2019. Not a level playing field: A qualitative study exploring structural, community and individual determinants of greenspace use amongst low-income multi-ethnic families. <i>Health & place</i> , 56, pp.118-126.
23. Edwards, R. C. (2021). Exclusive nature: Exploring access to protected areas for minority ethnic communities in the United Kingdom.	0	0
25. Eyre, E. L. J., Duncan, M. J., Birch, S. L., Cox, V., & Blackett, M. (2015). Physical activity patterns of ethnic children from low socio-economic environments within the UK [Article]. <i>Journal of Sports Sciences</i> , 33(3), 232-242. https://doi.org/10.1080/02640414.2014.934706	Eyre, E.L.J., Duncan, M.J., Birch, S.L. and Cox, V., 2015. Environmental and school influences on physical activity in South Asian children from low socio-economic backgrounds: A	

26. Ferguson, M., Roberts, H. E., McEachan, R. R. C., & Dalen, M. (2018). Contrasting distributions of urban green infrastructure across social and ethno-racial groups [Article]. <i>Landscape and urban Planning</i> , 175, 136-148. https://doi.org/10.1016/j.landurbplan.2018.03.020	0	0
29. Garland, J., & Chakraborti, N. (2006). Recognising and responding to victims of rural racism [Article]. <i>International Review of Victimology</i> , 13(1), 49-69. https://doi.org/10.1177/026975800601300103	0	0
43. McEachan, R. R. C., Yang, T. C., Roberts, H., Pickett, K. E., Arzeneu-Powell, D., Gidlow, C. J., Wright, J., & Nieuwenhuijsen, M. (2018). Availability, use of, and satisfaction with green space, and children's mental wellbeing at age 4 years in a multicultural, deprived, urban area: results from the Born in Bradford cohort study [Article]. <i>The Lancet Planetary Health</i> , 2(6), e244-e254. https://doi.org/10.1016/S2542-5196(18)30119-0	0	0
50. Nayak, A. (2017). Purgin the nation: race, conviviality and embodied encounters in the lives of British Bangladeshi Muslim young women [Article]. <i>Transactions of the institute of British geographers</i> , 42(2), 289-302. https://doi.org/10.1111/tran.12168	0	0
51. Neal, S., Bennett, K., Jones, H., Cochrane, A., & Mohan, G. (2015). Multiculture and public parks: Researching super-diversity and attachment in public green space. <i>Population, space and place</i> , 21(5), 463-475.	0	0 but array of lit on space
54. Ratna, A. (2017). Walking for leisure: the translocal lives of first generation Gujarati Indian men and women [Article].	0	0

Articles selected for screening, via title and abstract, checked if in initial screening, then screened via full text via forward and backward reference searching

Leisure Studies, 36(5), 618-632. https://doi.org/10.1080/02614367.2017.1285952		
58. Rishbeth, C., & Birch, J. (2021). Urban nature and transnational lives [Article]. <i>Population, space and place</i> , 27(4), Article e2416. https://doi.org/10.1002/psp.2416	Burt, J., Stewart, D., Preston, S., & Costley, T. (2013). Monitor of engagement with the natural environment survey (2009-2012): Difference in access to the natural environment between social groups within the adult English population. Natural England data reports. Number 003. Retrieved from http://publications.naturalengland.org.uk/file/4871615 accessed 10/12/2019. CABE. (2010). Community green: Using local spaces to tackle inequality and improve health. London, CABE space. Retrieved from https://www.designcouncil.org.uk/resources/report/community-green accessed 13/12/2019. Google Scholar Natural England. (2016). Minority ethnic communities and the natural environment. Natural England, Worcester. Google Scholar Sutcliffe, J., 2018. "Nature is Part of Me and I'm Part of Nature": Exploring How People Understand Their Relationships with Nature and How These Relationships	0 already included slater.

Articles selected for screening, via title and abstract, checked if in initial screening, then screened via full text via forward and backward reference searching

	Develop (Doctoral dissertation, University of Huddersfield).	
59. Rishbeth, C., & Bogaly, B. (2018). Transactions of the institute of British geographers, 43(2), 284-298. https://doi.org/10.1111/tran.12212	0	0
60. Roberts, H., Kellar, J., Conner, M., Gidlow, C., Kelly, B., Nieuwenhuijsen, M., & McEachan, R. (2019). Associations between park features, park satisfaction and park use in a multi-ethnic deprived urban area. <i>Urban forestry & urban greening</i> , 46, 126485. https://doi.org/https://doi.org/10.1016/j.ufug.2019.126485	CABE, 2010 CABE Urban Green Nation: Building the Evidence Base Retrieved from (2010) http://webarchive.nationalarchives.gov.uk/20101118110047/http://www.cabe.org.uk/files/urban-green-nation.pdf Google Scholar	0
61. Roe, J., Aspinall, P. A., & Thompson, C. W. (2016). Understanding relationships between health, ethnicity, place and the role of urban green space in deprived urban communities [Article]. <i>International Journal of Environmental Research and Public Health</i> , 13(7), Article 681. https://doi.org/10.3390/ijerph13070681	0	0
62. Scraton, S., & Holland, S. (2006). <i>Grassroots and leisure</i> [Article]. <i>Leisure Studies</i> , 25(2), 233-250. https://doi.org/10.1080/02614360500504693	0	0
64. Slater, H. (2022). Exploring minority ethnic communities' access to rural green spaces: The role of agency, identity, and community-based initiatives. <i>Journal of Rural Studies</i> , 92, 56-	Burt et al., 2013 J. Burt, D. Stewart, S. Preston, T. Costley	0

Articles selected for screening, via title and abstract, checked if in initial screening, then screened via full text via forward and backward reference searching

67. https://doi.org/https://doi.org/10.1016/j.jrurstud.2022.03.007	Monitor of Engagement with the Natural Environment Survey (2009 - 2012): difference in access to the natural environment between social groups within the adult English population Spatial Engl. Data Reports (2013), pp. 1-66 Number 003 http://publications.naturalengland.org.uk/publication/4646400 View PDF CrossRefGoogle Scholar Morris et al., 2011 J. Morris, E. O'Brien, B. A. mbrose-Oji, A. Lawrence, C. Carter, A. Peace Access for all? barriers to accessing woodlands and forests in Britain Local Environ, 16 (2011), pp. 375-376. 10.1080/13549839.2011.576662 CHECK REFS CITATIONS FOR THIS !!	
66.Stride, A. (2016). Centralising space: the physical education and physical activity experiences of South Asian, Muslim girls	0	0

Articles selected for screening, via title and abstract, checked if in initial screening, then screened via full text via forward and backward reference searching

[Article]. Sport, Education and Society, 21(5), 677-697. https://doi.org/10.1080/13573322.2014.938622		
68.Stride, A., Flintoff, A., & ~~Scratch~~ S. (2018). 'Homing in': South Asian, Muslim young women and their physical activity in and around the home [Article]. Curriculum Studies in Health and Physical Education, 9(3), 253-269. https://doi.org/10.1080/25742981.2018.1478673	0	0
73.Warren, S. (2017). Pluralising the walking interview: researching (ip)mobilities with Muslim women [Article]. Social and Cultural Geography, 18(6), 786-807. https://doi.org/10.1080/14649365.2016.1228113	0	Morris, S., Guell, C. and Pollard, T.M., 2019. Group walking as a 'lifeline': Understanding the place of outdoor walking groups in women's lives. <i>Social Science & Medicine</i> , 238, p.112489.
77.Wood, E., ~~Hart~~ A., ~~Dallinger~~ M., Cronin de Chavez, A., ~~86588090~~ R. R., & Hassali, C. (2018). Not all green space is created equal: Biodiversity predicts psychological restorative benefits from urban green space. <i>Frontiers in psychology</i> , 9, 2320.	0 but lots of good refs	

Appendix 5. Critical appraisal of each qualitative study (n = 17) (Page 74)

Study ID:	1	4	5	8	9	12	13	14	15	16	17	20	21	22	23	24	25
Clear statement of research aims?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Qualitative methodology appropriate?		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Research design appropriate?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Recruitment strategy appropriate?	X	X	X		X	X	X	X		X		X		X	X	X	X
Data collected in a way that addressed the research aims?	X	X	X		X	X	X	X	X	X		X	X	X		X	X
Relationship of researcher and participants considered?	X	X			X		X	X	X			X	X	X	X	X	X
Ethical issues accounted for?	X		X		X	X	X		X	X			X			X	X
Data analysis rigorous?	X	X	X		X	X				X			X	X	X	X	
Clear statement of findings?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Research valuable?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Appendix 6. Critical appraisal quantitative studies (n = 8) (Page 74)

Study ID:	2	3	6	7	10	18	19	26
Clearly focused?	X	X	X	X	X	X	X	X
Acceptable recruitment?	N/A	X	X	N/A	X	X	X	X
Accurate in measuring exposure to minimise bias?	X	X	X	X	X	X	X	X
Outcome measured accurately to minimise bias?		X	X	X	X	X		X
Authors identified confounding factors?		X		X	X	X	X	X
Taken into account the confounding factors in analysis?		X	X	X	X	X	X	X
Are there results of the study?	X	X	X	X	X	X	X	X
Believable results?	X	X	X	X	X	X	X	X
Applicable to locality?	X	X	X	X	X	X	X	X
Fit other evidence?	X	X	X	X		X	X	X
Positive implications?	X	X	X	X	X	X	X	X

Appendix 7. Critical appraisal of mixed method study (n = 1) (Page 74)

Study ID:

11

Is there an adequate rationale for using a mixed methods design to address the research question?	X
Are the different components of the study effectively integrated to answer the research question?	X
Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	X
Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	
Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	X

Appendix 8. Independent critical appraisal comparison (Page 74)

Article ref.	Slater 2022	Cronin-de-Chavez et al. 2	Eyre, Duncan, Birch, and	Garland & Chakraborti 2006 -	Morris et al. 2019 -	Nayak 2017 -	Neal et al. 2015 -	Ratna 2017 -	Rishbeth a
1. Clear statement of research aims?									
2. Qualitative methodology appropriate?									
3. Research design appropriate?									
4. Recruitment strategy appropriate?									
5. Data collected in a way that addressed the research aims?									
6. Relationship bt researcher and participants considered?									
7. Ethical issues accounted for?									
8. Data analysis rigorous?									
9. Clear statement of findings?									
10. Research valuable?									
OVERALL SCORE	9 out of 10	9 out of 10	9 out of 10	5 out of 10	9 out of 10	9 out of 10	8 out of 10	8 out of 10	9 out of 10
QUANTITATIVE STUDIES	Dadvand 2014	Eyre 2014	Ferguson 2018	Meechan 2018	Roberts 2019	Roe 2016	Wood 2018	Meechan 2015	
1. Clearly focused?									
2. Acceptable recruitment?			N/A						
3. Accurate in measuring exposure to minimise bias?									
4. Outcome measured accurately to minimise bias?									
5A. Authors identified confounding factors?									
5B. Taken into account the confounding factors in analysis?									
7. Are there results of the study?									
9. Believable results?									
10. Applicable to locality?									
11. Fit other evidence?									
12. Positive implications?									
	11 out of 11	10 out of 11	10 out of 10 (as one q didn't apply)	11 out of 11	11 out of 11	10 out of 11	11 out of 11	10 out of 11	
5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	Morris o Neil et al. 2011								
5.2. Are the different components of the study effectively integrated to answer the research question?									
5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?									
5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?									
5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?									

GREEN = AGREED
 RED= DISAGREE
 PURPLE - RACHAEL OR JORDAN ACCEPT FEEDBACK AND NOW AGREEING AFTER FEEDBACK FROM HAMZA
 YELLOW- Hamza ACCEPT FEEDBACK FROM RACHAEL OR JORDAN AND NOW AGREEING

Appendix 9. Discussing independent coding frameworks (page 75)

Hamza Mohammed (1605876) PHD

Will exclude as it does not mention the beach and thus could be at the local swimming pool?

10 April 2023, 21:26

@mention or reply

Rachael Edwards

Because she mentions cricket I included.

Hamza Mohammed (1605876) PHD

THINK ABOUT THIS

@mention or reply

Hamza Mohammed (1605876) PHD

Is Idin SA? Not sure I think he was Iraqi or ...?

1 more reply

Hamza Mohammed (1605876) PHD

Agreed

@mention or reply

Hamza Mohammed (1605876) PHD

Is this persn SA?? I think he was also middle eastern or...?

1 more reply

Hamza Mohammed (1605876) PHD

Agreed.

Reference 3 - 0.67% Coverage

Sumera acknowledges how her responsibilities influence her friendships. My family's different. We have good status, cause of my granddad and girls have to keep up that respect, that holy reputation. Do their work, study hard and get a good job, don't go out uncovered, don't mess about, no boys or smoking or bad things like that. Just respect boundaries, (unclear) It gets on my nerves a bit, cause I can't do what I want.

Reference 4 - 0.65% Coverage

For Noreen, 528 swimming with her dad and brothers, and boxing with young men, present her religious identity with (unclear) many challenges for her to participate in these activities. Whilst her family have not explicitly vocalised these expectations she is acutely aware of them and develops her own set of boundaries to operate within. Although 532 Borat regularly plays rugby and football with male family members, swimming presents additional barriers. Undeterred, she contemplates ways to overcome these: I'd love to go swimming but I can't go with all the guys cause of religion and stuff. I just wouldn't feel comfortable and neither would they. I could get one of them costumes that cover your belly and legs and stuff but I (unclear) where I'd get one. Or I could go to one of them women only sessions but I'm not sure where they do them.

Reference 5 - 0.53% Coverage

Sumera similarly recognises that surveillance by relatives and neighbours, combined with expectations to 'maintain yourself like a woman' and to not bring shame on her family and faith, restricts her agency and limits the activities she can do: I can't just stop in the street and talk and have a laugh with boys, or go and play cricket with them like Nisha. It'd get back to my parents with all my relatives and the ladies in the street So, you end up living the way other people want you to. Sumera's, and other girls' stories, continue to reflect the notion of spaces as 'contact zones' of cultural contestation, where issues of representation and practice are challenged and negotiated.

Page 4 of 11 125 of 4865 words 92%

Page 2 of 2 627 words English (United Kingdom) 73%

00:36 11/04/2023

Appendix 10. Study sample information (Page 83)

Study ID	Sample size	Ethnicity	Age	Religion	SES	Sex	Additional sample details
1	23	Diverse sample including four White British Origin, seven of Pakistani origin.	Mean age of 31.	NR	The three wards in the most deprived quintiles of the index of multiple deprivation UK, 12.3% of city population.	20 female and three males.	13 participants were UK born. Average of three children per participant.
2	Leicester city demographic	36% of Leicester's population to be from India (26%). Smaller Bangladeshi (1%) and Pakistani (1.5%) communities.	NR	2001 census figures; Leicester is Christian (45%), Hindu (15%), Muslim (11%) and Sikh (4%).	Based on census data 2001	NR	NR
3	799	Approximately 40% White British and 45% Pakistani origin.	20–24 years	NR	The cohort tended to reside in slightly less deprived neighbourhoods	All female	Participants were pregnant women at 26–28-week gestation who registered at the

							Bradford Royal Infirmary.
4	14	40% of participants were White British and 45% having Pakistani origin.	Seven aged between 30 and 50, two under 30, three over 50. 5 groups of children aged 7–9 years	All but two participants identified as practicing Muslims.	Lower socioeconomic status	Ten female and two males.	Most participants raised in the UK (N = 12). Diversity in occupation of each participant.
5	89	17; South Asian ¼ 17, White ¼ 8 and Black ¼ 8		NR	deprived wards of Coventry, England.	33; male ¼ 16, female	School attenders
6	64	white = 24, South Asian (Indian, Pakistani, Bangladeshi) = 60,	(7 - 9 years	NR	deprived wards of Coventry, England.	30 males 34 females	From the children excluded from the final analysis, 25% were overweight
7	Bradford demographic data	85% of Bradford report as either 'White' or 'Asian or Asian British'	NR	NR	NR	UK Census data (2011).	NR
8	Unclear. 65 interviews conducted.	Not clear of participants, drawn on census data.	Diversity in age groups.	Majority Muslim, one Sikh.	Unclear, referred to preceding study.	Even in males and females.	Victims from visible and non-visible ethnic minority communities.
9	2594	1519 (58%) south Asian, 740 (29%) were British,	The mean age of the	NR	NR	Women.	Diversity in age, smoking

		and 333 (13%) of another ethnicity.	mothers was 33·6 years (SD 5·5) and the mean age of their child was 4·5 years (0·4).				behaviour, child age, cohabitation status.
10	7547 from Born in Bradford cohort	Mix of White, South Asian origin, and other.	Diversity in age.	NR	SES included as a measurement.	Women	Women with singleton pregnancies. Diversity in marriage status and smoking habits
11	3012	Diverse ethnic background for interviewees, including ten Asian and ten Pakistani.	Majority over 45 adults. 6 children.	NR	Those from low-income background for the interviews. Other participants not described.	Women participants in interviews.	Active England user and non-user groups.
12	Total sample unclear. 25 group walks, 35 walking	Diverse participants including eleven South Asian.	Mostly aged between 60 and 80 years and retired.	NR	Most members lived in areas that were less deprived than areas they visited.	BME walking group was comprise of women,	Groups in areas with relatively poor resources and health.

albeit open
to all.

	interviews, and 20 interviews. 51 provided backgroun d detail. This study focuses on a sub- sample of 20 from 71. Unclear. 29 individual interviews and nine group interviews consisting of 6 to 9 individuals.						
13		Bangladeshi.	11–24 years.	Muslim.	NR	Women.	NR
14		Various including White British, Black British, South Asian.	Young, middle aged, and older.	Some Muslims.	NR	One male and some females.	NR
15	Ten.	Gujrati.	Older.	NR	NR	Five males, five females.	Five husband- wife couples.
16	23	Eight from Africa, twelve from the Middle East, eight from South Asia and nine from other countries.	Five participan ts were 16-25, nine participan	NR	Half from deprived neighbourhoods and half from more affluent	Eleven women and twelve men.	All participants were born elsewhere and moved to the UK in their childhoods.

			ts 40-50 and nine participan ts over 70.		neighbourhoods		
17	Total number unclear. 18 interviewed , then more than 30 discussion s recorded.	Diverse range of participants including Nepalese.	Older age ranges.	NR	From residences that are in top quintile for most deprived.	Mixed.	Park goers.
18	652	White Other (3.1%), Mixed Race (1.8%), Black (2.1%), Indian (3.7%), Bangladeshi (2.4%) and 'Other' (1.9%).	NR	NR	Most of the sample were in the most or second most deprived quintile.	Women	Pregnant women from Born in Bradford cohort.
19	The sampling structure reflected particular wards in England. 80-85 participants from each ward.	Wards with a minimum of 9% of the population from black and minority ethnic groups.	64% of Indian sample were under 44. 36% were over 45. 70% of the Pakistani and	NR	Wards among the most deprived 20% in England	Indian: M = 31% F = 69%. Bengali: M = 30% F = 70% Pakistani: M = 38% F = 62%	1.7% Indian, 6.7% Bengali and 4.5% of Pakistani sample had disabilities.

20	Twelve	Five were Indian, three were African Caribbean and four were White.	Bengali sample were under 44 and 30% over 45. Between the ages of 60 and 80 Half survey respondents aged between 25 and 64, with twelve aged 64 or over and one aged 24 or under.	Indians were Sikh.	Working class.	Males only	Grandfathers
21	Total sample unclear including survey, 30 interviews conducted.	In the survey 46% were from ethnic background. Interviewees from Boots and Beards included eight Pakistani, and four Indian.		NR	63% living in the 10% most deprived neighbourhoods in the country.	Most survey respondent were over (69%) and interviewees (77%) were female.	Leaders and volunteers of walking organisations.
22	120 participants with 23 in focus groups and 13 in interviews.	South Asian.	13 to 15.	Muslim.	63% living in the 10% most deprived neighbourhoods in the country.	Female.	School goes with varying degrees of religiosity.

23	120 with 23 in focus groups, and 13 interviews.	South Asian.	13 to 15.	Muslim.	63% living in the 10% most deprived neighbourhoods in the country.	Female.	School goes with varying degrees of religiosity.
24	16	Majority White with 1 Pakistani.	23 to 65. The Pakistani participant was 43.	The Pakistani participant was Muslim	NR	Ten males and six females. The Pakistani participant was female.	Participants with a variety of different relationships with nature were recruited.
25	26	Sample included those from Pakistan, Bangladesh, Afghanistan, Asia and Africa.	Young and middle aged. 49.6% were aged 46 or older in the survey.	Muslim.	NR	Females.	Sparkbrook ward is amongst the most conservative in the U.K.
26	128	65.9% were born in the UK, 26.4% South Asia born.		NR	Three most deprived wards of the Bradford city.	54.7% female.	52.7% married.

Appendix 11. Summary of access factors and psychological wellbeing associations of each study (Page 78)

Study ID	Main author and year	Key factors associated with access	Aspect of PWB focused on	How PWB outcomes were measured	Findings related to PWB
1	Cronin-de-Chavez et al. (2019b)	Proximity, amenities, transport costs, lack of knowledge, social companionship, family ties, family responsibilities, gender roles, mobility issues, health constraints, health benefits	Physical wellbeing	Retrospective interview discussions	illness and infections. Mental wellbeing- emotional: Mood and sleep were found to be better after engaging with NGS.
2	Comber et al. (2008)	Proximity, poorer access for South Asian compared to White counterparts	None	None	None
3	Dadvand et al. (2014a)	Proximity, poorer access for South Asian compared to White communities	Physical wellbeing	Measuring baby birth weight- Born in Bradford data	Positive associations between green spaces and pregnant women's health, moderated by ethnicity and socioeconomic status.
4	Edwards et al. (2022)	Infrastructure/amenities, language barriers, racial experiences, community organized visits	Spiritual wellbeing	Retrospective interview discussions	Participants used NGS as a catalyst for connecting with God.
5	Eyre et al. (2015a)	Safety concerns (e.g., slippery surfaces, poor aesthetics), fears of antisocial behavior (e.g., off-leash dogs), mobility issues	Physical wellbeing	Retrospectively through focus group discussions	PA was preferable in green spaces as opposed to indoors.

6	Eyre et al. (2015b)	Proximity, poorer access for South Asian compared to White communities	Physical wellbeing	GPS monitoring of physical activity in different environments	Access to NGS was significantly associated with higher physical activity levels.
7	Ferguson et al. (2018)	Proximity, quality and satisfaction, amenities, South Asian park satisfaction compared to White counterparts		None	None
8	Garland & Chakraborti (2006)	Racial experiences inhibiting NGS access		None	None
9	McEachan et al. (2018a)	Proximity, poorer access for South Asian compared to White counterparts	Mental wellbeing: depressive symptoms	Survey questionnaires	Found positive associations between access to NGS and decreased depressive symptoms.
10	McEachan et al. (2016)	Proximity, denser South Asian population associated with reduced access	Mental wellbeing: prosocial behaviours and behavioural difficulties	Survey questionnaires	More NGS was associated with fewer behavioural difficulties and prosocial behaviours for SA's.
11	Morris & O'Brien (2011)	Infrastructure/amenities, transport costs, social companionship, family ties, gender roles, mobility issues, health constraints	Mental restoration	Survey questionnaires and supplementary interviews	Found reduced feelings of stress and heightened relaxation in those who engaged with woodlands.
12	Morris et al. (2019)	Safety concerns (e.g., slippery surfaces), mobility issues, health constraints, family ties, health benefits	Physical wellbeing, social wellbeing, and escapism	Retrospective interviews and ethnographic walks with participants	SA women felt physically fitter when going for walks in NGS. They also felt a sense of escape from urban life and had the opportunity to socialise
13	Nayak (2017)	Racial experiences inhibiting NGS access, family ties		None	None

14	Neal et al. (2015)	Community organized visits	Physical wellbeing, connecting with nature, and social wellbeing:	Interview discussions individually and in groups	NGS provided opportunity to connect with others. It also gave an opportunity to perform fitness activities and connect with nature.
15	Ratna (2017)	Proximity, changes in life circumstances	Connecting with past and heritage, and escapism	Retrospective interview discussions and walking interviews	Elderly walkers were reminiscent on positive memories of previous life experiences when visiting certain NGS. They also used these walks to escape from boredom in the home.
16	Rishbeth & Birch (2020)	Quality and satisfaction, size of NGS, unpathed areas, usability	Escapism, healing, and spiritual wellbeing	Retrospective interview discussions	Being in NGS provided some distraction but led to loneliness, helped regain confidence through ill health, and offered the opportunity to pray.
17	Rishbeth & Rogaly (2017)	Proximity, safety concerns, health benefits, unpathed areas, mobility issues, health constraints	Social wellbeing	Retrospective interview discussions and film work	Nepalese elders used the NGS to sit together in conviviality.
18	Roberts et al. (2019)	Quality and satisfaction, social companionship, parental motivations	None	None	None
19	Roe et al. (2016b)	Racial experiences inhibiting NGS access	General health including physical, social, place belonging	Household survey questionnaires	Access to NGS was associated significantly with positive overall general health for SA's.
20	Scruton & Holland (2006)	Social companionship		None	None
21	Slater (2022)	Transport costs, social companionship, family ties, changes in life circumstances, mobility	General mental health, social wellbeing, restoration, sentimental, and physical wellbeing	Walking and semi-structured interview discussions	Participants found NGS as therapeutic leading to general mental health uplift. Participants built family bonds and relationships through NGS and

		issues, health constraints, health benefits			reminisced on their own engagement with nature in the past. Participants felt physically refreshed when breathing clean air in NGS.
22	Stride (2014a)	Proximity, gender roles, and racial experiences inhibiting NGS access		None	None
23	Stride et al. (2018b)	Racial experiences inhibiting NGS access	Physical wellbeing	Focus groups and interview discussions	NGS, parks, were used by girls to maintain their physical health. Participants felt a better sense of physical and mental wellbeing when engaging with NGS. Also felt better connected to God (i.e., through spirituality) when in NGS and were reminiscent of Pakistan.
24	Sutcliffe (2018)	Knowledge of NGS as enhancing health.	General mental wellbeing, physical wellbeing, spiritual wellbeing, and sentiment	Retrospective interview discussions	
25	Warren (2017)	Quality and satisfaction		None	None
26	Wood et al. (2018)	Proximity, poorer access for South Asian compared to White counterparts	General PWB	Face to face survey questionnaires	Found benefits of NGS independent of ethnicity. Instead, the type of NGS shapes PWB outcomes.

Appendix 12. Study leaflet for interviews (Page 116)

Appendix 10



SOUTH ASIAN MUSLIM FEMALE ADULT PARTICIPANTS REQUIRED FOR A STUDY ABOUT RURAL GREEN SPACES.

We are looking for volunteers to take part in a study of South Asian Muslim women's experiences of natural green spaces.

We want to hear your views about rural green spaces, regardless of whether you visit or not.

Your participation would involve 1 session, which lasts approximately 1 hour and 15 minutes if you are invited to a sat down – open ended interview. This can be in a place space such as a local coffee shop, or can be virtual (online).

Alternatively, you may be invited to participate in a walking interview. This may last around 1 to 2 hours where you will be select where to take part (in a green space that is in Yorkshire). The interviews will be sharia compliant, for instance, you can choose to bring a family member/friend with you if you wish.

With your help, this research will allow for more understanding of South Asians Muslim women experiencing natural spaces residing as a minority. You are welcome to bring a family member/friend with you. The information you share could potentially be used to help make rural spaces more accessible. To take part, you must identify as a female, South Asian, Muslim and be over the age of 18.

Recruitment ends 1st January 2023

For more information about this study, or to volunteer for this study, please contact:

Hamza Mohammed

Email: H.Mohammed@Leedstrinity.ac.uk

(Supervisor: L.depreto@Leedstrinity.ac.uk)

This study has been reviewed by and received ethics clearance through the School of Psychology Research Ethics and Integrity Sub-Committee (Ethics number: PGR-FSHS-0074-2022).

Appendix 13. Study information sheet (walking interviews) (Page 116)



Appendix 5

Participant Information Sheet

Project Title: South Asian Muslim women's experiences of rural green spaces.
Name of researcher: Mohammed Hamza
School / Institute: School of Social and Health Sciences, Leeds Trinity University
Ethics Approval ID: PGR-FSHS-0074-2022

1. Invitation and brief summary

I would like to invite you to take part in my research study. Before you decide if you would like to participate, I would like you to understand why the research is being done and what it would involve of you. This study is looking to explore the experiences and understandings South Asian Muslim women have of rural green spaces regardless of whether they visit or not.

2. What is the purpose of the project?

The study explores how South Asian Muslim women engage with rural green spaces, whether they visit or not, how often, the barriers faced by them, what helps to overcome such barriers, and what could be done to facilitate their access to rural green spaces. The aim of the study is to gain an understanding of this from the individual perspectives of South Asian Muslim women. With this knowledge, recommendations can be made as to how rural green spaces could be made more accessible, as well as furthering an understanding of the population, South Asian Muslim women, living in the UK.

3. Who is conducting the project?

This study is being conducted by Mr Mohammed Hamza as part of his PhD under the supervision of Dr Laura De Pretto (Senior Lecturer in Psychology) and Dr Madeline Sophie-Abbas (Senior Lecturer in Criminology, Sociology and Policing).

4. What does the project involve?

This study considers South Asian Muslim women's experiences of natural green spaces. Its' focus is on their understandings, engagement, feelings and factors of accessibility of natural green spaces. If you are interested in participating, you may sign and return the consent form to the researcher. You will be asked to attend an open-ended walking interview. Upon returning the consent form, the researcher will send you a table asking you to select a preferred a time, date and location for the interview. When you have affirmed your preferences, the route of walking interview will be planned in negotiation with you by the researcher. This will be somewhere near a nearby town/village for your and the researcher's safety. Prior to the interview and on the day, the weather of the location, temperature/humidity, the terrain, and participant motivations will be checked by the researcher to ensure that the walk is safe to go on (prior to the walk).

It is anticipated to last 1 to 2 hours after meeting with the researcher, but the length can be made longer or shorter depending on your capabilities and the route selected. The interview is expected to



Appendix 5

last around 1 hour and 15 minutes within the walk. More information of how to plan and prepare for this walk will be provided to you in the walking preparation sheet. You may choose to conduct this interview alone, or if you are happy that our conversations will be overheard, you can choose to come with a friend or family member. The interview will be audio recorded so that I don't miss anything that you say and can represent your opinions accurately. You will not be reimbursed for any costs incurred including travel. If you change your mind on whether you would like to do the interview you are free to withdraw or choose an alternative time and location for the interview. If the walk is deemed unsafe to go on by the researcher, he will reciprocate with you to determine an alternative time/date/location (or cancel if you change your mind). If you would like to take part in the study but are not willing to do a walking interview, you may choose to participate in a sedentary interview instead in a public location such as a cafe or library. If you prefer a non-walking interview instead, please contact the researcher and the time, date and location can be arranged mutually. There will be no follow up to any interview you take part in.

5. Why have I been asked to take part?

I am looking for self-identified South Asian Muslim women to take part in the study that is a part of my PhD thesis. I am looking to recruit a maximum of 30 participants: those with varying levels of experiences of RGS. This study will not provide any expenses or incentives. The information you provide could be used help to inform policy and practice to understand how rural green spaces can be made more inclusive to South Asian Muslim women.

6. Can I withdraw from the project?

This study is completely voluntary, and it is entirely up to you whether or not you want to participate. Please note that refusing to participate will have no impact on your relationship with the researchers or the institution. You have the right to withdraw from the study at any time before, during, or after the study without explanation or penalty. You also have the right to terminate the interview early. By signalling to the researcher that you do not wish to continue, you can end the interview at any time. This can be done by agreeing a safe word prior to the interview, which indicates that you do not wish to carry on. Alternatively, you may state that you wish to stop the interview. You are not required to respond to any of the questions, and you are free to refuse any or all the questions. If you complete the interview, you will have 10 working days to withdraw from the study after completing it. This is because your data will be analysed after this date, and you will not be able to withdraw from the study. If after partaking, you would like to withdraw within the 10 working day period, please contact the researcher on H.Mohammed@leedstrinity.ac.uk or Professor Martin Barwood M.barwood@leedstrinity.ac.uk. If you withdraw within the specified time, the data collected will be destroyed.

7. How will the data be dealt with and who will see the results?

Any information you provide will be kept private and confidential with the researcher and will not be shared with anyone else. You will be asked if you'd like to choose a pseudonym for yourself. This will be the name used to keep your identity hidden in the study. It will be impossible to identify you solely from the data once it has been analysed. Data and other materials will be securely stored for a period of ten years before being destroyed. The data gathered during the research will be stored in accordance with the Data Protection Act of 2018 and GDPR. This means that your information will be kept safe at Leeds Trinity University on a password-protected computer and an encrypted server. The anonymised data will be used as part of the researcher's thesis for his PhD at Leeds Trinity University and findings may be published in relevant journals. If you choose to come with a friend or family member, please note the interview will be overheard by them.

What are the possible benefits of taking part?

There are no direct benefits for you to take part in this study other than the pleasure of speaking about your experience, sharing your voice and going for a walk in a beautiful environment. Walking in rural green spaces allows people to get off the urban path and explore wild and natural landscapes.



Appendix 5

Moreover, providing us with your experiences may lead to facilitating better and more bespoke policy and practice in how RGS can be made inclusive. This could help to eradicate the marginalisation and stereotyping that South Asian Muslim women face within the UK. The priority of the study is to give you, the participant, a voice that can be heard in academia. If you do take part a debrief sheet will be provided at the end of the interview explaining a little more about the study and the research. This may be of interest to you if you want to understand further why this research is taking place.

9. What are the possible risks of taking part?

There are no anticipated risks or inconveniences associated with this study other than the time spent taking part, and the risks that are usually posed when walking in rural areas. Although the walk is anticipated to last around 1 to 2 hours. This will depend on both yours and the researchers' capabilities. The researcher (not a mountain leader) has completed a risk assessment for the walk and will dynamically risk assess prior to and during the walk. It is important to take steps to minimise the risk of loss and injury such as hyperthermia, dehydration, malnutrition and more. Therefore, I would like to kindly ask you to be responsible for your self during the walk. To support in the planning and preparation for the walk, I have provided you with a walking preparation document. This details how to be safe and the contingencies in place during the walk. The walk will be planned to take place on relatively flat ground and easy to walk on terrain, but I would like to remind you to bring appropriate footwear (i.e. walking boots). It is also important to bring waterproof/warm clothing (and a rucksack to delay), lots of water, sugary snacks and your mobile phone. The researcher (only trained in essential first aid) will carry a basic first aid kit as a contingency. On the day of the walking interview, a contingency meeting point will be shared with you should an unexpected occurrence arise, and a map of the area provided to you by the researcher. More details of how to prepare for the walk can be found at <https://adventures.com/information/how-to-prepare-for-a-hike/>.

Leading on from this, it is important to consider your wellbeing during the interview also. Should any topics arise during the interview that may lead you to feel stress you are free to refrain from answering or furthering the discussion. You do have the right to not answer any questions you feel uncomfortable with. You will be given a debrief sheet at the end of your involvement with information that may or may not be of use to you. Additionally, your responses will not be identifiable in the results as all names of people and places will be anonymised.

10. What if I require further information about the study or my involvement in it?

If you would like any more about any aspects of this research or you would like to withdraw from the study please contact Mohammed Hamza by email h.mohammed@leedstrinity.ac.uk

11. What if I have a complaint or any concerns?

Any person with concerns or complaints about the conduct of a research study should contact Professor Martin Barwood, Vice-Chair of the School of Social and Health Sciences / Leeds Trinity University Ethics Committee, Leeds Trinity University, ~~Shaw~~ Lane, Leeds, LS18 5HD by m.barwood@leedstrinity.ac.uk

Any person with concerns or complaints about data protection relating to a research study should contact the Data Protection Officer, Leeds Trinity University, ~~Shaw~~ Lane, Leeds, LS18 5HD. Email: dataprotection@leedstrinity.ac.uk

Appendix 14. Consent form for the walking interviews (Page 116).

Consent form

Project title: South Asian Muslim women's experiences of rural green spaces

Principal Researcher: Hamza Mohammed

Research Institution: Leeds Trinity University

Contact Email Address: H.Mohammed@leedstrinity.ac.uk

Supervisor Name: Laura Depretto L.Depretto@leedstrinity.ac.uk

Action	
I confirm that I have read and understood the Information Sheet for the above study	
I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	
I understand that my participation is voluntary and that I am free to withdraw from the study up until 10 working days after participation without giving a reason and my data will not be included in the research	
I understand that I can refuse to answer any or all the questions	
I understand that the information collected about me will be used to support other research in the future and may be shared anonymously with other researchers	
I understand that I am responsible for my own health and wellbeing, and that I will bring any prescribed medication/inhaler (if applicable)	
I understand the risks and benefits of walking in the selected rural area, and will use sound judgement to bring any clothing, snacks, water and footwear as appropriate	
I understand that I will not be incentivised or reimbursed for any costs arising, including travel to the selected location	
I understand that the interview will be audio <u>recorded</u> and all data will be de-identified after its' transcription	
I agree to take part in the above study.	

Please print, sign, date and return to the researcher.

Name (Print) _____

Signature _____

Date ____/____/____

Appendix 15. Interview schedule for all interviews (Page 118)

Semi-structured interview schedule

"Today is (Day, Date and Time) and this interview is taking place in (Location). All references to people will remain anonymous and for that reason I will ask you for a pseudonym at the end of the interview.

As a reminder, all questions are voluntary. If you would like to pass over a question, please indicate this and we will move on. You are also free to withdraw from this interview at any point by letting me know. Are you happy with this so far?

Can you please confirm that you have read the information letter and agree to being recorded on Dictaphone?

SET UP DICTAPHONE AND BEGIN RECORDING

I would like to emphasise that there are no right or wrong answers so please answer honestly. You do not have to answer any question you do not feel comfortable with. I also ask that you keep your phone switched off. Just to reiterate:

10 mins

- You are free to withdraw from the interview at any point if you wish to
- All data will be kept confidential and anonymised
- Do you have any questions before we start?

FAO INTERVIEWER ONLY

The questions asked in this first interview schedule have been designed to meet the objectives of the study. Each question has a potential prompt or probe that follows it in italics. Some questions also have "or" within it. This indicates that the question may not apply to the participant and this is the alternative question. When required, questions can be probed with responses like "could you please tell me a little more?".

10 mins

1. Can you please tell me what you understand Natural Green Spaces (NGS) to be?

PROMPT

Can you provide an example of an area you would regard as natural green spaces?

Can you give examples of the different types of natural green spaces you know of? Revisit this

What would you regard as Urban Green Spaces (UGS)? (i.e., parks, gardens) What do you associate with UGS? (i.e. fitness, health, spirituality, sentimental) What would you regard as Rural Green Spaces (RGS)? (i.e., moors, national parks) What do you associate with RGS? (i.e. fitness, health, spirituality, sentimental)

This about RGS do you ~~engage~~ ^{engage} with?

10 mins

2. Can you please tell me about how you engage with RGS?

If you visit RGS currently,

When do you go to RGS (i.e. occasion, weather, gatherings, routine)? How often do you visit RGS? Which spaces do you visit (in the UK)? When was the last time you visited? Which types of spaces do you visit generally? Who do you go with? Why do you choose to go with them to such spaces?

10 mins

3. What do you do when you are in RGS? What motivates you to go to these spaces?

If you do not engage with RGS currently (aimed in sedentary interviews)

Do you want to engage with RGS? What stops/prevents you from visiting RGS?

10 mins

4. Can you please explain how you currently feel towards the RGS we have discussed? (i.e. likes/dislikes)

What aspects of visiting RGS do/would you like?

What aspects of visiting RGS do/would you dislike?

10 mins

5. Do you feel connected or attached with RGS?

If yes,

How does visiting RGS make you feel? (i.e., spiritually, mentally, physically, sentimentally) What is it about RGS that makes you feel like that? Do different types of RGS make you feel differently? How does RGS make you feel in comparison to UGS?

If no,

10 mins

Why do you not feel connected/attached with RGS?

Both

What do you think the positives are of visiting/feeling connected RGS? What do you think the negatives are of feeling connected with RGS? How important is visiting RGS in your life? Why? Is it a priority for you?

6. Would you like to engage more with RGS than you do at present?

(i.e. The spaces you use now and other RGS you have not engaged with previously)

If no, why not and what challenges/ stops/ prevents you?

If yes, why would you like to engage more? where would you like to go? What challenges you or prevents you from engaging? When you face these challenges, how do you decide to go out or not to go out into RGS?

7. What would help you to engage more (in currently occupied RGS or other RGS you do not engage with)? Is there anything else you would like to share that we have not covered?

Debrief

Before we finish, I would like to thank you again for your time. Like I mentioned earlier, all references to people, including you, will remain anonymous within this interview. If you would like to withdraw from this interview you are free to do so without any explanation within 10 working days. If I do not hear back from you within 10 working days from now then I will assume you are happy with it.

5 mins

That concludes this interview, and I would like to thank you for your participation. Your contributions have been very helpful. More details about the purpose of this study and my contact details are available on the debrief sheet. If you feel distressed or uncomfortable with any aspects of the study, I encourage you to speak with services highlighted in the debrief sheet. Thank you once again for your participation."

End of interview

Appendix 16. Example of initial coding in the thematic analysis (Page 123)

The screenshot displays the NVivo software interface during the initial coding phase of a thematic analysis. The left sidebar shows the project structure, including 'Data' and 'Coding' sections. The main window shows a transcript document with highlighted text segments. A 'Select Code Items' dialog box is open, allowing the user to select codes for the highlighted text. The 'unexplain- language- limited' code is selected. The dialog box also includes a 'Create New' section with a 'Child Code' option. The background transcript text is partially visible, showing a narrative about a person's experience in Pakistan.

RAW DATA

Select Code Items

Search (CTRL+F)

Create New:

☐ Child Code

under 'New Code'

g 12.m4a 1hr 29m

[00] You could see my mountains from my mom's town and from my . But where dad's my my dad comes from is very flat. But and there is a it obviously it's always green or there's grain growing. So the fields are ur and they have so many trees and I used to spend ages on. Um. I ve been to Pakistan, but. You know the kota. And my relatives did not So why do you just stand there? Because you can see as far as. And you s and there were vultures and, you know, so many birds and nature. So d in nature and animals. And I would just watch. I would just stand there They thought I was a bit nuts. Like but I said, for you, this is your normal ese I don't think you appreciate it. Yeah, but I also don't think they t that all of this has a very positive impact on their mental health. so much greenery, so many trees. I mean, it's changed now, but now problems. So my family, I last time I went to PK was about 23 years ago. huge change in their environment. So there's more of this, you know, d houses, which are 2 to 3 storeys high. So where they used to get like ere like this. So it would be open space and you could see the sky. So at see the stars. There's a lot of fresh air, you know, and there's a the, you of the nightlife. You can hear it. It's daytime. Same thing now because concrete houses and they're built out. So there isn't as much greenery to alth has also deteriorated. But they don't make that connection. Whereas inexion so in regards tpo your study I was thinking, you know, how many ally looked at the fact that how even when they're not conscious of the w, oxygen is, you know, the trees give of oxygen or the colours are to the soul. How many of them have actually connected that thing? here they're born and they just take it for granted. But you see, my my the idea of depression and things, I thought it was something that they're not particularly familiar with. My mom and I talked about this about, you know, even though they, you know, people lost people, people have died. Um, but why isn't there like

In Codes Code to reminiscing times in pk (Codes\\Raw data)

MH 23 Items Codes: 1 References: 1 Read-Only Line: 12 Column: 5

15:57 09/03/2023

Appendix 17. Assigning initial codes to subthemes in the thematic analysis (Page 123)

The screenshot displays the NVivo software interface. On the left, the 'Quick Access' sidebar shows the 'Coding' section expanded, with 'Code Raw data' selected. The main window shows a list of codes and their assignments to subthemes. The table below represents the data shown in the interface.

Name	Files	References	Created on	Created by	Modified on	Modified by
Introducing other people to engage with RGS	0	0	19/04/2023 17:01	MH	19/04/2023 17:01	MH
○ introducing others to RGS	1	1	20/02/2023 19:59	MH	20/02/2023 19:59	MH
○ introducing others to the concept of challenge steps physical	1	1	04/03/2023 23:31	MH	04/03/2023 23:31	MH
○ being source of social capital taking others driving rgs	2	4	11/03/2023 12:56	MH	14/03/2023 14:21	MH
○ Organising or partaking in RGS activity	5	10	16/02/2023 14:07	MH	12/03/2023 18:41	MH
Seeing more SA M W in RGS would break down barriers	0	0	19/04/2023 17:02	MH	19/04/2023 17:02	MH
○ khan sab incident gave more PR for SA rep	1	1	04/03/2023 23:14	MH	04/03/2023 23:14	MH
○ No change from action	1	1	23/02/2023 11:42	MH	23/02/2023 11:42	MH
○ prefer where theres asian people mixed	1	1	13/03/2023 17:42	MH	13/03/2023 17:42	MH
○ social media help more representation	1	1	12/03/2023 19:06	MH	12/03/2023 19:06	MH
○ Spreading phenomena of wanting to visit	1	1	20/02/2023 21:02	MH	20/02/2023 21:02	MH
○ want it to be more acceptable for sa people to go	1	1	03/03/2023 17:38	MH	03/03/2023 17:38	MH
○ want rgs to be accessible for others	1	1	03/03/2023 17:36	MH	03/03/2023 17:36	MH
○ getting outside to the rgs is what matters no challenge	1	1	11/03/2023 12:32	MH	11/03/2023 12:32	MH
○ being part of walkers that go there purpose diversity	1	1	08/03/2023 16:51	MH	08/03/2023 16:51	MH
○ Needed more emphasis for SA to engage RGS	1	2	24/02/2023 12:26	MH	24/02/2023 12:28	MH
○ RGS is open space should be accessible for all	2	2	03/03/2023 17:35	MH	04/03/2023 23:16	MH
○ Want to break down barriers	2	2	23/02/2023 13:19	MH	10/03/2023 12:52	MH
○ happy with seeeing more representation	4	5	04/03/2023 23:12	MH	25/04/2023 14:20	MH
○ need more representation	6	9	23/02/2023 16:23	MH	25/04/2023 14:22	MH
○ just get out without expectations	5	10	23/02/2023 15:08	MH	14/03/2023 14:27	MH
Practically important to have the correct attire and equipment	0	0	19/04/2023 16:59	MH	19/04/2023 16:59	MH
○ Having the correct boots and attire	1	2	23/02/2023 13:49	MH	23/02/2023 16:18	MH

At the bottom of the interface, the status bar shows 'MH 105 Items'.

Appendix 18. Naming and defining the themes during thematic analysis (Page 123)

The screenshot displays the NVivo software interface. On the left is a dark blue sidebar with navigation options: Quick Access, Data (Files, File Classifications, Externals), ORGANIZE, Coding (Codes, Code Raw data, Themes, LR codes SA M W PA PE, SLR study data, SLR study data OLD, SLR study details, Relationships, Relationship Types), Cases, Notes, and Sets (Static Sets, Dynamic Sets, All Codes). The main window shows a 'Themes' table with columns: Name, Files, Reference, Created on, Created by, Modified on, and Modified by. A 'Code Properties' dialog box is open over the table, showing details for the theme 'Utilising RGS'. The dialog has a 'General' tab with fields for Name, Description, Nickname, Hierarchical name, Created on, and Modified on. The 'Description' field contains the text: 'This theme depicts how the participants would use RGS to manage their psychological wellbeing of feeling physically fit, connected to others, competent, and to manage their anxieties.' The 'Created on' field shows '11/05/2023 16:07' and the 'Modified on' field shows '12/05/2023 12:24'. The 'Color' dropdown is set to 'None'. The 'Created by' and 'Modified by' fields both show 'MH'. The 'OK' and 'Cancel' buttons are at the bottom of the dialog. The background table lists several themes, with 'Utilising RGS' highlighted in blue.

Name	Files	Reference	Created on	Created by	Modified on	Modified by
An opportunity to reset	0	0	11/05/2023 16:21	MH	12/05/2023 11:22	MH
Utilising RGS	0	0	11/05/2023 16:11	MH	12/05/2023 11:33	MH
				MH	12/05/2023 11:38	MH
				MH	12/05/2023 12:16	MH
				MH	12/05/2023 12:24	MH
				MH	12/05/2023 12:19	MH
				MH	12/05/2023 12:20	MH
				MH	12/05/2023 12:22	MH
				MH	12/05/2023 12:25	MH

Code Properties

General

Name: Utilising RGS

Description: This theme depicts how the participants would use RGS to manage their psychological wellbeing of feeling physically fit, connected to others, competent, and to manage their anxieties.

Nickname:

Hierarchical name: Codes\Code Raw data\Themes\Utilising RGS

☐ Aggregate coding from children

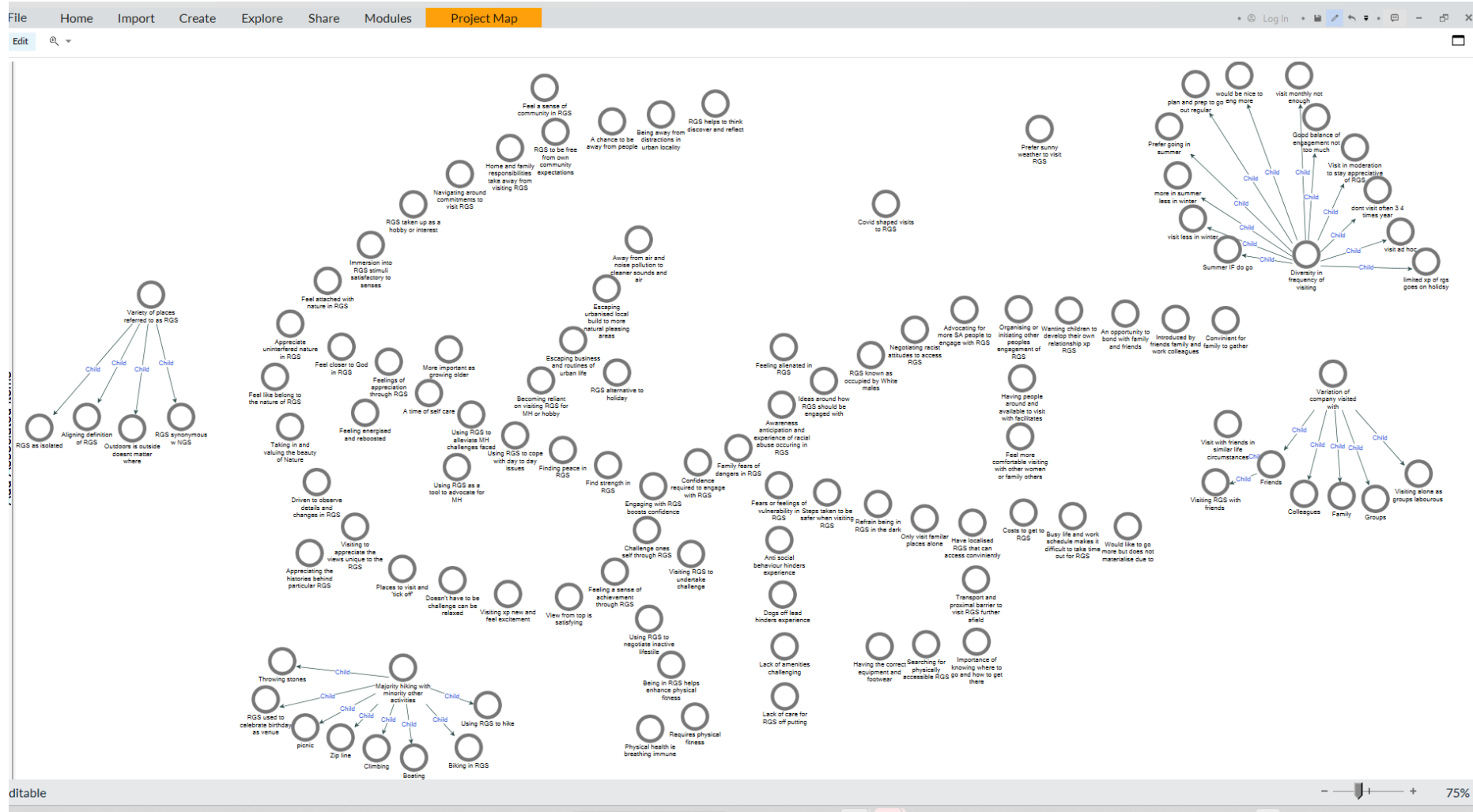
Color: None

Created on: 11/05/2023 16:07 by MH

Modified on: 12/05/2023 12:24 by MH

OK Cancel

Appendix 19. Grouping the lower ordered themes to create higher ordered themes during thematic analysis (Page 123)



Appendix 20. Participants (n = 23) contributions to each theme constructed in the thematic analysis (Page 93)

Name	Social time	Enhancing physical wellbeing	Undertaking challenge	Moments of reflection	Connecting with nature	Coping with stress	Escaping pathologies and mundanity of urban life	Commitments	Proximity, travel and cost	Infrastructure	Familiarity with RGS	Feeling vulnerable	Subordinated identities	Safety in numbers
Zara	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y
Elizah	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	N	N	Y
Safa	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y
Nergus	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y
Mehek	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Serish	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Alisha	Y	N	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y
Kulsoom	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N	N	Y
Muminah	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y
Aliyah	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	N	Y
Zoya	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y
Nosheen	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Naima	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Ayla	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	Y
Salma	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Marwah	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y

Harissa	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y	Y
Farah	N	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Nadia	N	Y	N	Y	Y	Y	Y	N	N	N	N	Y	Y	Y
Jannah	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
Imaan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Soorat	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y
Bushra	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y

Appendix 21. Moderation effects of variables on rate of engagement and psychological wellbeing (Page 192)

	Moderator Level	Direct Effect (Moderator on RoE/PWB)	p-value (Direct Effect)	Interaction Term	p-value (Interaction Term)	t-values (interaction term)
Social Relatedness	(Normal)	0.107 (0.016)	0.713	0.586 (0.092)	0.021	2.310
	(Low)	-0.088 (-0.01-3)	0.783	-1.338 (0.295)	<0.001	3.777
	(High)	0.193 (0.029)	0.508	0.006 (0.001)	0.985	0.662
Nature Connectedness	(Normal)	0.669 (0.100)	0.015	0.042 (0.006)	0.875	0.157
	(High)	0.589 (0.087)	0.044	-0.763 (-0.173)	0.055	1.919
	(Low)	0.627 (0.093)	0.024	0.753 (0.143)	0.024	2.258
Identity Visibility	(Normal)	0.202 (0.128)	<0.001	0.100 (0.068)	0.071	1.805
	(Low)	0.203 (0.129)	0.001	0.321 (0.289)	<0.001	4.472
	(High)	0.214 (0.135)	<0.001	-0.084 (-0.081)	0.240	1.176
Active Engagement	(Normal)	-0.036	0.603	0.112 (0.079)	0.046	1.994
	(Low)	-0.163 (-0.103)	0.057	0.354 (0.334)	<0.001	4.293
	(High)	0.023 (0.015)	0.732	-0.064 (0.061)	0.353	-0.928
Affective Engagement	(Normal)	0.156 (0.099)	0.017	0.022 (0.015)	0.691	0.397
	(Low)	0.169 (0.108)	0.008	0.157 (0.115)	0.006	3.961
	(High)	0.179 (0.114)	0.003	0.229 (0.167)	0.002	-2.321

Appendix 22. Survey items in the questionnaire (n = 600) (Page 176)

Screening

The initial section of this survey inquires about you, your circumstances, and your geographical area.

Please be aware that your data will be collected only upon clicking the "submit" button at the end of the survey.

Are you a South Asian Muslim female living in England and are over the age of 18?

- ☐ Yes
- ☐ No

What is your age?

What part of South Asia closest describes your heritage?

If you selected Other, please specify:

What is the first half of your postcode for your current area of residence (for example, LS22)? *Optional*

Do you live in an urban (built up concrete) area or rural (countryside, outside of a town) area?

- ☐ Urban area
- ☐ Rural area

What best describes your family circumstances?

What is your employment status?

- ☐ Unemployed
- ☐ Student
- ☐ Part time employed

- ☐ Full time employed
- ☐ Student who is also employed

What is your average total household income a month after tax (GBP)? Please note this is monthly and not annually.

Do you currently experience any physical health related disabilities (this could include mobility, hearing or vision impairments, muscle impediments, heart issues etc.) ?

- ☐ Yes
- ☐ No

How much does this physical health related disability negatively impact your every day activity (for example, cooking, going out, going shopping)?

- ☐ No impact
- ☐ Some impact
- ☐ A lot of impact
- ☐ Huge impact

Do you currently experience any mental health related disabilities (this could include anxiety, depression, mental disorder, autism etc.) ?

- ☐ Yes
- ☐ No

How much does this mental health related disability negatively impact your every day activity (for example, cooking, going out, going shopping)?

- ☐ No impact
- ☐ Some impact
- ☐ A lot of impact
- ☐ Huge impact

Were you born in the UK?

- ☐ Yes
- ☐ No

In terms of your family's immigration history, which generation best describes your connection to South Asia? Please select one of the following options:

- ☐ First Generation: I am a first-generation immigrant from South Asia.
- ☐ Second Generation: My parents immigrated from South Asia.
- ☐ Third Generation: My grandparents immigrated from South Asia.
- ☐ Fourth Generation: My great-grandparents immigrated from South Asia.
- ☐ Other

If you selected Other, please specify:

Approximately when did you move to the United Kingdom (to the closest month)?

(dd/mm/yyyy)

Is English your first language?

- ☐ Yes
- ☐ No

How often do you pray salah (namaz)?

- ☐ Never
- ☐ Sometimes
- ☐ Most of the time
- ☐ 5 times daily

Engagement with rural green spaces

Rural Green Spaces (RGS) are natural outdoor areas found outside of cities, like country parks, national parks, trails, botanical gardens, forests, woodlands, moors, rivers, meadows, farmlands, nature reserves, coastal areas and wetlands. These areas have things like plants, open land, water bodies, and wildlife and are sometimes referred to as the natural environment, or the outdoors. When we talk about RGS in this survey, we mean places like these. When you answer questions about your experiences with rural green spaces, think about these types of places.

On average, how often do you usually visit rural green spaces (e.g., country parks, national parks, trails, botanical gardens, forests, woodlands, moors, rivers, meadows, farmlands, nature reserves, coastal areas and wetlands)?

☐ I do not visit rural green spaces ever

☐ Rarely (1-3 times per year)

☐ Occasionally (every 3-6 months)

☐ Sometimes (once per every two months)

☐ Regularly (1-3 times per month)

☐ Very regularly (once a week)

☐ All the time (more than once per week)

How many times have you visited an rural green space in the past month (select the answer that best fits)?

☐ 0 visits (No visit in the past month)

☐ 1 visit

☐ 2 to 3 visits

☐ 4 to 5 visits

☐ 6 to 7 visits

☐ 8 to 9 visits

☐ 10 or more visits (2 to 3 times a week or more)

Please select how often you visit each of these types of rural green spaces (select the answer that best fits).

Please don't select more than 1 answer(s) per row.

Please select at least 10 answer(s).

	I have never visited this type of rural green space	Less than once a year	Once or twice a year	2-3 times a year	Once a month	2-3 times a month	Once a week or more
Countrysides, farmlands, and rural landscapes (e.g., Lake District in Cumbria, The Peak District in Derbyshire, The Cotswolds in Gloucestershire)	☐	☐	☐	☐	☐	☐	☐
National Park and protected natural areas (e.g., Northumberland National Park, The Brecon Beacons, South Downs National Park)	☐	☐	☐	☐	☐	☐	☐

Moorlands, heaths, or open upland areas Visits (e.g., Yorkshire Dales, Cannock Chase, Dartmoor)	☐	☐	☐	☐	☐	☐	☐
Forest and Woodland Visits (e.g., Kielder Forest, Sherwood Forest, New Forest)	☐	☐	☐	☐	☐	☐	☐
riversides, lakesides, or other waterfront areas (e.g., Lake Windermere, River Severn, River Thames)	☐	☐	☐	☐	☐	☐	☐
Botanical gardens, arboretums, or cultivated green spaces (e.g., The Alnwick Garden, Birmingham Botanical Gardens, Kew Gardens)	☐	☐	☐	☐	☐	☐	☐
Nature reserves and protected wildlife areas (e.g., Farnham Islands, Attenborough Nature Reserve, Rye Harbour Nature Reserve)	☐	☐	☐	☐	☐	☐	☐
Coastal areas, including beaches and seaside locations (e.g., Scarborough Beach, Blackpool Beach, Brighton Beach)	☐	☐	☐	☐	☐	☐	☐
Wetlands, swamps, or marshes (e.g., Lindisfarne National Nature Reserve, Brandon Marsh, Pagham Harbour)	☐	☐	☐	☐	☐	☐	☐
Mountainous Areas (e.g., The Yorkshire Peaks Highlands, The Pennines, The South Downs)	☐	☐	☐	☐	☐	☐	☐

How long, on average, do you stay in rural green spaces during your visits usually?

- ☐ Less than 30 minutes
- ☐ 30 minutes to 1 hour
- ☐ 1 to 2 hours
- ☐ 2 to 3 hours
- ☐ 3 to 4 hours
- ☐ 4 to 6 hours
- ☐ More than 6 hours

Activity during visits

Please rate how often you conduct the physical activities below when you visit RGS (Rural Green Spaces).

Please don't select more than 1 answer(s) per row.

Please select at least 7 answer(s).

	Never	Occasionally	Half the time	Most of the time	All of the time
Brisk walking (e.g., walking quickly)	☐	☐	☐	☐	☐
Jogging (e.g., running around a trail)	☐	☐	☐	☐	☐
Outdoor sports (e.g., football, frisbee, active games)	☐	☐	☐	☐	☐
Adventurous activities (e.g., rock climbing, trail running, mountain biking)	☐	☐	☐	☐	☐
Exercise (e.g., exercise routines, yoga sessions or bodyweight exercises)	☐	☐	☐	☐	☐
Gardening (e.g., planting plants, maintaining nature)	☐	☐	☐	☐	☐
Physically demanding tasks (e.g., chopping wood, maintaining a trail, or splitting wood for a fire)	☐	☐	☐	☐	☐

Please rate how often you engage in mental health activities as stated below when you visit RGS.

Please don't select more than 1 answer(s) per row.

Please select at least 6 answer(s).

	Never	Occasionally	Half the time	Most of the time	All of the time
Reminiscing about pleasant memories (e.g., thinking about cherished memories, like a special family vacation)	☐	☐	☐	☐	☐
Mindful reflection (e.g., thinking, or pondering about a goal, situation, challenges faced).	☐	☐	☐	☐	☐
Meditation (e.g., focusing on your breath, noticing sounds around you, or simply being aware of your surroundings to create a calm and centered state of mind)	☐	☐	☐	☐	☐
Activities for emotion regulation (e.g., deep breathing exercises, gentle stretches, or writing in a journal to manage your emotions)	☐	☐	☐	☐	☐

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Seeking solace (e.g., seeking solitude after facing difficulty in life through observing the strength of nature)	☐	☐	☐	☐	☐
Seeking calm (e.g., seeking moments quiet, listening to the rustling leaves)	☐	☐	☐	☐	☐

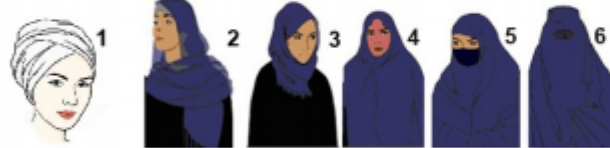
Identity in rural green spaces

Please answer the following questions about your experiences in rural green spaces. If you have never visited rural green spaces, please select the answers that best represent your experiences when you're outdoors or in public environments.

How frequently do you wear an Islamic headscarf (e.g., hijab, chador, burqa, etc.) when visiting RGS?

- ☐ Never
- ☐ Rarely
- ☐ Occasionally
- ☐ Sometimes
- ☐ Half the time
- ☐ Most of the time
- ☐ All of the time

Which of the following picture is closest to what you usually wear as an Islamic headscarf when visiting Rural Green Spaces (e.g., hijab, chador, burqa, etc)? If you do not wear an Islamic headscarf when visiting RGS please click "0" no covering. If you do not visit Rural Green Spaces, please select what you normally wear.



- ☐ 0- No covering
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6- Niqab/full veil

Please indicate the extent to which you agree or disagree with the following statements regarding your experiences and perceptions when visiting rural green spaces.

Please don't select more than 1 answer(s) per row.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
I wear loose clothing when I visit rural green spaces.	☐	☐	☐	☐	☐	☐	☐
My clothing is modest when I visit rural green spaces.	☐	☐	☐	☐	☐	☐	☐

My South Asian background is apparent in my appearance.	☐	☐	☐	☐	☐	☐	☐
My South Asian Muslim female identity is noticeable to others in rural green spaces.	☐	☐	☐	☐	☐	☐	☐
People are inquisitive or curious about my attire or cultural practices in rural green spaces.	☐	☐	☐	☐	☐	☐	☐
I often engage with others who look similar to me when visiting rural green spaces.	☐	☐	☐	☐	☐	☐	☐
I often feel different or out of place in these environments.	☐	☐	☐	☐	☐	☐	☐

Access to rural green spaces

In the following set of questions, we would like to understand your perceptions regarding access to Rural Green Spaces (RGS). There are no right or wrong answers; we are interested in your personal viewpoints. Please consider your own experiences and feelings when responding.

How would you rate your overall ease of access to Rural Green Spaces?

- ☐ Very easy
- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Extremely difficult

Do you own a private vehicle?

- ☐ Yes
- ☐ No

How would you describe the travel distance from your house to Rural Green Spaces?

- ☐ Very close
- ☐ Close
- ☐ Moderate
- ☐ Far
- ☐ Very far

How long would you estimate it would take you to your nearest Rural Green Space using your common method in minutes?

 More info

Please indicate your level of agreement with the following statements about safety when visiting rural green spaces

Please don't select more than 1 answer(s) per row.

Please select at least 6 answer(s).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I am concerned about my personal safety when traveling to Rural Green Spaces.	☐	☐	☐	☐	☐

I feel unsafe when visiting Rural Green Spaces.	☐	☐	☐	☐	☐
There are people participating in illegal activities around Rural Green Spaces.	☐	☐	☐	☐	☐
Rural Green Spaces are considered dangerous at night.	☐	☐	☐	☐	☐
Dangerous people are frequent in Rural Green Spaces.	☐	☐	☐	☐	☐
Rural Green Spaces are regularly patrolled.	☐	☐	☐	☐	☐

Please indicate your level of agreement with the following statements about the availability of rural green spaces

Please don't select more than 1 answer(s) per row.

Please select at least 8 answer(s).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
There are sufficient RGS around my neighbourhood	☐	☐	☐	☐	☐
Rural Green Spaces are close to where I live	☐	☐	☐	☐	☐
I can easily walk to RGS.	☐	☐	☐	☐	☐
The walk to RGS is a pleasant experience.	☐	☐	☐	☐	☐
I know where Rural Green Spaces are located and how to get there.	☐	☐	☐	☐	☐
I have good knowledge of the activities and programs held in Rural Green Spaces.	☐	☐	☐	☐	☐
I know how to participate in activities at Rural Green Spaces.	☐	☐	☐	☐	☐
I have good knowledge of changes to activities and programs held in Rural Green Spaces.	☐	☐	☐	☐	☐

Please indicate your level of agreement with the following statements about the social and personal factors of your visits to rural green spaces

Please don't select more than 1 answer(s) per row.

Please select at least 5 answer(s).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I have companions to visit RGS with.	☐	☐	☐	☐	☐

The RGS I have access to attract a variety of visitors from diverse backgrounds (for example, people of different religions and backgrounds are welcome in RGS)	☐	☐	☐	☐	☐
I have a good work-life balance, and I have enough leisure time to visit Rural Green Spaces if I want.	☐	☐	☐	☐	☐
I prefer outdoor activities to staying indoors, and outdoor exercise is an important part of my life.	☐	☐	☐	☐	☐
Visiting and using Rural Green Spaces is an affordable activity.	☐	☐	☐	☐	☐

How would you rate your general health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

Nature

Please answer each of these questions in terms of the way you generally feel (not just when you visit RGS). There are no right or wrong answers. Using the following scale, in the space provided next to each question simply state as honestly and candidly as you can what you are presently experiencing.

Connection with Natural World: Rate from 1 (Strongly Disagree) to 5 (Strongly Agree):

Please don't select more than 1 answer(s) per row.

Please select at least 14 answer(s).

	1 (Strongly agree)	2 (Agree)	3 (Neither agree nor disagree)	4 (Disagree)	5 (Strongly disagree)
I often feel a sense of oneness with the natural world around me.	☐	☐	☐	☐	☐
I think of the natural world as a community to which I belong.	☐	☐	☐	☐	☐
I recognize and appreciate the intelligence of other living organisms.	☐	☐	☐	☐	☐
I often feel disconnected from nature.	☐	☐	☐	☐	☐
When I think of my life, I imagine myself to be part of a larger cyclical process of living.	☐	☐	☐	☐	☐
I often feel a kinship with animals and plants.	☐	☐	☐	☐	☐
I feel as though I belong to the Earth as equally as it belongs to me.	☐	☐	☐	☐	☐
I have a deep understanding of how my actions affect the natural world.	☐	☐	☐	☐	☐
I often feel part of the web of life.	☐	☐	☐	☐	☐
I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'.	☐	☐	☐	☐	☐
Like a tree can be part of a forest, I feel embedded within the broader natural world.	☐	☐	☐	☐	☐
When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.	☐	☐	☐	☐	☐
I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees.	☐	☐	☐	☐	☐

My personal welfare is independent of the welfare of the natural world.	☐	☐	☐	☐	☐

The following survey items explore your social connections, both within your family and among your friends. Please answer these questions honestly, considering the people with whom you have various levels of connection and communication. Remember, there are no right or wrong answers.

How many relatives do you see or hear from at least once a month?

How many relatives do you feel at ease with that you can talk about private matters?

How many relatives do you feel close to such that you could call on them for help?

How many of your friends do you see or hear from at least once a month?

How many friends do you feel at ease with that you can talk about private matters?

How many friends do you feel close to such that you could call on them for help?

Wellbeing

Please rate the following statements based on your experiences and feelings in general. Use a scale from 0 to 10, where 0 means 'never' or 'not at all,' and 10 means 'always' or 'completely.' Your honest responses will help us understand your well-being and experiences better.

Rate each item from 0 to 10. 0 = Never, 10 = Always

Please don't select more than 1 answer(s) per row.

Please select at least 5 answer(s).

	0= Never	1	2	3	4	5	6	7	8	9	10= Always
How much of the time do you feel you are making progress towards accomplishing your goals?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How often do you become absorbed in what you are doing?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, how often do you feel joyful?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, how often do you feel anxious?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How often do you achieve the important goals you have set for yourself?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10. 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 5 answer(s).

	0= Not at all	1	2	3	4	5	6	7	8	9	10= Completely

In general, to what extent do you lead a purposeful and meaningful life?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
To what extent do you receive help and support from others when you need it?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, to what extent do you feel excited and interested in things?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How lonely do you feel in your daily life?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10. 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	0= Not at all	1	2	3	4	5	6	7	8	9	10= Completely
How satisfied are you with your current physical health?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10. 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 5 answer(s).

	0= Never	1	2	3	4	5	6	7	8	9	10= Always

In general, how often do you feel positive?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, how often do you feel angry?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How often are you able to handle your responsibilities?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, how often do you feel sad?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How often do you lose track of time while doing something you enjoy?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10: 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	0= Terrible	1	2	3	4	5	6	7	8	9	10= Excellent
Compared to others of your same age and sex, how is your health?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10: 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 4 answer(s).

	0= Not at all	1	2	3	4	5	6	7	8	9	10= Completely
To what extent do you feel loved?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
To what extent do you generally feel you have a sense of direction in your life?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

How satisfied are you with your personal relationships?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In general, to what extent do you feel contented?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Rate each item from 0 to 10. 0= Never, 10 =Always

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	0= Not at all	1	2	3	4	5	6	7	8	9	10= Completely
Taking all things together, how happy would you say you are?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Key for selection options

7.b - What part of South Asia closest describes your heritage?

Afghanistan
 Bangladesh
 Bhutan
 India
 Nepal
 Pakistan
 Sri Lanka
 Other

9 - What best describes your family circumstances?

Single, no children
 Single, with children
 Married/In a relationship, no children
 Married/In a relationship, with children
 Divorced/Separated/Widowed, no children
 Divorced/Separated/Widowed, with children
 Prefer not to say

30 - How many relatives do you see or hear from at least once a month?

None
 One
 Two
 Three
 Four
 Five
 Eight
 Nine or more

31 - How many of your friends do you see or hear from at least once a month?

None
 One
 Two
 Three
 Four
 Five
 Eight
 Nine or more