What is the impact of using *thedesk* on the wellbeing and psychological distress of undergraduate students? A systematic case series.

Daisy Walton-Ellis

Submitted in accordance with the requirements for the degree of
Doctor of Clinical Psychology (D. Clin. Psychol.)

The University of Leeds

School of Medicine

Academic Unit of Psychiatry and Behavioural Sciences

August, 2019

The candidate confirms that the work submitted is his/her own and that appropriate credit has been given where reference has been made to the work of others.

Acknowledgements

Firstly, I would like to thank my amazing supervisors Bridgette, Ciara and Helen. Your support and guidance has been absolutely invaluable during this process and I can honestly say that I would never have been able to complete this project without it. The wisdom and humour that you have brought to our supervision sessions meant that they were both extremely informative and surprisingly fun. Thank you.

I would like to thank my wonderful parents, who taught me the importance of love, kindness, humour, believing in myself and proper punctuation. Without you, I never would have had the courage to start this journey, nor the fortitude to complete it. I thank you from the bottom of my heart for all you have done for me over the years. You have made me who I am today, and I can only offer my sincere apologies if any rogue semicolons have somehow managed to find their way into the final document.

To my husband, I also owe my deepest thanks, appreciation and gratitude. Thank you for the endless love, care, and much needed laughs and cups of tea you have provided. You have not only supported me throughout this long process, but you have also married me during it. For this I will always be extremely grateful, if slightly surprised and confused.

I would also like to thank my brilliant sister, we have such a great relationship and I am so lucky to have you. In addition to being an amazing sister and friend, you have offered me so much support with this thesis and with planning a wedding. I have relied on this support so much, and you have been instrumental in helping me to survive and even enjoy this past year. I am so thankful for you and I definitely owe you one.

Finally, I would like to thank all my family and friends. I appreciate you all so much and am so fortunate to have such amazing people in my life. I can’t wait to see more of you all now this is done!

Abstract

Students are at greater risk of compromised wellbeing and elevated levels of psychological distress when compared with their non-student peers. They are also less likely to seek help. Web-based interventions may be able to support students to improve their wellbeing. This thesis was undertaken in order to investigate the impact of one such web-based intervention, *thedesk*, on students' levels of wellbeing and psychological distress. The project used a mixed-methods, systematic case series design. Nine participants completed the study. They were asked to use *thedesk* for six weeks whilst completing measures of their wellbeing, psychological distress, coping style and general self-efficacy, and were later interviewed about their experiences of using *thedesk*. The results indicated that *thedesk* had a positive impact on two of the participants' levels of wellbeing and psychological distress. None of the participants displayed improvements in their coping style or levels of self-efficacy. Usage data showed that many of the participants' engagement with *thedesk* during the study was low. During the interviews, participants gave both positive and constructive feedback about *thedesk*. They reported thinking that a web-based intervention designed for students was a good idea, that the content was helpful and appropriate for a student population, but that more content should be added to *thedesk* and it would benefit from being updated in several ways. The results indicate that students are receptive to web-based interventions, but that further research should be conducted to determine how to make these interventions as engaging and helpful as possible.

Table of Contents

List of Figures

List of Tables

INTRODUCTION

1.1 Chapter summary

This introduction chapter will provide an overview of the literature on student mental health. First, the concepts of mental illness, mental health problems and psychological distress will be defined and described. The research on mental health problems and psychological distress amongst students, along with proposed explanations for the increased rates amongst the student population will then be presented. Subsequently, research on improving the mental health of students will be discussed. This section will focus on traditional, face to face methods first, and go on to outline the existing research on web-based interventions designed for students. The structure and function of *thedesk*, the existing research examining its efficacy and the gaps in this literature will then be presented. Finally, the aims and research questions of the current study are described.

1.2 Student mental health: An issue that needs addressing

1.2.1 Mental illness, mental health, psychological distress and psychological wellbeing

The terms mental illness, mental health and psychological distress are often used interchangeably, both in general conversation and within the research literature. To aid the understanding of the literature on student mental health, it is important that these terms are described and defined. Mental illness is used to describe specific, diagnosable issues that fit with diagnostic criteria described in the ICD-10 (World Health Organization 1992) or DSM-5 American Psychiatric Association (2013). An individual would need to be seen by a medical or mental health professional to be formally diagnosed with a mental illness. Mental illnesses exist on a continuum of severity and prevalence, with more severe and enduring illnesses such as schizophrenia on one end of the spectrum, and more commonly experienced problems such as depressive and anxiety disorders at the other. Mental health has been defined as “A state of successful performance of mental function, resulting in productive activities, fulfilling relationships with people, and the ability to adapt to change and to cope with adversity” (U.S Public Health Service, 1999. p. 4). Mental health refers to something experienced by us all, as everyone will experience fluctuations in their mental health over the course of their lives.

Psychological distress has been characterised as a state of emotional suffering which is associated with symptoms of depression, such as feeling sad or a experiencing lack of enjoyment, and symptoms of anxiety, such as feeling tense (Mirowsky and Ross, 2002). Psychological distress is a necessary component of many mental illnesses, but is not, on its own, a diagnosable mental health issue. Instead, psychological distress is conceptualised as a normal response to life's difficulties, and levels of distress will ebb and flow within the lifetime of an average person (Drapeau, Merchand, Beaulieu–Prévost, 2010). In contrast to mental illnesses, which need to be diagnosed by a medical or mental health professional, psychological distress can be self-identified, or identified through self-report measures. Although individuals will experience varying levels of distress throughout their lifetimes, heightened levels of psychological distress can be a cause for concern. Although depression, anxiety and psychological distress are distinct, they are not independent from each other (Payton, 2009), and psychological distress has been shown to negatively impact functioning in students (Hunley, 2010). The World Health Organisation defines wellbeing as "A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organisation, 2014). Psychological wellbeing is therefore conceptualised as a construct which is related to but distinct from psychological distress and mental illness. There are two perspectives on psychological wellbeing: the hedonic perspective and the eudemonic perspective (Tennant et al. 2007). A hedonic perspective of wellbeing focusses on happiness, enjoyment and life satisfaction, whereas an eudemonic perspective focusses on meaning, functioning and self-actualisation (Ryan & Deci, 2001).

1.1.2 Mental health problems in students

The proportion of people who attend university in the UK is increasing. In 2018, 27.9% of 18 year olds in England were accepted onto a university course, which was the highest percentage yet (UCAS, 2018). Three quarters of adults experiencing a mental illness experienced the first onset of the disorder before they turned 25 (Kessler & Wang, 2008), and the current cohort of young adults are more likely to experience common mental health problems than previous generations (Stansfeld et al. 2016). A growing number of students in the UK are therefore affected by mental illness (Thorley, 2017).

There is a lack of large scale, epidemiological research on the rates of mental illness amongst UK students. One review used rates of disclosures of mental illness to universities as a proxy for the rates of mental illness within the student population (Thorley, 2017). They found a five-fold increase in the number of UK-domiciled first year students who disclosed a mental illness to their universities between the academic

years of 2006/7 and 2015/17. Students' levels of anxiety and depression were assessed one month before they started university and at the midpoint of their second year (Andrews & Wilding, 2004). Of the students who were below clinical cut off at the baseline assessment, 9% had developed clinically elevated symptoms of depression and 20% clinically elevated symptoms of anxiety at the second measurement.

1.2.3 Psychological distress in students

Research on psychological distress and wellbeing in students has consistently shown that university students at greater risk of compromised psychological wellbeing than their non-student peers (See Royal College of Psychiatrists, 2011 for a review). A study assessing undergraduate students at four UK universities (Bewick, Gill, Mulhearn, Barkham, & Hill, 2008) found that 29% of students displayed elevated distress as measured by the CORE-10 questionnaire, and that 2.7% of the sample displayed severe levels of distress. More recently, a 2016 YouGov poll of 1061 students found that 63% reported experiencing high levels of stress which interfered with their daily lives (Aronin & Smith, 2016). In an Australian sample, university students were found to have statistically significant higher rates of elevated distress when compared with their age-matched peers (Stallman, 2010).

There is evidence that something particular about attending university causes elevated levels of psychological distress. Using data from the UNIversity Quality of Life and Learning (UNIQoLL) data set, Cooke, Bewick, Barkham, Bradley and Audin (2007) compared data from 4,699 students at a UK university at four different time points. One measurement was taken before the participants had started university and three were taken during their first year of study. The mean levels of psychological distress, as measured by the GP-CORE, was significantly higher after the participants had started university. Data from the UNIQoLL data set has also been analysed longitudinally Bewick, Koutsopoulou, Miles, Slaa and Barkham (2010). The data from 1,591 students showed a statistically significant increase in students' levels of psychological distress between pre-registration and the end of the first term. Participants' levels of psychological distress improved slightly by the end of the second term, but remained higher than pre-registration levels. In addition, Bewick et al. (2010) found that the mean levels of psychological distress were higher than pre-registration levels during all three years of study.

1.2.4 Current explanations for increased distress and reduced wellbeing amongst the student population

It has been shown that students' levels of psychological distress are elevated during their time at university, leading to the conclusion that there are factors associated with

the university experience which contribute to elevated levels of psychological distress. A systematic review on the topic of students' stress identified four stressors which are consistently cited in the literature: transition to university, study related stressors, examination stress, and financial pressures (Robotham & Julian, 2006). The research related to each of these stressors will now be discussed.

1.2.4.1 External Stressors

Transitions to university

Universities place a set of new demands on their students, and the transition from home to university is recognised as a stressful experience for many students (Wilson, Mcintyre, Quinn, Buchan, & Tinklin, 2006). A student's transition into university predicts their future academic attainment and university satisfaction (Cook, Rushton & Macintosh, 2006), so it is important that the factors which predict a successful transition are understood. A systematic review of the literature on the experience of the first year of university (Harvey, Drew, & Smith, 2006) found that the following factors were important predictors of a successful transition into university: "personal goal setting and motivation; family, friends (external); paid work and financial situation; higher education-based peer support and friendship groups; institutional habitus (discourse, rules, norms); student understanding of the institutional habitus; student's cultural capital; prior information and choices; expectations; satisfaction; teaching and learning process and engagement with teachers; assessment and discussion of progress." (p. 107.)

Successful graduation is predicted by both social and academic integration with the university. Tinto's (1975) theory of social and academic integration has "near paradigmatic status" in the study of predictors of successful transition to university life and drop out, (Davidson & Wilson, 2013. P. 330). For many students in the UK, attending university can involve moving to a new place, away from previous providers of social support. These students must form new friendships in order to replace the social groups they have left behind. Lack of social support has been consistently shown to be associated with poorer mental health and greater risk for developing symptoms of depression and anxiety in students (Hefner & Eisenburg, 2009; Reid, Holt, Bowman, Espelage, & Green, 2016; Rubin, Evans, & Wilkinson, 2016; Wilson et al. 2014). Students asked to write about factors which had helped and hindered their transitions to university life discussed the importance of social support in helping their transition to university, and isolation and loneliness as factors which had made the process more difficult (Hughes and Smail, 2015). These findings indicate that the transition away

from established social networks may be a causal factor in the heightened levels of psychological distress amongst students. As well as the possibility that a lack of social support causes distress, the association could also be due to students experiencing higher levels of distress and then finding it more difficult to establish friendships, or being less able to seek social interaction (Blanco & Barnet 2014).

Study related stressors

As theorised by Tinto (1975), in addition to the pressures of creating a new social group, students must simultaneously develop their academic and time management skills in order to cope with the increased academic demands and different teaching styles of universities. These two challenges place conflicting demands on new students, who must organise their time effectively in order to keep up with their academic studies, as well as meet new people, engage in social activities and form new friendships. A review of student adjustment (Harvey et al., 2006) found that students adjusted to university life more quickly if they were able to understand the prominent academic discourse of their institution, and felt that they fit in with this discourse. Greater academic integration, supportive interaction with academic staff and access to educational resources were also predictors of adjustment to university.

Harvey et al (2006) also found that greater academic integration, through supportive interaction with academic staff and access to educational resources, enhanced adjustment to university. Due to the increase in people attending university, obtaining a degree no longer guarantees obtaining employment (Department for Education, 2016). This means students are likely to feel under greater pressure to achieve high grades. A quote from a first year student in a qualitative study on transition to university illustrates the conflict between the performing socially and academically "*Focusing just on schoolwork, you don't have the social life. And then if you throw yourself into the social life, then you go down. It's horrible, and then you feel you're going to disappoint everybody that you came up here for. And you're gonna disappoint yourself and it's just a tailspin. So . . . if you don't have the balance, I think it drives people insane. It drives me insane."* (Yazedjian, Toews, Sevin, & Purswell, 2008. p. 151).

Developmental transitions: Emerging adulthood

In addition to the social and academic adjustment faced by students starting university, the majority of students attend university during a more general time of transition. This is the transition between adolescence and adulthood, a stage labelled by Arnott (2000) as one of emerging adulthood. He argues that within post-industrialised societies people are experiencing marriage and parenthood later, and that the late teens and early twenties are no longer an age in which people settle into adult roles, but mark a period

of "*frequent change and exploration*" (p. 469). Erikson (1968) defined the tasks for adolescence as developing a sense of mastery, identity and intimacy and the psychosocial crisis as one of intimacy versus isolation. More recently, these tasks have been expanded on to include shifts in relationships with parents, the exploring of new roles, experiencing intimate relationships, the development of identity, planning one's future and developing the necessary skills for transition into adulthood (Eccles, Templeton, Barber & Stone, 2003). Therefore, as well as managing the tasks associated with transitioning to university life, most university students are also undergoing a more general psychosocial transition into the role of adulthood, which may make these challenges all the more difficult.

Examination stress

Examinations are widely recognised to be a source of stress for students (Robotham & Julian, 2006). Up to 30% of students report experiencing debilitating stress levels during the exam period, which can hinder their ability to complete the necessary work and preparation required to reach their full potential (Scott, 2000). Stress levels in students have been shown to decrease after they have sat their first exam, suggesting that the heightened levels of stress may be due to anticipatory anxiety rather than the stress of the exams themselves (Gadzella, Masten & Stacks, 1998). Exam stress has been associated with poorer academic performance (Ng, Koh & Chia, 2003) and elevated rates of depression (Gilbert et al. 1996). In healthy female undergraduates, blood sample testing showed oxidative damage in both protein and lipid cells after the exam period (Nakhaee, Shahabizadeh & Erfani, 2013). Oxidative damage is a hypothesised underlying mechanism of chronic anxiety and stress, so this finding suggests that, at the cellular level, the effects of exam stress are similar to the effects of chronic stress.

Financial pressures

For many students, attending university is associated with financial pressures and difficulties. Students at universities in the UK now face the additional burden of tuition fees. For UK home students, fees cost up to £9, 250 per year and will accumulate into an average student debt which is the highest in the English-speaking world (Coughlan, 2016). Bursaries and grants to help students from lower income families have also largely been replaced with student loans, which have to be repaid. Many students are unlikely to succeed in paying off their student debt within their lifetimes (Warrell, 2017). There has been a rise of 28% in students seeking support from university counselling services coinciding with the rise in tuition fees. It has been argued by the UK mental health charity Mind, that this shows that the rise in tuition fees is having a

direct effect on the mental health of students (Gani, 2016). This is consistent with the finding that higher levels of debt and financial pressures are associated with significantly higher levels of psychological distress amongst students (Cooke, Barkham, Audin, Bradley & Davy, 2004).

As well as the knowledge that attending university will, for most UK students, result in large amounts of debt, the majority of students must live on student loans which amount to far less than the average wage. Several studies have shown that mental health problems in the student population are linked with financial problems (Andrews & Wilding, 2004; Roberts et al. 2000). A longitudinal study measuring psychological distress, depression, anxiety, family affluence, and financial stress found that financial difficulties predicted levels of depression and stress at a cross-sectional level , and were longitudinal predictors of anxiety, psychological distress and alcohol dependence (Richardson, Elliott, Roberts, & Jansen, 2016).

1.2.4.2 Internal Processes

Levels of psychological distress and wellbeing are associated with internal, person specific processes as well as with external stressors. Coping style and self-efficacy have been shown to be particularly important internal process related to wellbeing within the student population, and are discussed in turn below.

Coping style and wellbeing

Coping has been defined as "Constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 184). Coping style is associated with levels of psychological distress and the risk of developing a mental health problem (Aldao, Nolen-Hoeksema, & Schweizer, 2010). In the student population, the use of maladaptive coping strategies has been shown to be a main predictor of depression, anxiety and stress (Mahmoud, Staten, Hall & Lennie 2012). In the literature, distinctions are made between different types of coping. Coping strategies can be divided into two broad types: problem- focused coping and emotion-focused coping (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Problem-focused coping includes strategies that attempt to change the stressor itself, such as seeking information from others and problem solving, whereas emotion-focused coping strategies, such as crying or venting, are attempts to modify emotional reactions to the stressor.

Although coping strategies can be broadly divided into the categories of emotion focused and problem focused, there have been issues with this conceptualisation. The

results of a factor analysis of 400 coping responses derived from various coping measures led to the conclusion that this distinction should no longer be used (Skinner, Edge, Altman & Sherwood, 2003). Amirkhan (1990) sought to develop his own, empirically derived classification of coping strategies, which did not succumb to the pitfalls of the taxonomies that had been developed in the past. Three rounds of factor analysis were conducted on a list of coping responses using a total of 2100 participants. This resulted in a taxonomy of coping containing three categories: problem solving, social support seeking and avoidance. The correlates between these three types of coping and psychological wellbeing will now be discussed.

Problem solving coping refers to attempts to solve or change the problem which is causing distress. Accurate appraisal is important for the successful use of problem-solving coping. For problem solving coping to be effective, an individual must have correctly appraised a stressor as amenable to change (Folkman, 2013). The example of coping with the stress of an upcoming exam versus coping with the stress of waiting for the results of the exam illustrates this. Problem solving coping is likely to be effective in dealing with the stress of an upcoming exam, as it is likely to involve preparation and revision. When waiting for the results, however, using a problem solving approach would not be likely to be effective, as actions cannot change the nature of the stressor (Folkman, 2013). The use of problem solving coping has been associated with positive outcomes in the student population. Greater use of problem solving coping strategies is associated with lower rates of mental health problems, higher life satisfaction and better academic adjustment (MacCann, Lipnevich, Burrus, & Roberts, 2012; Zhang, Chang, Zhang, Greenberger, & Chen, 2011).

Social support seeking coping responses involve seeking social support in times of stress. A meta-analysis of research into coping responses found that women were more likely to use social support seeking as a coping strategy (Tamres, Janicki & Helgeson, 2002). There is a lack of recent research on whether the tendency to use a social support seeking style of coping is associated with positive or negative effects on psychological wellbeing and mental health, so older research will be included in this review. Social support seeking, problem focused coping and positive reinterpretation have been shown to be positively correlated. They have been labelled as a cluster of adaptive coping strategies (Scheier et al. 1986). In university students, optimism, control and self-esteem predict adjustment and performance, but this effect is mediated by social support seeking (Aspinwall &Taylor, 1992). These findings suggest that the use of social support seeking in response to stress is associated with positive outcomes. There is also much secondary evidence for the relationship between social support seeking and wellbeing, as the presence of a strong social support network has been shown to be strongly associated with better mental health. For example, in an Australian national

survey of 8841 participants, higher social connection quality was associated with lower odds of depression in the past year (Werner-Seidler, Afzali, Chapman, Sunderland, & Slade, 2017).

The third type of coping strategy labelled by Amirkhan (1990) is an avoidant coping style. This includes coping responses such as avoiding other people, sleeping a lot and trying not to think about the problem. Research has consistently shown that an avoidant coping style is associated with poorer mental health. A four year longitudinal study found that adolescents with an approach orientated coping style reported the lowest levels of depressive symptoms at the third and fourth year of the study, whereas participants with avoidant coping styles reported higher levels of depressive symptoms (Seiffge-Krenke & Lessinger, 2000). This effect was independent of gender and time. Avoidant coping has also been shown to predict post-traumatic stress symptoms in women who have experienced intimate partner violence, female survivors of assault, and survivors of motor vehicle accidents (Krause, Kaltman, Goodman, & Dutton, 2008; Pineles et al. 2011; Bryant & Harvey, 1995). Lower use of avoidant coping strategies, greater use of an approach coping style and greater seeking of social support have been shown to mediate the relationship between optimism, control, self-esteem and the adjustment to university (Aspinwall, & Taylor, 1992).

Previously, there have been interventions designed to help students develop a more healthy and helpful coping style. One such intervention is the Transforming Lives through Resilience Education, which was evaluated using a sample of 64 American university students (Steinhart & Dalbier, 2008). Coping responses were measured using the Brief Coping Orientations to Problems Experienced measure (Carver, 1997). Participants randomly allocated to the experimental condition showed statistically significant improvements in their use of avoidant and problem solving coping strategies. The authors also found statistically significant improvements in resilience, positive affect, self-esteem, depressive symptoms and stress. The impact of a mindfulness based intervention on coping styles and levels of psychological wellbeing was investigated in a sample of 288 students in a six year longitudinal study (De Vibe et al., 2018). Students allocated to the mindfulness condition had better wellbeing, problem solving and avoidant coping scores at the six year follow up. Increased problem focussed coping style predicted increases in psychological wellbeing, which is consistent with the literature on coping and wellbeing. These studies provide evidence for the efficacy of relatively low intensity interventions in helping students adopt a more adaptive coping style and improve their wellbeing.

Self-efficacy and wellbeing

The concept of self-efficacy is attributed to Albert Bandura (Bandura, 1977a). He described self-efficacy as "belief in one's capabilities to organise and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3), and asserts that this is a major predictor of people's behaviour. In the student population, high levels of self-efficacy have been shown to correlate both with academic success (Richardson, Abraham, & Bond, 2012), levels of psychological wellbeing and the quality of experience at university (Zajacova, Lynch, & Espenshade, 2005). As self-efficacy is domain specific, researchers have investigated different types of self-efficacy and their associations with academic outcomes and mental health. Social self-efficacy describes an individual's belief in their ability to form and maintain successful relationships with others. Social self-efficacy has been shown to mediate the relationship between attachment anxiety, loneliness and depression in first year students (Wei, Russel & Zakalik, 2005), and to be negatively correlated with depression in students aged 16-19 (Ahmad, Yasien, & Ahmad, 2014). Students with high social self-efficacy are more capable of identifying sources of support in times of stress (Smith & Betz, 2002) and pursuing their goals effectively (Zajacova, Lynch, & Espenshade, 2005). Emotional self-efficacy refers to a person's self-belief in their ability to manage their emotions. There is a lack of research on emotional self-efficacy within the student population (Paciello, Ghezzi, Tramontano, Barbaranelli & Fida, 2016). In the general population, high levels of emotional self-efficacy are associated with higher levels of life satisfaction and lower levels of depression (Lightsey, Maxwell, Nash, Rarey, & McKinney, 2011; Caprara, Gerbino, Paciello,Di Giunta, & Pastorelli, 2010). Academic self-efficacy refers to the belief in one's ability to regulate learning processes and take action towards satisfactory academic outcomes (Zimmerman, 2000). Academic self-efficacy is associated with better academic outcomes (Honicke & Broadbent, 2016). Students with high academic self-efficacy have higher overall satisfaction of the university experience and are less likely to interpret academic pressures as a source of stress (Chemers, Hu & Garcia, 2001).

1.3 Improving the mental health of students

1.3.1 Traditional interventions

As discussed above, current research indicates that students are at greater risk of experiencing comprised levels of wellbeing and elevated levels of psychological distress compared with their non-student peers. There has been a growing interest in improving student mental health, and there are several organisations who report to and advise the

government on the issue. In 2015, Universities UK summarised the key recent developments and pieces of policy and strategy in the area of student mental health, and created a good practice guide for universities to promote positive mental wellbeing amongst their students. Their recommendations included for universities to collaborate with student unions and students with lived experiences of mental health problems when developing and implementing mental health policies. They also advised universities to consider making training on mental health awareness available for all of their staff; for student counselling services to be adequately resourced; and the capacity of the services regularly being assessed in relation to the demand. Research relating to student counselling services is discussed in more detail below.

A report by the Royal College of Psychiatrists (2011) concluded that the needs of students experiencing elevated levels of psychological distress and common mental health problems are best met within student counselling services (Royal College of Psychiatrists, 2011). Students experiencing a diagnosable mental illness should receive the appropriate support through NHS services, and services need to work flexibly and collaboratively to meet the needs of students who relocate between their family home and university locations several times a year (Royal College of Psychiatrists, 2011). Data collected from seven student counselling services and 846 service users showed that pre to post therapy effect sizes ranging from 1.34 to 2.04 (Connell, Barkham & Mellor-Clarke, 2008). Approximately half of the service users demonstrated both reliable and clinically significant change as measured by the CORE-OM, and 71% demonstrated reliable change. A more recent study evaluating the effectiveness of student counselling services found similar results. Of the 117 service users included in the analysis, 67% demonstrated reliable change as measured by the CORE-OM and 40% demonstrated clinically significant change (McKenzie, Murray, Murray, & Richelieu, 2015).

Although research evidence suggests that student counselling services produce acceptable outcomes for the students they serve, the growing demand for counselling from students and the challenges that this causes for services has been widely documented. A survey of 113 student counselling services found that the levels of service demand increased over the three year period studied (Broglia, Millings & Barkham, 2018). Due to the rise in demand, student counselling services have been searching for innovative ways of designing their service pathways in order to best meet the needs of the students seeking help (Randall & Bewick, 2016). Seventy-one percent of the student counselling services surveyed reported using or being interested in using alternative types of support (Broglia et al, 2018). The majority of students experiencing psychological distress do not seek formal support. If they did, the demand would be even greater and existing services would be completely overwhelmed (Stallman &

Kavanagh, 2016). Therefore, alternative sources of support must be provided in order to help the many students who are struggling, but do not seek or are unable to access traditional support.

1.3.2 eHealth: An emerging area

Web-based interventions are one means of providing support to those unwilling or unable to access traditional treatment for their mental health. There is also evidence to suggest that younger individuals who have accessed higher levels of education are more likely to prefer a web-based intervention over face-to-face sources of support (Batterham & Calear, 2017). Web-based interventions have existed for the last twenty years, but it is more recently that they have been accepted into the mainstream. In the last decade there has been an eruption of published literature on the topic (Cunningham, Gulliver, Farrer, Bennett, & Carron-Arthur, 2014). In order to determine the extent of the use of web-based interventions by mental health services in England, freedom of information requests were sent to all mental health NHS trusts and IAPT service providers (Bennion, Hardy, Moore, & Millings, 2017). Of those who responded, 88.5% of the IAPT services and 76.5% of the NHS mental health trusts recommended web-based interventions to their service users or used to them to help deliver treatments. There was high variability in the programmes recommended by different services, with 13 different web-based apps and 35 different smartphone-based apps being recommended or made available through NHS libraries. The authors concluded that further research is required to measure the effectiveness of the web-based interventions being utilised within the NHS, to ensure that the use of technology is based on research evidence and established guidelines. The lack of consensus or agreement between services in terms of which programmes are recommended reflects the current state of the research within the field of eHealth. Although there has been much research examining the efficacy of web-based interventions for mental health, specific programmes have been made available to the public before they have been evaluated. For example, a review of available web-based interventions targetting symptoms of depression and anxiety found that less than half had any published research studies evidencing their effectiveness (Ashford, Olander, & Ayers, 2016; Renton et al., 2014).

The evidence on web-based interventions for compromised mental health and wellbeing in the general population indicates that they can be effective for people experiencing a range of difficulties. A review of meta-analyses on web-based interventions found that interventions targeting symptoms of depression produced small to moderate effect sizes, that interventions targeting symptoms of anxiety produced larger effect sizes, and that these outcomes were comparable to those of face to face therapy (Cunningham et al. 2014). A literature review of web-based interventions for children and young people

experiencing mental health problems found similar results, as web-based interventions were again shown to be more effective at treating anxiety than depression (Hollis et al., 2017. One explanation for this could be anhedonia, a central symptom of depression (American Psychiatric Association, 2013), which may make it more difficult for people with depression to engage in web-based interventions, as they tend to require more self-direction than traditional therapy. Future research on the topic should attempt to delineate the factors behind this finding. Current research therefore suggests that web-based interventions can be effective for people experiencing elevated levels of psychological distress and common symptoms of poor mental health. The literature on web-based interventions within the student population specifically will now be discussed.

1.3.2 Web-based interventions for students

There has been a great deal of research on the effectiveness of web-based interventions for the student population. In order to effectively present an overview of the current findings, this section will focus on systematic reviews and meta-analyses.

eHealth literacy has been defined by (Stellefson et al., 2011) as "the ability to seek, find, understand, and appraise information from electronic resources and apply such knowledge to addressing and solving a health problem" (p. 2). In their systematic review of the existing literature examining the eHealth literacy of students, between 63% and 73.9% of the participants reported that they used the internet to search for health information. However, many lacked the skills to successfully search for, retrieve, use and evaluate eHealth information. This suggests that, although university students use the internet to access eHealth resources, they may need support to ensure that they are able to find the most beneficial and accurate information. Stellefson's review was conducted in 2011, so there is a possibility that the eHealth literacy of students may have improved since then, although the findings of a survey conducted more recently indicated that the eHealth skills of Jordanian nursing students needed improvement (Tubhaishat & Habiballah, 2016).

Tobacco and substance use in students has been shown to be high (Latimer, Batanova, & Loukas, 2014; Caldeira, Arria, O'Grady, Vincent, & Wish, 2008), but students are unlikely to seek help from student counselling services (Mowbray et al. 2006) and are even less likely to seek help for alcohol or substance use related issues (Reavley, Cvetkovski, Jorm, & Lubman, 2007). Therefore, web-based interventions could potentially allow a greater number of students to receive support in this area. A systematic review and meta-analysis of technology-based interventions for tobacco and drug use in students was conducted by Gulliver et al. (2015). The review included 12 articles examining a total of 20 interventions delivered through the internet, telephone,

and mobile SMS. These interventions were found to increase rates of abstinence by 1.5 times that of control groups. None of the studies included used the "gold standard" outcome measurement of smoking cessation interventions however, which is abstinence at six months.

A systematic review of online interventions targeting alcohol use was conducted by White et al. (2010), and 12 of the 17 studies they included in their review were conducted on a sample of university students. The authors found that, of the 17 studies included in the analysis, effect sizes could be calculated for only eight articles and these were highly variable. The authors concluded that web-based alcohol interventions could be particularly useful for those less likely to access traditional alcohol related services such as young people and students, but that more high quality research needs to be conducted in the area.

Symptoms of depression and anxiety are commonly experienced within the student population. For example, in a 2016 survey conducted by YouGov, 27% of students self-identified as experiencing a mental health problem, and depression and anxiety were the most common problems reported (Aronin & Smith, 2016). A systematic review and meta-analysis of the research on computer-delivered and web-based interventions designed to improve depression, anxiety and wellbeing in university students was conducted by Davies, Morris and Glazebrook (2014). Their review included 17 studies with a combined total of 1795 participants. Web-based interventions were shown to produce statistically significant effects in the treatment of anxiety, depression, and stress when compared with no treatment control groups, but not when compared with active controls. The authors concluded that there was a moderate risk of bias, and that more high quality research needs to be conducted. Overall, the current research indicates that web-based and computer delivered interventions can be useful for students experiencing a range of mental health problems and substance use difficulties, but a consistent theme among existing reviews and meta-analyses is that more research of high quality needs to be carried out.

1.3.2.1 A systematic search of coping and wellbeing focussed interventions for students

As well as supporting students with a specific mental health problem, web-based interventions are well placed to support students experiencing elevated psychological distress related to the stress of being a student. *thedesk* is one such intervention, but research examining its efficacy had not yet been conducted when this project commenced. Therefore, a systematic search was conducted in order to identify any existing web-based interventions designed to help students to cope with the normal stressors of university life, and whether they had been shown to be effective. This was

in addition to the narrative review of reviews on web-based interventions for students, as these focussed on interventions which were disorder or problem specific which does not fit with the framework of *thedesk* or of this thesis.

As outlined above, the search was specifically targeting interventions developed outside of a disorder specific framework, so articles detailing interventions designed to support students with a specific mental health problem were therefore excluded from the search. Interventions which supported students to cope with a range of difficulties, improve wellbeing, and to reduce and prevent psychological distress were included. The search was for interventions that have been designed and or adapted specifically for a student population, so papers examining the effectiveness of generic interventions using a student sample were excluded. The search was carried out using the Ovid Medline R database; search terms are included in Appendix A. The initial search was conducted in April 2019 and returned 1381 results. After inspection of the titles, 28 article titles appeared relevant and were further investigated . The majority of the articles were excluded at this stage, as the titles clearly showed that the papers were not examining wellbeing or transdiagnostic web-based interventions for students. Thirteen articles were excluded after their abstracts had been read, because they did not meet the criteria outlined above. This resulted in 15 included articles which are summarised below in Table 1. The search was conducted again in July 2019, returning 53 articles which had been published between the searches. Upon inspection, none of these met the criteria outlined above.

The search returned articles examining a range of different web-based interventions, which were informed by several different approaches. Four of the interventions under study were based on Cognitive Behavioural Therapy (CBT), nine were Acceptance and Commitment Therapy (ACT) based interventions, one intervention was developed using a positive psychology framework and one intervention was *thedesk*, which is discussed in detail in section 1.4. Eleven of the 15 articles reported that statistically significant improvements had occurred in participants' levels of wellbeing or psychological distress. This indicates that transdiagnostic, wellbeing focussed web-based interventions can be effective in helping students to improve their levels of wellbeing and psychological distress. Interventions informed by CBT, ACT and positive psychology were shown to produce statistically significant improvements, indicating that web-based interventions informed by a variety of frameworks can be effective. The interventions all included a psychoeducation component, with exercises for users to complete such as thought and mood diaries in the interventions based on CBT, and value eliciting exercises and downloadable mindfulness audio in the ACT informed programmes. The interventions differed in presentation and website design. Some employed a simplistic text based design, in which users read through content as they would in a textbook and

completed text based exercises. Others used a multimedia approach including video, audio, pictures and automatically generated emails to encourage use. There were no clear differences between the interventions which were shown to produce statistically significant improvements in the target measures, as all interventions were described as containing the core components of psychoeducation and exercises as described above. Therefore, there is substantial overlap in the material used in web-based interventions available for students, and there is not yet adequate information available to determine which specific aspects of these interventions make them effective.

Table 1: Summary of systematic literature search

Authors, year	Description of intervention	Design	*N*	Findings
Choubissa and Singh, 2018	Web-based positive psychology intervention developed for Indian students. Four modules: time management, stress management, emotional intelligence and self-management.	Randomised Control Trial (RCT)	177	Participants allocated to experimental condition had improved, emotional intelligence, time, stress and self-management scores at post-test when compared with controls.
Day, McGrath & Wojtowiz, 2013.	Web-based CBT intervention with five core modules: Introduction and assessment, activity and mood, motivation, thoughts and feelings, advanced thoughts and feelings.	RCT	66	Immediate access participants reported significantly greater reductions in depression, anxiety and stress than those in the waitlist group. This was maintained at six month follow up.
Eustis, Hayes-Skelton, Orsillo, Roemer, 2018.	Web-based ACT intervention with three modules: psychoeducation, mindfulness and values. Participants received reminder emails, feedback on written work from therapists and could contact them to ask questions.	RCT	156	Statistically significant effects on depression, anxiety and quality of life measures.
Firestone et al. 2019	Living Your Values. An ACT informed intervention focussing on values based living. Programme contains modules supporting students to identify and clarify their values then connect these to action based goals.	Pre-post measurement design.	133	Participants reported that the programme had good usability, but accessibility and receptivity to the programme was scored lower. At post-test there was a statistically significant improvement in participants' valued based living, but no improvements in wellbeing.

Lattie, Duffecy, Mohr, Kashmina, 2017	ThinkFeelDo programme. CBT informed intervention comprising of 15 lessons and five tools. Covers topics such as behavioural activation, cognitive restructuring and managing anxiety.	Pre-post measurement design.	15	Participants logged into the programme an average of 11.9 times over the six week study. Participants showed statistically significant improvements in stress and less participants reported feeling burnt out at post-test.
Levin 2013	ACT on College Life (ACT-CL). Three week ACT based intervention containing two multi-media modules on values and acceptance. Participants also received supplementary emails, text messages and web-based content.	RCT	234	ACT-CL had significantly lower user engagement and satisfaction ratings compared with the control website (provided basic psycho-education on depression and anxiety). There were few differences between intervention and control groups, but where there were the control group outperformed the intervention group.
Levin, Pistorello, Seeley and Hayes 2013	ACT-CL. Two multi-media modules with supplementary emails, text messages and web-based content.	RCT	76	Statistically significant improvements in depression, ACT knowledge and education values relative to control group. Intervention improved depression in students with the lowest depression scores.
Levin, Hayes, Pistorello, Seeley, 2016	ACT-CL compared with a generic mental health education website.	RCT	234	No difference in outcome measures or ACT process measures between the groups at post-test or follow up.

Levin, Haeger, Pierce, Twohig 2017	Six session ACT based intervention. Sessions focussed on: cost of experiential avoidance, cognitive diffusion, mindfulness, acceptance, clarifying values and goal setting.	RCT	79	Only 55% of participants completed the whole intervention. Usability and satisfaction ratings were adequate. Participants in the intervention group showed significant improvements in distress, general anxiety, social anxiety, depression, academic concerns and positive mental health.
Melnyk et al. 2015	Creating Opportunities for Personal Empowerment (COPE) intervention. A CBT based skills building programme, including material on self-esteem, managing stress, healthy coping, goal setting, problem solving and emotional management.	RCT	121	Participants gave mostly positive feedback about the programme. There no were no statistically significant differences in depression or anxiety found between the intervention and control groups however.
Musiat et al. 2014	Personality and Living of University Students (PLUS). CBT based intervention designed to prevent the development of common mental health problems in students. Aims to help students categorised as high risk due to their personality traits recognise their unhelpful patterns of thinking and behaviour, and develop more positive strategies to cope with university life.	RCT	1047	High attrition rate of over 60%. Students rated as high risk showed statistically significant improvements in their anxiety, depression and self-esteem scores.

Räsänen, Lappalainen, Muotka, Tolvanen, Lappalainen, 2016	Seven week ACT based intervention, included two face to face meetings with a coach and five week online programme containing modules on clarifying values, taking action, being present, watching one's thinking and awareness and acceptance. Programme was originally developed for general population than modified to meet needs of students.	RCT	68	Participants in the intervention group showed statistically significant improvements in wellbeing, life satisfaction, mindfulness skills, stress and depression when compared with the control group. This was maintained at 12 month follow up.
Stallman, Ohan & Chierra, 2019	Compared *thedesk* with Care. Collaborate. Connect: *Student Success* (CCC-SS; Stallman 2017a). CCC-SS is comprised of three modules on self-care, problem-solving and self-management which are completed sequentially. The whole programme takes roughly an hour to complete. Students are then encouraged to download *My Coping Plan* app (Stallman 2017b) and use this to use promote the use of healthy coping strategies when they feel distressed.	RCT	70	Participants in both treatment groups had access to their allocated intervention for two weeks. Pre-test post-test results showed that participants in both conditions demonstrated statistically significant improvements in their levels of psychological distress.
Viskovitch and Pakenham, 2018	You Only Live Once (YOLO). An ACT based intervention with four modules: cognitive fusion, acceptance, mindfulness and the observer self and values and committed action. Participants received SMS and email prompting during the study to engage engagement.	RCT	130	Participants in all three conditions showed statistically significant improvements in depression, anxiety, stress, wellbeing, life satisfaction, alcohol use, and self-compassion. They also showed statistically significant improvements in ACT process measures.

1.4 *thedesk*

thedesk is an online intervention designed to normalise the common stressors and difficulties experienced amongst students, and to help students develop their coping skills in order to improve their wellbeing (Stallman, Kavanagh and Ralph, 2012). *thedesk* was developed in consultation with a group of students, academic staff, student services staff and counsellors. The content is informed by evidenced-based theories including CBT, positive psychology and interpersonal theories of wellbeing and distress.

Focus groups about *thedesk* were conducted with a sample of 12 domestic and international students at an Australian university (Stallman & Kavanagh, 2016). Feedback about *thedesk* was largely positive, although there was also some constructive feedback. The study gained responses from students who were relatively unfamiliar with *thedesk*, as they had not used the programme prior to the 90 minute focus groups. This is a limitation of the study, as it cannot comment on how students who were more familiar with *thedesk* would evaluate the programme.

As displayed in Table 1, an RCT comparing *thedesk* to Care Collaborate Connect Student Success, another web-based intervention designed by Stallman (2017a), was conducted using a sample of 70 Australian students (Stallman et al. 2019). The pre-test measure of wellbeing was taken three weeks before the start of the exam period, and the post-test was taken two weeks later. Participants in both conditions showed moderate to large reductions in levels of distress. This provides evidence that *thedesk* helps students improve their mental health even under stressful circumstances. The study did not include a no intervention control group, so it cannot be stated with certainty that the improvements were caused by the two interventions rather than external factors which may have affected both groups. So far, no research has been conducted into whether *thedesk* helps students in the UK to improve their wellbeing. The current study uses a systematic case-series approach to examine this.

1.5 Aims and research questions

The first aim of this study is to explore the impact of using *thedesk* on the wellbeing and psychological distress of undergraduate students. The second aim of this study is to examine the processes which may underlie any impact on wellbeing or distress. The third aim of this study is to explore students' experience of using *thedesk*.

Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

METHOD

2.1 Design

This study used an experimental systematic case series design. The design was informed by hermeneutic single case design methodology, in which several types of data are collected in order to allow for reasonable inferences about mechanisms of change to be drawn. These include quantitative pre-post measures, weekly measures to track changes, qualitative data from participants about outcomes, qualitative data about significant external events, assessment of participant attributions of change and direct information about the process of the intervention (Elliot, 2014).

The design was a modified A/B/A design, in which participants completed an assessment phase (A1), followed by two intervention phases (B1 and B2), and a follow-up phase (A2). Participants were screened for suitability using a recruitment survey. A randomly selected group who met the eligibility criteria were invited to take part in the study. Those who responded to the invite were randomly assigned to a variable baseline period of two-to-five weeks. During this period, participants completed measures each day, with no treatment or intervention occurring. The order of the intervention phases were also randomised for each participant. During these phases, participants continued to complete measures daily and the independent variable of access to *thedesk* was introduced. During the unguided intervention phase, participants were instructed to use the programme however they thought would be most helpful. During the guided intervention phase participants received weekly emails from the researcher guiding their use of the program. During the follow-up phase participants continued to complete the measures, but were not asked to use *thedesk*. This study used mixed-methods, as participants were interviewed after they had completed the case series. See Figure 1 for a graphical representation of the study procedures.

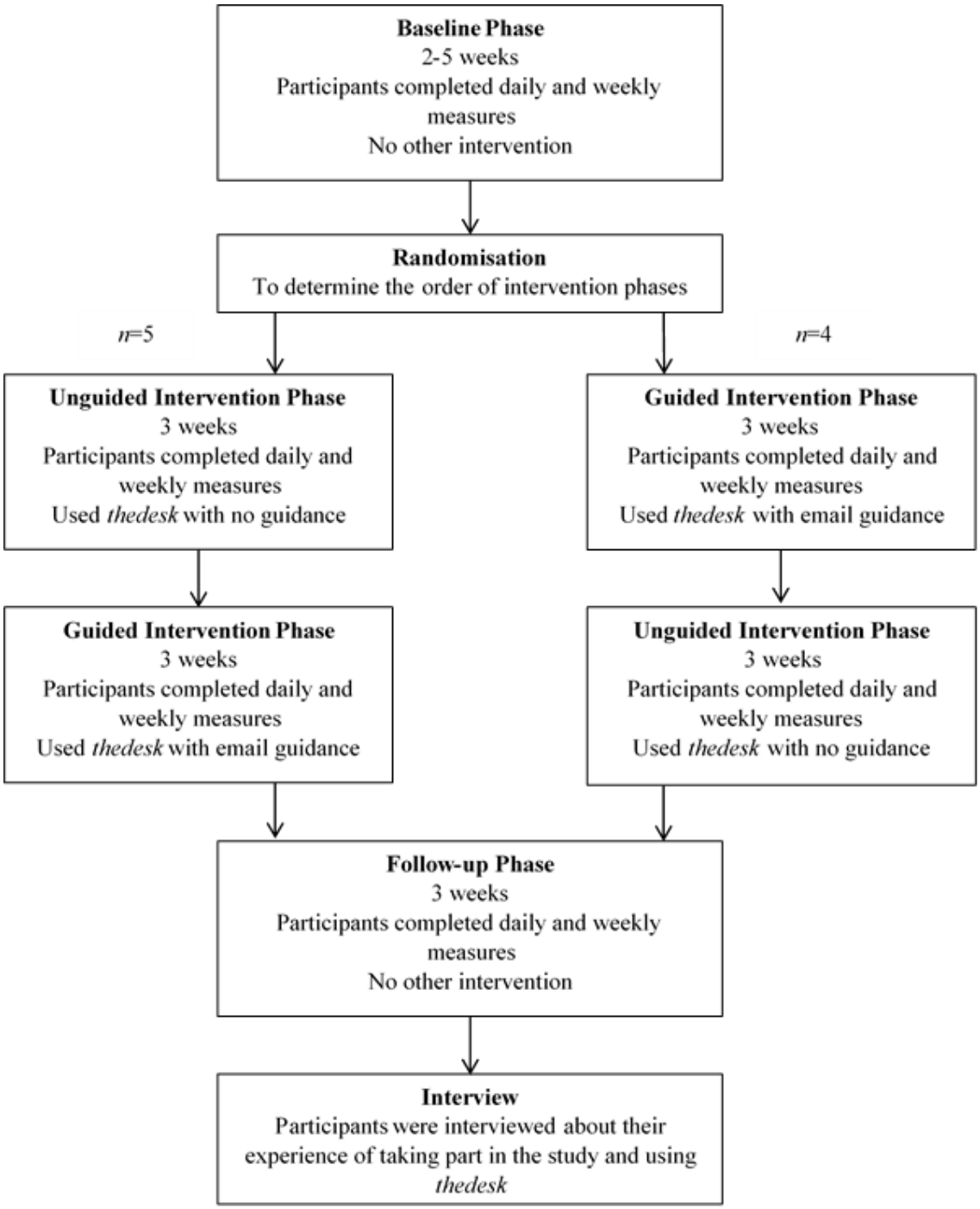


Figure 1: Study procedures

2.1.1 Justification for the design

The systematic case series design was chosen to allow for the in-depth analysis of each individual's response to and experience of using *thedesk*. The close monitoring of a relatively small number of participants allows for the examinations of possible mechanisms of change, through the use of outcome and potential process variables (Morley, 1994). This is relevant, as *thedesk* is a relatively new intervention and research into the experiences of students who use it is limited. As such, there is a paucity of research investigating how *thedesk* may affect wellbeing and psychological distress. A systematic case series design also has good power, relative to between-groups studies. This is due to each participant acting as their own control, meaning that potential confounding variables such as socio-economic status and gender are automatically controlled for, therefore reducing noise in the data set. The baseline period was used so that causal inference regarding any changes in scores during the intervention phases could be reasonably drawn. The phase length of two to six weeks was selected to balance the need to obtain an adequate quantity of data from each participant, without requiring an excessive amount of involvement from those taking part. The order of the intervention phases were randomised to account for order effects.

2.2 Ethical clearance

Ethical approval for this project was sought from the University of Leeds School of Medicine and Health Ethics Committee. Ethical approval for the project was granted on the 21st of June 2018 (See Appendix B). An amendment was subsequently submitted to the committee, requesting approval to recruit participants using posters, flyers and social media. This was approved on the 17th of October 2018. The following ethical issues were considered when designing the project:

2.2.1 Safeguarding students with elevated levels of psychological distress

The project recruited undergraduate students with elevated levels of psychological distress. Therefore, participants may have been eligible to receive support for their mental health. Participant information sheets (See Appendix C) included the contact details for Leeds IAPT and the University of Leeds Counselling and Wellbeing Service, and informed participants of their right to withdraw from the study and/or seek support from support services at any time. Initial emails from the researcher to participants also

contained this information, and encouraged participants to seek additional support if they felt they needed it.

2.2.2 Managing risk

As this project specifically recruited participants with elevated levels of psychological distress, it was possible that some participants would have posed a risk to themselves or others. Risk was measured using the CORE-OM and CORE-10. One participant, whose response to these questions indicated that they may have presented a risk to themselves, was discussed with the project supervisors. It was agreed that their risk did not seem serious or imminent enough to warrant sharing their details with a University of Leeds Mental Health Advisor (Disability Services), which was the study protocol for managing high risk situations. Throughout the study, all participants, including the one participant who had disclosed some indications of risk to self, were advised to seek support if they felt that they may be a risk to themselves or to those around them.

2.2.3 Confidentiality and data protection

Data was collected using Online Surveys, a secure site endorsed by the University of Leeds. Data for each participant was downloaded from this site and kept on a database stored securely on the researcher's University of Leeds M: Drive. Participants' names and email addresses were stored separately from this data. Research data was linked to each participant using a unique identifier word, and only the lead researcher had access to the file containing the information of which unique identifier corresponded to each participant. This information was stored separately from main data set. Interviews were recorded using an encrypted Dictaphone and the recordings were deleted once they had been transcribed by either the researcher or an approved transcriber from the University of Leeds Institute of Health Sciences and transcriptions were also stored securely. No identifying information about the participants is included in this report.

2.2.4 Informed consent

Separate participant information sheets were developed for the two stages of recruitment, to allow participants to give informed consent to complete the recruitment survey and to take part in the case series. Participants' consent was obtained for each stage using two online consent forms, delivered by Online Surveys. Participant information sheets are included in Appendix C.

2.2.5 Right to withdraw

The participant information sheets informed the participants of their right to withdraw at any time whilst they were completing the recruitment survey or taking part in case series. Participants could withdraw from the recruitment survey by closing the browser, and could withdraw from the case series at any time by choosing not to complete the measures or use *thedesk*. Participants were informed of their right to request that their data be removed from the dataset, providing they contacted the researcher before data analysis had taken place. Participants who completed the recruitment screening measures but did not provided an email address were not able to have their data removed from the dataset, as this data was unidentifiable as theirs. This was explained in the participant information sheet.

2.2.6 Sensitive material

The measures used in the study include items which ask about some potentially sensitive topics, such as depression, self-harm, and suicidal ideation. Participants were informed of this in the participant information sheet, and advised that they had the right to stop completing the questionnaires at any time without giving a reason.

2.2.7 Reimbursement

As this study required a relatively high level of commitment from participants, they were reimbursed for the time they invested in taking part. Participants who completed the recruitment survey were given the opportunity to enter a prize draw to win a £20 Amazon voucher. This was an online voucher code which was delivered to the winner via email. For participants who completed the case series, there was a maximum reimbursement of £10 available for each phase of the study. To receive the full £10 reimbursement for a phase, participants had to complete over 80% of the measures within that phase. Those who completed more than the minimum required 50% of measures within a phase, but less than 80% received £5 of reimbursement for that phase. Participants were also awarded £10 reimbursement for taking part in the interview, so there was a maximum reimbursement of £50 for completing the entire study. This was given to participants in cash by the researcher.

2.3 Participants

Participants were all full-time undergraduate students at the University of Leeds. The eligibility criteria are outlined below.

Inclusion Criteria:

- Full-time undergraduate students at the University of Leeds
- Aged 18 – 21 when starting their current degree
- Mild – moderate levels of psychological distress, operationalised as raw scores between 21 and 84 on the CORE-OM.

Exclusion criteria:

- Severe psychological distress, operationalised as raw scores of 85 or over on the CORE-OM
- Healthy levels of psychological distress, operationalised as raw scores of 20 and under on the CORE-OM
- Currently receiving counselling or support from mental health services
- Currently prescribed psychotropic medication at assessments
- Mature students, who were aged 22 or over when they started their degree.

The study recruited full-time undergraduates who were not mature students because *thedesk* is designed to help students cope with the common problems and pressures associated with attending university, and it was thought that these would be likely to be different for postgraduates, part-time students and mature students. Individuals reporting healthy levels of psychological distress were excluded as they would be less likely to benefit significantly from using *thedesk.* Those presenting with severe levels of psychological distress were excluded as it was believed that their needs would be better met through student counselling or mental health services. Students who were currently receiving support for their mental health or taking psychotropic medication were excluded. It was thought that these could potentially be confounding variables, as it would be unclear whether any changes in dependent variables would be caused by the use of *thedesk,* or the receipt of other mental health support or psychotropic medication.

The characteristics of the participants who completed the case series are outlined in Table 2. More information about the number of participants who completed the recruitment survey is included in section 2.5.1, Figure 2.

Table 2: Participant characteristics

Participant	Age at Recruitment	Gender	Sexual Orientation	Ethnicity	Year of Study	Mental Health Treatment
Fox	19	Female	Gay Woman/Lesbian	White British	Second	In the last year
Harp	19	Female	Not Disclosed	Mixed Race – Asian and White	First	Never
Igloo	19	Male	Heterosexual/Straight	Mixed – Black African and White	First	Never
Moon	23	Female	Heterosexual/Straight	Black Caribbean	Fourth	In the last year
Penguin	19	Male	Gay Man	White British	Second	In the last year
Rhyme	22	Female	Heterosexual/Straight	White British	Fourth	Never
Sage	22	Female	Heterosexual/Straight	White British	Third	Never
Tiger	19	Female	Heterosexual/Straight	White British	First	In the last year
Umbrella	19	Female	Heterosexual/Straight	Any other White Background	Second	Never

2.4 Materials

All self-report measures were delivered via the website Online Surveys. The measures could be accessed using any smart phone, tablet or computer, and participants accessed them using their own devices. The data from Online Surveys was exported to and analysed using IBM SPSS (version 25), and the graphs were created using Microsoft Excel. The interviews were recorded using a digital encrypted voice recorder, and transcribed using Microsoft Word. Qualitative analysis was managed using NVivo (version 12).

2.4.1 *thedesk*

thedesk is a web-based intervention designed by Stallman et al. (2012) to help students cope with the common stressors of university life, improve their psychological and physical wellbeing and reduce their psychological distress. *thedesk* contains four main sections designed to help students cope with some of the common problems encountered while studying at university. Each of these sections is comprised of a number of short modules. The intervention is designed so students can decide how much or how little of the website to explore and they can view the material in any order they would like. *thedesk* contains quizzes to help students decide which parts of the intervention might be helpful and relevant for them.

The section "Getting Things Done" is designed to help students who are struggling with completing their work and manage their time. This is relevant to the student population, as procrastination has been found to be a common problem amongst students (Nordby, Katrin, Klingsieck & Svartdal, 2017). It contains modules on setting goals and prioritising, managing time and managing procrastination. The modules contain psychoeducation about goal setting, time management and procrastination and resources to help students with these, such as a SMART goal template.

The section "Staying Calm" is designed to help those experiencing stress or anxiety. This is appropriate, as anxiety is the second most common mental health problem reported by students in the UK (Aronin & Smith, 2016). The section includes modules on managing stress, and managing anxiety and worries. These include psychoeducation about stress and anxiety as well as mindfulness and relaxation audio clips.

The section "Staying Connected" focusses on forming and maintaining healthy relationships. For many students, starting university involves moving to a new place, away from family and friendship groups formed at school and college. Buote et al. (2007) found that there was a significant positive correlation between the quality of new

friendships formed by students and adjustment to university. The section includes modules on improving relationships, making friends, managing disagreements and developing assertiveness. These are designed to help students to communicate their needs effectively, to improve the relationships they already have as well as develop new ones.

The fourth section in *thedesk* is called "Feeling Good", and is designed to help students improve their mood. Aronin and Smith (2016) found that depression was the most commonly reported mental health problem in their student sample. The section includes modules on managing emotions, keeping healthy, appearance related confidence, sleep, healthy eating, alcohol consumption and exercise. Symptoms of depression have been found to be positively correlated with unhealthy behaviours (Allgöwer, Wardle & Steptoe, 2001). The modules contain psychoeducation about this link between healthy behaviours and mood, and information and guidance to support students to improve their behaviours in order to improve their mood.

2.4.2 Measures

As displayed in Table 3, participants were asked to complete a range of measures each day whilst taking part in the study. Participants were sent an automatically generated email each day, at a time chosen by them. This prompted them to complete the daily measure and included their personalised access link. If participants missed two days' measures consecutively, or their completion rate dropped below 90%, they were sent an email from the researcher. Email templates are included in Appendix E. The weekly and end of phase batteries were prioritised over the daily measures, so if a participant did not complete their daily measure on a day where the longer battery was due, this carried over until they had completed it. Therefore, all participants who completed the case series had a complete data set for all of the measures included in the longer batteries, but not of the daily measures.

Table 3: Measure protocol

Recruitment and start and end of each phase	Weekly	Daily
CORE-OM (34 items) WEMWBS (14 items) GSE (10 items) CSI (33 items)	CORE-10 (10 items) WEMWBS (14 items) GSE (10 items)	5 item measure developed for this study

2.4.2.1 Target measures

The Warwick-Edinburgh Mental Wellbeing Scale (Tennant et al. 2007)

The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) is a 14 item instrument which measures both hedonic and eudemonic aspects of wellbeing. Respondents are asked to read 14 indicators of psychological wellbeing, and indicate the extent they have experienced each one in the last two weeks using a five point Likert scale. The items are all positively scored and the sum of these scores is used to create one wellbeing score. The WEMWBS has been shown to have good criterion, construct, and content validity. The instrument has high internal consistency (Cronbach's alpha = 0.91 in the population sample, 0.81 in the student sample) and good one-week test-retest reliability (r= 0.83). The measure has been validated in both general population and student samples. Participants completed the WEMWBS at screening and then at weekly intervals throughout the study. A copy of the WEMBWS is included in Appendix D.

Daily wellbeing measure

Measuring wellbeing on a daily basis allows for closer monitoring, which can give insight regarding mechanisms of change. Established measures such as the Outcome Rating Scale (Miller, Duncan, Brown, Sparks, & Claud, 2003) were considered, however due to the visual analogue nature of the measure it would not have been possible to deliver it using Online Surveys. Therefore, a short measure which could be used to track wellbeing on a daily basis was developed for this study as outlined below. A critique of this approach is presented in the section 4.3.2.

Participants were asked to complete this measure six days per week during all phases of the study. The measure was comprised of five questions, so that it could be completed quickly. Participants were asked to think about the last 24 hours, read the items and indicate to what extent they agreed with each statement using a Likert scale. The items were:

1) I have felt unhappy

2) It has been easy for me to stick to my aims and achieve my goals

3) Overall, I have felt satisfied with my life

4) I have tense, anxious or nervous

5) I have felt able to cope with any difficulties that have arisen.

The Likert scale included the options "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree" or "Strongly disagree". Items one and four were taken from the CORE-OM and designed to measure levels of depression and anxiety respectively, as a

proxy intended to track levels of psychological distress. Item two was taken from the General Self Efficacy scale, and reworded so that the item could be asked daily. Item three was included to track wellbeing during the study, the question is widely used to measure wellbeing at a population level (Office for National Statistics, 2016). Item five was designed to track coping. It would not have been possible to effectively track coping style on daily basis, so instead the item was included to track how well participants felt that they were coping with hassles each day throughout the study. Items one and four were reverse scored and the sum of all the scores were used as an indication of the participant's functioning for each day of the study, with greater scores indicating greater levels of wellbeing.

Clinical Outcomes Routine Evaluation (Evans et al. 2000)

The Clinical Outcomes Routine Evaluation (CORE-OM) scale was used to measure participants' levels of psychological distress. The CORE scales are widely used in primary care, and have been shown to be reliable, valid, and sensitive to change (Evans et al. 2000). The CORE-OM consists of 34 symptoms of distress, and asks respondents to indicate the frequency they have experienced each of them in the last week using a five point Likert scale. Higher scores on the measure indicate greater levels of psychological distress. Participants completed the CORE-OM at screening stage, then at the beginning of each phase and at the end of the case series. A copy of this measure is included in Appendix D.

CORE-10 (Barkham et al. 2013)

It was not considered appropriate to administer the CORE-OM at weekly intervals. Due to the length of the measure, it was believed that this would place an unreasonable response burden on participants. Therefore, a shorter measure of psychological distress which was suitable for tracking levels of psychological distress on a weekly basis was required. The CORE-10 was designed to be a short and generic measure of distress which could be used at weekly intervals during therapy (Barkham et al. 2013). The items were taken from the longer CORE-OM, and were designed to measure problems (depression, anxiety, physical problems and trauma), functioning (general functioning, social functioning and close relationships) and risk. The item scores can also be combined to create one psychological distress scores, with higher scores indicating greater levels of psychological distress. The measure has high internal reliability (Cronbach's Alpha = .90), correlates well with the CORE-OM (r = .94 in a clinical sample, r = .92 in a non-clinical sample), and has good sensitivity and specificity. Participants were asked to complete the CORE-10 at weekly intervals during the study,

but were not asked to complete the measure at points in which the CORE-OM was used. A copy of this measure is included in Appendix D.

2.4.2.2 Process Measures

Coping Strategies Indicator (Amirkhan, 1990)

The Coping Strategies Indicator (CSI) is a 33 item instrument which measures coping strategies used in response to stressful life events. The measure asks respondents to recall an event in the last six months which was important to them and caused them worry. Keeping that particular event in mind, participants then indicate how much they used each of the coping strategies listed in the measure on three-point Likert scale with "Not at all", "A little", "A lot" as available responses. The instrument has three subscales: problem solving (Cronbach's alpha = 0.89), seeking support (Cronbach's alpha = 0.93) and avoidance (Cronbach's alpha = 0.84). These are scored separately and higher scores indicate a greater use of that coping strategy. The measure has been shown to have good test-retest reliability, good convergent validity and high criterion validity (Amirkhan, 1994). Participants completed the CSI at recruitment, at the start of each phase and at the end of the final phase of the case series. This measure was not used at weekly intervals because of the high response burden it would mean for participants, and because it was thought that coping style may have been slower to change as a response to the intervention than other variables. Amirkhan, the author of the measure, did not give permission for the entire measure be reproduced in the appendices, so the initial prompt for participants and one item from each subscale is included below.

> Try to think of one problem you have encountered in the last month. This should be a problem which was important to you, and that caused you to worry (anything from the loss of a loved one to receiving a lower than hoped for grade on a piece of work, but one was important to you).
>
> Keeping that problem in mind, indicate to what extent you...
>
> Set some goals for yourself to deal with the situation?
> (Problem solving subscale.)
>
> Confided your fears and worries to a friend or relative?
> (Social support seeking subscale.)

Fantasized about how things could have been different?
(Avoidance subscale.)

The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995).

The General Self-Efficacy Scale (GSE) is a ten item instrument designed to measure individuals' sense of self-efficacy. The scale does not measure belief about ability to perform a specific action in a specific situation, rather, as the name suggests it measures self-belief in the ability to respond to general demands and challenges in the environment. The measure produces one total self-efficacy score from the sum of all the items. The internal consistency of the instrument is high: Cronbach's alphas have ranged from 0.76 to 0.90 in different samples, with the majority in the high .80s. Convergent and discriminant validity has also been shown for the measure, as GSE scores have been found to correlate positively with positive affect, optimism and work satisfaction; and negatively with depression, anxiety and stress. Pre-surgery GSE scores have also been shown to predict recovery in cardiac patients at six months, providing evidence for predictive criterion validity. Participants completed the GSE at screening and then weekly throughout the study. A copy of this measure is included in Appendix D.

2.5 Procedure

2.5.1 Recruitment

A recruitment survey, delivered through Online Surveys, was used to screen potential case series participants for eligibility. The participant information sheet and consent form, which are included in Appendix C, were presented on the first two pages of the survey, so that interested participants could access information about what completing the recruitment survey would involve, and consent to taking part if they wished to do so.

The recruitment survey included demographic questions to assess participants for eligibility in the case series and to collect information about the characteristics of the sample. The demographic questions were as follows:

1) Are you an undergraduate or postgraduate student?
2) Are you studying full-time or part-time?
3) How old were you when you started your current degree?
4) How old are you currently?
5) Which year of study are you in?

6) Which University of Leeds school are you studying with?

7) Please describe your gender.

8) Please describe your sexual orientation.

9) Please describe your ethnicity.

10) What is your home status?

11) Have you ever sought help for psychological ill-health and/or psychological distress?

12) Are you currently being prescribed medication for your mental health?

The recruitment survey then contained the following measures: the WEMWBS, the CORE-OM, the CSI and the GSE. Participants were asked if they were interested in finding out more about the second stage of the study, and invited to provide their email address if they wished to receive information about the second stage.

The recruitment survey was advertised to students from the University of Leeds using a variety of methods. Advertisement posters containing a URL link and a QR code which accessed the recruitment survey were placed at different points on the University of Leeds campus, and flyers containing the same information were also distributed. An online version of the advert was shared on social media, and participants were asked to share the advert amongst any friends that they thought may be interested in taking part. Finally, the study was advertised via an email database for University of Leeds students interested in taking part in psychology research in exchange for payment. All advertising materials are included in Appendix E.

Participants whose answers to the recruitment survey indicated that they were eligible to take part in the case series were invited to take part by email. The email contained a link to the first battery of questionnaires of the case series. The participant information sheet and consent form for the study, which are included in Appendix C were presented on the first two pages of the battery, to allow participants to access information regarding the case series, and consent to take part if they wished to do so. The measures in the battery were the same as those used in the recruitment survey. At the end of the battery, participants were asked what time they thought they would be likely to complete their daily survey, and what time they would like to receive their daily reminder email.

During the first wave of recruitment, all eligible participants were invited to take part in the case series. Participants were sent an email inviting them to take part, and a second email if they had not responded to the first email within two weeks. After four participants had been recruited, the study was advertised using the participant database.

After this advert had been placed, 45 participants completed the recruitment screening survey within a short period of time. Consequently, there were more eligible participants who were interested in taking part in the case series than were required for the project. Eligible participants from this group were selected at random, and invited to take part via email as described above.

Random selection was chosen as a sampling strategy in order to eliminate bias, as all eligible participants had an equal chance of being invited to take part. Another strategy which could have been utilised in order to select eligible participants is purposive sampling, in which participants are selected on the basis of their personal characteristics. This approach was considered, but was not chosen as the researcher did not have enough information to meaningfully decide which characteristics would be most important to select for and prioritise, so it was thought that using purposive sampling could have introduced bias into the sampling strategy.

The recruitment process is displayed graphically in Figure 2. This illustrates the number of participants at each stage of recruitment.

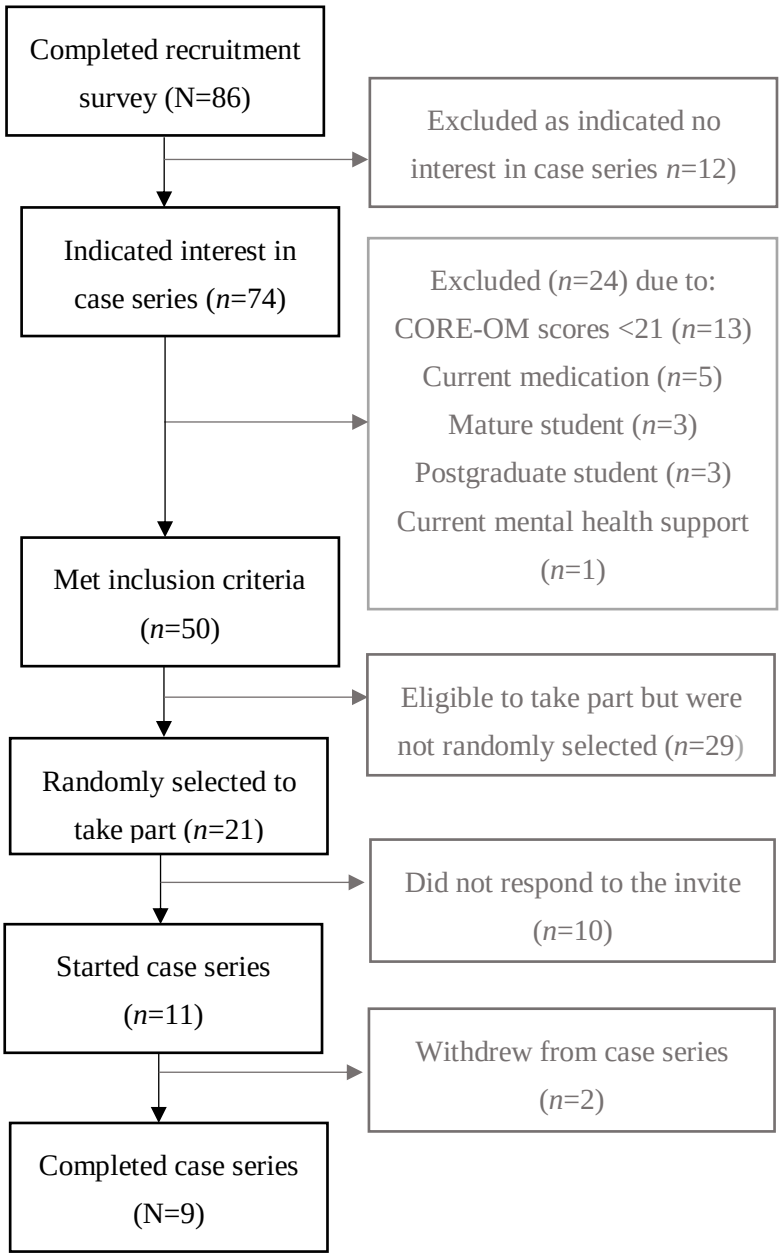


Figure 2: Recruitment procedures

2.5.2 The case series

2.5.2.1 Baseline

The baseline phase lasted between two and five weeks, with the length being randomly allocated to participants. During this phase, participants were asked to complete the daily and weekly measures outlined above in Table 3, in order to establish a baseline level of functioning. They were not asked to do anything else during this phase.

2.5.2.2 Unguided intervention phase

The sequence in which participants completed the two intervention phases was randomised to account for order effects. At the beginning of the unguided intervention phase, participants received an email from the researcher informing them about *thedesk*, and inviting them to create an account using the same email address they had supplied for the study. Participants were advised that their answers to quizzes on *thedesk* would remain confidential, but that the researcher would receive details of their log-ins and which parts of the website they had looked at. Participants were invited to use the website in the way they believed would be the most helpful to them during this phase, and did not receive any other emails from the researcher about *thedesk* during this period.

2.5.2.3 Guided intervention phase

The guided intervention phase followed the same protocol as the unguided phase, but in addition to receiving access to *thedesk* the participants also received weekly support emails from the researcher. These emails were designed to offer motivational support, encourage participants to access *thedesk*, and to use parts of the programme which were relevant to them.

The guidance emails were based on participants' responses on the CORE-OM measure, which includes items assessing anxiety, depression, relationships and functioning. Items relating to the four sections of *thedesk* were organised into clusters, these are outlined in Table 4. Participants were guided to use two different sections during the guided intervention phase. The sections they were guided to use were determined by the two cluster of items they had the highest scores on.

Table 4: Items determining guidance

Section	Items
Staying Calm	I have felt tense, anxious or nervous
	Tension and anxiety have prevented me from doing important things
	I have felt panic or terror
Feeling Good	I have felt totally lacking in energy or enthusiasm
	I have felt despairing or hopeless
	I have felt unhappy
Staying Connected	I have felt terribly alone or isolated
	I have felt I have someone to turn to support when needed
	I have thought I have no friends
Getting Things Done	I have been happy with the things that I have done
	I have been able to do most things that I needed to
	I have achieved the things that I wanted to

2.4.2.4 Follow up

The final phase was a follow up period lasting for three weeks. At the beginning of the follow up phase, participants received an email from the researcher thanking them for their continued involvement in the study, and asking them to continue completing their daily surveys for the last three weeks of the case series. The email informed participants that they were no longer required to use *thedesk* during this period.

At the end of the follow up phase, participants received an email thanking them for completing the case series, detailing how much money they had earned for their reimbursement and how to arrange to collect it. They were also invited to take part in an interview with the researcher, which is discussed in more detail below.

2.5.3 Client Change Interview

After the follow-up phase, participants were invited to take part in an interview with the researcher. These interviews were semi-structured and were based on the Client Change Interview (Elliott,1999). In the interviews, participants were asked whether they had

noticed any positive or negative changes since they started using *thedesk*, what they believed had caused these changes and how likely they think these changes would have been to occur if they had not been using *thedesk*. Participants were asked which parts of *thedesk* they found helpful or unhelpful, if any. Participants were also asked about their experience of taking part in the study and completing the measures. Interviews were conducted face to face at the University of Leeds, recorded using an encrypted digital voice recorder and transcribed by the researcher or an approved member of University of Leeds staff.

2.5.4 *thedesk* usage data

Data on participants' use of *thedesk* during the study was captured; participants were informed of this at recruitment. The researcher received information about the number of times the participants logged into *thedesk*, the dates and times of their access, the amount of time they had spent on the site and the parts of the site they had accessed. This usage data was obtained from Stallman, but was not available until after the interviews had been conducted. This meant that the researcher did not have information about participants' use of *thedesk* during the change interview, so they were unable to discuss this with participants. The usage data was not viewed by the researcher or the project supervisors until after the data analysis had been completed, as it was believed that this could have introduced an element of bias into the analysis.

2.6 Data analysis

2.6.1 Quantitative analysis of measure data

Quantitative measure data was exported from Online Surveys into SPSS, in which the scale and subscale scores for each participant were calculated. These were then exported to Microsoft Excel, which was used to create the graphs used for visual analysis. Visual analysis was conducted using the framework outlined by Morley (2018), in which measure scores from each phase were displayed separately on graphs. The central tendency (median) and inter-quartile ranges were calculated and displayed in order to visually analyse variation between and within the phases. In order to address the third research question: whether changes in wellbeing were associated with changes in coping style; it was necessary to display WEMWBS and CSI scores on the same graphs. Social support seeking and problem solving have previously been grouped together into a cluster of adaptive coping strategies, as they have consistently been shown to be associated with greater levels of wellbeing (Scheier et al. 1986). Therefore, in order to make the graphs as clear as possible and to allow any patterns to be more easily

observable, the social support seeking and problem solving subscales were combined and shown together on some graphs.

Excel was also used to complete reliable change analysis (Jacobson & Truax, 1991), which was conducted for all pre-established measures. Published reliable change criteria for the measures were used where available, or were calculated using an online reliable change criterion calculator when necessary. This was conducted using published Cronbach's alpha levels and standard deviations for each scale and subscale. Clinically significant change was calculated using published clinical cut-offs, for the measures for which this was available.

Together, the information from visual analysis and reliable change analysis was combined, and used to answer the three research questions for each participant. Multiple sources of information including changes in scores, when these had occurred, and participant attributions of change were taken into account when making this decision, as outlined in Elliott (2002). In addition, the researcher's findings and conclusions were discussed multiple times within research supervision, considering the evidence for and against each research question. This procedure was informed by adjudicated hermeneutic single case design (Elliott, 2002), and the strengths and limitations associated with this method are discussed further in the discussion chapter.

2.6.2 Qualitative analysis of interview data

The data from the Client Change Interviews were analysed using Thematic Analysis, following the steps outlined by Braun and Clarke (2008) which are presented below. These steps were followed one transcript at a time. After coding four transcripts, it became apparent that the nature of the change interview meant that the codes and themes were similar across the majority of transcripts. Therefore, the thematic analysis became more akin to an inductive framework approach, where the framework was built after coding four transcripts and applied to the remaining transcripts with additions made where content necessitated. The qualitative analysis was managed using NVivo (version 12). Due to technical difficulties, one of the nine interviews was not recorded, so eight interview transcripts were included in the analysis.

2.6.2.1 Familiarising yourself with the data

Four of the eight interview recordings were transcribed by the researcher, to aid familiarisation with the content. In order to effectively and efficiently manage the time and resources available to the project, the remaining four interviews were transcribed by

an approved transcriber. All of the transcripts were read multiple times by the researcher, to ensure familiarity prior to analysis.

2.6.2.2 Generating initial codes

Due to time constraints of the project, only data relating to the research questions were coded. This included utterances relating to changes experienced by the participants during the study, discussion and feedback relating to the use of *thedesk*, and feedback about the experience of taking part in the study and completing the measures. Therefore, participants' discussion regarding topics such as their thoughts about mental health and experiences of university were excluded, and were not coded or included in the analysis.

2.6.2.3 Searching for themes

Once initial codes had been generated for the entire data set, the researcher searched for shared themes amongst the data. The codes were organised into related categories, which were then described by the researcher. These descriptions were used to create the initial theme names.

2.6.2.4 Reviewing themes

The initial themes were discussed and reviewed via meetings and email between the researcher and the supervisors. The themes were checked against the coded extracts of the interviews and against the data set as a whole. The number of codes related to each theme and number of participants who had discussed each theme was recorded using tables. A thematic map was created to illustrate how the themes related to one another.

2.6.2.5 Defining and naming themes

The meta-themes, themes and subthemes were reviewed by the researcher. Names and definitions which clarified meaning and ensured the qualitative essence was maintained were developed at each level. Once the themes had been defined and named, the researcher discussed them once more in research supervision as final a quality check.

2.6.2.6 Producing the report

Finally, the analysis was written up for inclusion in the results chapter of this thesis. The researcher composed a narrative description of each of the meta-themes, themes and subthemes that had been developed. The most appropriate and descriptive quotes from the data were selected and included in the report, in order to illustrate the themes to the reader.

RESULTS

First, the data from each participant are presented separately. This is organised according to the three research questions. The changes reported in the change interview and attributions for these are also displayed separately for each participant. Next, the group level analysis is presented, with the summary of research questions, group level quantitative and qualitative findings described and explained.

3.1 Analysis of case series data

3.1.1 Participant 1: Fox

Fox was a second year student studying with the school of Mechanical Engineering. At recruitment, her WEMWBS score was 45 which is in the normal range for wellbeing. Her CORE-OM score was 52, indicating that her levels of psychological distress were in the moderate range. She was randomly allocated to complete the guided intervention phase before the unguided intervention phase. Her responses during the case series indicated that she was experiencing difficulties relating to her mood, anxiety and stress. Therefore, during the guided intervention phase she was encouraged to use the Feeling Good and Staying Calm sections of *thedesk*.

Fox's engagement with completing the measures was extremely high: she completed 98.2% of the daily measures during the case series. The data obtained regarding her usage of *thedesk* indicated that she was less engaged with this aspect of study participation. During the guided intervention phase, she visited both the Staying Calm and Feeling Good sections of *thedesk* as she was encouraged to, but she only spent a total of seven minutes using the programme and did not visit the site during the unguided intervention phase.

3.1.1.1 Research question 1: What is the impact of *thedesk* the wellbeing and psychological distress?

Wellbeing: WEMWBS

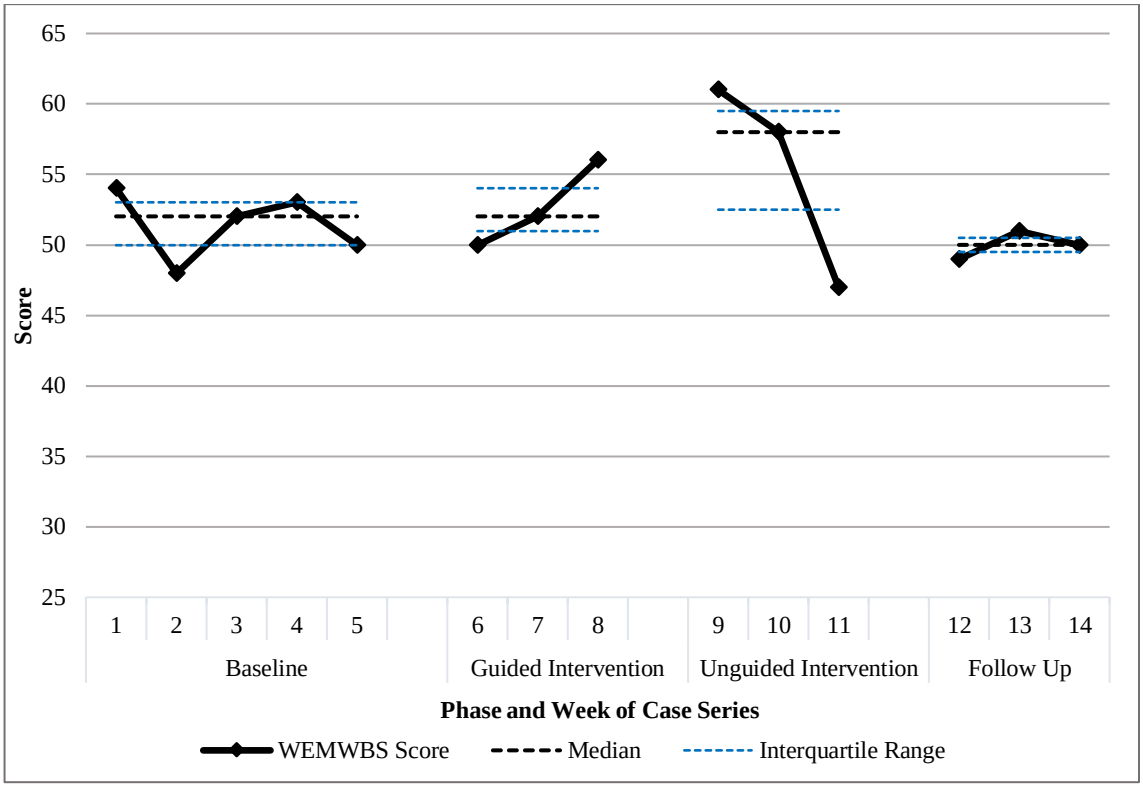


Figure 3: A visual display of Fox's WEMWBS scores during the case series

Figure 3 displays participant Fox's WEMWBS scores throughout the study. Higher scores indicate higher levels of wellbeing. Visual analysis of the data shows that her scores decreased slightly during the baseline phase, and that this was followed by an increase during the guided intervention phase. Her scores reached their peak in week nine, the first week of the unguided phase. This was followed by a sharp deterioration at weeks 10 and 11. Her scores during follow up were fairly consistent. There was no reliable change in her scores, and they remained within the average wellbeing range throughout.

When Fox was shown her scores during the change interview, she attributed much of the variation in her wellbeing to external events. She thought that the increase in her wellbeing scores during the intervention phase was due to feeling excited about Christmas. Week 11 coincided with Fox's return to University and the start of her exam period, which she reported had a negative impact on her wellbeing.

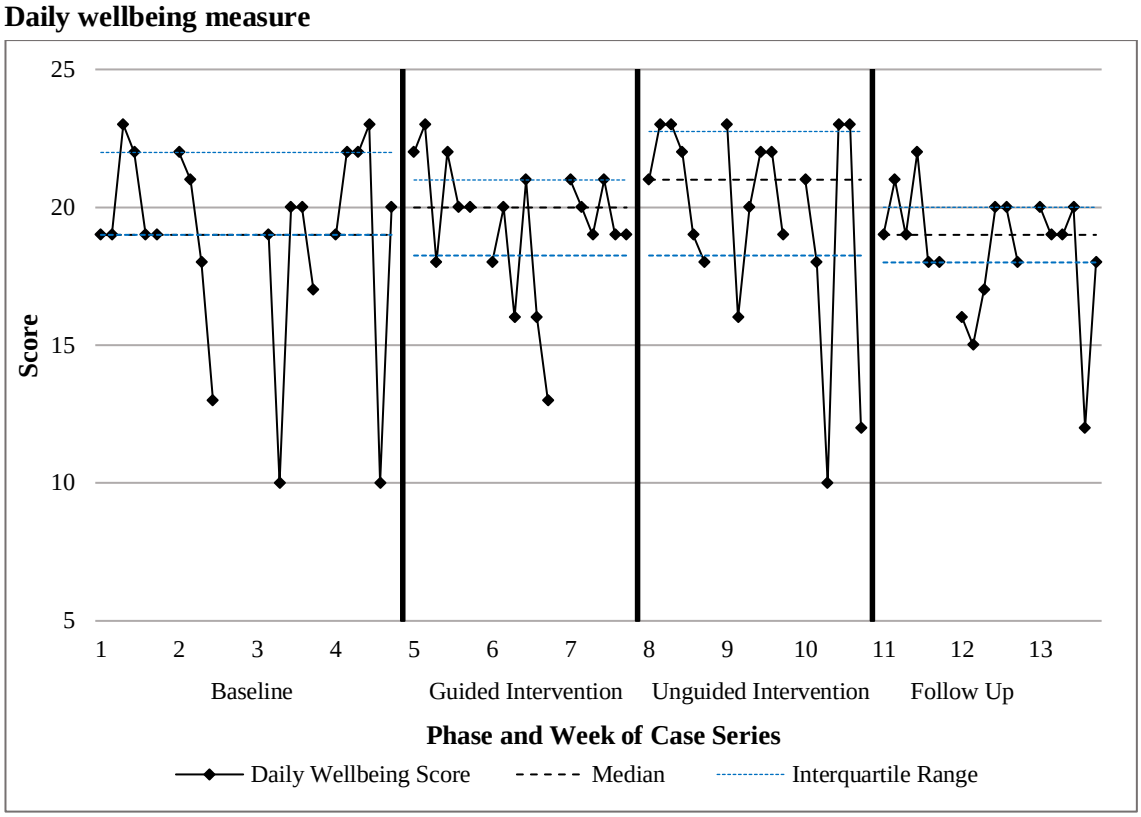


Figure 4: A visual display of Fox's scores on the daily wellbeing measure during the case series

Fox's scores on the daily measure of wellbeing are displayed in Figure 4. Higher scores indicate higher levels of wellbeing. Visual analysis shows that there were high levels of variability in her level of wellbeing on a daily basis, and that this variability was largest during the baseline and unguided intervention phases. There was a slight increase in her wellbeing score between baseline and guided intervention phase, and again between the intervention phases, but her scores returned to their original levels during the follow-up phase. This is consistent with her scores on the WEMWBS.

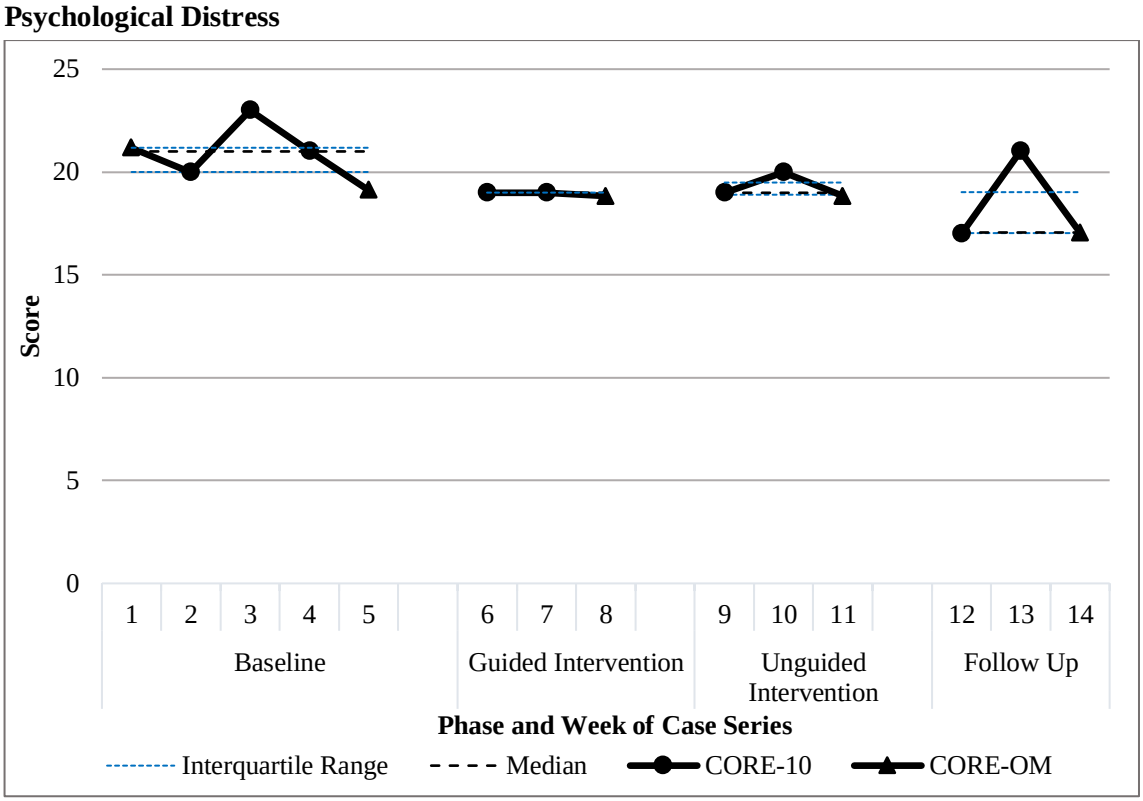


Figure 5: A visual display of Fox's CORE-OM and CORE-10 scores during the case series

Figure 5 displays Fox's scores on the CORE-OM and CORE-10 throughout the case series, with higher scores indicating greater levels of distress. Fox's levels of psychological distress were high compared with other participants. Visual analysis shows that there was a slight reduction in her levels of psychological distress during the baseline phase. Her scores remained slightly lower during the intervention and follow up phases, with the exception of week 13. This improvement did not meet the criteria for reliable change. Her score at week one was in the moderate-to-severe range, and by the end of baseline her score was in the moderate range. This indicates that a clinically significant improvement took place, but as it occurred during the baseline phase it is not attributable to *thedesk*.

Overall, Fox's scores on the three primary measures indicate that *thedesk* did impact her levels of wellbeing or psychological distress. Slight improvement in her scores could be observed during the intervention phases, but these did not meet the criteria for reliable or clinical change and were not maintained at follow up.

3.1.1.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

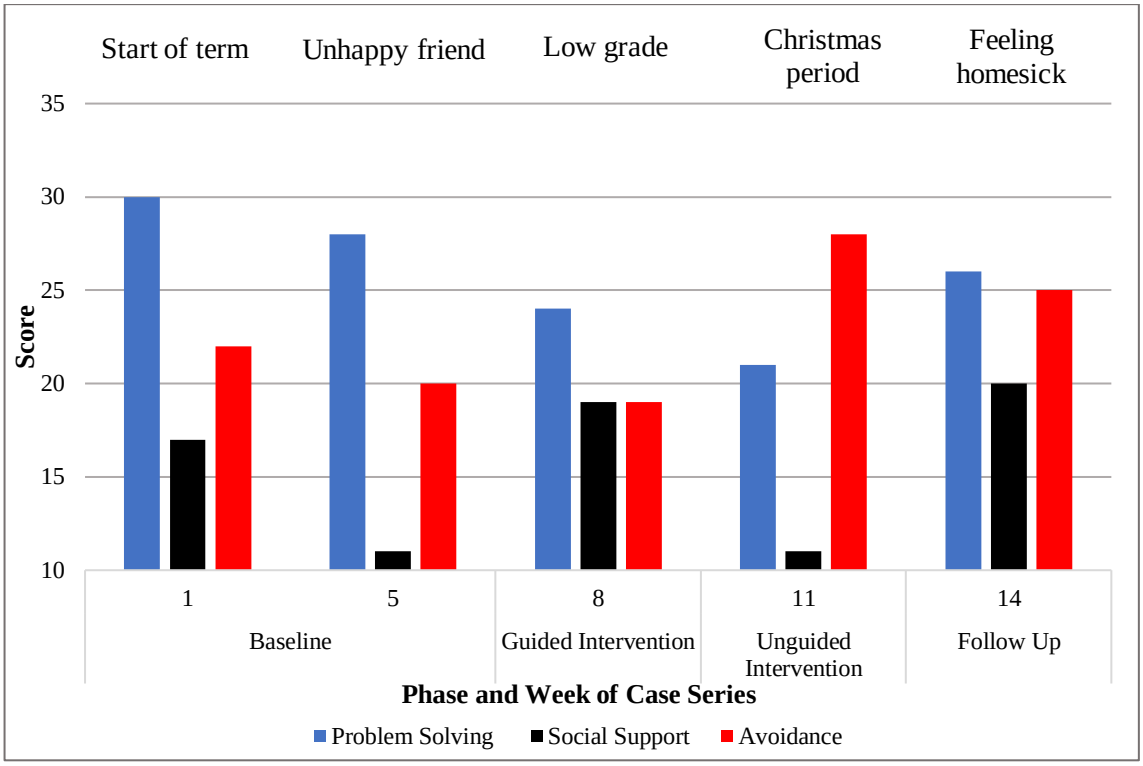


Figure 6: A visual display of Fox's CSI scores during the case series

Fox's scores on the three subscales of the CSI are displayed in Figure 6. This measure was administered at the start and end of baseline and at the end of each subsequent phase, resulting in five data points for each subscale. In order to provide context, a brief description of the problem described at each measurement is included at the top of the figure. Higher levels of problem solving and social support seeking are thought to be positive, whereas higher use of avoidance based coping is believed to be negative.

Fox's scores on the problem solving subscale were within the average range throughout the case series. They decreased during the baseline and intervention phases than increased at follow up, with no reliable change between the first and last weeks of the case series. Her scores on the social support subscale varied at each stage of measurement and there did not seem to be an overall trend. Her scores on the avoidance subscale fluctuated, but increased during the case series.

Therefore, Fox's scores on the CSI did not indicate an improvement in her coping style.

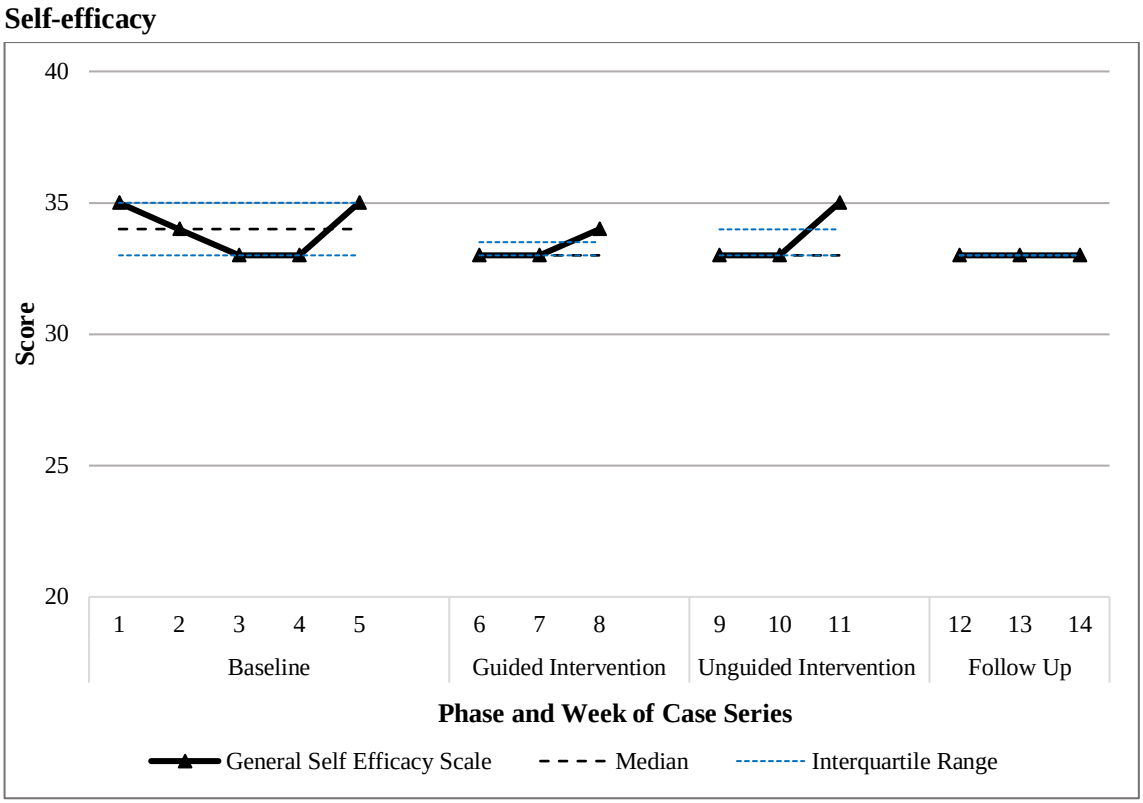


Figure 7: A visual display of Fox's GSE scores during the case series

Fox's scores on the GSE are displayed in Figure 7, higher scores indicate higher levels of self-efficacy, which is thought to be positive. There was little variation in her scores and there was no reliable change in her scores at any point.

Therefore, Fox's scores on the CSI and GSE indicate that *thedesk* did not have an impact on her coping style or levels of self-efficacy.

3.1.1.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

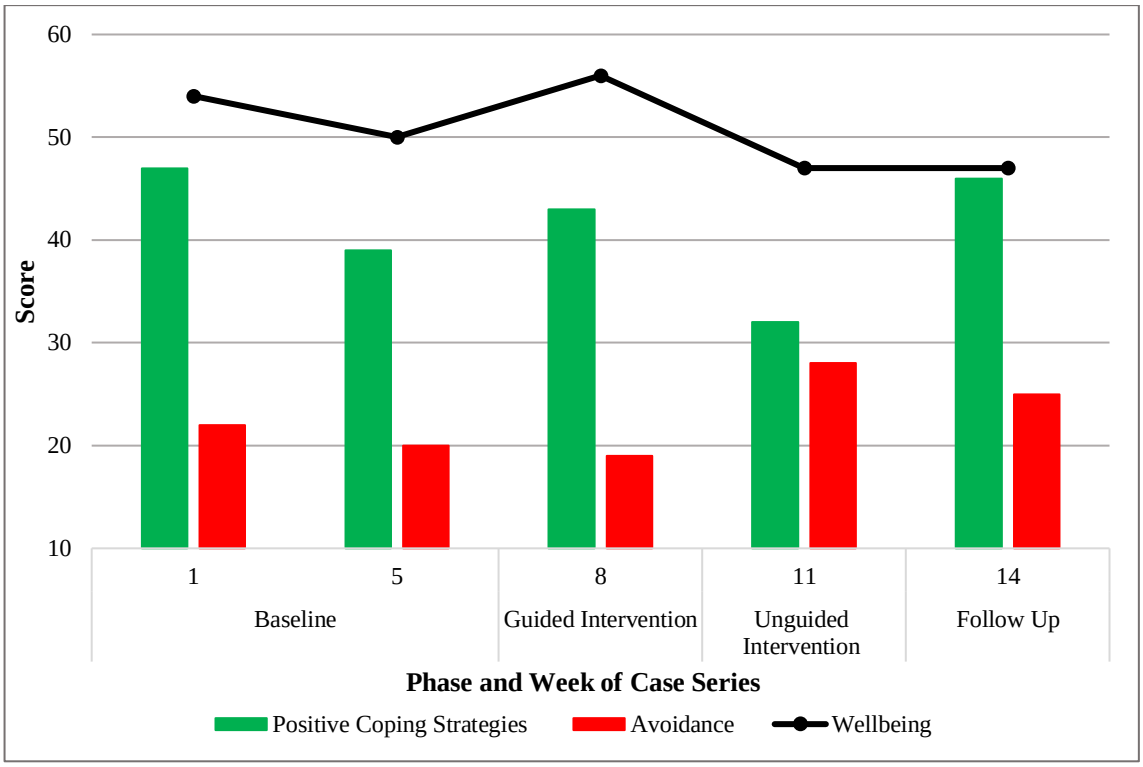


Figure 8: A visual display of Fox's WEMBWS and CSI scores during the case series

Fox's scores on the three subscales of the CSI are displayed in Figure 8, alongside her corresponding WEMWBS score for each week she completed the CSI. Her scores on the problem solving and social support seeking subscales have been combined to create one positive coping strategies score, in order to aid readability of the graph. Visual analysis indicates that there was a relationship between her coping strategies and levels of wellbeing. For example, her lowest levels of wellbeing coincided with her greatest use of avoidance and lowest use of positive coping strategies at week 11, and her highest wellbeing score coincided with lower use of avoidance and higher use of positive coping strategies at week 8.

Figure 9: A visual display of Fox's WEMWBS and GSE scores during the case series

Figure 9 displays Fox's scores on the WEMWBS and the GSE. There were some periods during the case series in which they followed similar trends, but they deviated at other points, such as at week 11.

Overall, Fox's scores indicated that there changes in her levels of wellbeing were associated with changes in her coping style, but not with her level of self-efficacy.

3.1.1.4 Change interview

In the change interview, Fox reported three positive changes that she had experienced whilst taking part in the case series. These are summarised in Table 5. She attributed one change to external life events, one change to using *thedesk*, and was unsure about the cause of the third change.

Table 5: Summary of the changes reported by Fox during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Decided to see a doctor for my mental health, would not have done this before	Somewhat surprised by it	No way of telling	Extremely Important
Thinking differently and more positively about mindfulness	Somewhat surprised by it	Clearly would not have happened without *thedesk*	Moderately important
Thinking differently about anxiety and stress – realising that lots of people experience this.	Somewhat surprised by it	Probably would not have happened without *thedesk*	Very important

3.1.1.5 Fox participant summary

Fox's engagement with *thedesk* was fairly poor, as she only accessed the site for a total of seven minutes whilst taking part in the study. There were no reliable or clinically significant improvements in Fox's wellbeing, psychological distress, coping style or self-efficacy. Her levels of wellbeing appeared to be associated with her coping style but not with her levels of self-efficacy.

Fox reported finding *thedesk* helpful during the change interview. She reported that she had previously managed difficult emotions by trying to ignore them, and keeping herself extremely busy. She stated that whilst taking part in the study, as a result both of completing the daily measures and of using *thedesk*, she had become more reflective about her feelings and decided that she wanted to seek support for her mental health. She reported that previously she would have perceived this negatively, but that her outlook and perspective on mental health had changed for the better whilst taking part in the case series.

3.1.2 Participant 2: Harp

Harp was a first year student studying with the School of Chemistry. At recruitment, her WEMWBS score was 43 which is in the normal wellbeing range, and her CORE-OM score was 31 which indicates low levels of psychological distress. Her responses during the case series indicated that she was experiencing difficulties related to her mood and with procrastination, so during the guided intervention phase she was encouraged to use the Feeling Good and Getting Things Done sections of *thedesk*. She was randomised to complete this intervention phase first.

Harp's engagement with the daily measures was extremely high, and she completed 100% of them during the case series. During the guided intervention phase, which she completed first, Harp visited *thedesk* a total of 15 times, and viewed the Feeling Good and Getting Things Done sections as she had been encouraged to do. The majority of these visits lasted less than two minutes however, and during five of these visits she appeared to log in and then log out before doing anything. During the unguided intervention phase she visited the site 11 times, but all visits were under two minutes and on seven occasions she did not appear to access any material after logging in. She spent an estimated total of 27-38 minutes using the site.

3.1.2.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

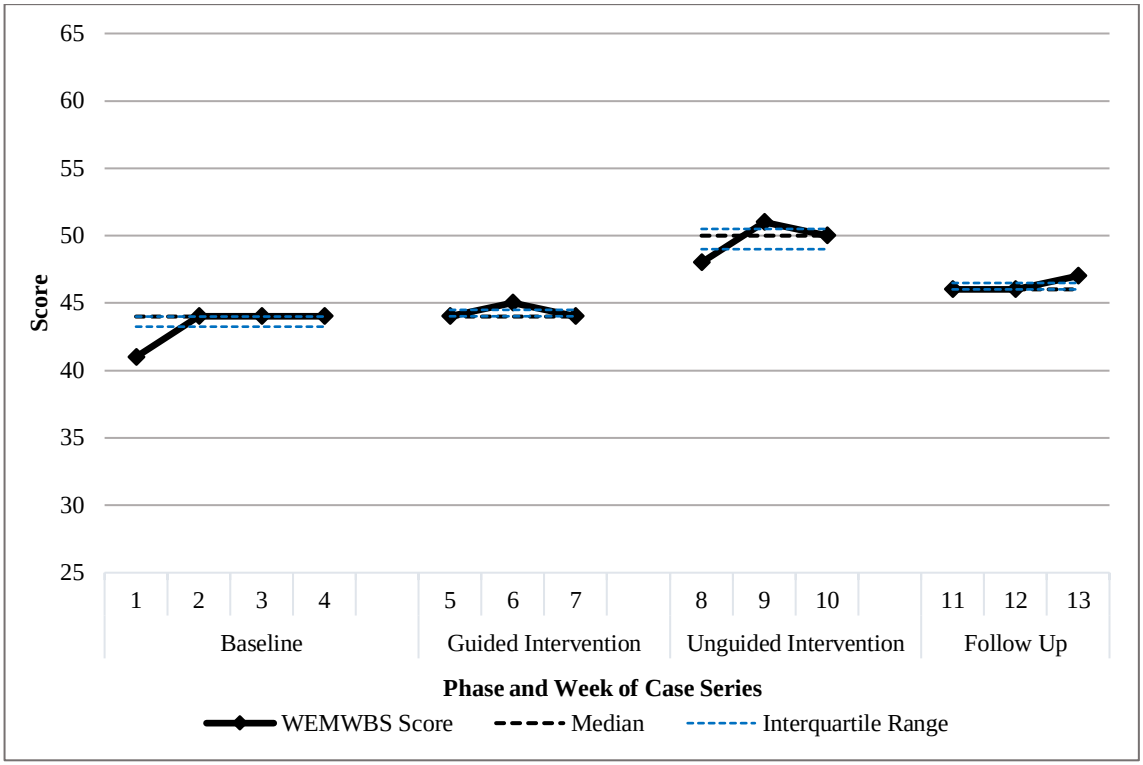


Figure 10: A visual display of Harp's WEMWBS scores during the case series

Figure 10 displays Harp's WEMWBS scores throughout the case series. Visual analysis shows that there was a low level of variation in her scores on a weekly basis. There was an improvement in her scores during the unguided intervention phase followed by a slight deterioration during follow up, although her scores remained higher than at baseline. The improvement during the case study was not reliable or clinically significant.

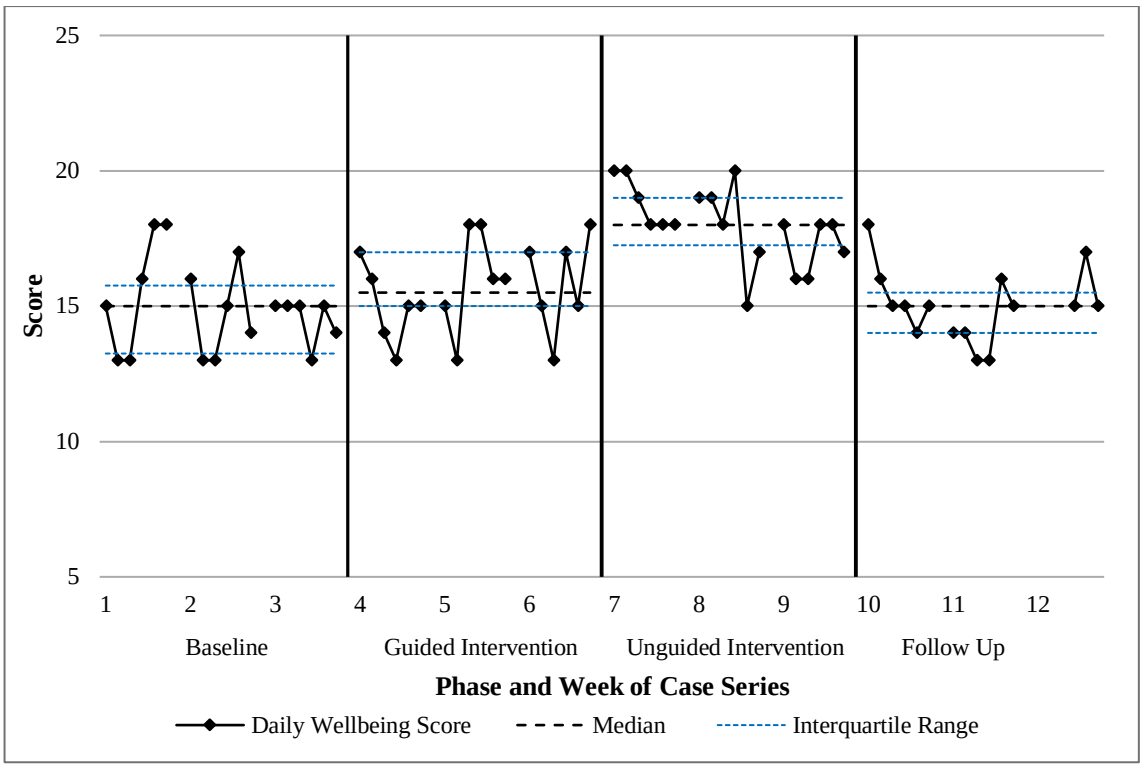


Figure 11: A visual display of Harp's scores on the daily wellbeing measure during the case series

Harp's scores on the daily wellbeing measure are displayed in Figure 11. Her scores showed little variability when compared with the scores of the other participants. This is consistent with her scores on the other measures. Her scores improved during the intervention phases, but this was not maintained during follow up as her scores decreased during weeks 11 and 12.

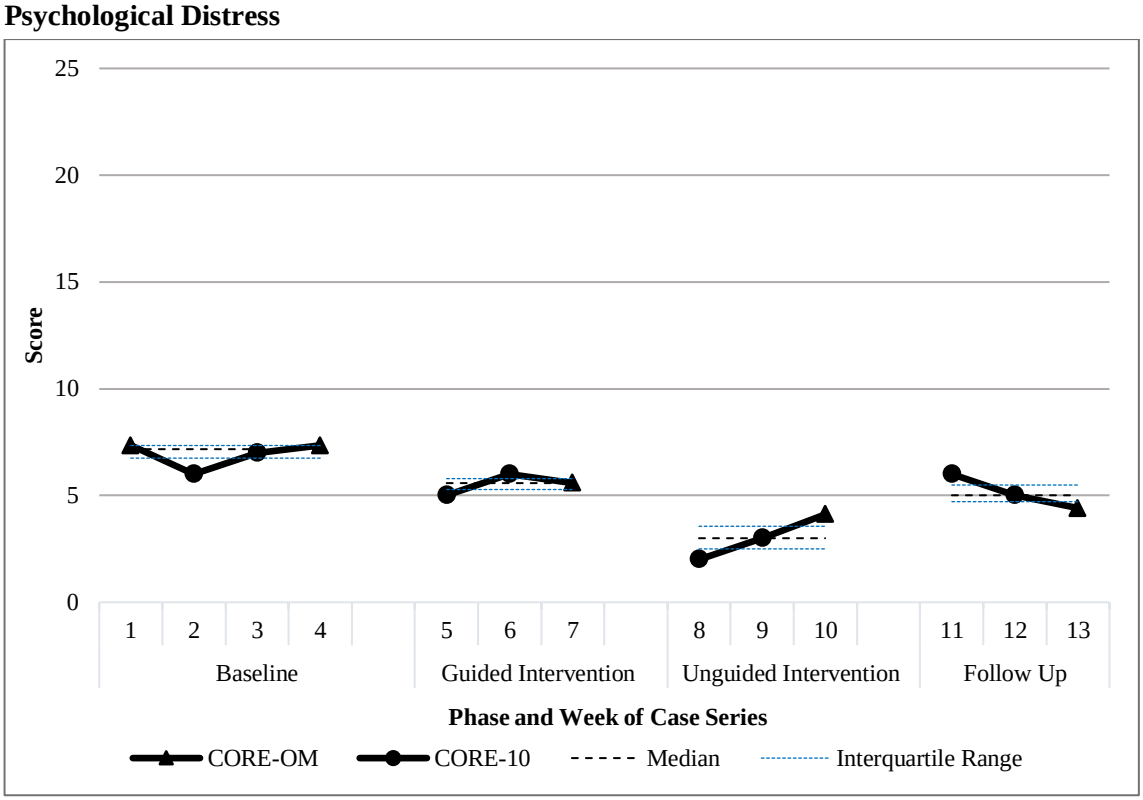


Figure 12: A visual display of Harp's CORE-OM and CORE-10 scores during the case series

Figure 12 displays Harp's CORE-OM and CORE-10 scores during the case series. Higher scores indicate higher levels of psychological distress. Visual analysis shows that there was a reduction in Harp's levels of psychological distress during the baseline and intervention phases. This was followed by a deterioration at the start of follow up phase, although her scores remained lower than their original levels and improved during the final two weeks of the study. The changes did not constitute a reliable improvement, but Harp's scores were in the low level range during baseline then decreased to the healthy range, indicating that a clinically significant improvement had taken place.

Overall, Harp's results indicate that *thedesk* did not have an impact on her levels of wellbeing or psychological distress. Slight improvements in her scores were visible, but these did not meet the criteria for reliable change, were not maintained at follow up and were attributed to external events.

3.1.2.2 Research question 2: What is the impact of *thedesk* on the self-efficacy and coping style of the participants?

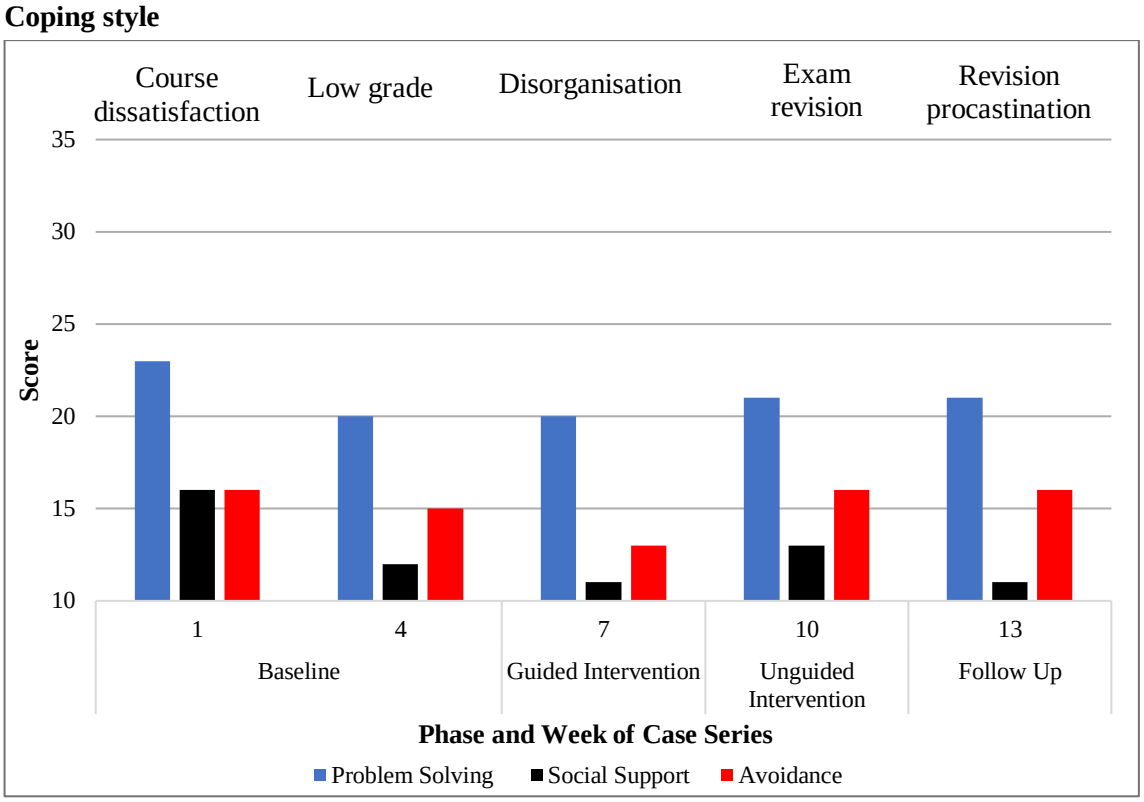


Figure 13: A visual display of Harp's CSI scores during the case series

Figure 13 displays Harp's scores on the three subscales of the CSI throughout the study. Her scores on the problem solving and avoidance subscales remained stable throughout, and there were no reliable or clinically significant changes between baseline and follow up in her scores on these subscales. Her scores on the social support seeking subscale deteriorated during the case series, and her score moved from the low range at baseline to the very low range at follow-up.

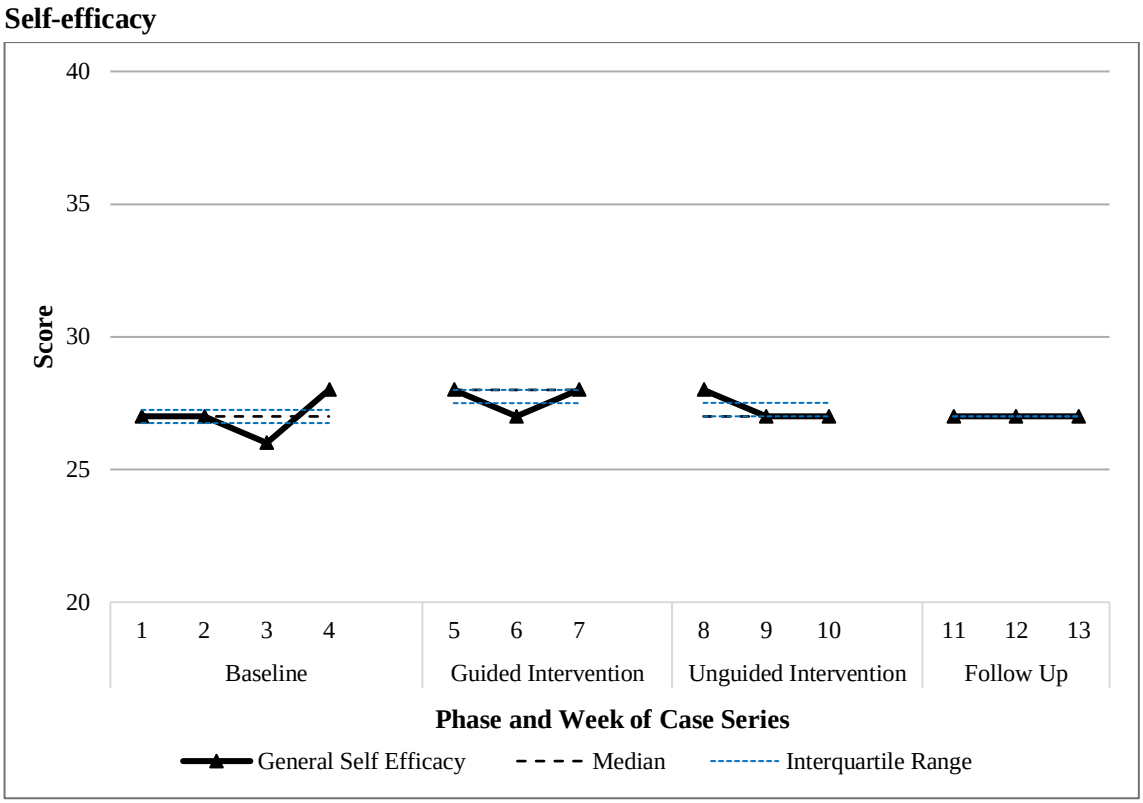


Figure 14: A visual display of Harp's GSE scores during the case series

Figure 14 displays Harp scores on the GSE measure. There was little variability in her scores throughout the case series and no reliable changes at any point.

Therefore, Harp's scores indicate that *thedesk* did not have an impact on her coping style or levels of self-efficacy, as there were no improvements in her self-efficacy or her coping style in response to the intervention.

3.1.2.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

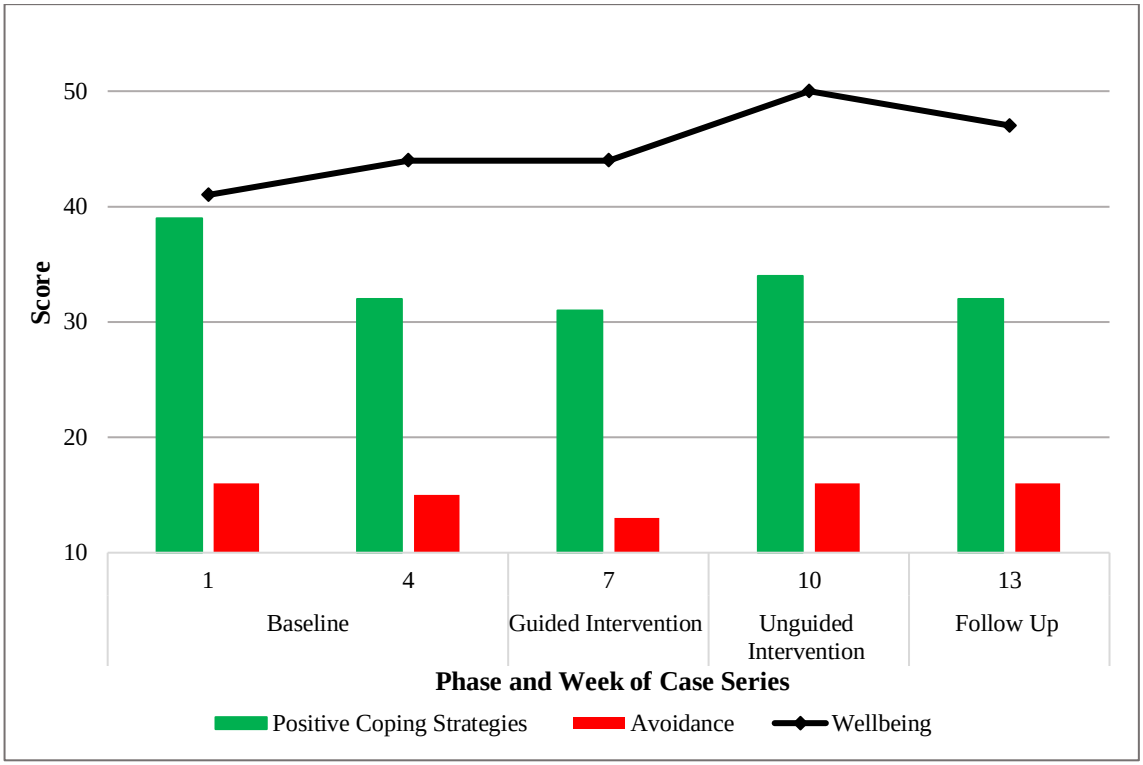


Figure 15: A visual display of Harp's WEMBWS and CSI scores during the case series

Figure 15 displays Harp's scores on the CSI and the WEMWBS. It does not appear that her scores on the two measures were associated with one another in the expected direction. For example, at week four her wellbeing increased whilst her use of positive coping strategies decreased, and at week ten her wellbeing increased whilst her use of avoidance based coping strategies increased.

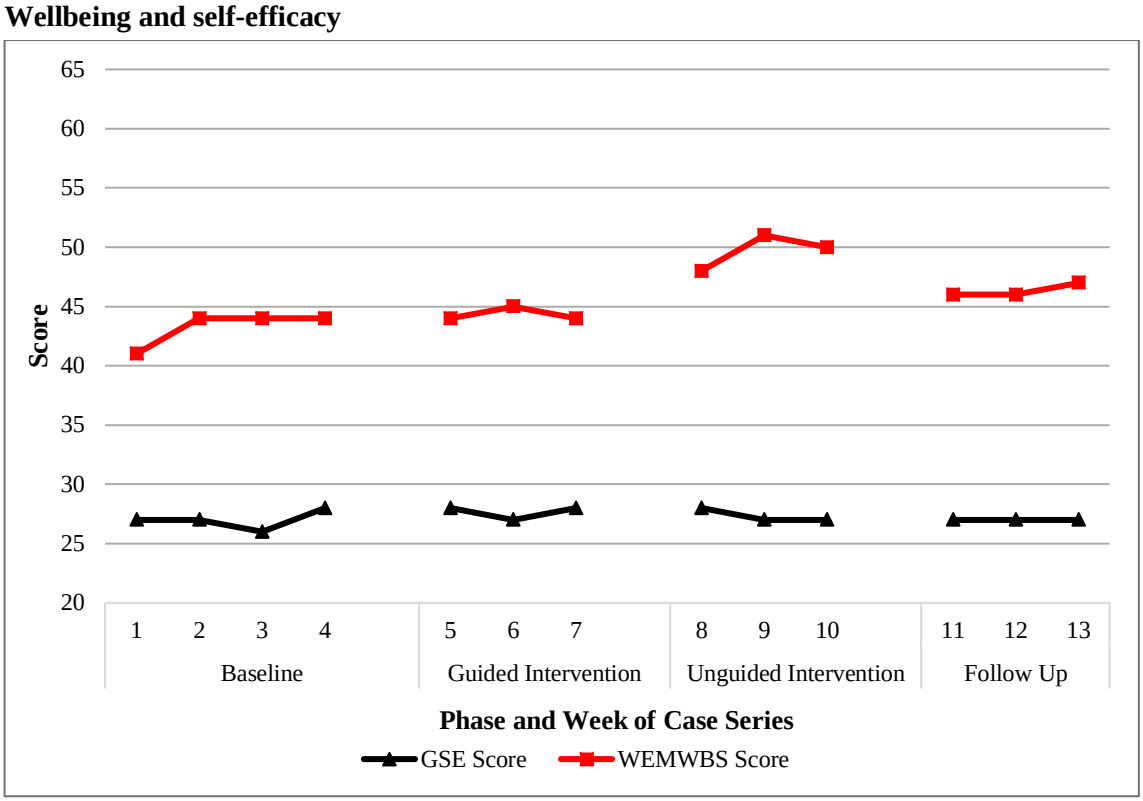


Figure 16: A visual display of Harp's WEMWBS and GSE scores during the case series

Harp's wellbeing and general self-efficacy scores are displayed in Figure 16. Changes in Harp's wellbeing scores did not appear to be associated with her scores on the GSE scale, for example her WEMWBS score was highest during the unguided intervention phase but there was not a corresponding increase in her GSE scores during this period.

Therefore, Harp's scores on the GSE, the CSI and the WEMWBS indicate that any changes in her levels of wellbeing were not associated with changes in her coping style or levels of self-efficacy.

3.1.2.4 Change interview

Harp completed the change interview, but was not able to identify any changes that she had experienced whilst taking part in the study.

3.1.2.5 Harp participant summary

Harp's scores on the measures indicate small improvements in her levels of wellbeing and psychological distress during the case series. These improvements were not all maintained at follow up, and Harp attributed them to the Christmas holidays. During the change interview, Harp was not able to identify any changes since starting the study. She also discussed finding it hard to keep up with the strategies and ideas she had read about in *thedesk*. Although she visited the website often whilst taking part in the study,

the majority of her visits were under two minutes and she often appeared to log out without accessing any content or material, so her engagement with *thedesk* could be regarded as superficial. As Harp's CORE-OM score at recruitment indicated that she was experiencing low level psychological distress, this may have affected her motivation or need to change or improve. Harp expressed ambivalence regarding changing her study habits during the interview, which is consistent with this idea.

3.1.3 Participant 3: Igloo

Igloo was a first year student studying with the School of Medicine. At recruitment, his WEMWBS score of 56 indicated normal levels of wellbeing, and his CORE-OM score of 22 indicated low levels of psychological distress. He was randomised to complete the unguided intervention phase first. His responses indicated that he was experiencing difficulties relating to anxiety and feeling isolated, so during the guided intervention phase he was encouraged to visit the Staying Calm and Staying Connected sections of *thedesk*.

Igloo's engagement with completing the daily measures was high, he completed measures on 96.5% of the days during the case series. His engagement with *thedesk* was also higher than the majority of the participants. He spent an estimated total of 23 minutes actively using the site during the study, and a further six minutes using the site after he had completed the case series. He used *thedesk* more during the unguided intervention phase which he completed first. He accessed both the Staying Calm and Staying Connected sections of *thedesk* during this unguided period, so perhaps did not feel the need to revisit them when he received the guidance emails.

3.1.3.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

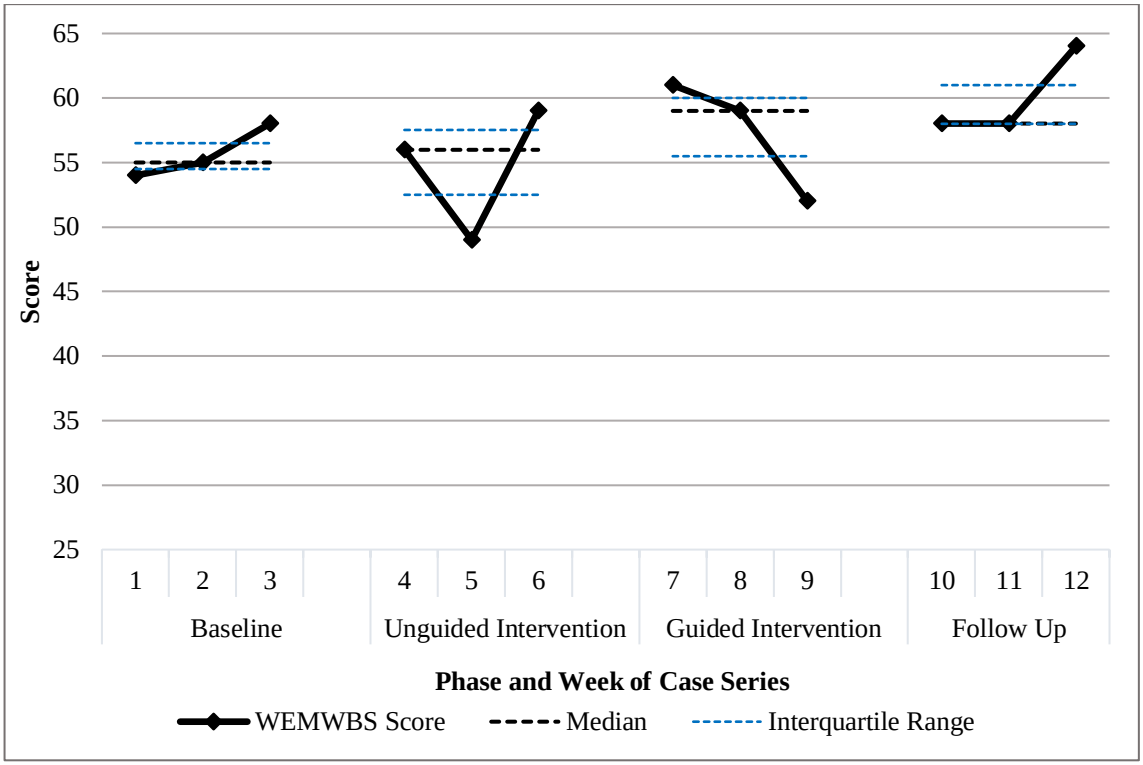


Figure 17: A visual display of Igloo's WEMWBS scores during the case series

Visual analysis shows that there was a slight improvement in Igloo's wellbeing during the baseline phase. His median scores also increased during the intervention phases, although there were higher levels of variation within these than during baseline. There was an increase in his score at the final week of the study, and the difference between his scores between week one and week 12 met the criteria for a reliable improvement. Although a positive trend in his scores can be observed, this was not attributable to *thedesk*, due to the fact that the largest increases occurred during the baseline and follow up phases.

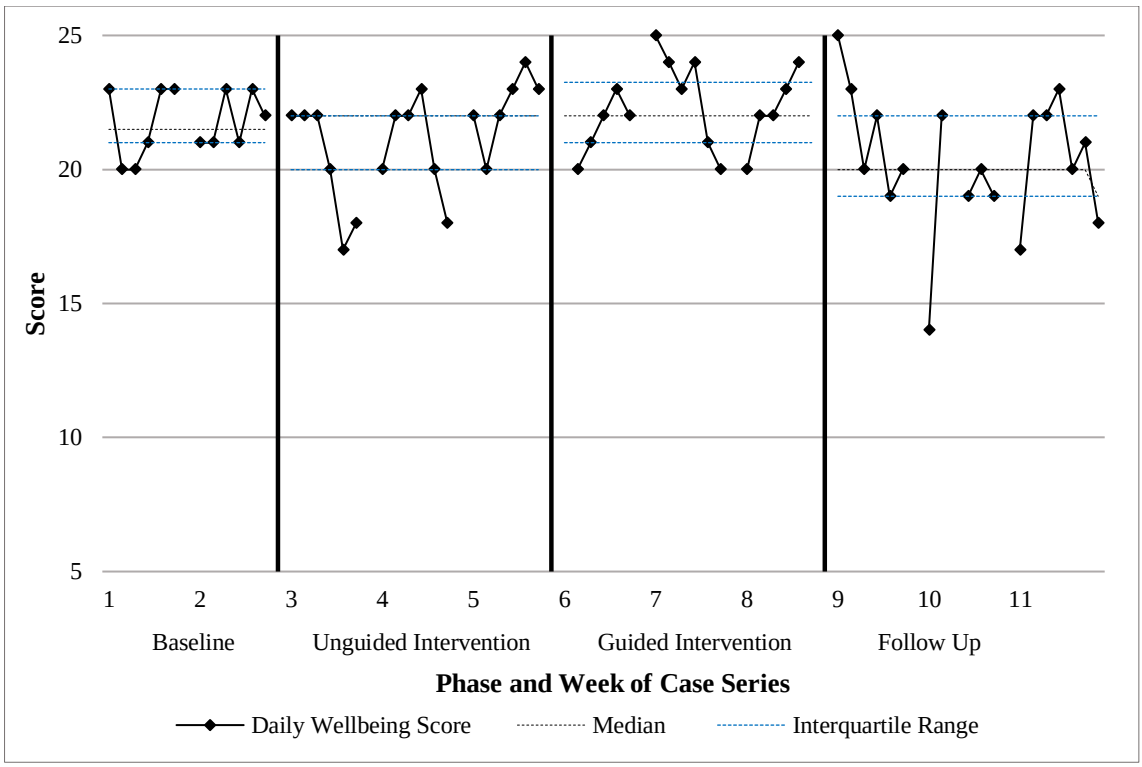


Figure 18: A visual display of Igloo's scores on the daily wellbeing measure during the case series

Igloo's scores on the daily wellbeing measure are displayed in Figure 18. His scores indicated a fairly high level of daily wellbeing, with some variation. This is consistent with his scores on the WEMWBS. His scores did not indicate that there was an improvement in his level of daily wellbeing during the case series.

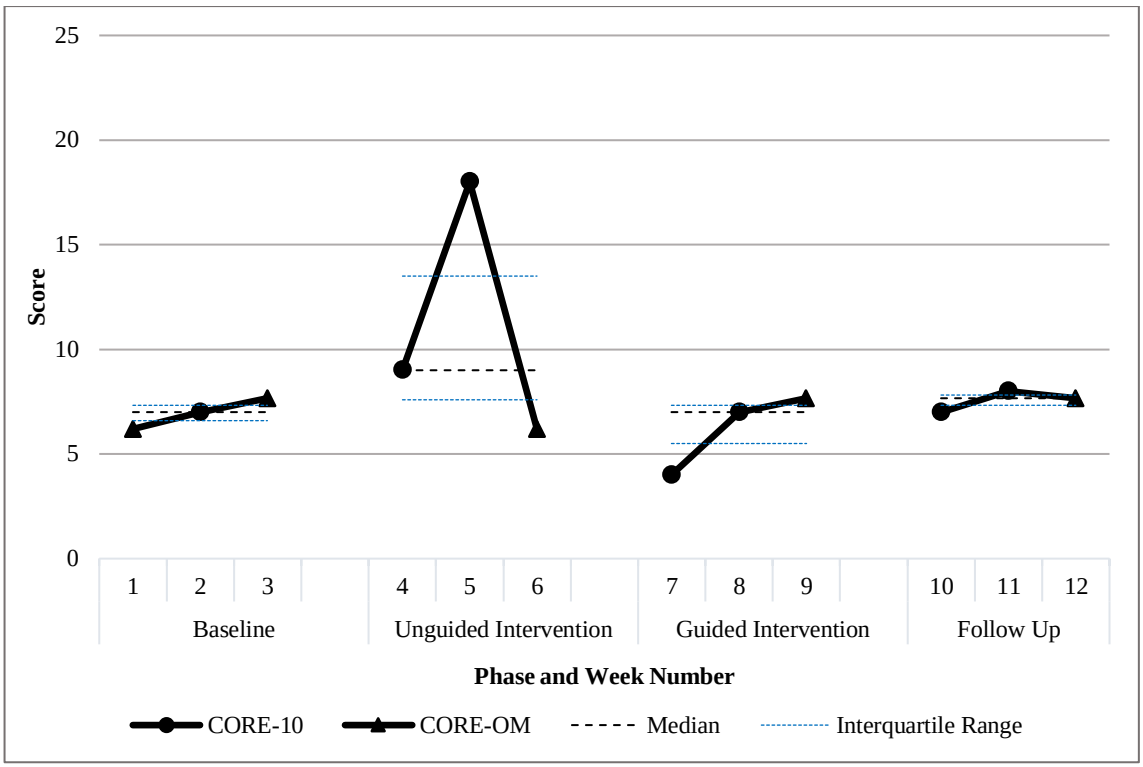


Figure 19: A visual display of Igloo's CORE-OM and CORE-10 scores during the case series

Igloo's CORE-OM and CORE-10 scores are displayed in Figure 19. Higher scores indicate higher levels of psychological distress. His scores deteriorated during the baseline and unguided intervention phases and there was a sharp increase in his levels of distress at week five. This corresponds with his scores WEMBWS scores. His scores improved slightly during the guided intervention and follow up phases, but this improvement was not reliable nor clinically significant.

Overall, Igloo's scores on the primary measures indicate that *thedesk* did not have an impact on his levels of wellbeing or psychological distress.

3.1.3.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

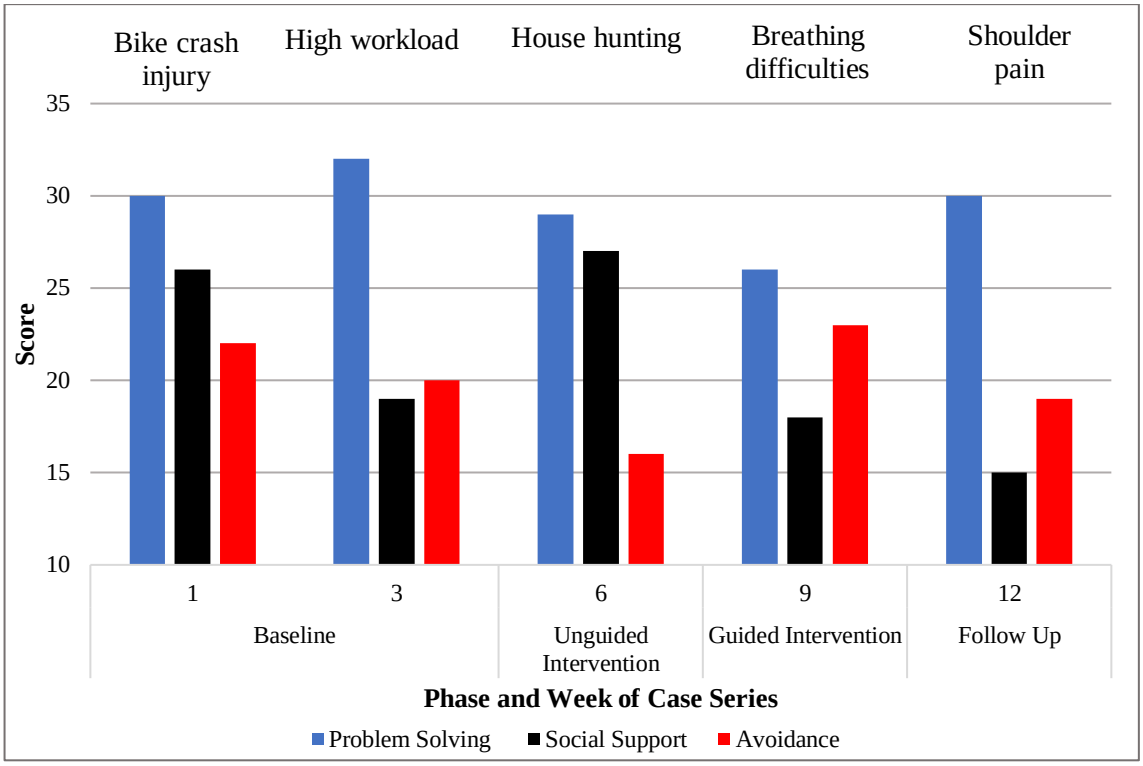


Figure 20: A visual display of Igloo's CSI scores during the case series

Igloo's scores on the three subscales of the CSI are displayed in Figure 20. His scores on the problem solving scale fluctuated slightly during the case series, but there was no overall improvement or deterioration in his score. With the exception of week six, there was a downwards trend in his scores on the social support seeking subscale. There was a reliable deterioration in his scores on this subscale between the start and end of the case series, and his scores fell from the average range to the low range. Igloo's scores on the avoidance subscale fluctuated. There was a slight decrease in his score between the first and last week of the case series but this was not reliable and his scores remained within the average range.

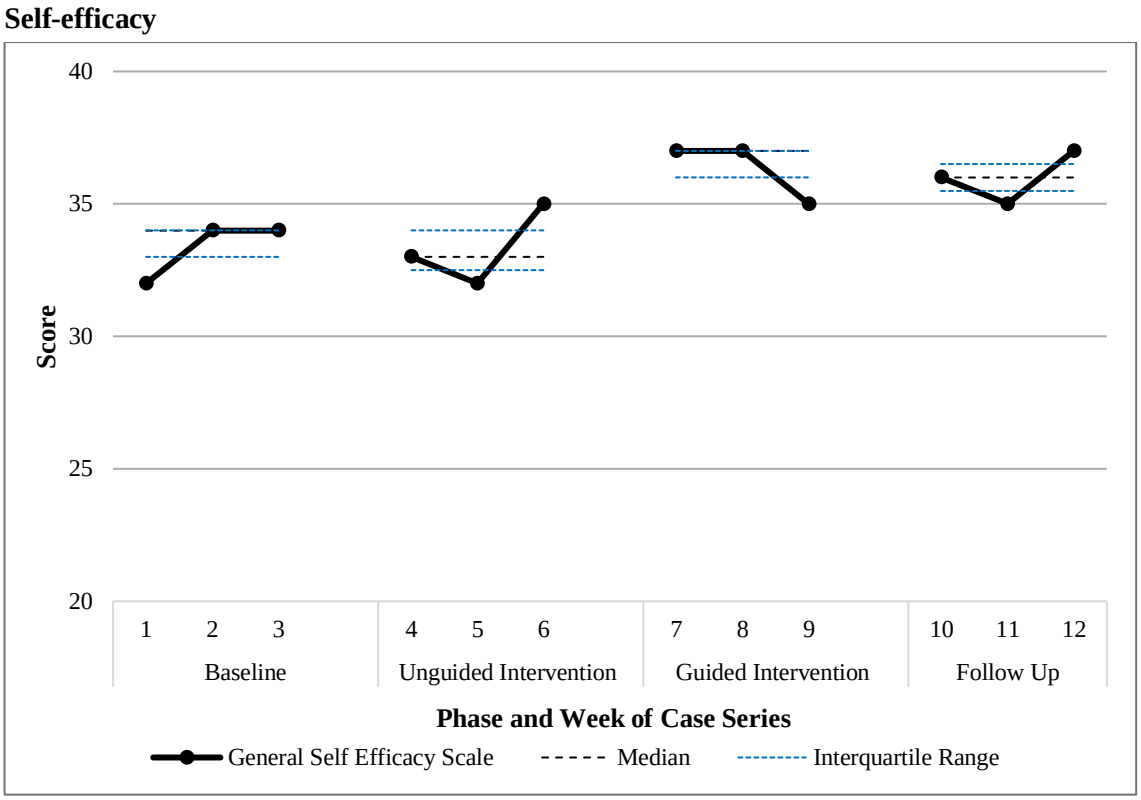


Figure 21: A visual display of Igloo's GSE scores during the case series

Igloo's scores on the GSE are displayed in Figure 21. Visual analysis shows that his scores improved slightly during the case series, but this improvement was small did not meet the criteria for reliable improvement.

Therefore, Igloo's scores on the CSI and GSE indicate that *thedesk* did not have an impact on his coping style or levels of self-efficacy.

3.1.3.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

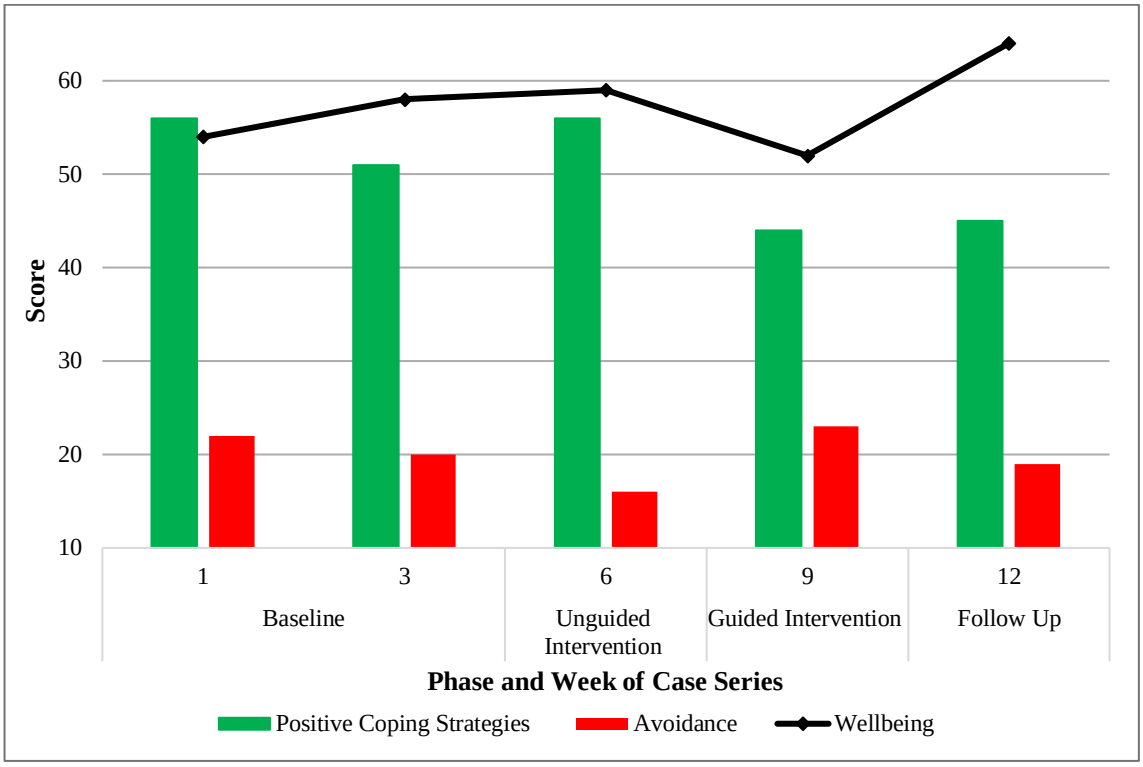


Figure 22: A visual display of Igloo's WEMBWS and CSI scores during the case series

Igloo's scores on the CSI and the WEMWBS are displayed in Figure 22.Visual analyses indicates that his levels of wellbeing and coping style were not related with one another.

Figure 23: A visual display of Igloo's WEMWBS and GSE scores during the case series

Igloo's wellbeing scores and self-efficacy scores are displayed in Figure 23. His scores on the two measures appeared to be consistent with one another and followed a similar pattern throughout the case series. This indicates that there was a relationship between his scores on the two measures.

Therefore, Igloo's scores indicate that changes in his wellbeing were associated with changes in his levels of self-efficacy but not his coping style.

3.1.3.4 Change interview

In the change interview Igloo reported experiencing three positive changes whilst taking part in the case series, all of which he rated as highly important to him. He believed that one change, which was being more talkative and making more of an effort to make new friends probably would have occurred had he not been using *thedesk*. He felt that the other two changes he had experienced, adding new exercises to his routine and better time management and work-life balance, would probably not have happened had he not been using *thedesk*.

Table 6: Summary of the changes reported by Igloo during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Being a lot more talkative and sociable	Somewhat surprised by it	Probably would have happened on its own	Very Important
Adding new, different types of exercise to routine such as climbing	Somewhat expected it	Probably would not have happened without *thedesk*	Extremely important
Having better time management with work, so being able to do more socially	Neither expected nor surprised by the change	Probably would not have happened without *thedesk*	Very important

3.1.3.4 Igloo participant summary

Overall, Igloo showed reliable and statistically significant improvements in his wellbeing during the case series. The largest changes occurred during the baseline and follow up phases so were not attributed to using *thedesk*. His scores did not indicate that there were improvements in his levels of psychological distress or his coping style. Although there was not a reliable change, his scores on the GSE show some improvement. This is consistent with the changes he reported in the interview, which were practicing better time management and trying new things. There appeared to be an association between his WEMWBS scores and his level of self-efficacy but not his coping style.

3.1.4 Participant 4: Moon

Moon was a fourth year student studying with the school of Medicine. At recruitment, her WEMWBS score was 48, indicating normal levels of wellbeing. Her CORE-OM score was 32, indicating low levels of psychological distress. Her responses to the measures indicated that she was experiencing difficulties relating to her mood and her relationships, so she was encouraged to use the Feeling Good and Staying Connected sections of *thedesk* during the guided intervention phase. She was randomised to complete this phase first.

Moon's engagement in completing the daily measures was fairly high, and she completed 94.1% of them during the study. Her engagement with *thedesk* was low. She did not use it during the guided intervention phase which she completed first. She visited the site twice during the unguided phase, spending an estimated 13 minutes actively using *thedesk*.

3.1.4.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

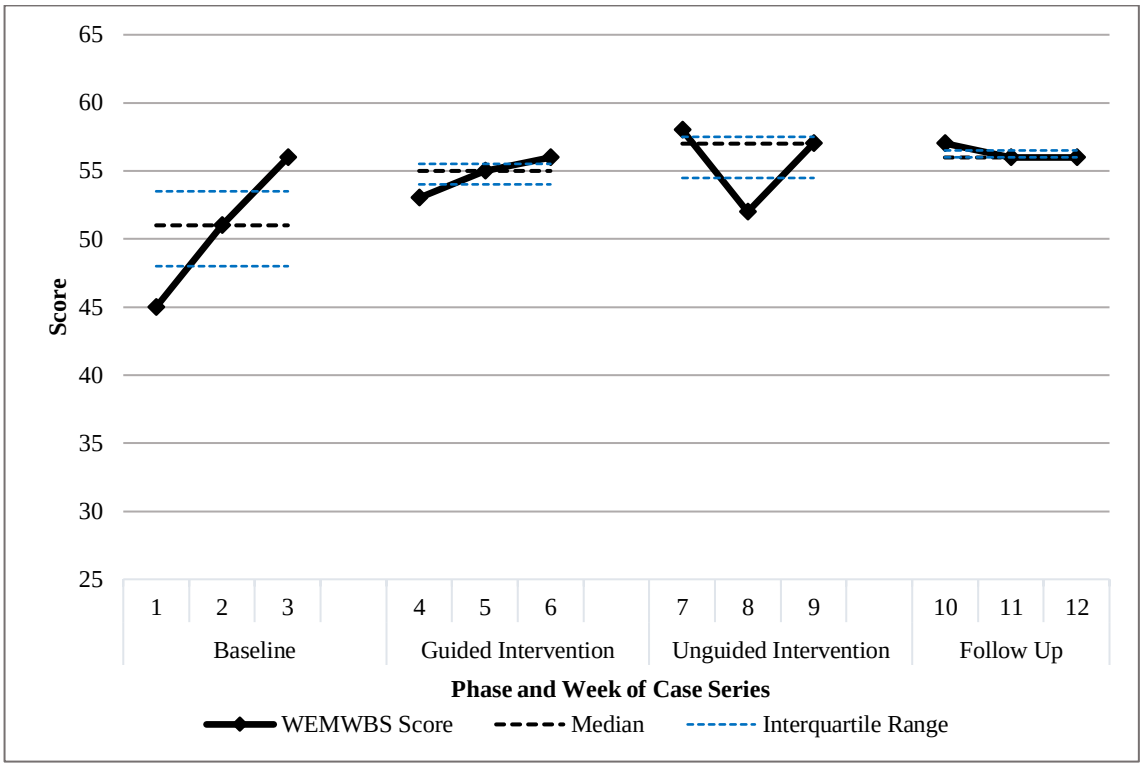


Figure 24: A visual display of Moon's WEMWBS scores during the case series

Moon's wellbeing scores are displayed in Figure 24. Visual analysis shows that there was a sharp increase in her wellbeing during the baseline phase. This was maintained

during the remainder of the case series with the exception of a small decrease in week eight. The increase in her scores during baseline was a reliable change, but her scores fell in the normal range throughout the case series meaning that this was not a clinically significant improvement.

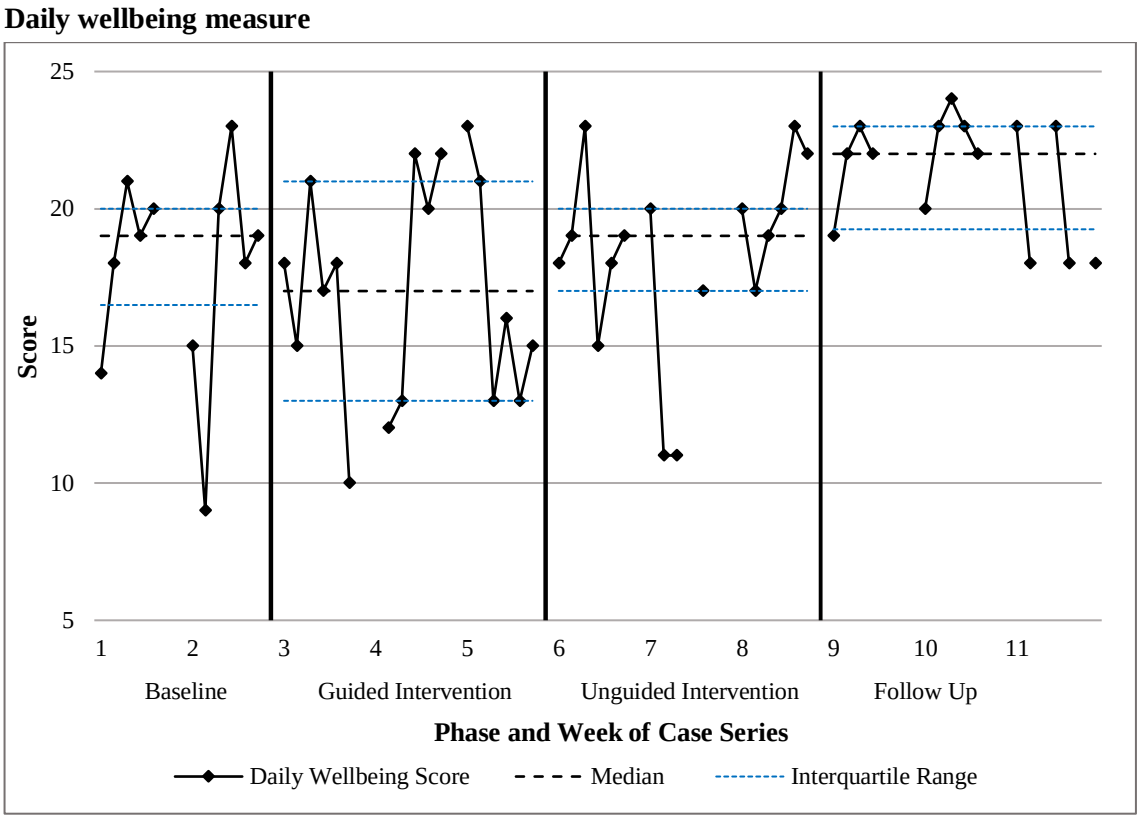


Figure 25: A visual display of Moon's scores on the daily wellbeing measure during the case series

Moon's scores on the daily wellbeing measure are displayed in Figure 25. Visual analysis shows that there were high levels of variability during the baseline and guided intervention phases of the study. Her scores become less variable as the case series continued, and fell within a narrower range during the unguided intervention and follow up phases. Her median score decreased slightly between baseline and the unguided intervention phase, and this was followed by an increase in her scores during the guided intervention phase and follow up.

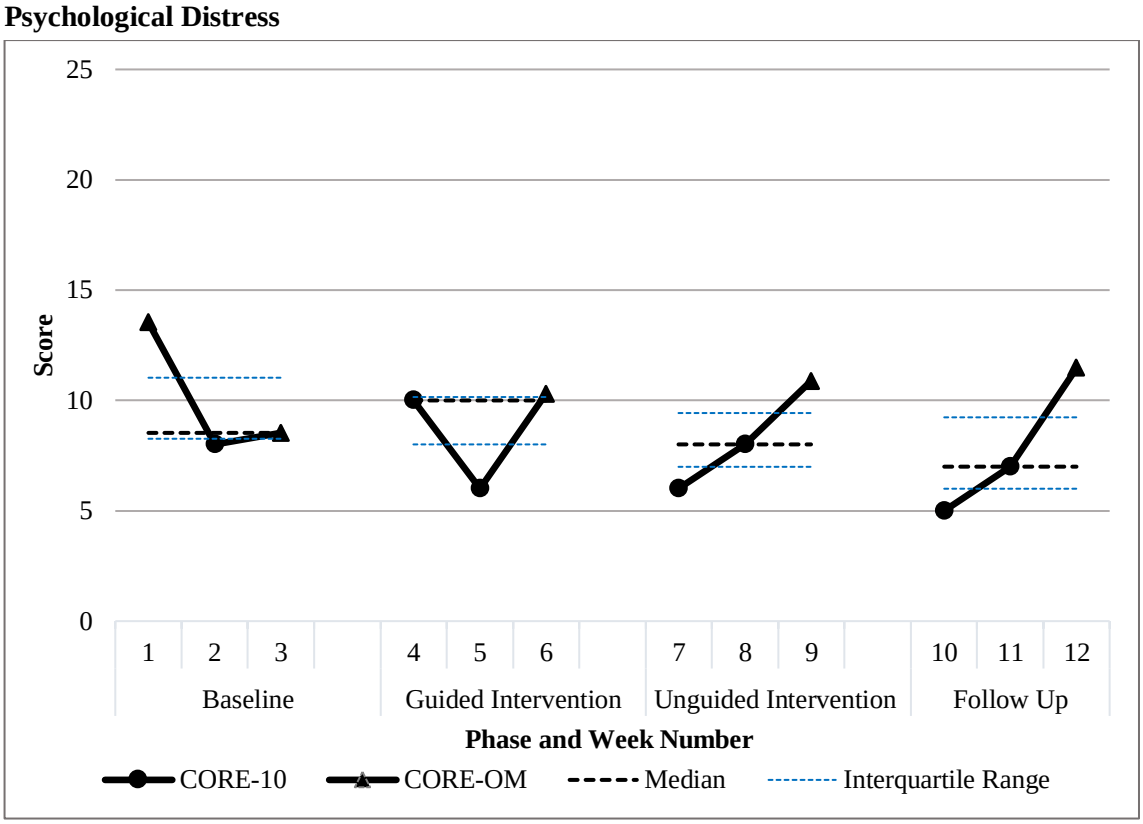


Figure 26: A visual display of Moon's CORE-OM and CORE-10 scores during the case series

Moon's CORE-OM and CORE-10 scores are displayed in Figure 26, higher scores indicate greater levels of psychological distress. Similarly to her wellbeing scores, there was a reliable improvement in her levels of psychological distress during baseline. There was high variability in her scores during the remainder of the case series, but they remained slightly improved compared with the start of baseline.

Therefore, Moon's scores on three target measures indicate that *thedesk* did not have an impact on her levels of wellbeing or psychological distress. Her scores on the WEMWBS did improve during the case series, but the largest improvements occurred during the baseline phase so are not attributable to *thedesk*.

3.1.4.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

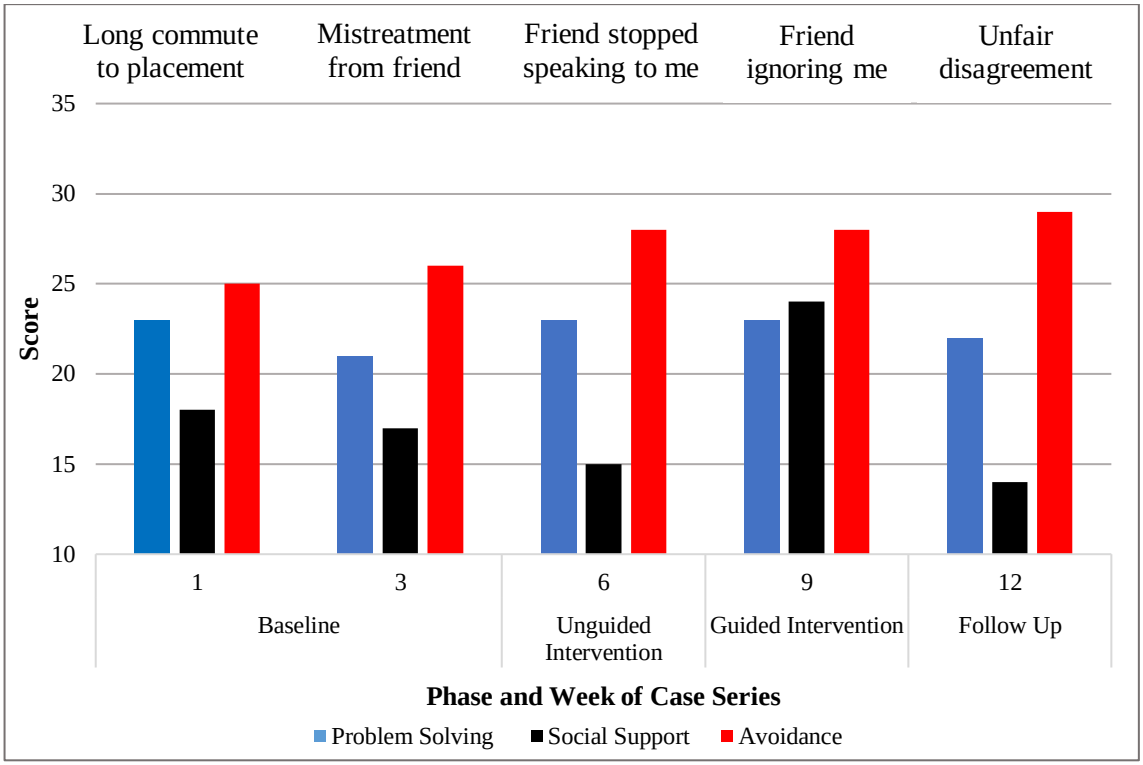


Figure 27: A visual display of Moon's CSI scores during the case series

Moon's scores on the three subscales of the CSI are displayed in Figure 27. Her scores on the problem solving subscale remained fairly consistent and were in the average range throughout the case series. There appeared to be a decrease in her use of social support seeking, and an increase in her use of avoidance strategies across the study. At week one her score on the avoidance coping scale was in the high range, and by week 12 it has increased to the very high range. Therefore Moon's scores on the CSI did not indicate that her coping style improved in response to the intervention.

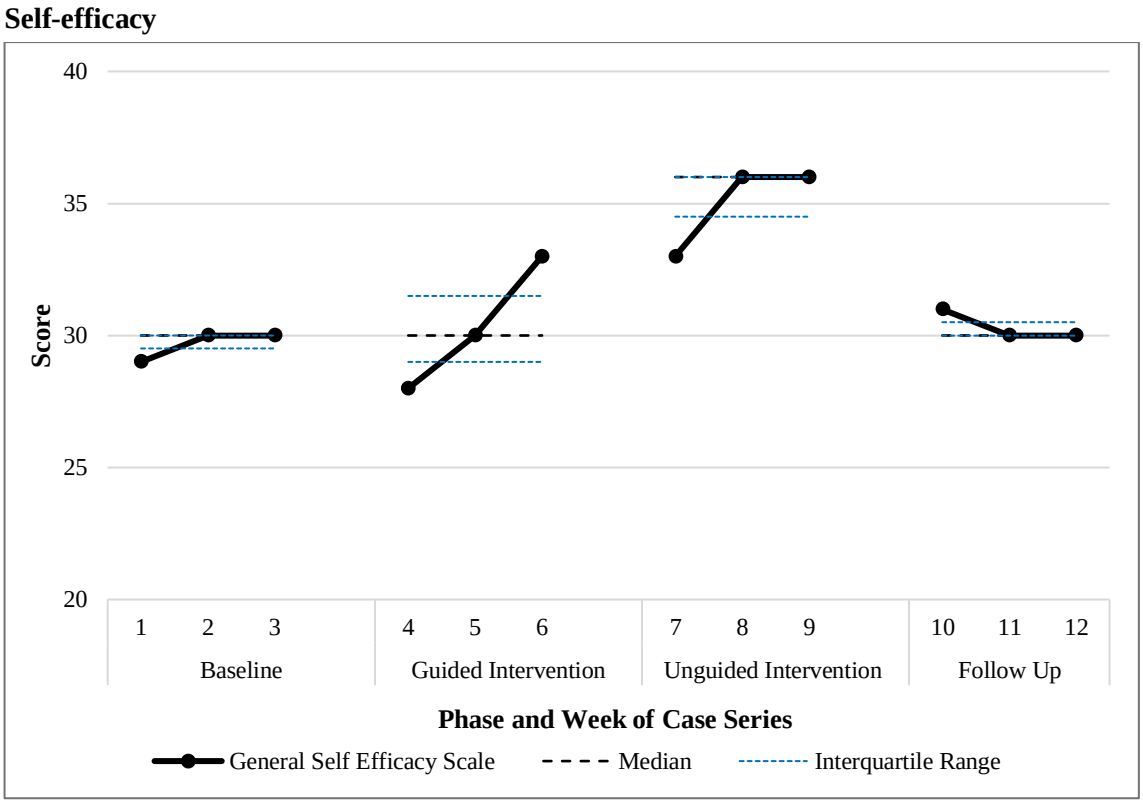


Figure 28: A visual display of Moon's GSE scores during the case series

Moon's scores on the GSE are displayed in Figure 28. She showed more variability in her self-efficacy scores than the majority of the other participants in the case series. Her self-efficacy increased between baseline and the intervention phases, and the improvement in her scores between week one and weeks eight and nine constituted a reliable improvement. This was not maintained during the follow up phase.

Overall Moon's scores on the CSI and the GSE indicate that *thedesk* did not have an impact on her coping style or levels of self-efficacy.

3.1.4.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

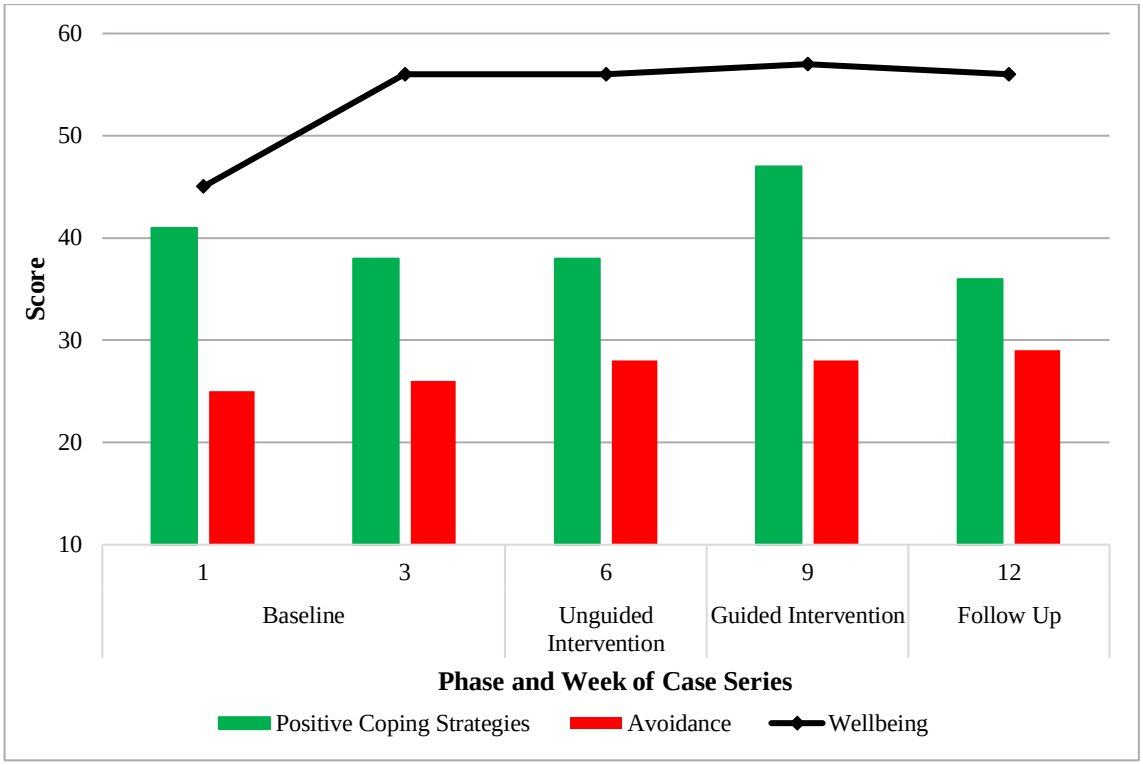


Figure 29: A visual display of Moon's WEMBWS and CSI scores during the case series

Moon's scores on the CSI and the WEMWBS are displayed in Figure 29. There did not appear to be an association between her scores on the two measures. There was an initial sharp increase in her wellbeing score which was not accompanied by a change in her scores on the subscales of the CSI. Subsequently, changes can be observed in her score on the CSI which were not accompanied by changes in her wellbeing scores.

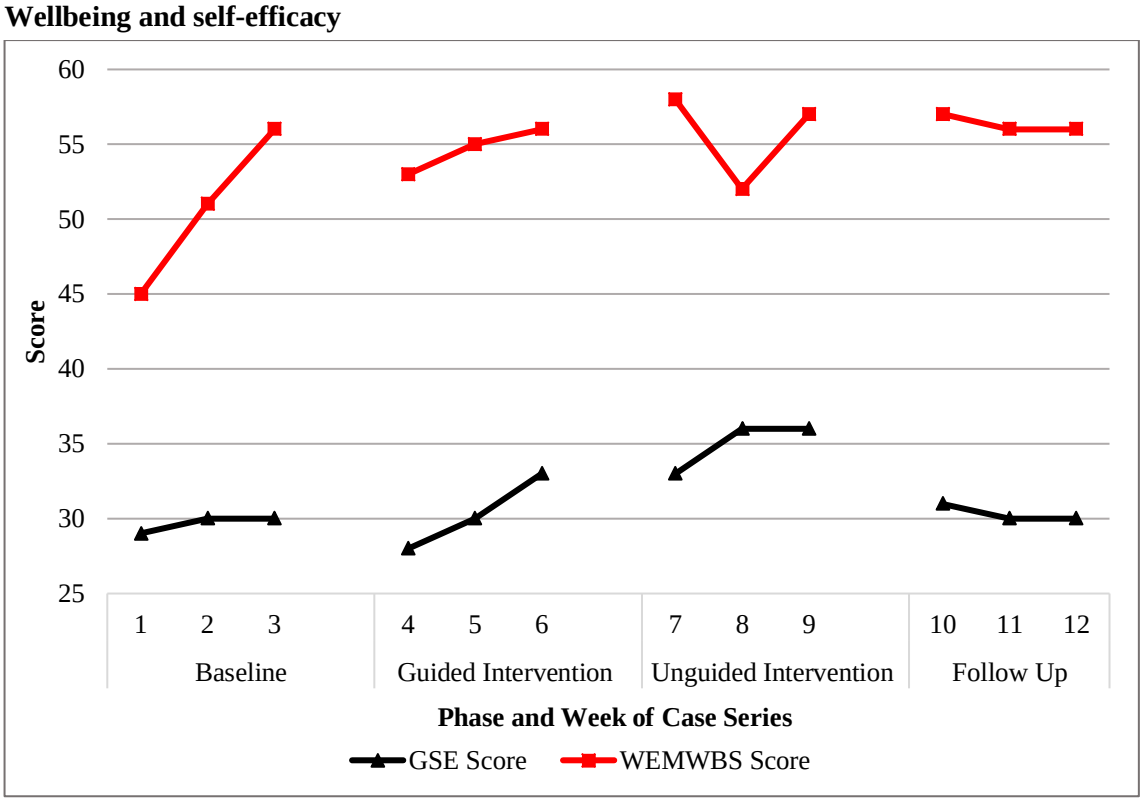


Figure 30: A visual display of Moon's WEMWBS and GSE scores during the case series

Figure 30 displays Moon's scores on the WEMWBS and GSE throughout the case series. There was not a clear relationship between her scores on the two measures as they deviated from one another at several points.

Therefore, Moon's results show that changes in her levels of wellbeing were not associated with changes in her coping style or levels of self-efficacy.

3.1.4.4 Change interview

In the change interview, Moon reported experiencing five positive changes during the case series. These are displayed in Table 7. She reported that she was somewhat surprised by all of these changes, and that they were all extremely important to her. She attributed three of the positive changes to external life events and was not sure whether the other two changes would have occurred had she not been taking part in the study.

Table 7: Summary of the changes reported by Moon during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Mind feeling more stable clear	Somewhat surprised by it	Probably would have happened on its own	Extremely important
Thinking clearly and feeling more like myself	Somewhat surprised by it	Probably would have happened on its own	Extremely important
Increased wellbeing and better mental health	Somewhat surprised by it	Probably would have happened on its own	Extremely important
Devoting more time to religion and prayer	Somewhat surprised by it	No way of telling	Extremely important
Changing relationships	Somewhat surprised by it	No way of telling	Extremely important

3.1.4.5 Moon participant summary

There was a reliable improvement in Moon's WEMWBS and CORE-OM scores. As these improvements occurred during the baseline phase they were not attributable to using *thedesk*. Moon's engagement with *thedesk* during the case series was low, so improvements in her levels of wellbeing in response to the intervention would not necessarily have been expected. *thedesk* did not have an impact on her coping style or levels of self-efficacy, and changes in her wellbeing were not accompanied by changes in self-efficacy or coping style. Moon reported five positive changes during the change interview. She thought that three of these changes were caused by external factors, and reported that she was not sure about the cause of the other two.

3.1.5 Participant 5: Penguin

Penguin was a second year student studying with the School of Philosophy, Religion and the History of Science. At recruitment, his WEMWBS score of 41 was within the normal range of wellbeing. His CORE-OM score of 45 was in the mild range of psychological distress. Penguin was randomised to complete the unguided intervention phase first. His responses indicated that he was experiencing difficulties relating to anxiety and low mood, so he was guided to use the Staying Calm and Feeling Good sections of *thedesk* during the guided intervention phase.

Penguin's engagement with completing the daily measures was high, and he completed them on 97.7% of days during the case series. His usage data also indicated high engagement with using *thedesk* during the study, with total of 95 minutes spent actively using the site. He used *thedesk* more during the unguided intervention phase, during which he accessed the Feeling Good, Staying Calm and Getting Things Done sections of *thedesk*. During the guided intervention phase he accessed the Staying Calm and Feeling Good sections again, as he was encouraged to do, although he spent less time using *thedesk* during this period.

3.1.5.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

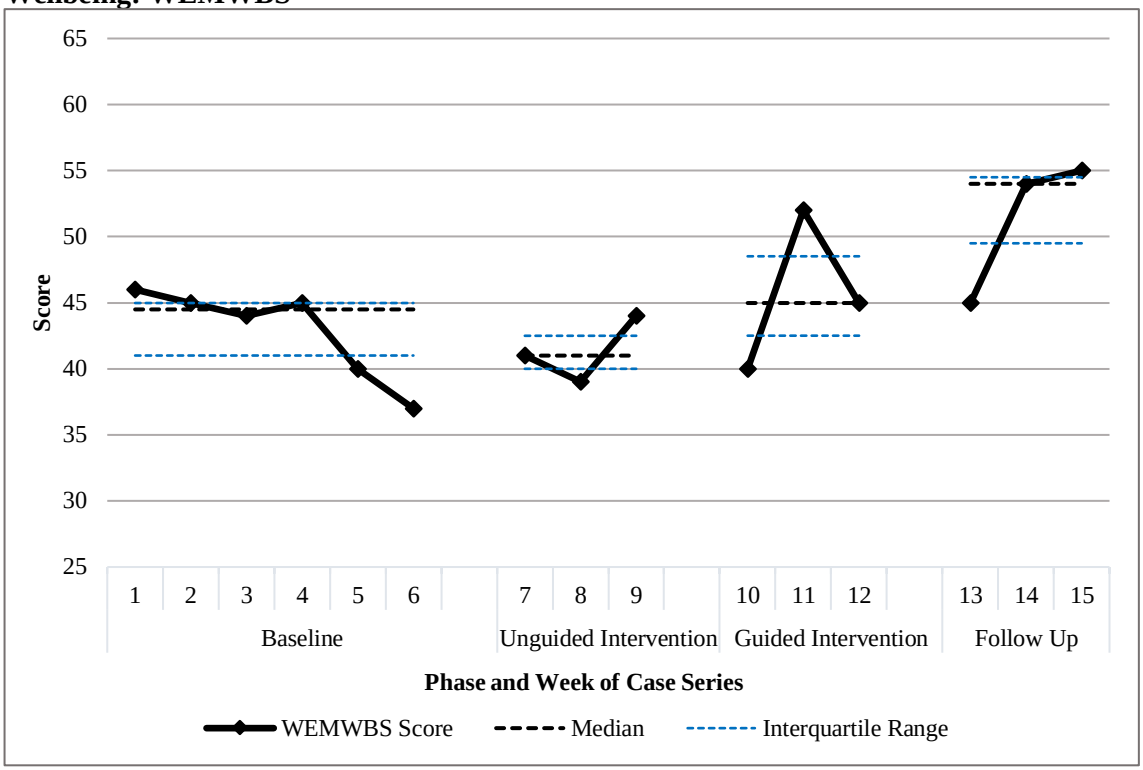


Figure 31: A visual display of Penguin's WEMWBS scores during the case series

Penguin's WEMWBS scores are displayed visually in Figure 31. His wellbeing deteriorated during the baseline period, then increased during the remainder of the case series. Penguin's highest wellbeing scores were at the final two measurements of the follow up phase, and there was an observable positive trend in his scores during the study. His scores were in the normal wellbeing range at week one and at week 15, indicating that this improvement was not clinically significant, and it did not meet the criteria for a reliable change.

When Penguin was shown his WEMWBS scores, he thought that the deterioration in his wellbeing during the baseline phase was due to going home for the Christmas holidays, and the stress of preparing for the January exams. He reported finding transitions between university life and home life challenging. He stated that the subsequent increase in his wellbeing scores fit with his experience. He believed that the improvement had mainly been caused by external life events, although he reported that using *thedesk* had been helpful.

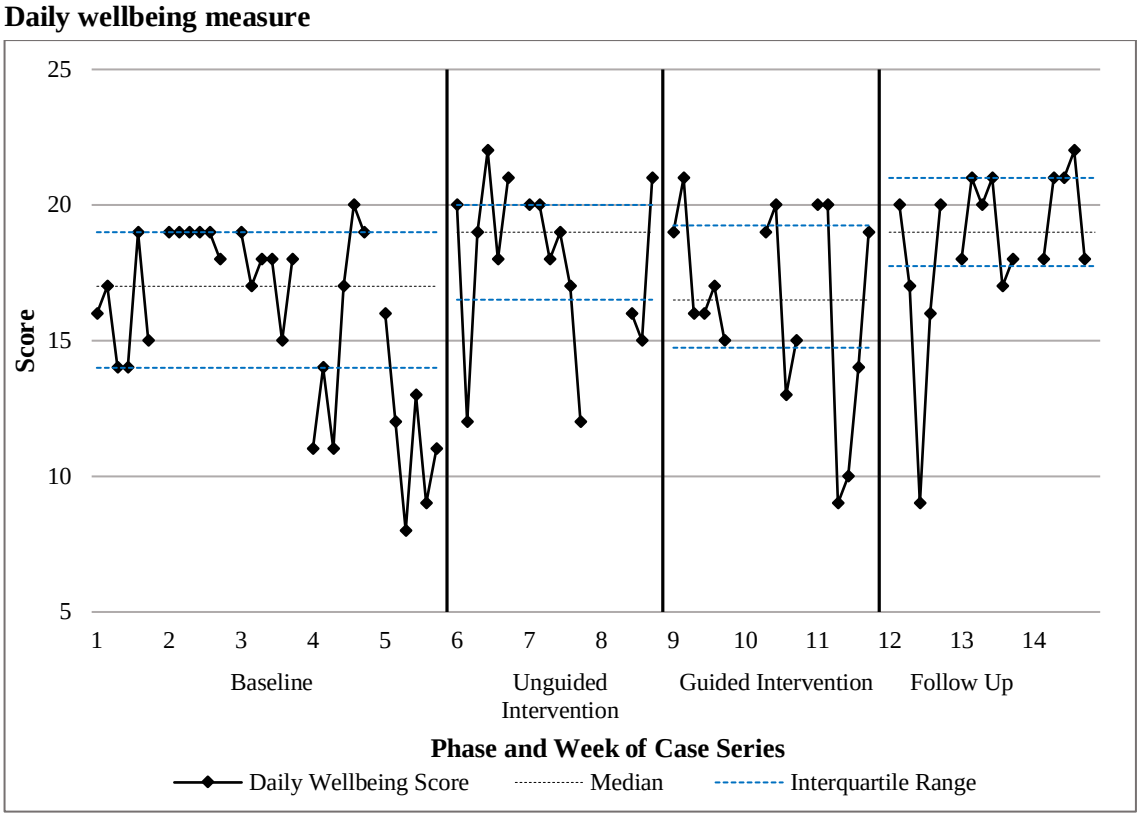


Figure 32: A visual display of Penguin's scores on the daily wellbeing measure during the case series

Penguin's scores on the daily measure of wellbeing are displayed in Figure 32, higher scores indicate higher levels of wellbeing. Consistent with scores on the WEMWBS, the scores on this measure also show that there was deterioration in his wellbeing during the baseline phase. During the unguided intervention phase his scores improved. This was followed by a deterioration during the guided intervention phase. During the first week of the follow up phase his wellbeing remained low, but there was an improvement in his wellbeing during the last two weeks of the case series. His scores during the last week of the case series were better than his scores during the first week, and his median score was higher during the follow up phase than the baseline phase.

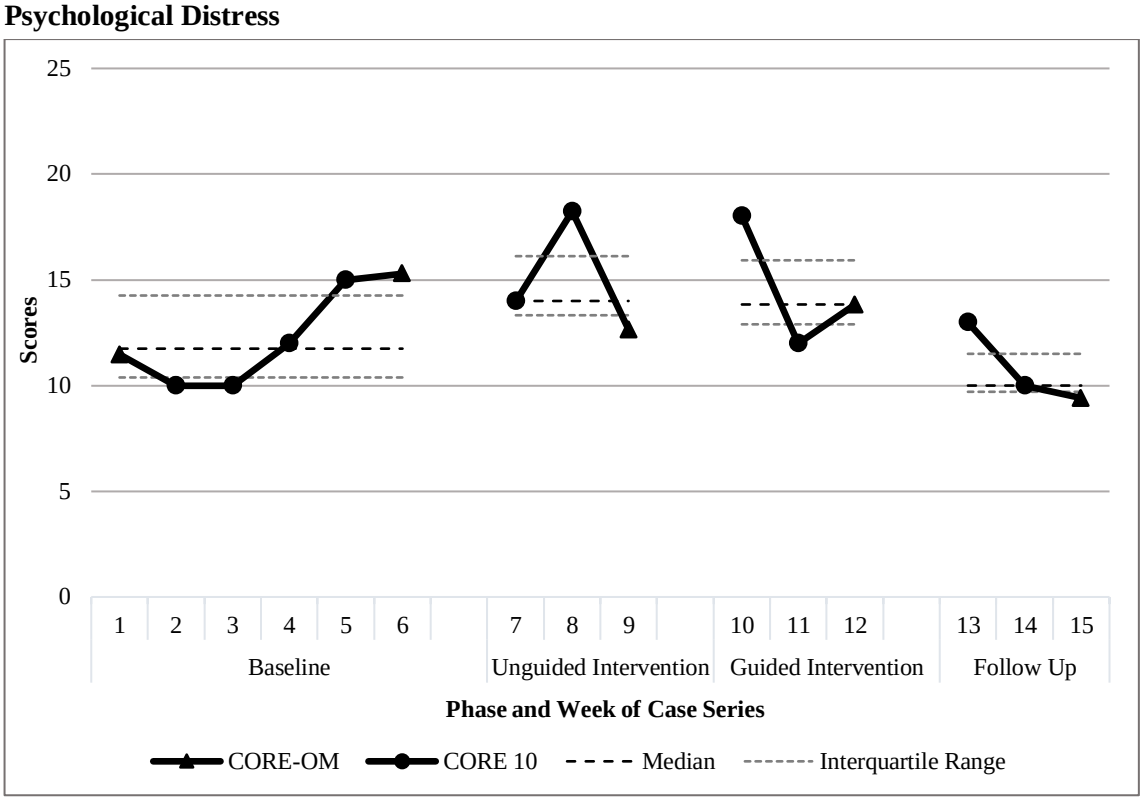


Figure 33: A visual display of Penguin's CORE-OM and CORE-10 scores during the case series

Penguin's scores on the CORE-OM and CORE-10 are displayed in Figure 33, higher scores indicate greater levels of psychological distress. There was an increase in his levels of psychological distress during the baseline phase, which is consistent with his scores on the WEMWBS and daily wellbeing measures. There were high levels of variability in his scores during all phases, and his median score during both intervention phases was worse than during baseline. During the follow up phase, his scores improved and were better than they were during baseline.

Penguin's scores indicate that *thedesk* had a positive impact on his levels of wellbeing during the case series. Although there was deterioration in Penguin's wellbeing during the baseline phase, his scores improved during the intervention phases and were better than their baseline levels by the end of the follow up. There were high levels of variability in his scores during all phases of the study however, and his scores on the CORE-OM and CORE-10 did not show improvements during the intervention phases so this result is interpreted tentatively.

3.1.5.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

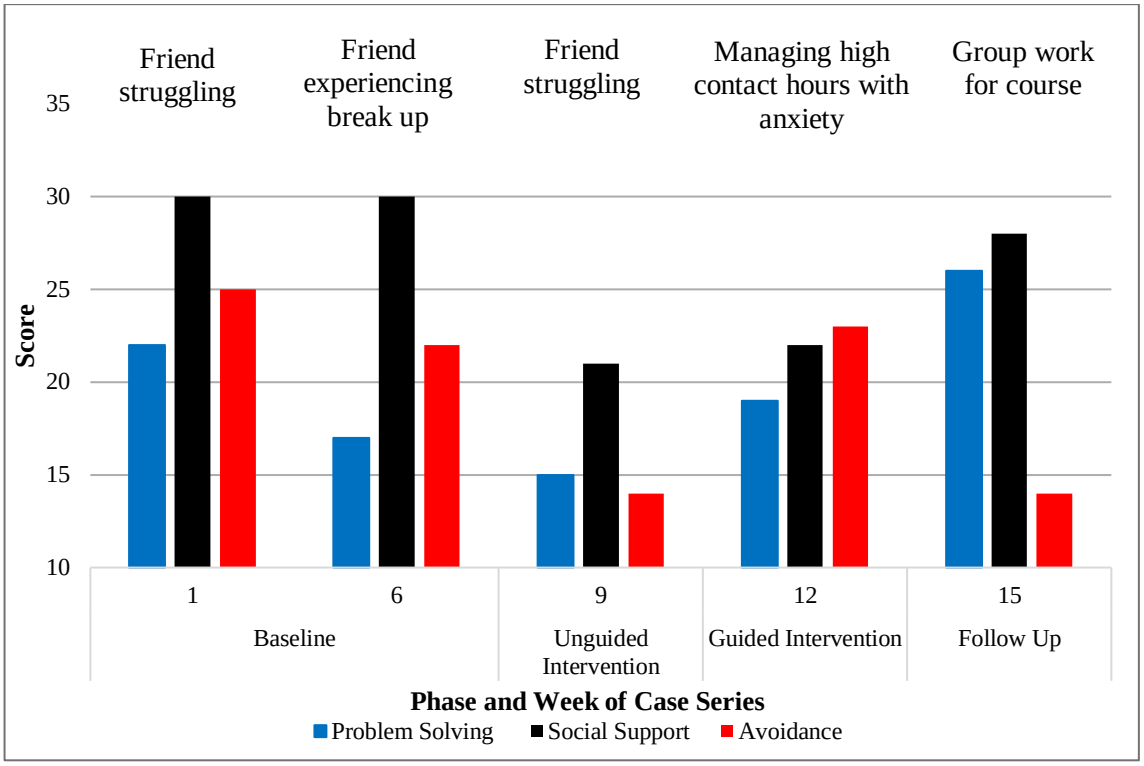


Figure 34: A visual display of Penguin's CSI scores during the case series

Penguin's scores on the three subscales of the CSI are displayed in Figure 34. Higher levels of problem solving and social support seeking are thought to be positive, whereas higher use of avoidance based coping is thought to be negative. His scores on all three subscales fluctuated during the study and there were no clear patterns or trends. Therefore, Penguin's scores on the CSI did not indicate that his use of coping strategies improved during the case series. There were no significant or reliable improvements in his scores on the problem-solving and social support seeking subscales between baseline and follow-up. Although there was an improvement in his scores on the avoidance subscale between weeks 1 and 15, they were highly variable over the course of the study.

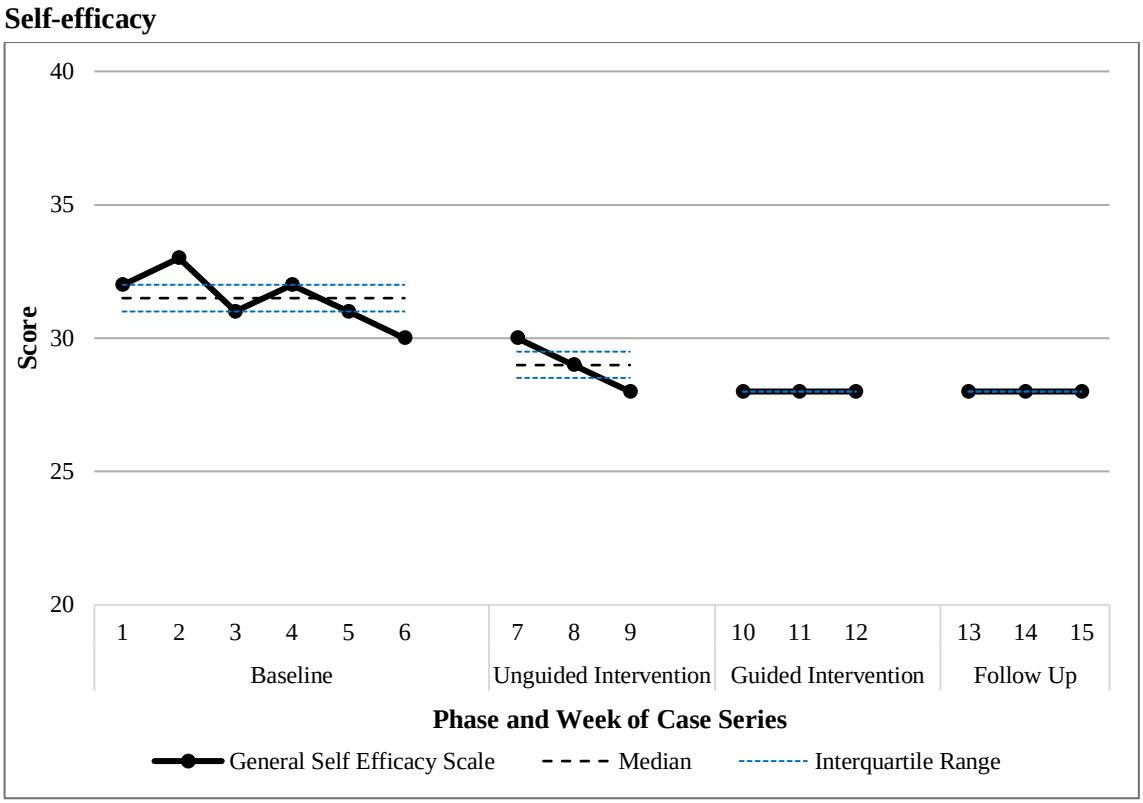


Figure 35: A visual display of Penguin's GSE scores during the case series

Penguin's self-efficacy scores are displayed in Figure 35, higher scores indicate higher levels of self-efficacy, which is thought to be positive. His scores reduced steadily during the baseline and the unguided intervention phase, suggesting a deterioration. Between week nine and the end of the follow up phase his scores were extremely stable, and remained consistently at their lower level.

Therefore, Penguin's scores on the CSI and GSE indicate that *thedesk* did not have an impact on his coping style or levels of self-efficacy.

3.1.5.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

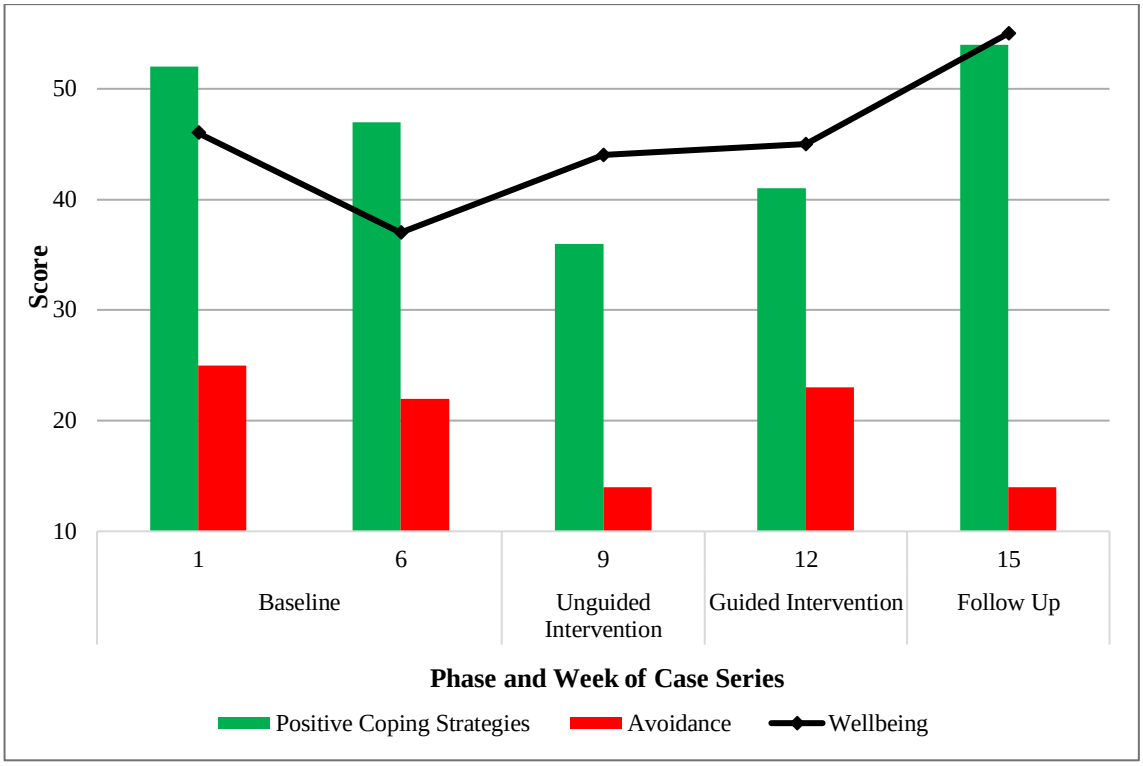


Figure 36: A visual display of Penguin's WEMBWS and CSI scores during the case series

Penguin's scores on the CSI and the WEMWBS are displayed in Figure 36. It does not appear that there was a relationship between Penguins' coping style and his level of wellbeing, as his wellbeing scores and his two coping scores followed different patterns during the case series.

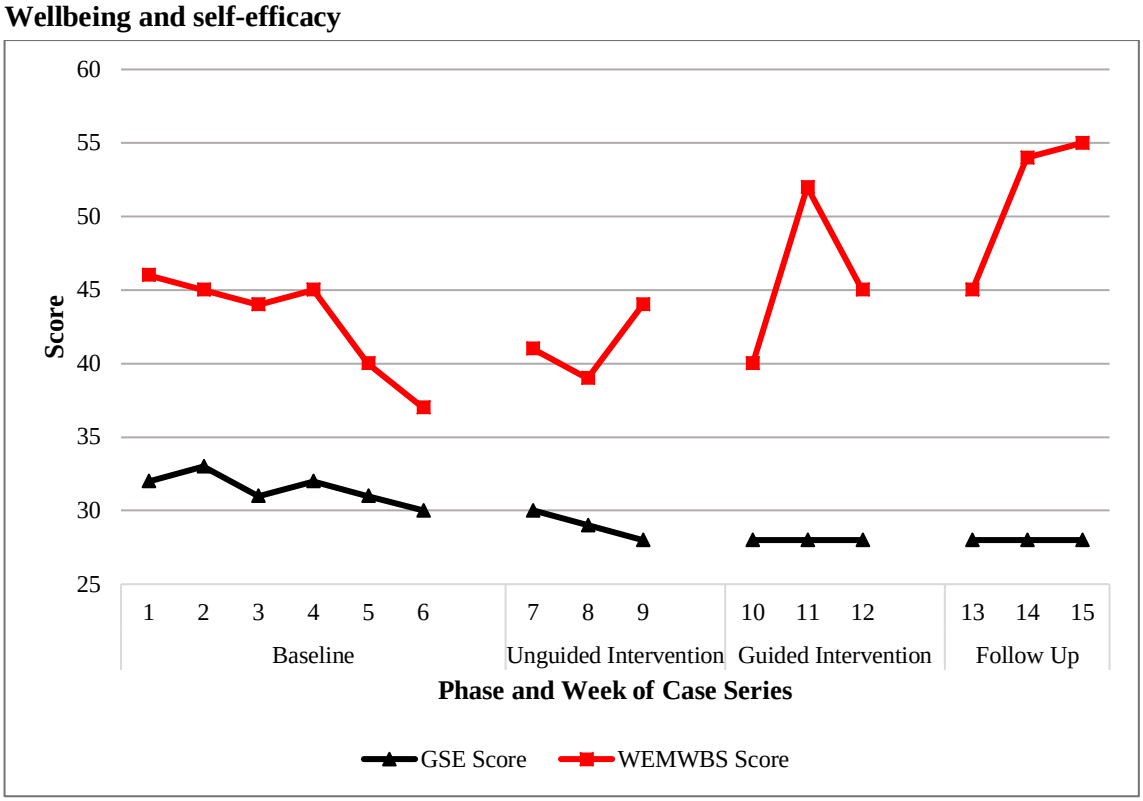


Figure 37: A visual display of Penguin's WEMWBS and GSE scores during the case series

Figure 37 displays Penguin's scores on the WEMWBS and the GSE. His scores on the measures followed a similar pattern during the baseline phase, but then diverged from one another. From week nine onwards Penguin's scores on the GSE remained constant, but his scores on the WEMBWS varied.

Overall, Penguin's scores on the CSI, WEMWBS and GSE suggest that changes in his WEMWBS scores were not associated with changes to his coping style or levels of self-efficacy.

3.1.5.4 Change interview

As summarised in Table 8, Penguin reported experiencing three positive changes during the change interview. He stated that these were all important to him. He was somewhat surprised by two of these changes, and expected one of them. He attributed one change to external life events and was unsure about the cause of the other two changes.

Table 8: Summary of the changes reported by Penguin during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Being more aware of my feelings and noticing them more	Somewhat surprised by it	No way of telling	Extremely important
Talking more openly with friends about my feelings and mental health	Somewhat surprised by it	No way of telling	Very important
Going out less and drinking less alcohol	Very much expected it	It clearly would have happened on its own	Very important

3.1.5.5 Penguin participant summary

Penguin's scores indicate that there were improvements in psychological wellbeing during the study, and these occurred during the intervention phases rather than the baseline phase. When he was shown his WEWMBS scores during the change interview, he agreed that his wellbeing had improved. Penguin believed that these improvements were mainly attributable to external life events such as living in his own house as opposed to university accommodation, but he also reported that *thedesk* had been helpful. Penguin's usage data indicated that he had the highest level of engagement with *thedesk* of the nine participants. These findings were tentatively interpreted to mean that *thedesk* had a positive impact on Penguin's levels of wellbeing.

3.1.6 Participant 6: Rhyme

Rhyme was in her fourth year of studying with the School of Psychology. At recruitment, her WEMWBS score was 39 indicating low levels of wellbeing and her CORE-OM score was 42, indicating mild levels of psychological distress. Her measure responses indicated that she was experiencing difficulties with her relationships and with doing what she needed to, so was guided to look at the Staying Connected and Getting Things Done sections of *thedesk* during the guided intervention phase. She was randomised to complete this phase first, before using *thedesk* without guidance.

Rhyme's engagement with the measures was high, and she had a completion rate of 95.8% during the case series. Her engagement with *thedesk* was also fairly high during the study, and she spent an estimated 37-39 minutes actively using the site. She used *thedesk* more during the unguided phase, which she completed first. She accessed material from the Getting Things Done and Feeling Good independently during this phase. During the guided phase she accessed the Staying Connected section, which she had been encouraged to do.

3.1.6.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

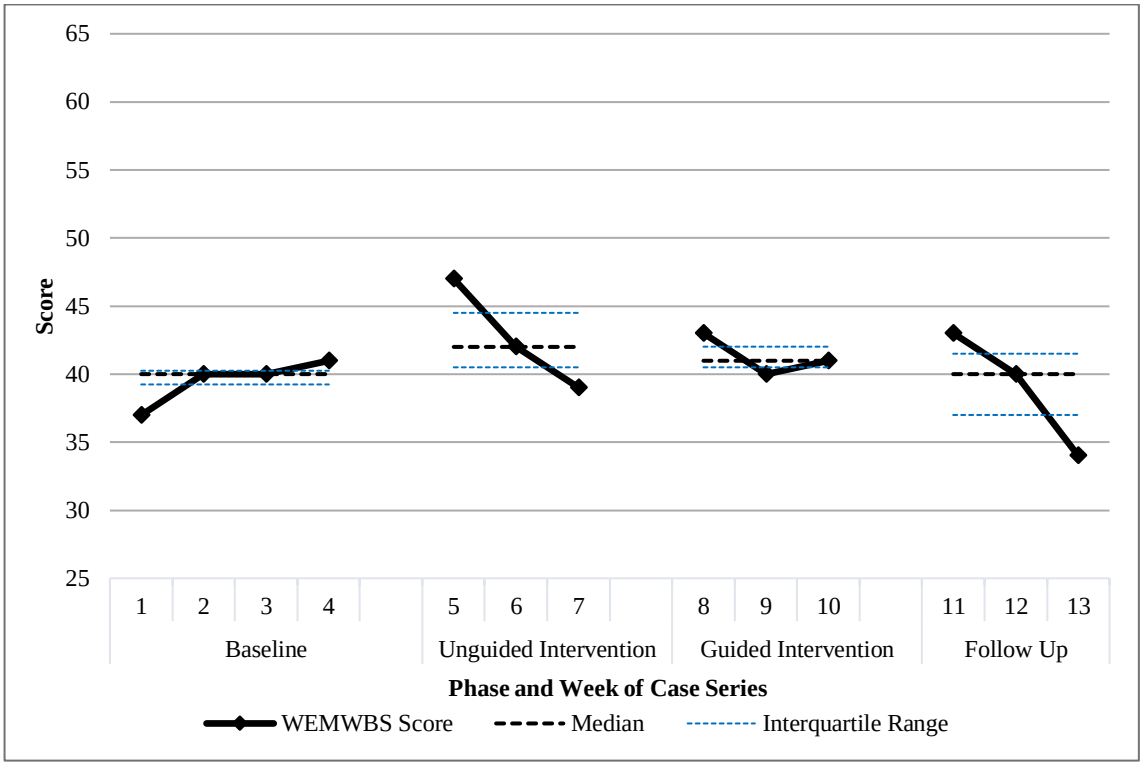


Figure 38: A visual display of Rhyme's WEMWBS scores during the case series

Rhyme's wellbeing scores are displayed in Figure 38, higher scores indicate better levels of wellbeing. Her scores remained fairly stable during the baseline period, followed by an increase in scores at week five. This was followed by a reduction in her scores, returning them to levels similar to those at baseline. There was then a deterioration in her score at week 13.

When shown her scores on the WEMWBS, Rhyme thought that her scores were lower during the baseline phase as she had gone home for Christmas and she does not get on well with her parents. She felt the increase in her score at week five was due to visiting her boyfriend, and attributed the subsequent drop in her wellbeing to the January exam period. She reported that the deterioration in her wellbeing at the final week was due to an issue she experienced with her dissertation.

Daily wellbeing measure

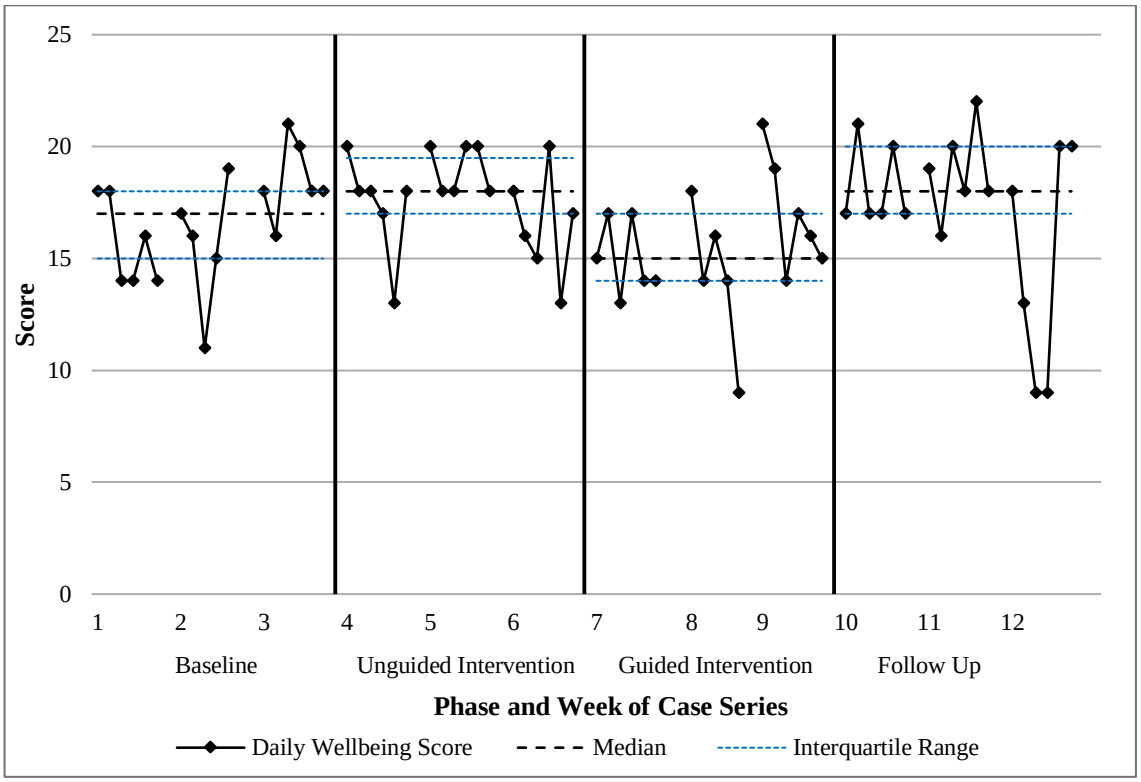


Figure 39: A visual display of Rhyme's scores on the daily wellbeing measure during the case series

Rhyme's scores on the daily wellbeing measure are displayed in Figure 39. It appears that there was more variability in her scores within phases than between phases. Her scores increased slightly during the unguided intervention phase, then decreased during the guided intervention phase. There was an increase in her scores during the follow up phase, with the exception of a period during week 12, in which her scores were low.

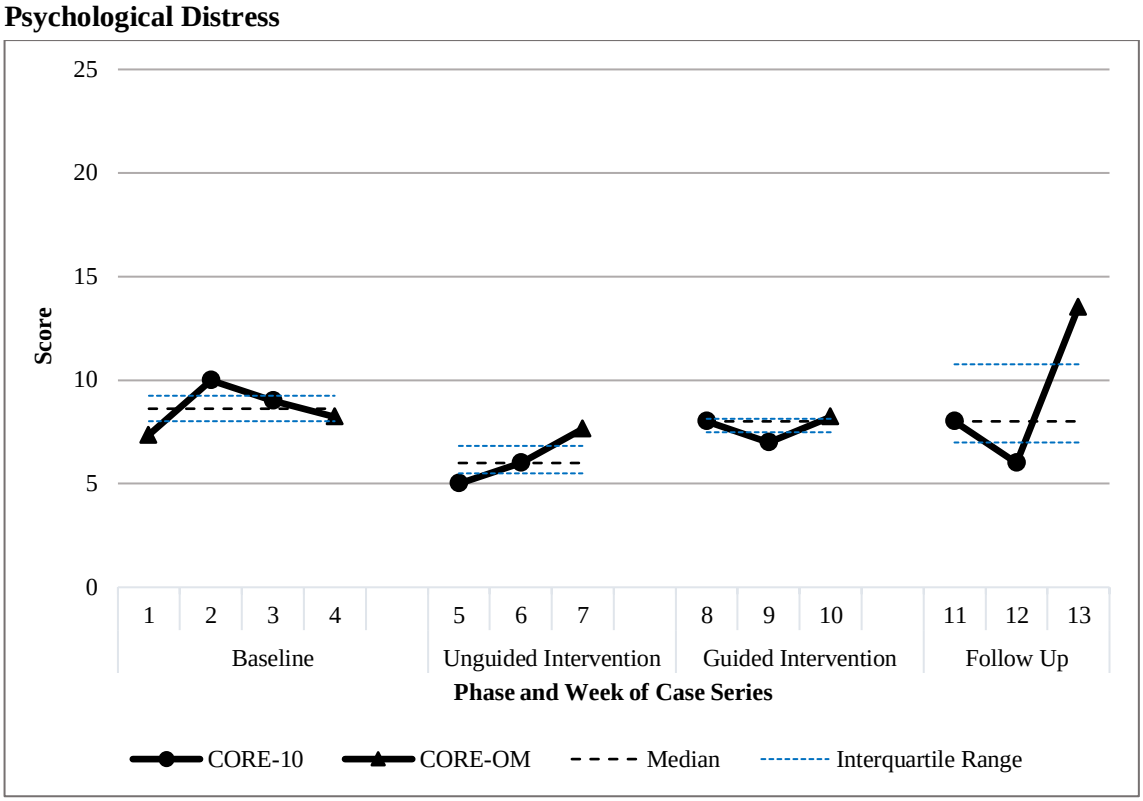


Figure 40: A visual display of Rhyme's CORE-OM and CORE-10 scores during the case series

Figure 40 displays Rhyme's scores on the CORE-10 and CORE-OM during the case series; higher scores indicate more severe levels of psychological distress. There was a deterioration in her score at week two, followed by an improvement during the rest of baseline which returned her scores back to their original levels by week four. Her scores were slightly improved during the intervention phases, but this did not constitute a reliable or clinically significant change. At the final week of the case series there was a sharp increase in her levels of psychological distress. This was a reliable deterioration and this also constituted a clinically significant change, as her CORE-OM scores moved from the low level range to the mild range.

Overall, Rhyme's scores indicated that *thedesk* did not have an impact on her wellbeing psychological distress. There were some small improvements in her levels of wellbeing and psychological distress during the intervention phases, but these were not consistent, reliable or clinically significant and were not maintained at follow up.

3.1.6.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

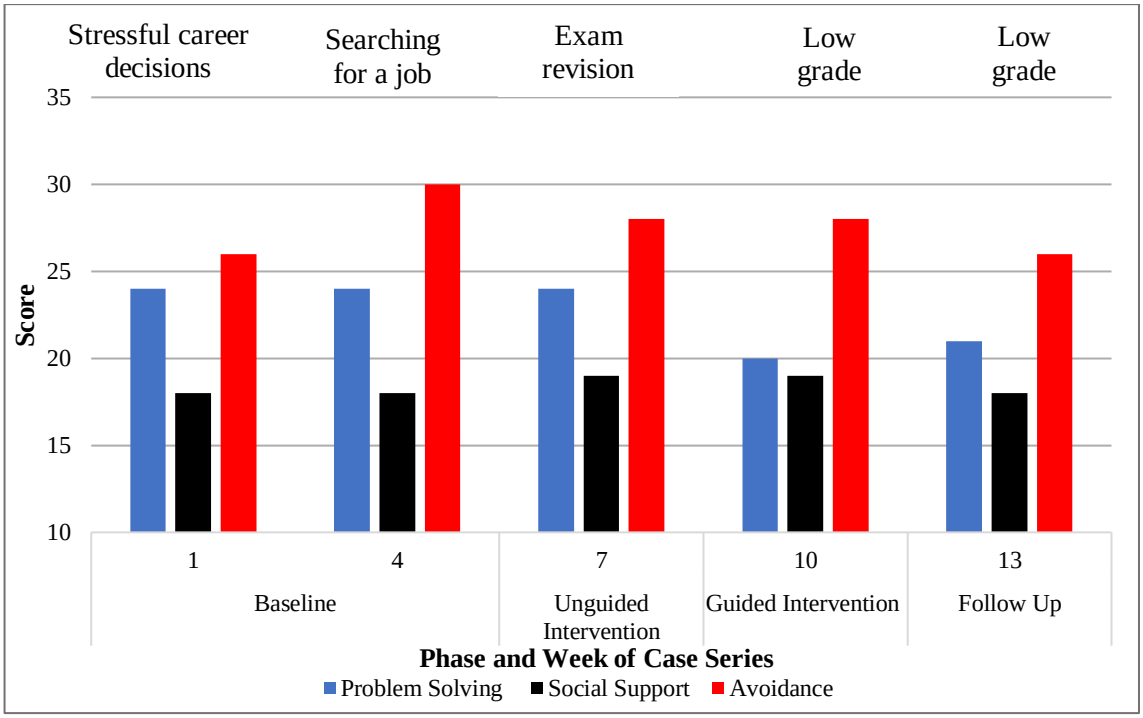


Figure 41: A visual display of Rhyme's CSI scores during the case series

Rhyme's scores on the three subscales of the CSI are displayed in Figure 41. Her scores on all three subscales remained fairly consistent during the case series, and there were no reliable changes in her scores. Therefore, her scores did not indicate that there was an improvement in her coping style in response to the intervention.

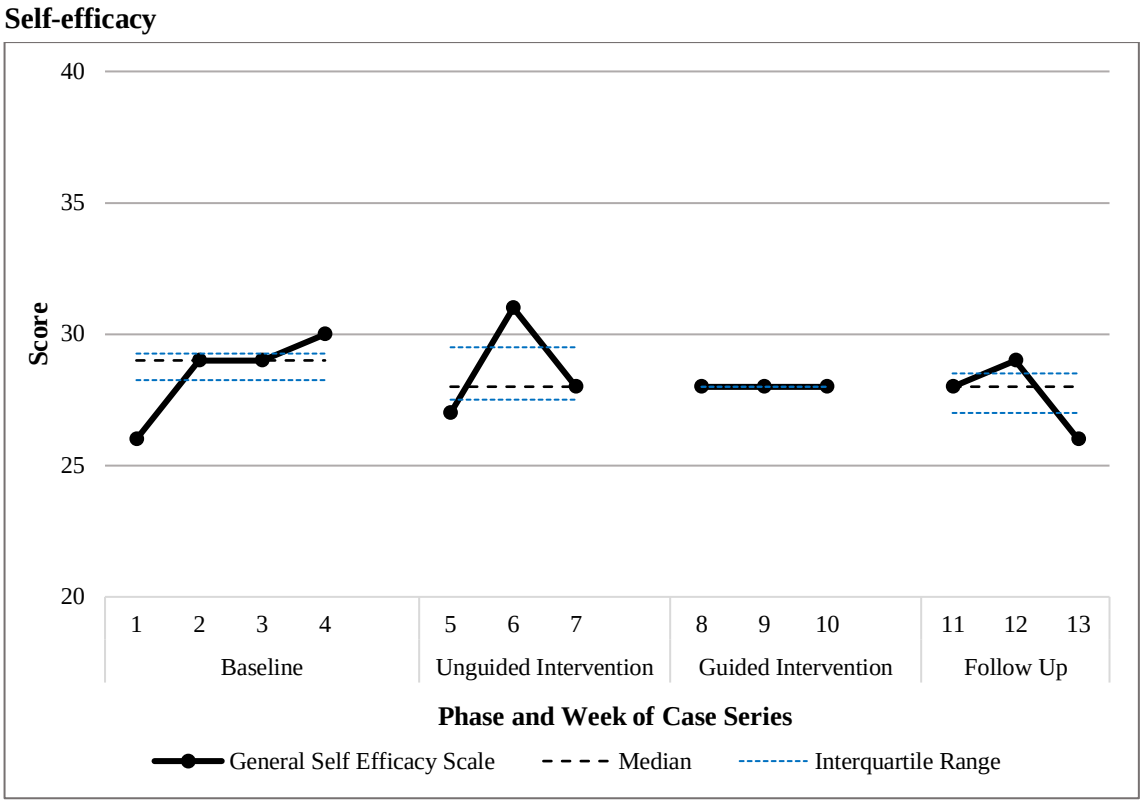


Figure 42: A visual display of Rhyme's GSE scores during the case series

Rhyme's scores on the GSE are displayed in Figure 42. There was a slight increase in her scores during baseline, her scores were variable during the unguided intervention phase and they then returned to their original levels during the guided intervention and follow up phases . There was no reliable change in her scores at any point during the case series.

Therefore, Rhyme's scores on the CSI and GSE indicated that *thedesk* did not have an impact on her cooping style or levels of self-efficacy.

3.1.6.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

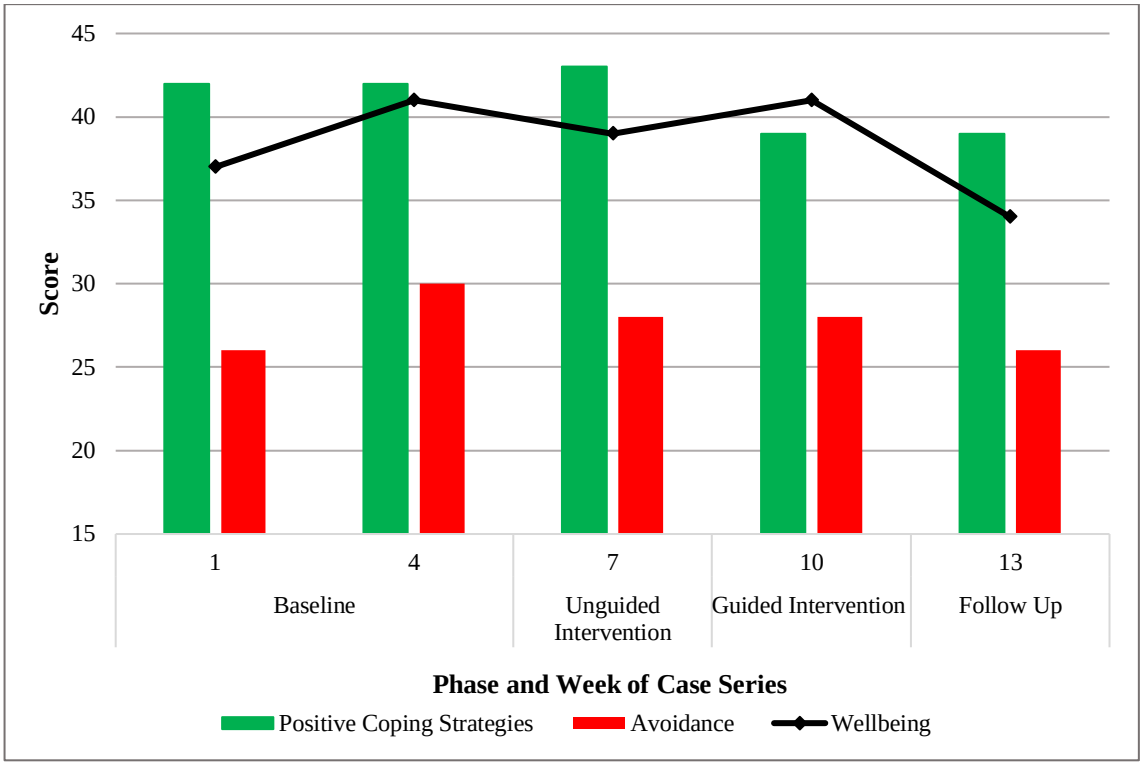


Figure 43: A visual display of Rhyme's WEMBWS and CSI scores during the case series

Rhyme's scores on the CSI and the WEMWBS are displayed in Figure 43. There did not appear to be a relationship between her levels of wellbeing and her coping style. For example, at week 13 there was a marked reduction in her wellbeing score which was not accompanied by a corresponding change in her use of coping strategies.

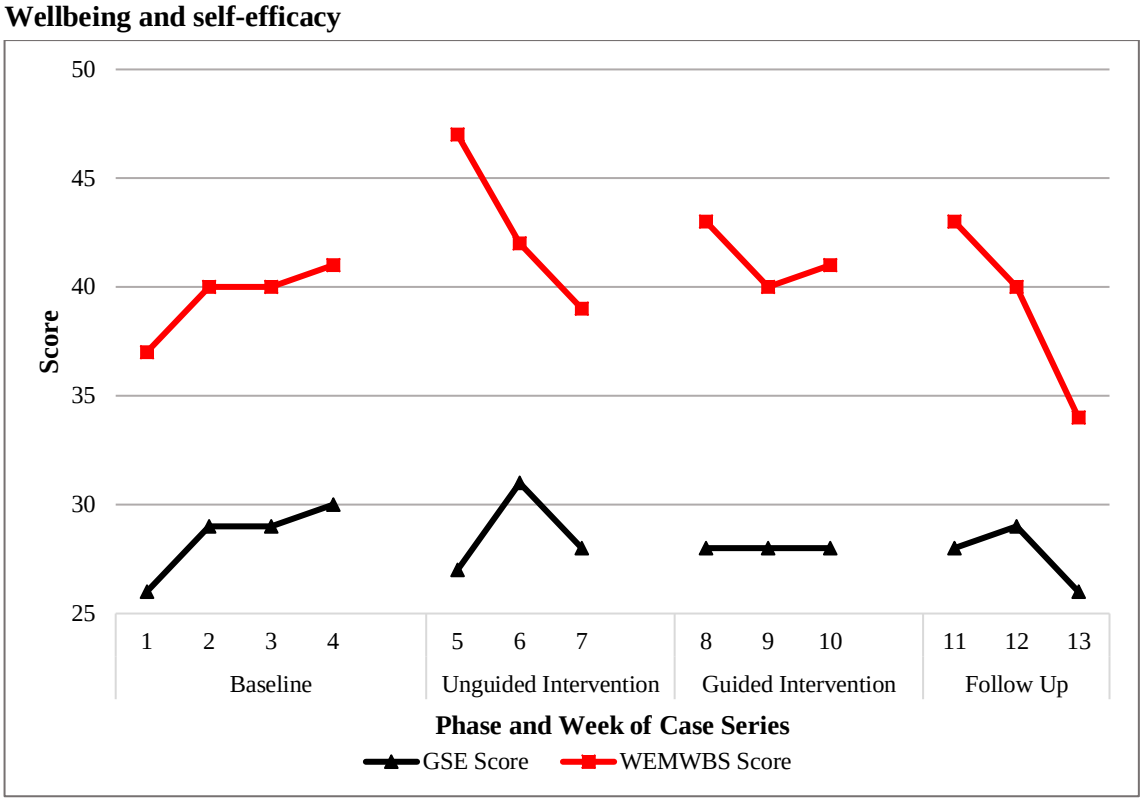


Figure 44: A visual display of Rhyme's WEMWBS and GSE scores during the case series

Rhyme's wellbeing and general self-efficacy scores are displayed in Figure 44. They appear to follow a similar pattern during the baseline phase but then they diverge from one another. For example, there was a decrease in Rhyme's WEMWBS scores between weeks five and six, but an increase in her GSE score.

Overall, Rhyme's scores on the WEMWBS, GSE and CSI suggested that changes in her levels of wellbeing were not associated with changes in her coping style or levels of self-efficacy.

3.1.6.4 Change interview

In the change interview, as summarised in Table 9, Rhyme reported that she had noticed two positive changes since she had started the study. She was somewhat surprised by both of them, and reported that they were both important to her. Both changes were associated with being more reflective and were attributed to completing the daily measures rather than using *thedesk*.

Table 9: Summary of the changes reported by Rhyme during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Being more reflective about how I am feeling	Somewhat surprised by it	Clearly would have happened without *thedesk*	Moderately important
Reflecting on what I things I have been doing and realising what has gone well	Somewhat surprised by it	Clearly would have happened without *thedesk*	Very important

3.1.6.5 Rhyme participant summary

Rhyme's scores on the measures indicate that there were no improvements in her levels of wellbeing, psychological distress, coping strategy or self-efficacy in response to *thedesk*. This is consistent with her responses in the change interview, in which she reported that she had not found *thedesk* helpful despite her engagement with it being fairly high in comparison to other participants. She reported that completing the daily measures had been helpful, stating that this had prompted her to be reflective and aware of her feelings.

3.1.7 Participant 7: Sage

Sage was a third year student with the School of Fine Art, History of Art and Cultural Studies. At recruitment, her WEWMBS score was 33, indicating that her levels of wellbeing were in the low range. Her CORE-OM score was 41, indicating that her levels of psychological distress were in the mild range. Her responses indicated that she was experiencing difficulties relating to low mood and completing her university work, so she was encouraged to use the Feeling Good and Getting Things Done sections of *thedesk* during the guided intervention phase. She was randomly selected to complete this phase first.

Sage's engagement with the daily measures was fairly low. She completed the measures on 80.2% of days during the case series and did not receive the full available reimbursement. Sage's engagement with *thedesk* was also fairly low, she spent a total of 18 minutes actively using the site, but five of these minutes occurred during the follow up phase. Her greatest use of the *thedesk* occurred during the guided intervention phase, which she completed first. During this phase she accessed several of the quizzes as well as material on managing procrastination from the Getting Things Done section. During the unguided intervention phase she completed two more quizzes, and she completed a further two quizzes during the follow-up phase.

3.1.7.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

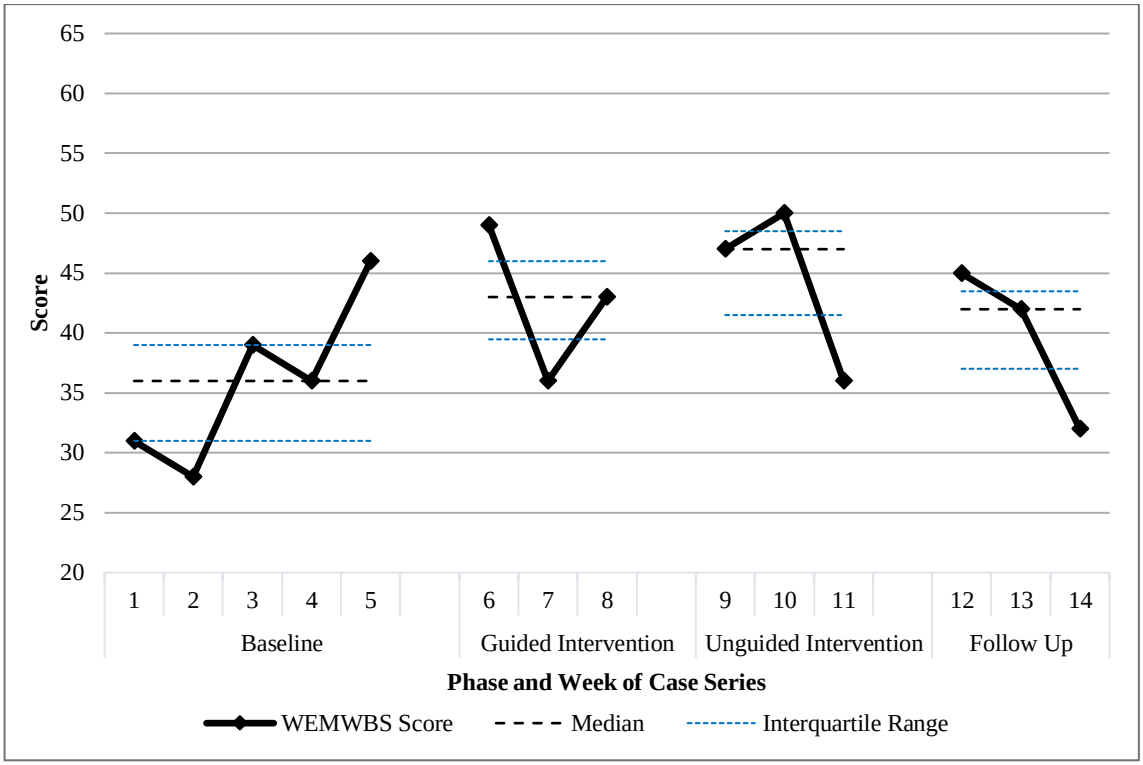


Figure 45: A visual display of Sage's WEMWBS scores during the case series

Sage's WEMWBS scores are displayed in Figure 45. Her wellbeing levels increased during the baseline phase and at the first week of the guided intervention phase. This was followed by a decrease at week seven and an increase at week eight. Her scores increased at weeks nine and 10, then decreased again at week 11. This pattern was repeated during the follow up phase.

During weeks one to four of the case series, Sage's WEMWBS scores were in the low range. For the majority of the subsequent weeks of the case series, her scores were in the normal range which indicates a clinically significant improvement had taken place. The improvement in her scores during the baseline phase also constituted a reliable change. As this improvement occurred during baseline, it cannot be attributed to use of *thedesk*.

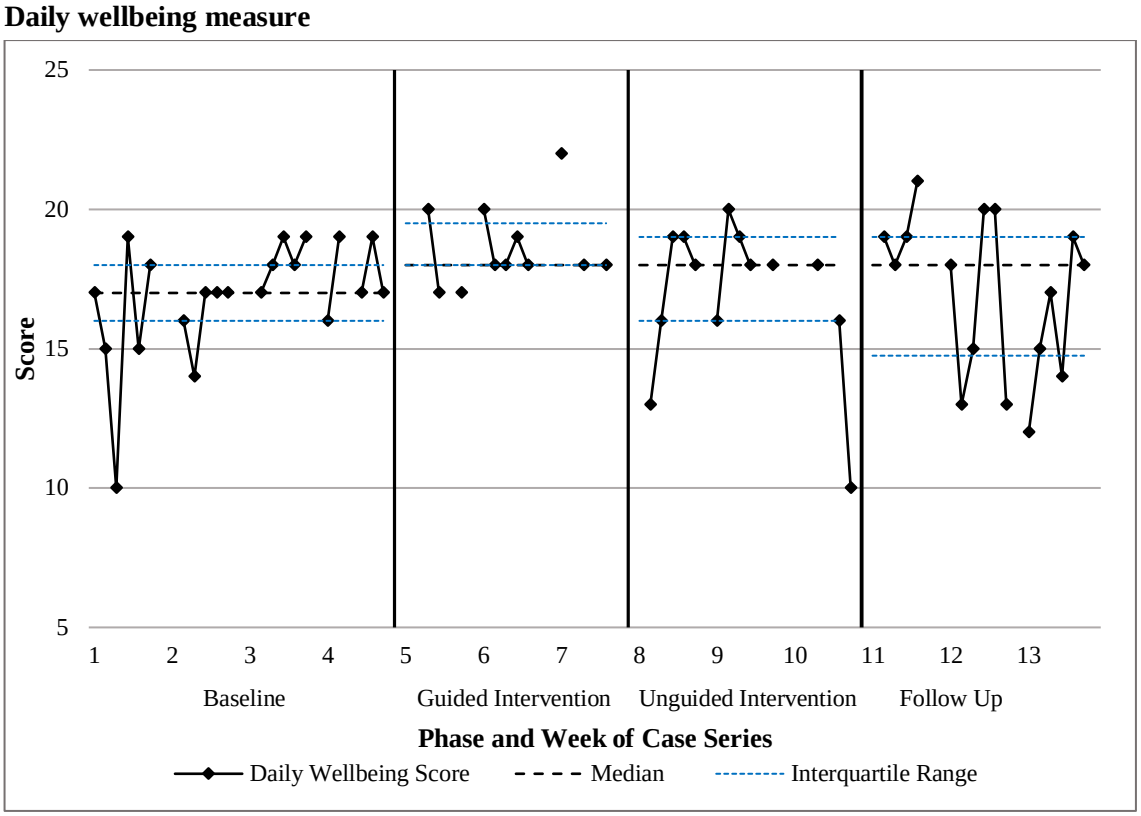


Figure 46: A visual display of Sage's scores on the daily wellbeing measure during the case series

Sage's scores on the daily wellbeing measure are displayed in Figure 46. Her levels of wellbeing varied considerably from day to day during the first week of the study, then appeared to become more stable for the rest of the baseline phase and the guided intervention phase. They were more variable during the unguided intervention phase and varied highly during the follow up phase. Variation in her scores was higher within the phases than between them and her median score was similar throughout all phases of the case series.

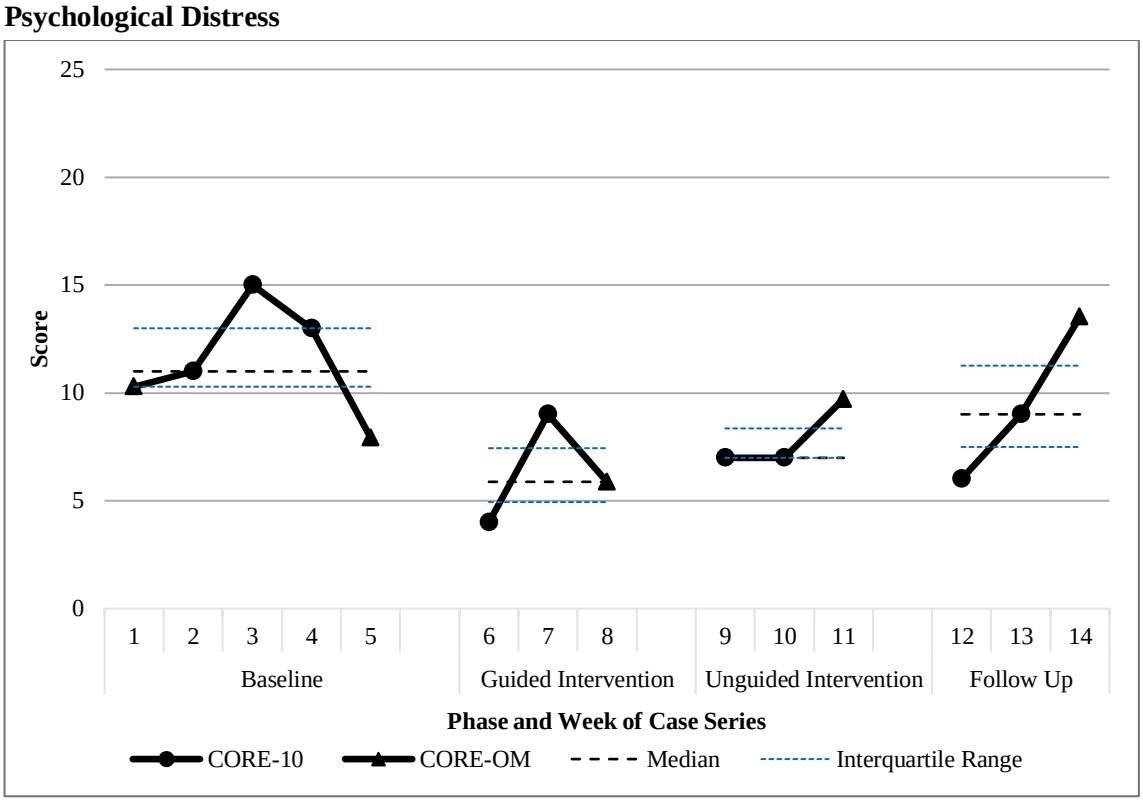


Figure 47: A visual display of Sage's CORE-OM and CORE-10 scores during the case series

Sage's scores on the CORE-OM and the CORE-10 are displayed in Figure 47; higher scores indicate greater levels of psychological distress. There was a deterioration in her scores during the first half of baseline, followed by an improvement during the second half. There was an improvement in her scores during the guided intervention phase, followed by subsequent deteriorations in the unguided intervention and follow up phases. Sage's CORE-OM scores were in the mild range at the start of baseline and remained in this range throughout the case series, indicating that no clinically significant changes had taken place.

Overall, Sage's scores on the three primary measures suggested that *thedesk* did not have an impact on her levels of wellbeing or psychological distress. Whilst there was some improvement in her scores during the intervention phases, her scores were highly variable and the majority of the improvements occurred during the baseline period, so were not attributable to use of *thedesk*.

3.1.7.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

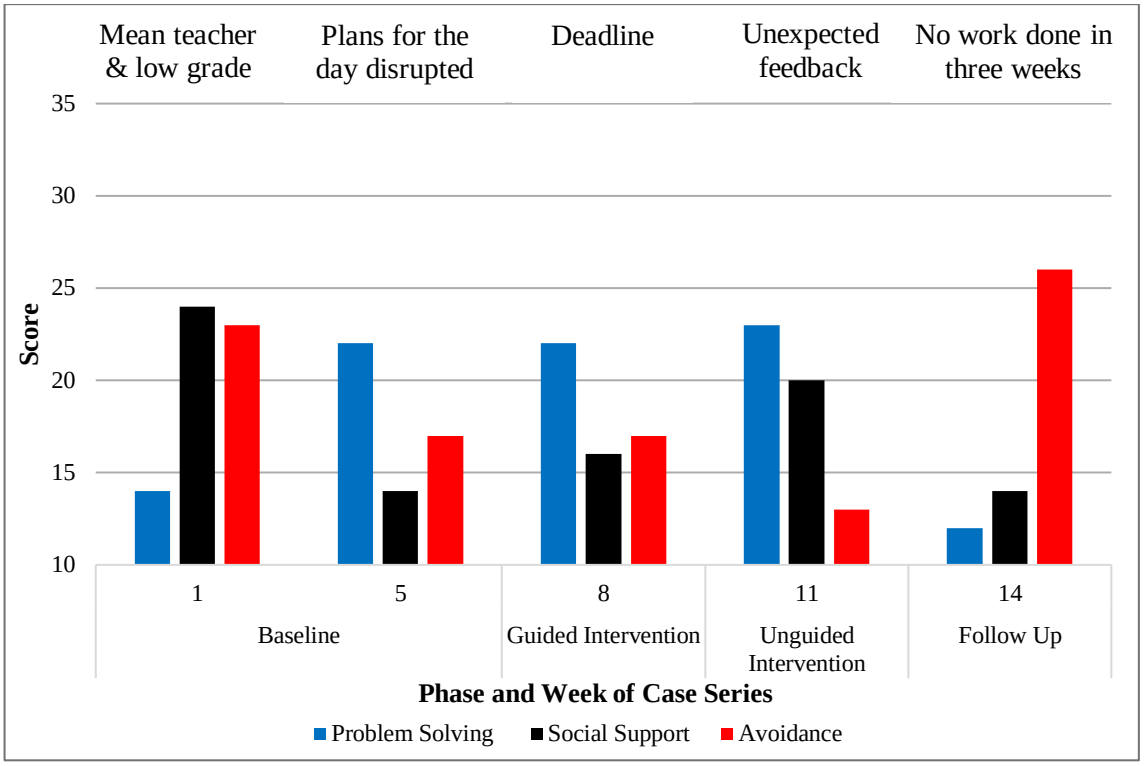


Figure 48: A visual display of Sage's CSI scores during the case series

Sage's scores on the three subscales of the CSI are displayed in Figure 48. Her scores on all three subscales fluctuated during the study and she displayed higher use of avoidance based strategies and lower use of social supporting based strategies at follow up compared with the start of baseline.

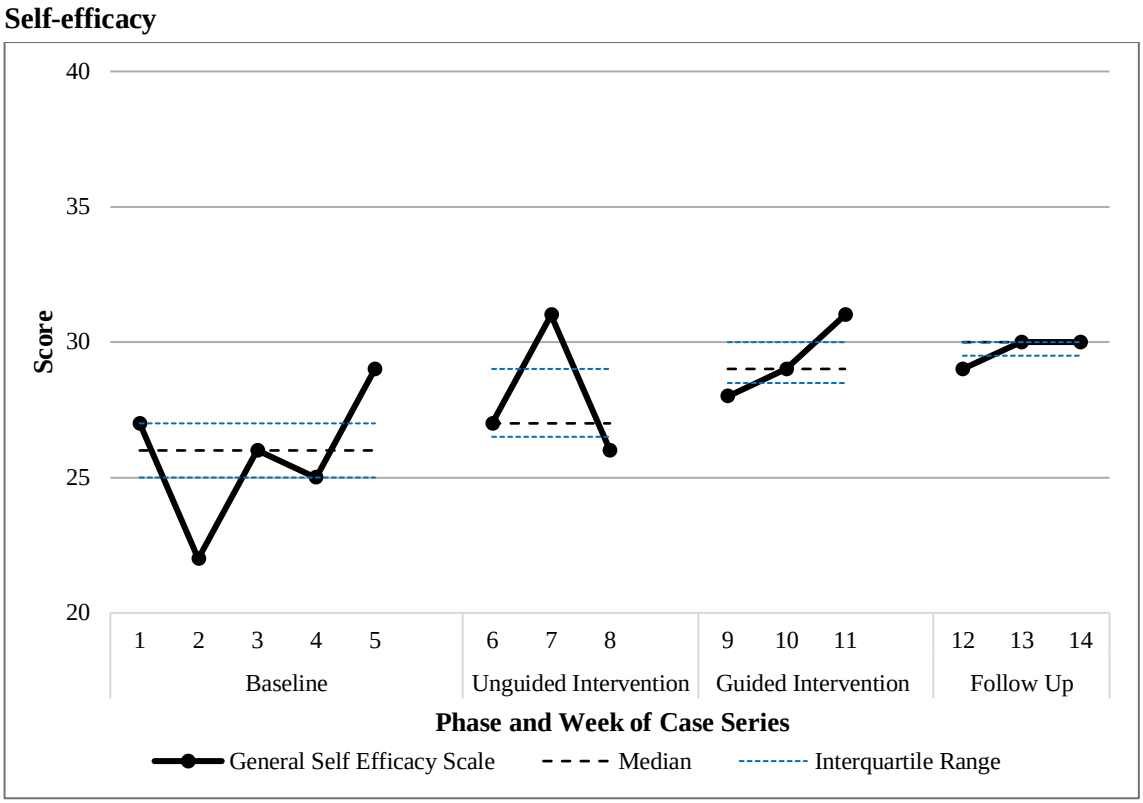


Figure 49: A visual display of Sage's GSE scores during the case series

Sage's scores on the GSE are displayed in Figure 49. There was a reduction in her self-efficacy scores between weeks one and two, followed by an increase during the rest of the baseline phase. This positive trend continued over the rest of the case-series, despite some variability from week to week. At no point did these improvements constitute a reliable improvement from her score at week one.

Sage's scores on the CSI and the GSE suggest that *thedesk* did not have an impact on her coping style or levels of self-efficacy. Her CSI scores did not indicate an improvement in coping style, and her GSE score did improve during the intervention phases but this trend began during the baseline phase and did not meet the criteria for a reliable improvement.

3.1.7.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

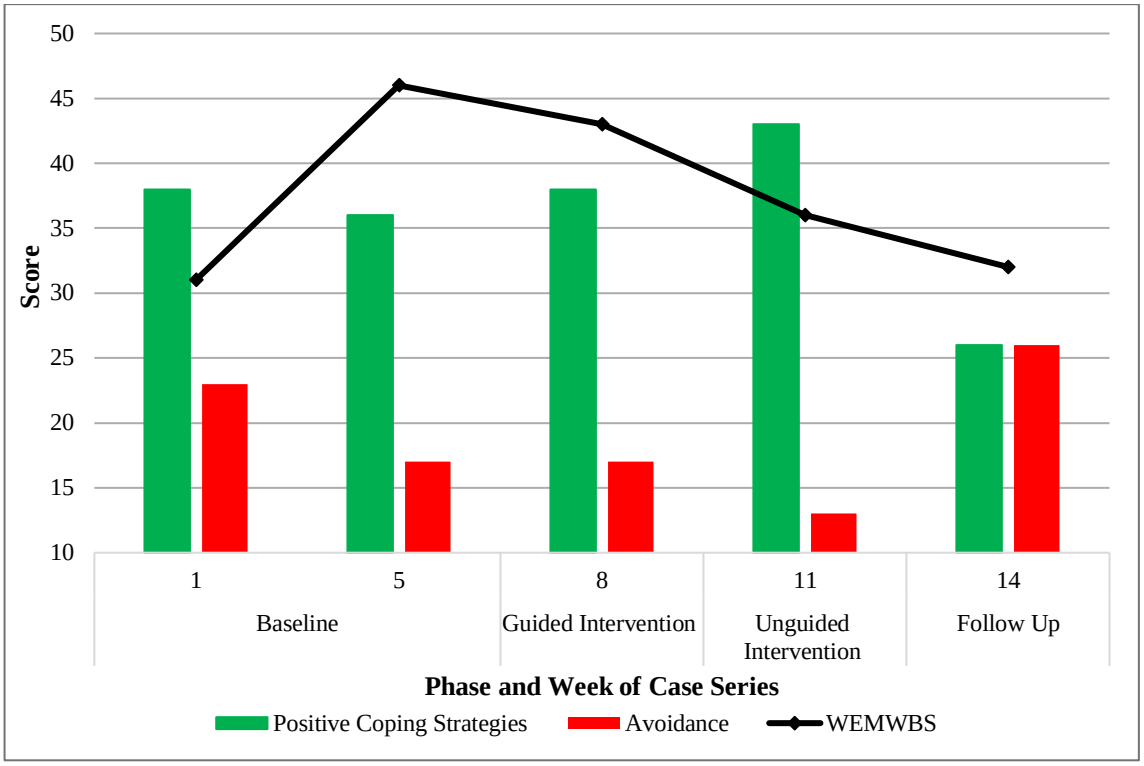


Figure 50: A visual display of Sage's WEMBWS and CSI scores during the case series

Sage's scores on the WEMWBS and the CSI are displayed in Figure 50. There did not appear to be a clear association between her scores on the measures in the expected direction. For example, at week 11 there was a reduction in her wellbeing score accompanied by an increased use of positive coping strategies and a reduction in her use of avoidance based coping strategies.

Figure 51: A visual display of Sage's WEMWBS and GSE scores during the case series

Sage's self-efficacy and wellbeing scores are displayed in Figure 51. Although her scores on the two measures followed a similar pattern during the baseline phase, they deviated from one another during the subsequent phases. This indicates that there was not a clear association between her levels of wellbeing and perceived self-efficacy.

Therefore, Sage's scores on the WEMWBS, the GSE and the CSI indicate that changes in her levels of wellbeing were not associated with changes in her coping style or self-efficacy.

3.1.7.4 Change interview

In the change interview Sage reported that she had noticed two positive changes since starting the study; these are displayed in Table 10. She reported that she was somewhat surprised by one of these changes and very much expected the other. She rated them both as important to her, and reported that they both would clearly have occurred on their own had she not been using *thedesk*.

Table 10: Summary of the changes reported by Sage during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
I feel more aware that I find it hard to get motivated	Somewhat surprised by it	Clearly would have happened without *thedesk*	Moderately important
I feel better about my course and have been engaging more with my work	I very much expected it	Clearly would have happened without *thedesk*	Extremely important

3.1.7.5 Sage participant summary

Sage's scores on the measures indicated that her levels of wellbeing, psychological distress, self-efficacy and coping style did not improve in response to the intervention. She reported two positive changes since starting the study, but attributed neither of these to using *thedesk*. Her usage data indicated that she had fairly low levels of engagement with *thedesk* during the study, and that she mainly accessed the quizzes rather than the other material and tools. Therefore her levels of wellbeing and psychological distress would not necessarily have been expected to improve in response to the intervention.

3.1.8 Participant 8: Tiger

Tiger was a first year student studying with the School of Politics and International Studies. At recruitment, her WEMWBS score was 42, indicating that her levels of wellbeing were in the normal range. Her raw CORE-OM score was 61, indicating moderate levels of psychological distress. Her responses during the case series indicated that she was experiencing difficulties related to anxiety and her mood, so she was encouraged to use the Staying Calm and Feeling Good sections of *thedesk* during the guided intervention phase of the study. She was randomly selected to complete the unguided phase first.

Tiger's daily measure completion rate was fairly low: she completed the measures on 80.4% of days during the case series and she did not receive the full available reimbursement for all of the phases. No data about her usage of *thedesk* was available, as there was no account registered with the site matching the email she had provided for the study.

3.1.8.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

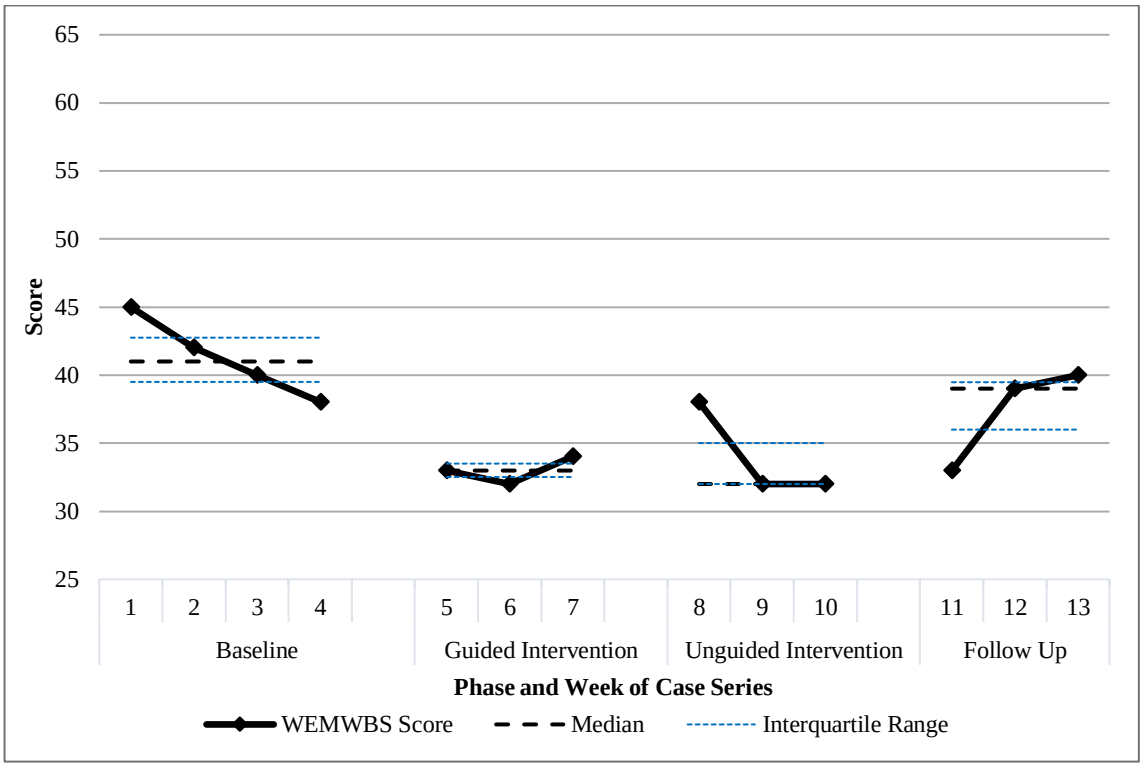


Figure 52: A visual display of Tiger's WEMWBS scores during the case series

Tiger's WEMWBS scores are displayed in Figure 52. Her wellbeing levels decreased steadily during the baseline period. The difference in her scores between week one and week five constituted a reliable and clinically significant deterioration, as her scores moved from the normal wellbeing range to the low wellbeing range. During the intervention phases her scores remained lower than during the baseline phase. Her scores increased during weeks 12 and 13 of the study, although they were still lower than their original levels.

When Tiger was shown her scores on the WEMWBS, she reported that her low levels of wellbeing during baseline and the guided intervention phase were due to a combination of tonsillitis and deadlines. She thought that her score improved at week eight because she was feeling better and her deadlines had been completed. Tiger was not sure what caused the drop in her scores at weeks nine to 11, or the improvement in her levels of wellbeing at weeks 12 and 13.

Daily wellbeing measure

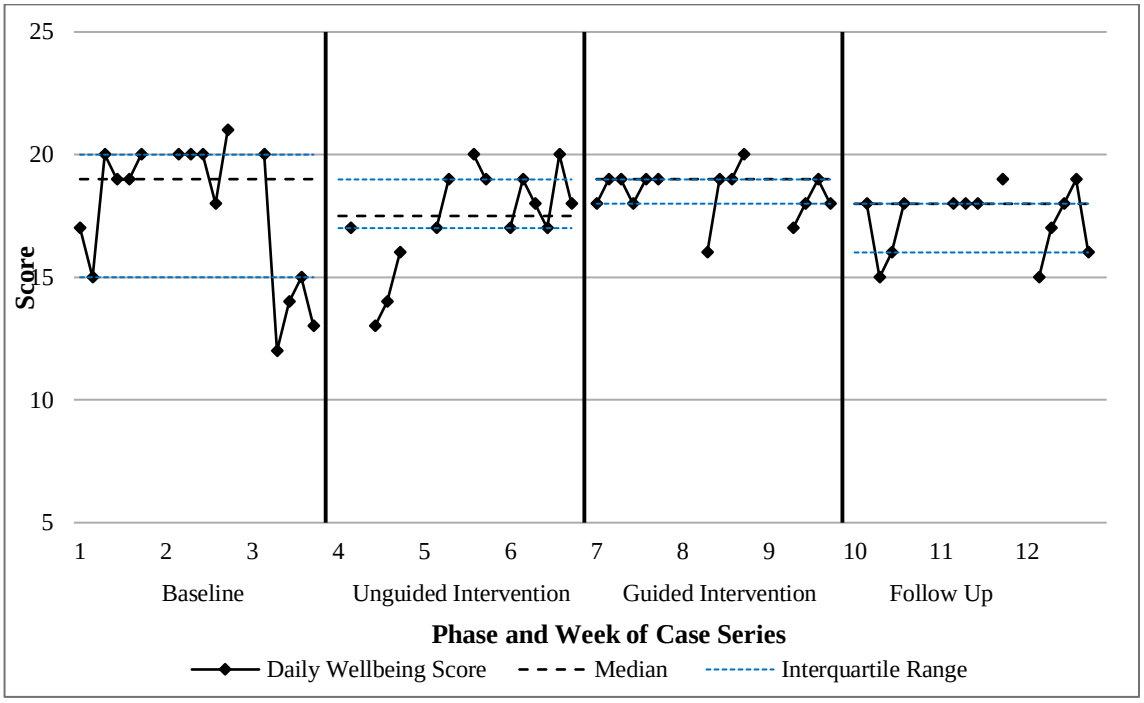


Figure 53: A visual display of Tiger's scores on the daily wellbeing measure during the case series

Tiger's scores on the daily wellbeing measure during the study are displayed in Figure 53. There was a deterioration in her scores towards the end of the baseline period, which is consistent with her scores on the WEMWBS. Her scores remained low during week four, then increased slightly during weeks five and six. There was little variation in her scores during the remainder of the case series.

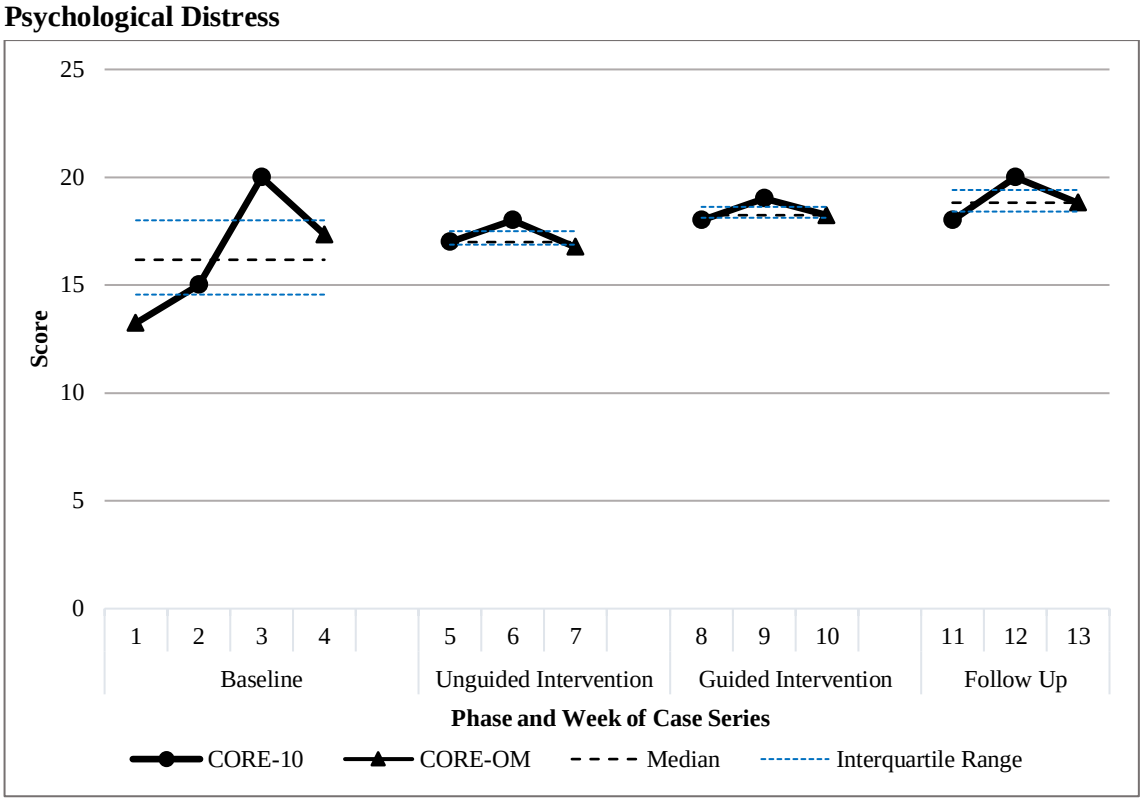


Figure 54: A visual display of Tiger's CORE-OM and CORE-10 scores during the case series

Figure displays Tiger's CORE-OM and CORE-10 scores. There was a sharp increase in her levels of psychological distress during baseline which constituted a reliable deterioration. At week one, Tiger's score indicated that she was experiencing mild levels of psychological distress, however by week five her score was in the moderate range. This indicates that a clinically significant deterioration took place during baseline. This was followed by a slight further deterioration in her scores during the remainder of the case series, but this was not reliable or clinically significant.

Overall, Tiger's scores on the three target measures indicate that *thedesk* did not have an impact on her levels of wellbeing or psychological distress. There was a notable deterioration in her scores during the baseline phase. This was not attributable to *thedesk*, but was not followed by an improvement during the intervention phases.

3.1.8.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

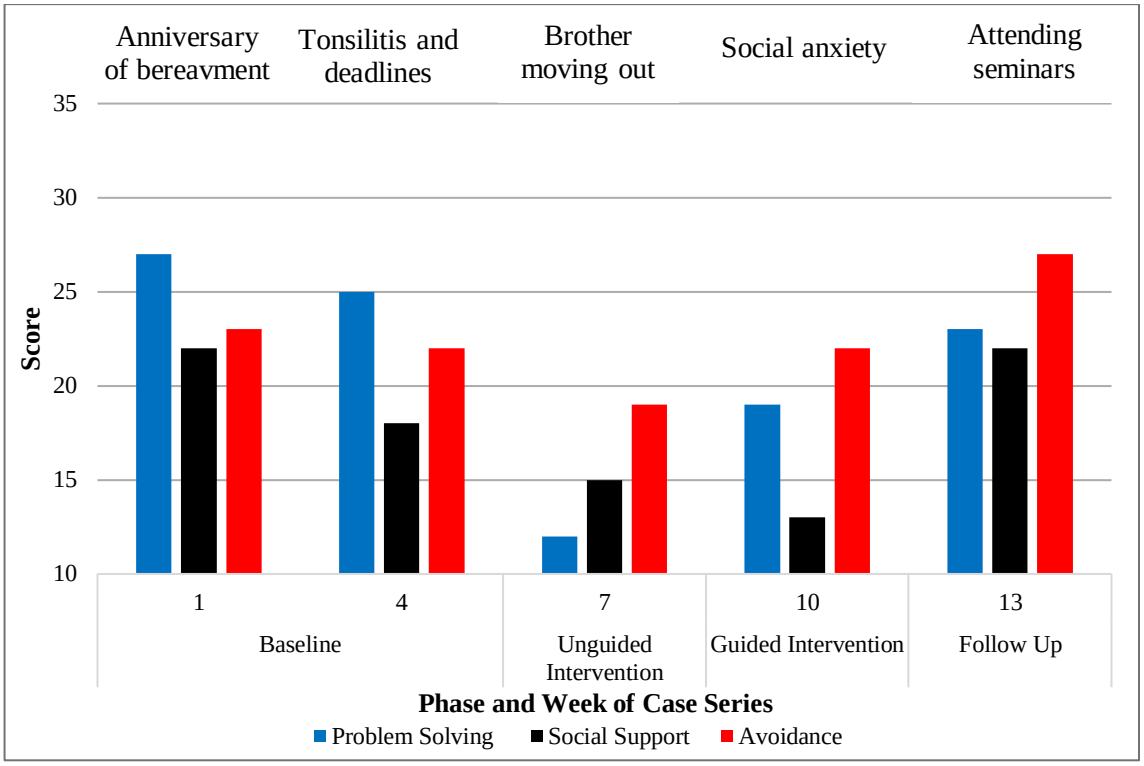


Figure 55: A visual display of Tiger's CSI scores during the case series

Tiger's scores on the three subscales of the CSI are displayed in Figure 55. Her scores on all three subscales fluctuated during the study and did not indicate that her coping style improved in response to the intervention.

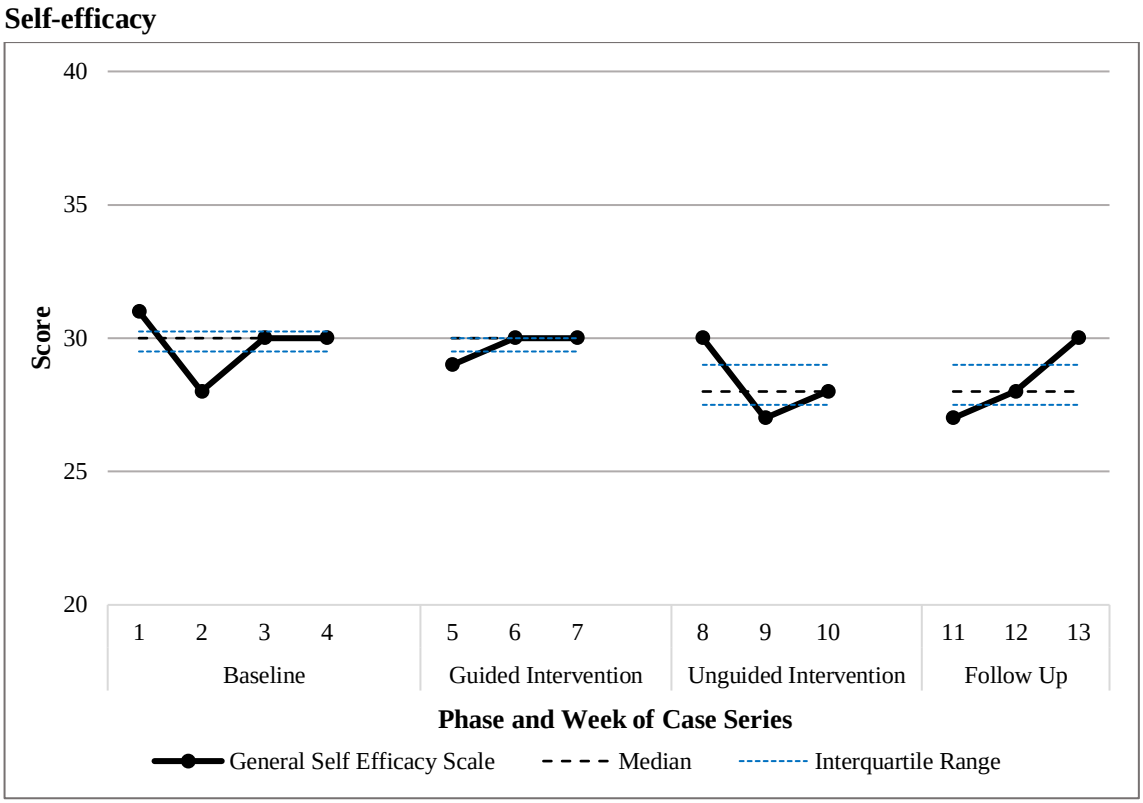


Figure 56: A visual display of Tiger's GSE scores during the case series

Figure 56 displays Tiger's GSE scores during the study. They remained fairly stable throughout the case series. There was a slight reduction in her scores during the last two weeks of the guided intervention phase and the first two weeks of follow up, but they returned to their original levels at the final measurement.

Therefore, Tiger's scores on the CSI and the GSE suggested that *thedesk* did not have an impact on her coping style or level of self-efficacy.

3.1.8.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

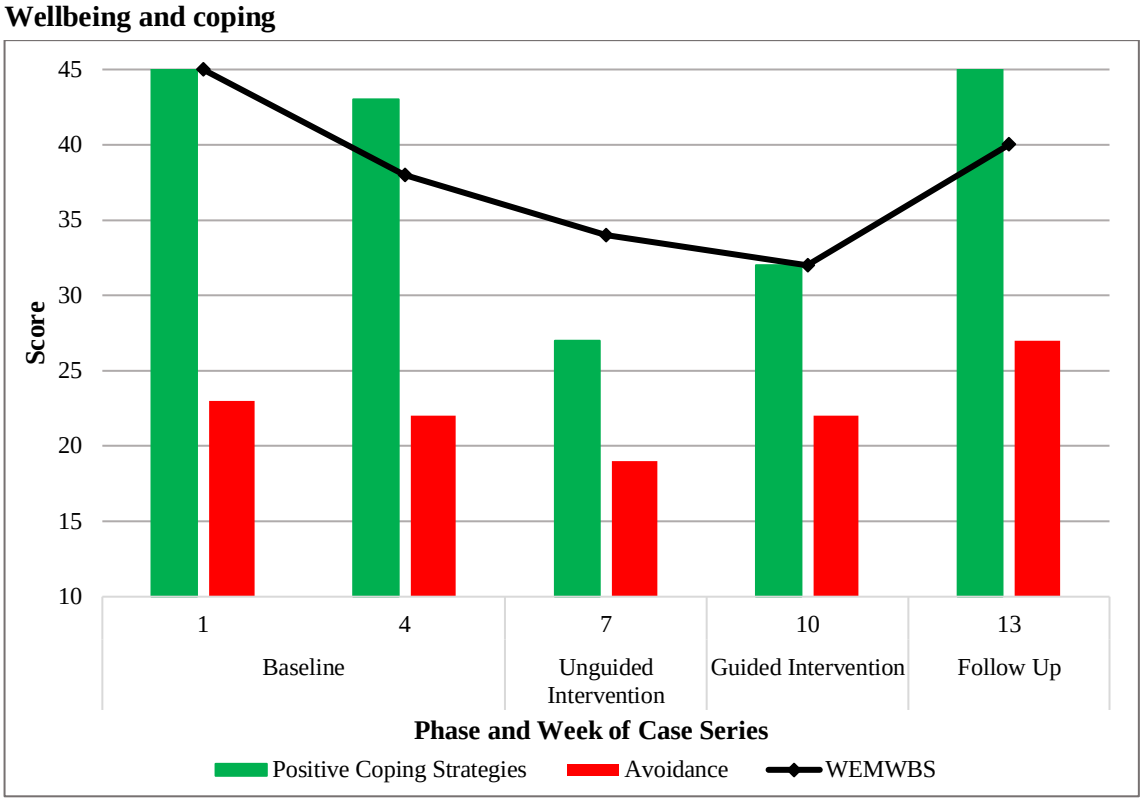


Figure 57: A visual display of Tiger's WEMBWS and CSI scores during the case series

Tiger's scores on the CSI and the WEMWBS are displayed in Figure 57. Her use of positive and avoidance based coping strategies appeared to follow a similar pattern to one another but the pattern of her wellbeing scores differed from this. Therefore there did not seem to be a clearly discernible relationship on her levels of wellbeing and coping style.

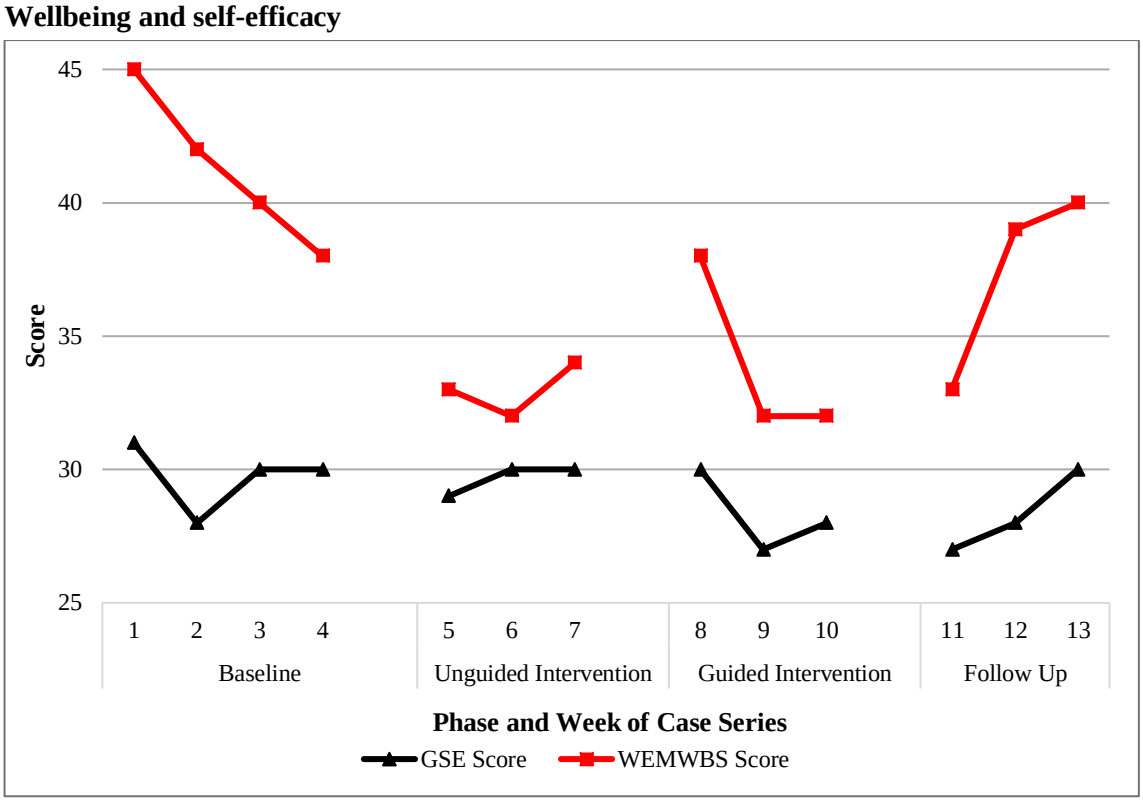


Figure 58: A visual display of Tiger's WEMWBS and GSE scores during the case series

Tiger's scores on the WEMWBS and the GSE are displayed in Figure 58. There appeared to be some similarities between the trends in her scores on the two measures, but there were also some points where her scores deviated from one another. For example, there was a consistent downwards trend in her WEMBS score during the baseline phase which was not accompanied by a corresponding pattern in her GSE scores.

Therefore, Tiger's scores indicated that changes in her wellbeing were not associated with changes in her coping style or self-efficacy.

3.1.8.4 Change interview

During the change interview, Tiger reported that she had experienced three changes whilst taking part in the case series; these are displayed in Table 11. She reported that she was somewhat surprised by two of the changes and had somewhat expected the third. She reported that all three changes had been at least somewhat important to her. She attributed two of the changes to events outside of using *thedesk*, and was not sure whether the third change had been brought about by using *thedesk* or not. This change was being more aware of her anxiety in social situations, and she did not think this was a positive change.

Table 11: Summary of the changes reported by Tiger during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
I have a greater awareness of my feelings	Somewhat surprised by it	Clearly would have happened without *thedesk*	Extremely important
I have implemented a more structured routine	I somewhat expected it	It probably would have happened without *thedesk*	Moderately important
A heightened awareness of anxiety in social situations	Somewhat surprised by it	No way of telling	Somewhat important

3.1.8.5 Tiger participant summary

Tiger's WEMWBS, daily wellbeing measure and CORE scores indicated that a deterioration may have taken place during the case series, as did her levels of self-efficacy and coping style. These deteriorations all occurred or started during the baseline phase so were not attributable to using *thedesk*, but were not followed by improvements during the intervention phases. During the change interview, Tiger reported experiencing two positive changes that she felt would have occurred had she not been using *thedesk*. She also reported one negative change, and was not sure whether it would have happened had she not been using *thedesk*. These results therefore indicate that *thedesk* was not a helpful intervention for Tiger, although it is unclear how much she used the programme, or indeed whether she used it at all, as there was no record of an account associated with her provided email address.

3.1.9 Participant 9: Umbrella

Umbrella was a second year student with the School of English. At recruitment, her WEMWBS score of 52 was in the normal range, and her CORE-OM score of 27 was in the low level range. Her responses during the case series indicated that she was experiencing difficulties relating to her mood and in relationships, so she was encouraged to use Feeling Good and Staying Connected sections of *thedesk* during the guided intervention phase. She was randomly selected to complete this phase second.

Umbrella's completion rate of the daily measures was quite low; she completed the measures on 81.3% of days during the study and she did not receive the full reimbursement for all the phases. During the unguided intervention phase, which she completed first, she spent an estimated total of 24 minutes actively using *thedesk*. During this period she accessed material from the Feeling Good and Getting Things Done sections. She did not access the site during the guided intervention phase, which she completed second.

3.1.9.1 Research question 1: What is the impact of *thedesk* on wellbeing and psychological distress?

Wellbeing: WEMWBS

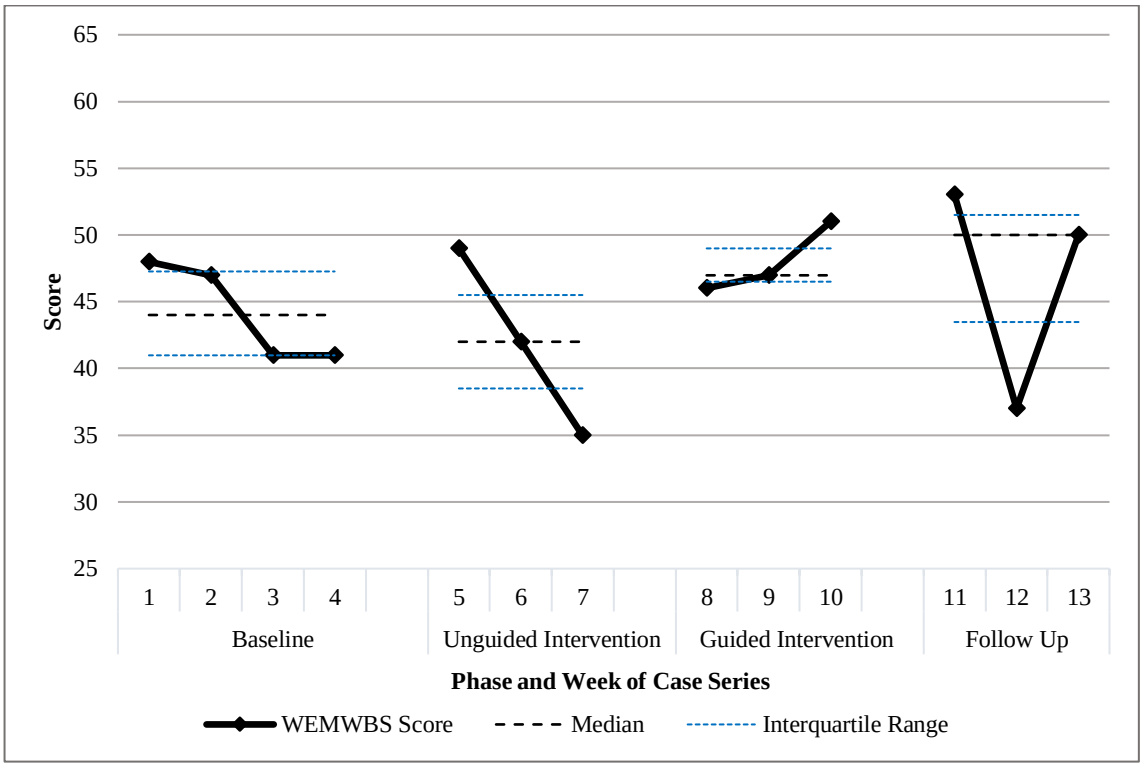


Figure 59: A visual display of Umbrella's WEMWBS scores during the case series

Figure 59 displays Umbrella's scores on the WEMWBS measure during the case series. Visual analysis shows that her scores on the measures were highly variable. There was a slight deterioration in her wellbeing during the baseline phase. This was followed by an increase in her score at week five, then a sharp reliable deterioration in her scores during the unguided intervention phase. There was a reliable improvement in her WEMWBS score between week seven and week eight, and this was maintained throughout the guided intervention phase. Her scores were highly variable during follow up: her highest wellbeing score throughout the case series was at week 11, followed by her second lowest score during the case series at week 12.

At the start of the case series, Umbrella's score was in the normal wellbeing range, and her scores remained in this range throughout baseline. Her score at week seven was in the low range, representing a clinically significant deterioration. Her scores improved during the unguided intervention phase and were within the normal range for the rest of the case series, with the exception of week 12.

When shown her scores on the WEMWBS, Umbrella reported that the deterioration in her wellbeing during baseline was due to stress. During this period she was at home with her family, with a lot of revision to complete and a lack of time to do so. She thought that the sharp deterioration in her scores between weeks five and seven was also due to stress, as she had essay deadlines during this period and had also picked up an extra shift at work a week. Similarly, she reported that the deterioration at week 12 was due to the amount of hours she had done that week at work, which had impacted on her ability to see her friends or socialise.

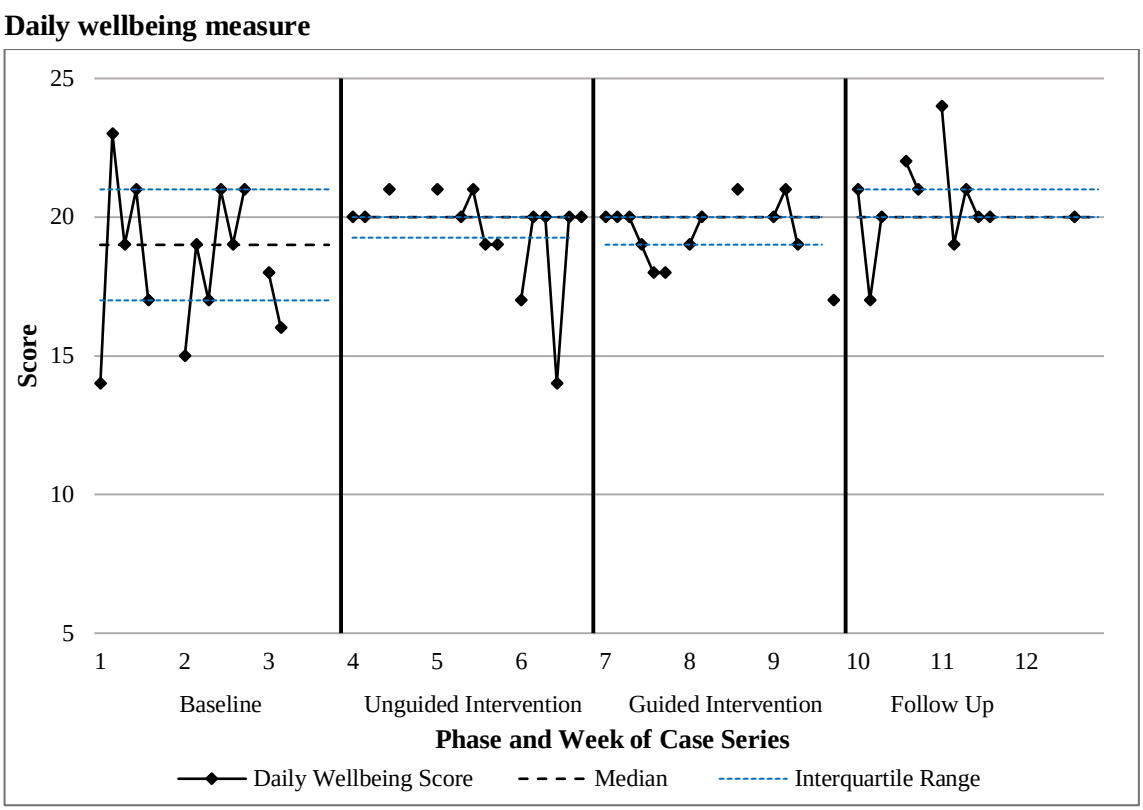


Figure 60: A visual display of Umbrella's scores on the daily wellbeing measure during the case series

Umbrella's scores on the daily measure of wellbeing are displayed in Figure 60. During the baseline, there was high variability in her scores. There was less variability in her scores during the intervention and follow up phases, and her median score was slightly higher during these phases than during baseline.

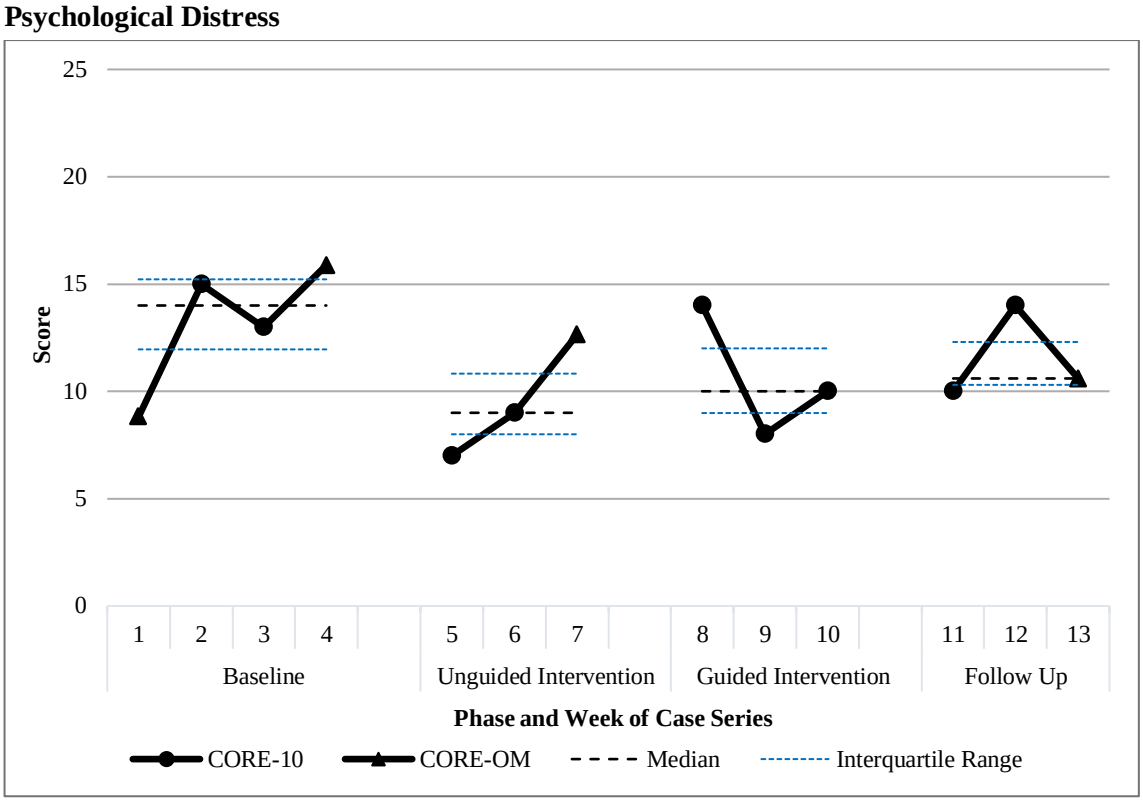


Figure 61: A visual display of Umbrella's CORE-OM and CORE-10 scores during the case series

Figure 61 displays Umbrella's scores on the CORE-10 and CORE-OM scores during the case series. Higher scores indicate greater levels of psychological distress. During the baseline phase, there was a reliable deterioration in her scores. There was then a large improvement in her level of distress at week five, followed by a deterioration during the remainder of the unguided intervention phase. Her scores remained highly variable from week to week, but on average her scores were slightly higher during the guided intervention and follow up phases compared with the unguided phase.

Overall, Umbrella's scores on the three target measures indicated that *thedesk* had a positive impact on her levels of wellbeing. Her scores on the wellbeing measures showed some improvements, but the high level of variation in her scores mean that this was interpreted tentatively.

3.1.9.2 Research question 2: What is the impact of *thedesk* on coping style and self-efficacy?

Coping style

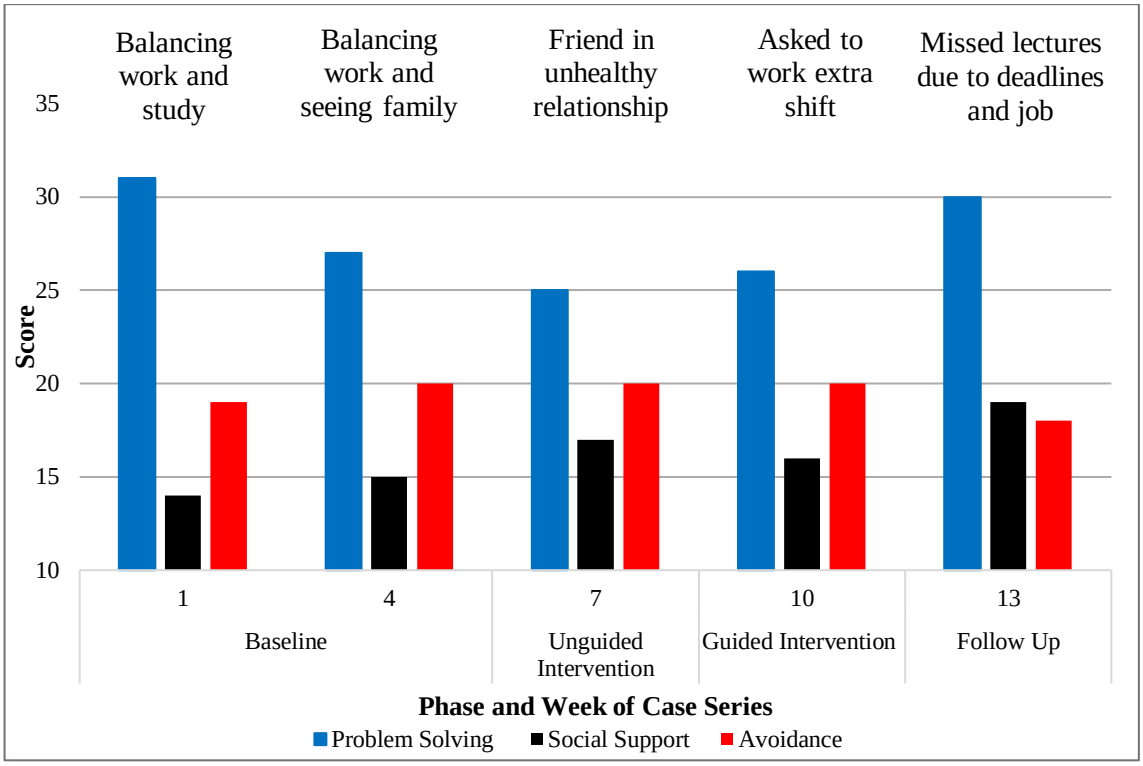


Figure 62: A visual display of Umbrella's CSI scores during the case series

Figure 62 displays Umbrella's scores on the three subscales of the CSI. Her scores on the subscales remained fairly consistent and did not indicate that her coping style improved in response to the intervention.

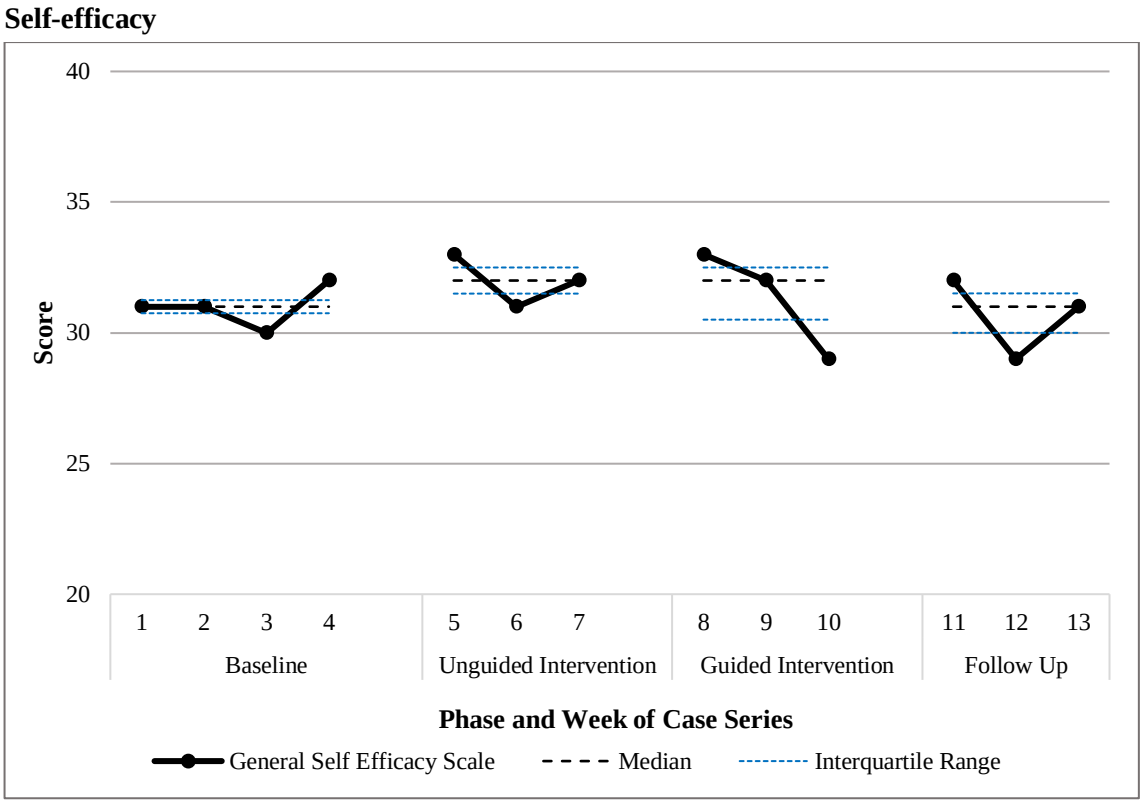


Figure 63: A visual display of Umbrella's GSE scores during the case series

Figure 63 displays Umbrella's scores on the GSE scale throughout the case series. There were low levels of variation in her scores and no large differences between phases. There was a very slight downwards trend in her GSE scores over time, but no reliable changes took place in her scores over the case series.

Overall, Umbrella's scores on the CSI and the GSE indicated that *thedesk* did not have an impact on her coping style or self-efficacy. There was a slight improvement in her use of social support seeking based coping strategies during the case series, but her scores on the avoidance subscale, problem solving subscale and the GSE did not improve.

3.1.9.3 Research question 3: Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

Wellbeing and coping

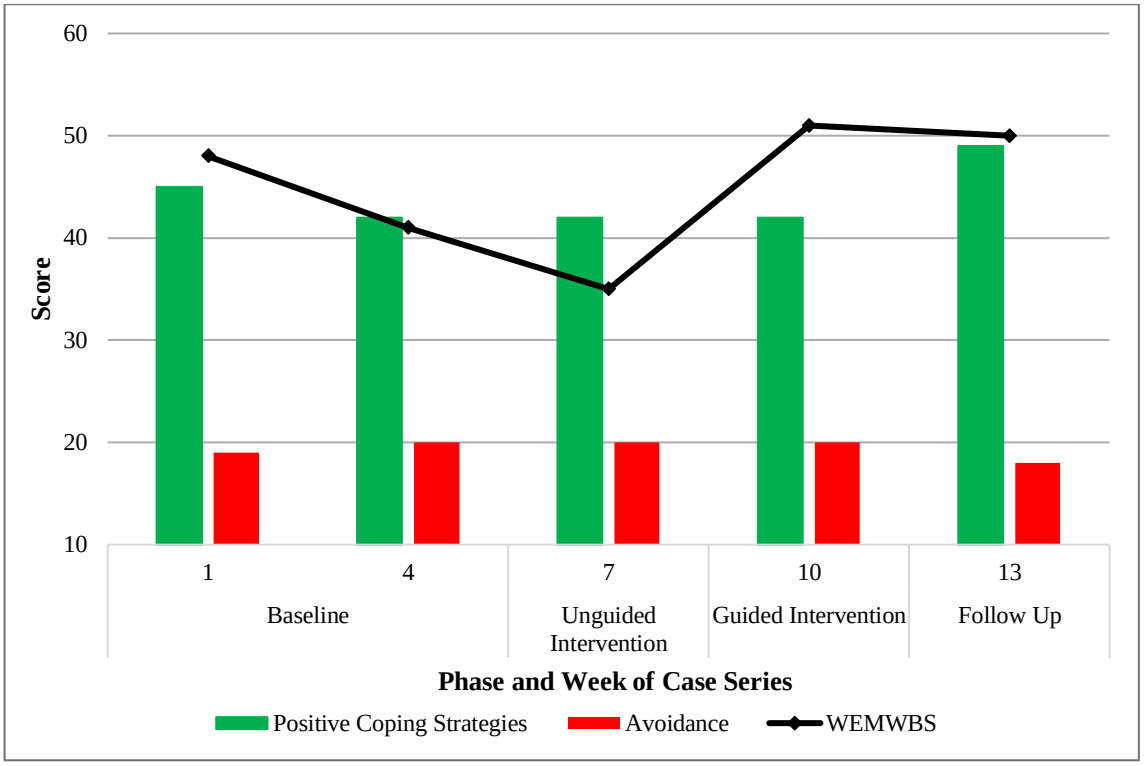


Figure 64: A visual display of Umbrella's WEMBWS and CSI scores during the case series

Figure 64 displays Umbrella's scores on the CSI and the WEMWBS. There did not appear to be a relationship between her coping style and her levels of wellbeing, as her use of positive and avoidance based coping strategies remained fairly stable whilst there were more pronounced fluctuations in her wellbeing.

Figure 65: A visual display of Umbrella's WEMWBS and GSE scores during the case series

Umbrella's wellbeing and self-efficacy scores are displayed in Figure 65. Although her scores followed similar patterns during some parts of the case series, they deviated from one another at other points. For example, there was a large reduction in her WEMBS scores during the unguided intervention phase which was not accompanied by an associated reduction in her GSE scores.

Therefore, Umbrella's scores indicate that changes in her levels of wellbeing were not associated with changes in her coping style or level of self-efficacy.

3.1.9.4 Change interview

At the change interview, Umbrella described experiencing one positive change since starting the case series, this is displayed in Table 11. She was somewhat surprised by this change, reported that it was very important to her, and thought that it probably would have happened anyway had she not been using *thedesk*.

Table 12: Summary of the changes reported by Umbrella during the change interview

Description of change	Expectancy of change	How likely would it have been without *thedesk*	Importance of change
Thinking more positively about challenges	Somewhat surprised by it	Probably would have happened without *thedesk*	Very important

3.1.9.5 Umbrella participant summary

Umbrella's scores indicated that there were improvements in her levels of wellbeing during the case series, but they were highly variable so this result was interpreted tentatively. Her self-efficacy and coping style did not show improvements during the case series, and there did not appear to be a relationship between her wellbeing, coping style or self-efficacy. During the change interview, Umbrella reported one positive change. She stated that this probably would have occurred anyway had she not been using *thedesk*, but did report that she had found using *thedesk* helpful.

3.2 Group Level Quantitative Analysis

3.2.1 Summary of research questions

A summary of the findings from each participant in relation to the three research questions is displayed in Table 13.

Table 13: Group level summary of research questions

Participant	Research question 1*	Research question 2**	Research question 3***
Fox	No impact	No impact	WEMWBS and CSI associated
Harp	No impact	No impact	WEMWBS, CSI and GSE not associated
Igloo	No impact	No impact	WEMWBS and GSE associated
Moon	No impact	No impact	WEMWBS, CSI and GSE not associated
Penguin	Some positive impact	No impact	WEMWBS, CSI and GSE not associated
Rhyme	No impact	No impact	WEMWBS, CSI and GSE not associated
Sage	No impact	No impact	WEMWBS, CSI and GSE not associated
Tiger	No impact	No impact	WEMWBS, CSI and GSE not associated
Umbrella	Some positive impact	No impact	WEMWBS, CSI and GSE not associated

* What is the impact of *thedesk* on wellbeing and psychological distress?

** What is the impact of *thedesk* on coping style and self-efficacy?

*** Are any changes in wellbeing associated with corresponding changes in coping style and self-efficacy?

3.2.2 The association between wellbeing, self-efficacy and coping style

Coping style and self-efficacy were measured as potential mechanisms of change. None of the participants showed improvements in their coping style or levels of self-efficacy however, and wellbeing only appeared to be associated with coping style or self-efficacy in two and one participant's scores respectively. As these results deviated from what was expected, further group level analyses were conducted. In order to assess relationships between wellbeing, coping style and self-efficacy, correlations between the variables in the 86 participants who completed the recruitment battery were calculated. General self-efficacy scores were positively associated with wellbeing scores (r = .62, p<.001) and negatively associated with psychological distress scores (r = -.43, p<.001). Problem focussed coping was positively associated with wellbeing scores (r = .28, p<.001) and negatively associated with psychological distress scores (r = -.36, p<.001). Correlations between social support seeking, wellbeing and psychological distress were in the expected direction, but were small and non-significant. Avoidance based coping was negatively associated with levels of wellbeing (r = -.43, p<.001) and positively correlated with levels of psychological distress (r= .64, p<.001). These findings provide further evidence that coping style and self-efficacy are associated with wellbeing and psychological distress, although these were cross sectional correlations which did not measure predictive power as potential process variables.

3.2.3 The impact of guidance

Participants in this study used *thedesk* both without guidance and with weekly guidance emails from the researcher. Further group level analysis was conducted to investigate whether this guidance had any impact on participants' levels of wellbeing or their engagement with *thedesk*, with levels of wellbeing within the two intervention phases compared across participants. There was not clear effect of guidance on levels of wellbeing. Some participants had higher levels of wellbeing during the guided intervention phase, whereas some had higher levels during the unguided intervention phase. Nor did the guidance emails appear to have an effect on participants' usage of *thedesk*. Five of the eight participants for whom usage data was available used *thedesk* more during the unguided phase than the guided phase. Seven participants used *thedesk* more during their first intervention phase, therefore timing seemed to have a greater impact on use of *thedesk* than guidance.

3.3 Thematic analysis of change interview data

This section of the results chapter presents the thematic analysis of change interview data. Five meta-themes were developed from the data, these are displayed in Figure 66 and the meta-themes, themes and subthemes are discussed in more detail below.

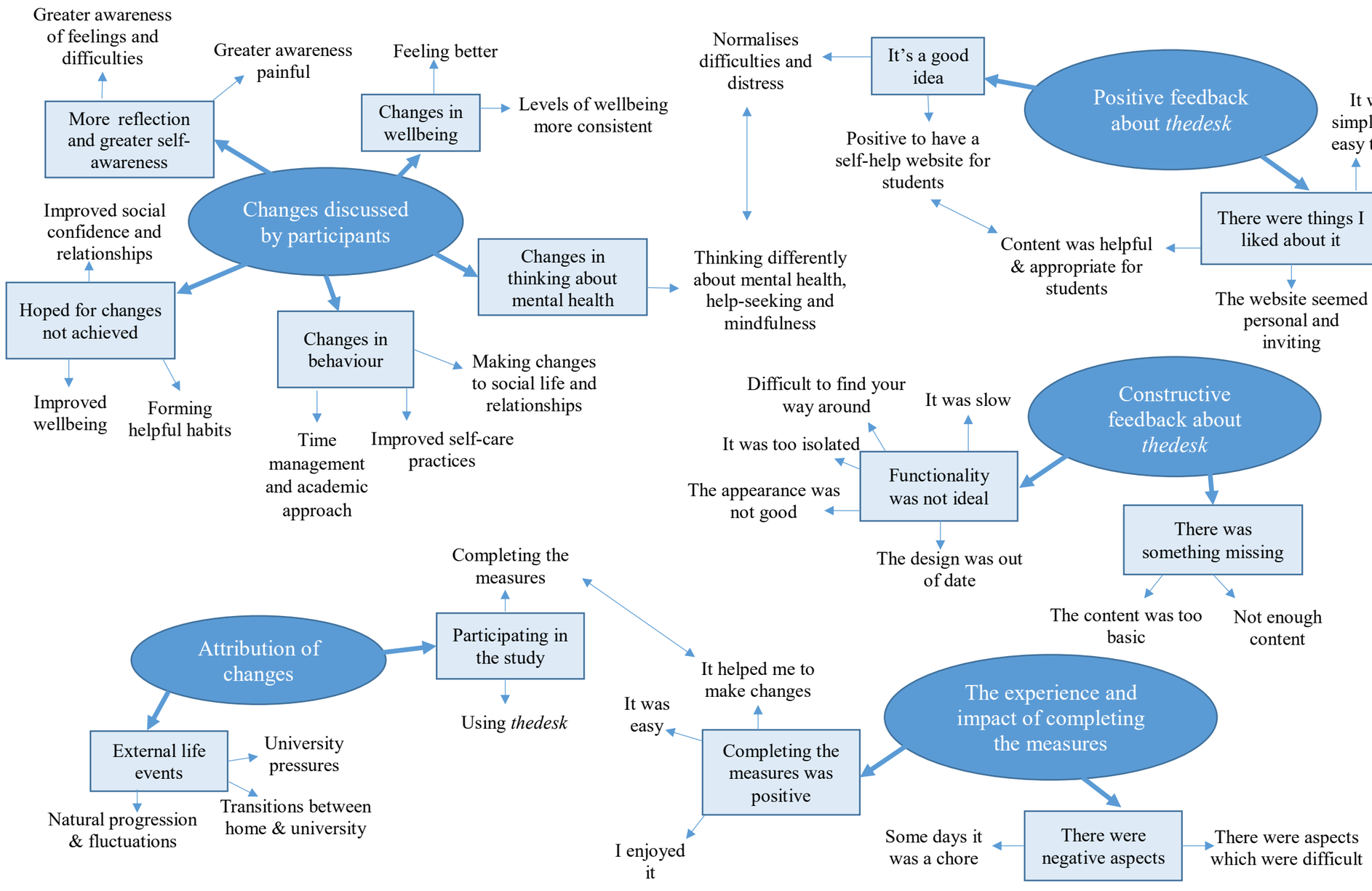


Figure 66: The thematic map

3.3.1 Meta-theme 1: Changes discussed by participants

Table 14: A summary of meta-theme 1, Changes discussed by participants

Theme	Subtheme	*n* Instances	*n* Participants
More reflection and greater self-awareness	Greater awareness of feelings and difficulties	11	4
	Greater awareness could be painful	4	2
Changes in wellbeing	Feeling better	8	4
	Levels of wellbeing are more consistent	2	2
Changes in thinking about mental health	Thinking differently about mental health, seeking help and mindfulness	6	2
Changes in Behaviour	Improved self-care practices	3	3
	Making changes to social life and relationships	6	3
	Improved time management and academic approach	6	4
Hoped for changes which were not achieved	Forming helpful habits	3	2
	Improved social confidence and relationships	3	3
	Improved levels of wellbeing and mental health	2	2

The meta-theme of changes discussed by participants contains participants' discussion about the changes that they had noticed in themselves during taking part in the study, as well as their discussion of the changes they had hoped for but hadn't achieved. As displayed in Table 13, the changes reported by participants were grouped into five themes which are discussed in more detail below.

3.3.1.1 More reflection and greater self-awareness

A common change reported by the participants was that they had they had become more reflective and aware of their thoughts, feelings and behaviours whilst taking part in the study. This was discussed both in a positive and negative light by participants.

Greater awareness of feelings and difficulties

Participants reported that they were more aware of their feelings and difficulties after taking part in the study. They felt that they were more reflective and aware, and were less likely to become swept up in their emotions. Participants reported that this greater self-awareness meant that they felt that they could now do something differently to manage their difficulties, including one participant who had realised that they would benefit from seeking more support for their mental health.

> "*So it does kind of force you to think "Oh… actually how am I feeling?" Or, or you know why am I feeling like this when… you connect with why you feel those feelings. So I think that's kind of … more of a kind of…like self-awareness."* **Tiger.**

Greater awareness was painful

Although greater levels of reflection and awareness of feelings were usually discussed in a positive light during the interviews, two participants spoke about the heightened awareness and connection with their feelings and difficulties as being unpleasant or painful. They discussed previously having coped with their emotions by avoiding them or pushing them away, and that a greater connection with their emotions had been concerning for them at times.

> *"Obviously thinking about your feelings every day is quite difficult because sometimes you don't want to think about it… It's like "Should have I pushed things away for so long, have I made things worse?" Yeah…It probably did get worse before getting better. Over the Christmas holidays when I went home I think my parents were fairly concerned about me."* **Fox.**

3.3.1.2 Changes in wellbeing

Another change that was reported by participants was improvements in wellbeing. This included participants reporting that they were feeling better, and that their levels of wellbeing were more consistent after taking part in the study.

Feeling Better

During the interviews, four of the participants reported that they had been feeling better, although only two said that this was due to their participation. Participants talked about feeling less anxious, feeling more positive about university and their course, and feeling like their wellbeing was on an upwards trajectory.

> *"I'm in a good headspace mentally I would say, better than I have been in for a long time."* **Moon.**

Levels of wellbeing more consistent

Two participants reported that they were experiencing fewer fluctuations in their levels of wellbeing after taking part in the study, one of whom also reported improvement. They stated that they had previously experienced large fluctuations in their wellbeing, but that they were now experiencing more stable emotions and states of mind.

> *"Yes it's, it's like, I used to have very like ups and downs and but now it's kind of like, if you know what I mean, staying up which is quite nice."* **Penguin.**

3.3.1.3 Changes in thinking

Two participants reported that their thinking about mental health had changed during their participation. They stated that previously they had underestimated or denied their difficulties, but that they had come to see mental distress as more normal. This had led to one participant thinking more positively about seeking help and engaging in mindfulness practice.

> *"There was like a long period in the first year, I was just kind of in denial about it because I kind of had this idea in my head that I was like… oh well I, I've got good friends and like I've, like very close to my family. Like generally have no reason to be feeling bad! But then now I've kind of acknowledged like it's okay to feel bad even if you don't know why you're feeling that."* **Penguin.**

3.3.1.4 Changes in behaviour

The fourth theme within the meta-theme of changes discussed by participants was changes in behaviour. This contained participants' discussion of changes that they had made to their behaviour whilst taking part in the case series.

Improved self-care practices

Three participants reported making changes to their self-care whilst taking part in the study. This included drinking less alcohol, going out less, exercising more, trying different types of exercises and devoting more time to religious practices.

> *"Trying to like change some… habits and things like that. Like… trying to exercise more. I wanted to try a few different things like climbing as well. I went to one of the give it a go sessions which was an awesome experience."* **Igloo.**

Making changes to social life and relationships

Three participants spoke about making changes to their social life and in their relationships. This included making more of an effort to meet people and make new friends, ending a relationship which was unhappy, being more open within existing friendships and talking more about emotions.

> *"I've had this on and off situation with a guy for a long time, years now…and I've literally just been like "I deserve better than this, I'm tired of this.""* **Moon.**

Improved time management and academic approach

Participants discussed making changes to how they were approaching their academic work and managing their time. This included developing a more structured routine which allowed them to spend time with their friends, making more time for themselves away from work, working from the library rather than from home and increased enthusiasm and motivation to do work.

> *"I'm doing work for once. And think, being in you know just a better mind-set. Whereas I think at the beginning of study was like "I hate my course. I want to drop out!""* **Sage.**

3.3.1.5 Changes participants hoped for but did not achieve

Six participants said that there were improvements which they had hoped to experience as a result of taking part of the study which had not occurred. These were organised into the three subthemes of forming helpful habits, improving social confidence and relationships, and greater wellbeing. These are discussed in turn below.

Forming helpful habits

Helpful habits that participants had hoped to develop but were not able to do so included improving levels of procrastination and eating more healthily.

> *"I have tried different strategies but one of the biggest issues for me is that I can't stop procrastinating. It's been going on for years now."* **Harp.**

Improved social confidence and relationships

Three participants spoke about wanting to improve their social confidence and relationships during the study, but not achieving this. Their goals had included speaking up more in lectures, feeling less lonely and developing greater levels of confidence about how they were perceived by others.

> *"When I kept ticking things…there was one about friendship and feeling like you have no friends. I remember…a lot of the time, especially towards the beginning I felt like…yeah I didn't really have much community around me. I would have wished that that would of changed more really."* **Moon.**

Improved wellbeing and mental health

Two participants reported that they had hoped to experience improvements in their wellbeing and mental health whilst taking part in the study, but that this had not occurred. One participant reported experiencing irritable bowel syndrome relating to

anxiety which had not improved. The second participant said that she had hoped to feel better in a more general sense, but that this had not happened for her.

> *"Feeling slightly, like, better about things. It hasn't yet but I appreciate that is a process and a survey's probably not going to change…change it."* **Tiger.**

3.3.2 Meta-theme 2: Attribution of changes

Table 15: A summary of meta-theme 2, attribution of changes

Theme	Subtheme	*n* Instances	*n* Participants
Participating in the study	Using *thedesk*	5	4
	Completing the measures	6	5
External life events	Natural progression and fluctuations	8	6
	Transitioning between home and university	12	8
	University pressures	15	6

The second meta-theme was attributions of changes. This contains participants' discussion about what they believed had caused any changes they had experienced whilst taking part in the study. As illustrated in Table 14, these were organised into the two themes of changes caused by participation in the study and changes caused by external life events.

3.3.2.1 Participating in the study

In total, five participants attributed some of the changes they had experienced to their participation in the study. Participants reported that both using *thedesk* and completing the daily measures had been agents of change. The subtheme of using *thedesk* is discussed in more detail below, and the subtheme of changes caused by completing the measures is discussed within meta-theme five.

Using *thedesk*

Four participants attributed some of the changes that they had experienced to using *thedesk*, however two participants reported that it was not the content of *thedesk* which had been important in helping them to change, but rather the general act of engaging with a website which was focused on wellbeing. The videos about mindfulness and the

quizzes on sleep and procrastination were discussed as two specific elements of *thedesk* which had produced change.

> *"I'd say somewhat. I'd say less in the, like the content of it. And more in just the action of like…doing something, being quite proactive about like getting stuff done I think."* **Penguin.**

3.3.2.2 Changes caused by external life events

Natural progression and fluctuations

Five participants reported that the changes they had experienced whilst taking part in the study were due to natural progression and fluctuation in their levels of wellbeing and mental health. Participants spoke about their mental health changing and progressing over time due to what had been going on in their lives, as opposed to taking part in the study or using *thedesk*.

> *"How I've been during the study has actually been less dependent on the resources I am using and more dependent on what's going on in my life, and how that's making me feel."* **Moon.**

Transitioning between home and university

The transition between home and university was a common subtheme, with eight participants reporting that moving between home and university had an impact on their mood and levels of wellbeing. This effect occurred in both directions. Some participants reported that their wellbeing was improved during the holidays, and some reported that being away from university had had a negative impact on their wellbeing.

> *"I was going home for Christmas and I don't really get on with my parents. So it wasn't exciting time for me!"* **Rhyme.**

University pressures

The pressures associated with being a university student were mentioned by six participants as causes of the changes they had experienced. Participants discussed workload, exams, deadlines, receiving disappointing grades and dissatisfaction with their courses as factors which had negatively impacted their wellbeing

> *"I feel that my mood can go up and down depending on exams, deadlines, stress."* **Harp.**

3.3.3 Meta-theme 3: Positive feedback about *thedesk*

The meta-theme of positive feedback about *thedesk* is discussed first. As presented in Table 15, this was comprised of two themes which are discussed in more detail below.

Table 16: A summary of meta-theme 3, positive feedback about *thedesk*

Theme	Subtheme	*n* Instances	*n* Participants
It's a good idea	Positive to have a self-help website for students	4	3
	Normalises difficulty and distress	6	2
There were things I liked about it	It was simple and easy to use	12	8
	The content seemed helpful and appropriate for students	17	6
	It seemed personal and inviting	5	3

3.3.3.1 It's a good idea

This theme encapsulates positive feedback about *thedesk* being a good idea. Participants reported that they thought a web-based intervention for students was positive, and that they would be open to using a web-based resource to manage distress.

Positive to have a self-help website for students

The participants reported that they felt it was positive that a self-help resource for students had been developed, as university can be a stressful time. Feedback from some participants suggested that the act of engaging in self-help itself was more helpful than the specific elements or content of *thedesk*.

> *"I think it's not specifically thedesk, the concept of going on a website and just sort of reading it through and thinking about it just was really helpful"* **Fox.**

Normalises difficulty and distress

Using *thedesk* seems to have supported participants to learn that experiencing distress and anxiety is normal and understandable, rather than viewing this as pathological. Participants appreciated the fact that *thedesk* was designed to support student problems with generic stressors associated with attending university rather than providing crisis help, which seemed to support this normalisation. One participant also realised that they would benefit from seeking support for their mental health as a result of taking part in the study, and that this did not have to be perceived negatively.

> *"Generally more just day to day like "are you a bit stressed", "are you a bit angry?" or whatever, which is much more…for just a general student population rather than specific crisis help. That was really good."* **Penguin**.

3.3.3.2 There were things I liked about it

This theme refers to participants' comments about specific things they had liked about *thedesk*, rather than general feedback that they had felt that it was positive or a good idea.

It was simple and easy to use

The majority of participants reported that they were able to navigate *thedesk* and find what they were looking for with ease. Participants reported that the organisation of the content into the four sections *thedesk* helped with this, and that the layout was simple and easy to use.

> *"It was such a simple layout. I don't think you can make improve the layout at all…"* **Sage**

The content seemed helpful and appropriate for students

The participants commented positively on the topics which were covered, and reported that the content seemed appropriate for the student population. Participants also gave positive feedback about specific elements of *thedesk*, such as the bullet point action plans at the end of each module and the videos containing breathing exercises.

> *"The topics were really good. They were really interesting. A lot that I wanted to look at."* **Rhyme.**

It seemed personal and inviting

Participants reported that *thedesk* felt like a personal website, as opposed to some other self-help websites they had previously used which had seemed more generic. They reported that *thedesk* was inviting and pleasant to use, and appreciated being able to use it in their own way and choose what seemed relevant to them, rather than having to follow a predetermined structure.

> *"I mean I suppose how it kind of felt like a personal website as opposed to, cos a lot of the things were online if you like look at anxiety or depression or whatever! It's just like a general like here's a list of symptoms. Here's a list of this. And like it's very impersonal whereas it makes it seem like, it's almost like a Facebook for your like own like wellbeing almost. Which that, I think that was quite a nice bit as well actually."* **Penguin.**

3.3.4 Meta-theme 4: Constructive feedback about *thedesk*

Meta-Theme four is comprised of participants' constructive feedback about *thedesk*. As displayed in Table 16, this was comprised of two themes which are discussed in more detail below.

Table 17: A summary of meta-theme 4, constructive feedback about *thedesk*

Theme	Subtheme	*n* Instances	*n* Participants
There was something missing	The content was too basic	12	4
	There was not enough content	6	4
The functionality was not ideal	The appearance was not good	8	5
	It was slow	5	2
	The design was out of date	12	6
	It could be difficult to find your way around	7	4
	It was too isolated	6	2

3.3.4.1 There was something missing

Feedback from participants suggested that there was something missing from *thedesk*, and that the content it did have was not quite enough to support them to change.

The content was too basic

This subtheme contains participants' comments about the existing content of *thedesk* not being quite what they were looking or hoping for from the programme. Participants reported that the strategies and advice contained within *thedesk* were not helpful, were too simplistic and were common knowledge. Some participants felt that many of the topics were inapplicable to them or that the quizzes were too specific. Overall, feedback suggested that the content of *thedesk* was too basic, and that it did not help participants to change.

> *"I mean again it was all stuff like everyone knows! Like you know phone off and out of bed!"* **Tiger.**

There was not enough content

Participants gave feedback that there should have been more content added to *thedesk*. Some thought that *thedesk* did not give them enough strategies and asked them to put in too many ideas themselves, others suggested that more sections should be added, and one participant said that the content had started to make them think, but that the modules had ended before they had felt finished.

> *"Like I'm not quite sure what. But just something else... Like I'd be like, feeling like I needed something else from it…I don't know just something…missing."* **Penguin.**

3.3.4.2 The functionality was not ideal

Participants reported that the functionality and website design of *thedesk* was poor, seemed unprofessional or out of date. They stated that this had a negative impact on how useful it was to them, and believed that it would be likely to discourage other people from using it.

The appearance was not good

The majority of the participants gave negative feedback about the appearance of *thedesk*. They reported that the website design was unattractive and was therefore not inviting. They reported that the graphic design was overly busy and colourful, and this made the website appear childish. Participants reported that they would have preferred a simpler, sleeker design.

> *"The way it looked! I always just prefer like a clear, white background. Just the first page, I feel like it wasn't as inviting as it could have been."* **Moon.**

It was slow

Participants reported that *thedesk* was slow. It is hypothesised that this would have inhibited the usability of the website.

> "*It's quite slow. Like even on a fast, like network*." **Tiger**.

The design was out of date

Participants reported that *thedesk* could be improved and brought up to date by adding in features such as a daily run streak to incentivise use, a greater degree of personalisation, and a display of all selected coping strategies on one page. They also stated that the website would be better as an app. They reported that they did not always have the motivation to use their laptop computers to access *thedesk*, but would have been likely to use more often it if it was accessible from their phone.

> *"The only time I would really have time to use it would be at mine around the time I did the survey and most nights I would be there like "I could start on my laptop…or I could just go to sleep."* **Igloo.**

It could be difficult to find your way around

Participants reported that they had had to search in order find what they were looking for on *thedesk*. This had sometimes been difficult, and they had not felt like doing this

when they were experiencing distress. They also reported that the design of *thedesk* made it harder to navigate, as it was not clear which parts were interactive or not, and that the layout of the site into sections made it harder to use for people who were not sure of what they were looking for.

> *"I think maybe the way it's kind of set out as an actual website seemed like…It was quite weird to navigate if that makes sense? Like, I just felt like there was a lot of unnecessary like stuff round the edges and stuff and then kind of like going back and forth, I kind of lost track a little bit about where I was with each bit."* **Penguin.**

It was too isolated

Participants stated that *thedesk* was too isolated, and that it would benefit from being integrated with other websites and sources of support. Suggestions for this included linking in with the GP so that a GP could suggest sections of *thedesk* for students to use, being linked with university support services, including a page detailing the sources of support available at as user's university, and containing links to other, more specific self-help websites for students for whom this might be beneficial.

"But I think that what they could potentially do is link it with something that…for more severe or more specific mental health conditions so that you can sort of channel through…Maybe if you had say anxiety you can go on this anxiety home page but it can also take you back to "If you have anxiety you might find it beneficial to visit the calm module"". **Fox.**

3.3.5 Meta-theme 5: The experience and impact of completing the measures

Meta-theme five regards participants' feedback about the experience and impact of completing the measures during the study. Completing the daily and weekly measures was a large part of participation in the study, and participants were asked to complete the measures over a greater length of time than they had been asked to use *thedesk*. Therefore, it seemed important to analyse the impact of completing the measures on the participants. As displayed in Table 17, the meta-theme was comprised of two themes which are discussed in more detail below.

Table 18: A summary of meta-theme 5, the experience and impact of completing the measures

Theme	Subtheme	*n* instances	*n* participants
Completing the measures was positive	I enjoyed it	11	5
	It was easy	6	4
	It helped me to make changes	6	5

But there were negative aspects	Some days it was a chore	2	2
	There were aspects which made them difficult	15	7

3.3.5.1 Completing the measures was positive

Participants were required to complete a measure each day during the study, and many of the participants reported that this had been a positive aspect of taking part which they had found beneficial and enjoyable.

I enjoyed completing the measures

Five participants reported that they had enjoyed completing the measures, and this seemed to have been surprising for some participants. They stated that they had liked the questions and that completing the measures had been a chance for them to pause and check in with themselves each day. One participant said that they wanted to carry on completing the measure each day after their study participation had come to an end.

> *"Actually….I got to the point where I started to like it. Just because it's like a two minute moment where you keep track of how you are doing. Like a check in with myself kind of thing."* **Moon.**

It was easy to complete the measures each day

Four of the participants reported that it had been easy for them to complete the daily measures, and some had been more engaged with this part of the study than with using *thedesk*. It seems that participants had felt more obligation to complete the measures as part of the study than they had to use *thedesk*. Participants stated that the email reminders had helped them to remember to complete the measures, and that they had formed a habit of doing them each day.

> *"I just got into the habit of doing it."* **Harp.**

It helped me to make changes

Participants reported that completing the measures each day had helped them to make changes, and some stated that the measures had been a greater catalyst for change than using *thedesk*. Completing the measures had caused participants to reflect on their thoughts and feelings and to become more self-aware. For some participants this then prompted them to change their behaviours.

> *"I think it was the daily tracking. Like, how many days have been good and bad and what I'd done each day. I think that was it. And then starting from rock*

> *bottom. Unmotivated and then trying to get out of it! And then being able to track each day was what worked."* **Sage**

3.3.5.2 But there were negative aspects

There were also negative aspects about having to complete the measures as part of participating in the study. As would be expected, participants did not always feel like completing the measures, and there were some aspects of the measures which were difficult.

Some days it was a chore

Although many of the participants reported that it had been easy for them to complete the daily measures, two participants also stated that it had sometimes felt like a chore to complete the measure each day. One participant reported that it had been hard for them to find the time to complete them on days where they were busy, and another reported that sometimes they did not want to have to reflect on what they were feeling.

> *"Sometimes, you didn't want to wake up and do that "Oh how am I feeling today?"""* **Tiger.**

There were aspects which made them difficult

Participants also reported that there were aspects of completing the measures which they had found challenging. Difficulties included finding it hard to think of a problem for the CSI measure, similarities between some of the items, feeling uncertain about how to answer accurately and the format of the measures making them difficult to use on a smartphone device.

> *"In the larger one…some of them were similar but not the same and it was maybe a bit hard to differentiate…you'd maybe give a high rating to one but not to the other which would make you question your answer."* **Igloo**

DISCUSSION

4.1 Summary of findings

This study was conducted to evaluate *thedesk*. The intervention's impact on wellbeing and psychological distress was measured, and coping style and self-efficacy were assessed as potential mechanisms of change. The majority of participants' engagement with *thedesk* was fairly low. The results indicated that *thedesk* had some positive impact on two of the participants' levels of wellbeing or psychological distress, but no impact for the remaining seven. Penguin, one of the participants whose scores had indicated improvements, had the greatest levels of engagement with *thedesk*, and the other participant, Umbrella had average levels of engagement. *thedesk* did not have an impact on any of the participants' coping style or levels of self-efficacy. Changes in wellbeing were not accompanied by associated changes in coping style or self-efficacy for seven participants. There appeared to be an association between one participant's levels of wellbeing and self-efficacy, and one participants' coping style and levels of wellbeing. Overall, the participants' scores suggested that levels of wellbeing and psychological distress were highly variable, and changed rapidly on both a daily and weekly basis.

The majority of the participants' scores did not indicate improvements in wellbeing or psychological distress, however eight of the nine participants reported experiencing at least one positive change whilst taking part in the study. In total, 21 positive changes were reported by participants. The majority of changes were attributed to events which were external to the study, and only three changes were attributed to using *thedesk*. Three participants reported that completing the daily measures had caused them to experience a positive change during the study, and this daily assessment was mentioned as a cause of change by the participants more frequently than using *thedesk*.

The study included an unguided intervention phase and a guided intervention phase, in order to examine the impact of guidance on participants' use of *thedesk* and its effectiveness. The quantitative data from the measures indicated that there was no difference in participants' wellbeing between the guided and unguided phases. The usage data from *thedesk* indicated that the guidance emails did not impact participants' levels of engagement with *thedesk*. The majority of participants accessed *thedesk* more often during the first intervention phase they completed, irrespective of whether this was the unguided or guided phase.

In the change interview, participants' discussion about *thedesk* included both positive and negative feedback. Participants thought the existence of a self-help website designed specifically for students was a good idea, that the coverage of topics was appropriate for the student population, that the website was easy to use and that it seemed personal and inviting. The constructive feedback from interviews suggested that *thedesk* needs to be updated to improve its engagement and acceptability. Several participants reported that something was missing from the site's content. The functionality of the *thedesk* was also reported to be limited. Overall, feedback from participants suggests that the current version of *thedesk* provides a good foundation, but that it needs be improved and updated to meet expectations of interactivity and functionality in order to improve user engagement.

4.2 Interpretation of findings in relation to the wider literature

This section will interpret the findings of the study in relation to the wider literature. Firstly, the findings in relation to the three aims of the study are discussed. This is followed by an exploration of the additional findings.

4.2.1 Research Aim 1: To explore the impact of using *thedesk* on the psychological wellbeing and psychological distress of undergraduate students

The findings indicated that *thedesk* did not produce positive effects on the majority of the participants' levels of wellbeing or psychological distress. This is inconsistent with the findings of Stallman et al. (2019), in which students who used *thedesk* for a two week period showed statistically significant improvements in their wellbeing. Stallman's (2019) study did not include a no treatment control condition, so the improvements in the participants' levels of wellbeing may have been caused by external factors. This is one potential explanation of the discrepancies in the findings of the two studies. The two studies were also conducted using different samples and using different methodologies, which are discussed below.

In Stallman's (2019) study, participants were exposed to the intervention for two weeks, whereas in the current study the participants were asked to use *thedesk* for a six week period. When designing the current study, it was thought that this would be an appropriate length of time for participants to use the intervention. It is possible that this was too long however, and that any treatment effects may have been diluted by the length of exposure to the intervention. In order to examine this supposition, participants' WEMWBS scores during the first two weeks of exposure to *thedesk* were analysed. The majority of the participants did not show improvements in their

WEMWBS scores during the two weeks, which is inconsistent with the hypothesis that it was the different lengths of exposure to the intervention which caused the different results.

Another potential explanation for the lack of improvements in the wellbeing and psychological distress for the majority of the participants could be the timing of data collection. Participants started and completed the study at different times, but they all began the study during the autumn term, participated over the Christmas holidays and completed the study during the spring term. During the change interview, six participants reported that the transition between home and university had impacted upon their levels of wellbeing. It is possible that the effects of leaving for the Christmas holidays then returning to university may have been a confounding variable. This may have caused too much fluctuation in participants' wellbeing for any effects of *thedesk* to be detected.

Stallman et al. (2019) measured distress using the Kessler-10 (Kessler et al. 2003) and did not measure wellbeing. This difference in measurement tools may have also contributed to the discrepancy between the findings of the two studies. Both studies used well established and validated measures, so it would be expected that they would have been targeting the same constructs, although there may have been differences in the measures' sensitivity to change. A difference in the samples between the two studies could also explain the differences in findings. Stallman et al. (2019) recruited participants with elevated levels of psychological distress and operationalised this as scores of 16 and above on the Kessler-10. In a non-clinical Australian population the majority of adults had scores below 15 and 32.5% had scores of 15 or higher. This was compared with the eligibility criteria for this study, which was a raw CORE-OM score of 21 or over. Data taken from a non-clinical population shows 29.5% score 20 or above on the measure. This indicates that the criteria used to determine eligibility within the two studies are comparable, but it is not clear whether there was a difference in the levels of psychological distress between the samples.

A review and meta-analysis of the literature on web-based interventions found that they produced statistically significant effects on anxiety, depression and stress when compared with no treatment control groups (Davies, Morris & Glazebrook. 2014). A review of research on web-based interventions designed to enhance wellbeing in students conducted as part of the current study returned 15 articles. In 12 of these it was reported that statistically significant changes had occurred. Therefore, the findings of this study are inconsistent with the majority of the research on the outcomes of web-based interventions within the student population. This could be attributed to *thedesk*

not being an effective web-based intervention, or to the design of the current study not being sufficient to detect improvements in wellbeing or psychological distress.

4.2.2 Research Aim 2: To examine the processes which may underlie any impact of using *thedesk* on wellbeing or distress

For the majority of the participants, *thedesk* showed no impact on their levels of psychological distress, and the intervention showed no impact on the coping style or levels of self-efficacy of any of the participants. This can be explained in one of two ways. Firstly, the findings could be interpreted to provide further evidence of the relationship between coping style, self-efficacy and wellbeing. No participants showed improvements in their coping style or self-efficacy, and the majority did not show improvements in their levels of wellbeing or psychological distress. Therefore, the lack of improvements in wellbeing and psychological distress are consistent with *thedesk* not affecting these mechanisms of change. Secondly the findings could be interpreted as suggesting that self-efficacy and coping style were not important predictors of improvements in wellbeing or psychological distress, as for the majority of participants there did not seem to be a relationship between their scores on these measures. Both interpretations have their own merits, and are discussed in more detail below.

Maladaptive coping strategies have been shown to be a statistically significant predictor of depression, anxiety and stress in the student population (Mahmoud et al. 2012). Statistically significant associations have been found between greater usage of problem solving based coping strategies, lower rates of mental health problems, greater life satisfaction and better academic adjustment (Zhang et al. 2011; MacCann et al. 2012). Social support seeking and avoidance based coping have been shown to mediate the relationship between optimism, control, self-esteem and adjustment and performance in university students (Aspinwall &Taylor, 1992). Social self-efficacy has been shown to mediate the relationship between attachment anxiety, loneliness and depression in first year students (Wei et al. 2009) and academic self-efficacy is associated with better academic outcomes and higher levels of university satisfaction (Honicke & Broadbent, 2016; Chemers et al. 2001). Therefore, the interpretation of the current study's findings to suggest the importance of self-efficacy and coping style as process variables in the improvement of wellbeing and psychological distress would be consistent with much of the literature. It would also be consistent with the further group level analysis which was conducted on the scores of the 86 participants who completed the recruitment battery. Correlations between the scores of the WEMWBS, CORE-OM, GSE and CSI subscales were all in the expected direction, and the majority were statistically significant.

In addition to their relationships with wellbeing and psychological distress in the literature, coping style and self-efficacy were chosen as potential process variables because they were believed to be constructs which *thedesk* was designed to target. *thedesk* was designed to "*enhance student wellbeing and resilience by building on students' existing strengths for self-regulation of behaviour and affect*" (Stallman & Kavanagh, 2018. P. 61). However, the impact of *thedesk* on these specific constructs has not been previously evaluated. Stallman et al. (2019) measured the related construct of coping self-efficacy using the Coping Self-Efficacy Scale (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), but found no statistically significant improvements. Therefore, the current study's finding that *thedesk* did not produce improvements in the participants' coping style or levels of self-efficacy is consistent with the current available research on *thedesk*'s impact on self-efficacy and wellbeing. Therefore, the majority of participants' lack of improvements in levels of wellbeing or psychological distress could be partially attributable to *thedesk* not producing changes in self-efficacy or coping style as mechanisms of change.

The second possible interpretation of the current study's findings is that coping style and self-efficacy did not predict changes in wellbeing and psychological distress, and were not the appropriate process variables to investigate in this study. As outlined above, this interpretation would be inconsistent with much of the literature on the topic, although correlations across group-level data cannot be assumed to predict relationships within one individual. It does however align more closely with the results of this study. Two participants showed improvements in their levels of wellbeing and psychological distress, despite not showing improvements in their coping style of levels of self-efficacy. Scores on the WEMWBS, GSE and CSI indicated wellbeing, self-efficacy and coping were not associated for the majority of participants.

The Coping Strategies Indicator (CSI, Amirkhan, 1990) was used to assess coping style in this study. This was chosen because the measure has been shown to have good test-retest reliability, good convergent validity and high criterion validity (Amirkhan, 1994). Each time they completed the measure, participants were asked to recall a specific problem they had encountered which had caused them stress. Subsequently, the extent to which they had utilised each of the strategies listed to cope with that problem was then indicated. The majority of the participants described a different problem every time they completed the measure, and a broad variety of problems were disclosed by participants. These ranged from coping with the anniversary of a significant bereavement to looking for a job. The accurate appraisal of a stressor is essential in order to utilise the most effective coping response to a particular problem (Folkman, 2013). For example, a use of a problem solving coping style would have been likely to have been effective whilst looking for a job, but would be less effective in helping

someone manage the emotions associated with the anniversary of a bereavement. When analysing the data from the CSI, problem solving coping strategies and social support seeking strategies were assumed to be helpful, and avoidance based strategies were presumed unhelpful. This is consistent with the literature on the relationships between coping style and wellbeing, but may have been problematic given the broad range of problems listed by participants. Perhaps simply comparing the degree to which participants used the different types of coping strategies in order to assess coping style was too simplistic, given the fact that the most helpful way to cope with a problem is likely to depend on the nature of the problem itself. Statistically significant correlations between problem solving based coping and avoidance based coping strategies with wellbeing and psychological distress were observed in the expected directions within the recruitment battery data however. This does suggest that there is a relationship between coping style, as it was measured in this study, and levels of wellbeing.

The General Self-Efficacy Scale (GSE, Schwarzer & Jerusalem, 1995) was used to measure self-efficacy in this study, and was chosen because the measure has been shown to have good levels of internal consistency, convergent, discriminant and predictive validity. Participants' GSE scores remained fairly consistent during the study, and showed lower levels of variability than scores on the other measures. This raises the question of sensitivity of the GSE to change, and whether it is taps into a psychological state or a personal trait. Bandura (1977b) argued that self-efficacy is not personal trait, but rather that *"*It refers to beliefs regarding specific abilities in relation to specific situations and varies according to task and context" (Gangloff & Mazilescu, 2017. P. 2). The GSE does not measure people's self-efficacy to complete a specific task in a specific situation, but attempts to measure a broader sense of self-efficacy with items such as "I can solve most problems if I invest the necessary effort." Therefore, it is possible that the GSE is measuring a construct related to self-efficacy that is more of a personality trait that self-belief regarding specific situations, and would therefore would be less amenable to change. No research on the sensitivity of the GSE to change could be located.

4.2.3 Research Aim 3: To gain an understanding of students' reactions to and experiences of *thedesk*.

The majority of the participants reported that *thedesk* was a good idea. They believed that the existence of a self-help website designed specifically for students was positive. This is consistent with the research on the topic of web-based interventions in the student population (Davies et al. 2014). Although the likelihood of students seeking help through counselling services or their GP decreases as levels of psychological

distress increases, students experiencing greater levels of distress report that they are more likely to utilise an online intervention (Ryan et al. 2010). A high percentage of students (between 63% and 73.9%) report that they have used the internet to search for health information (Stellefson et al. 2011), indicating that students are already using the internet to support them with their health and wellbeing.

The participants reported that *thedesk* normalised difficulties and distress experienced within the student population. This is a positive aspect of an intervention designed to help students cope with the common stressors of university life. This is consistent with other research on *thedesk*. Students who participated in focus groups reported that using *thedesk* was a normalising experience, saying "It's just nice to see that other people are going through it and they're just people like you." (Stallman & Kavanagh, 2016. P. 65). The finding is also consistent with research on the broader topic of web-based interventions, which indicates that they can successfully help to normalise a range of difficulties in young people and adolescents, such as bulimia nervosa, accidental injury and diabetes (Pretorius, Rowlands, Ringwood & Schmidt, 2010; Kenardy, Cox & Brown, 2015; Nicholas el al. 2012). Specific aspects of *thedesk* which participants reported were positive included the design, which they had found simple and easy to use, the content, which they felt was helpful and appropriate for the student population and the feel of the website, which seemed personal and inviting. This is consistent with participants' feedback from focus groups about *thedesk*, as they made positive comments about the design, navigation and content of the programme (Stallman & Kavanagh, 2016).

The responses from the client change interviews indicate that the participants felt positively about the concept of a web-based intervention for students, and that there were things they had liked about the programme. However, their responses also indicated that there are several problems with *thedesk* which indicates that, in its current form, it is less likely to be acceptable or perceived as helpful for students. Participants reported that there was something missing, which had impacted how helpful it was for them. This is partially consistent with the focus groups conducted by Stallman and Kavanagh (2016), in which some participants reported that more information would have been helpful. In the current study, there was a sense of frustration from some participants regarding being asked to generate ideas about what they could be doing differently to manage their wellbeing themselves, rather than being informed about different strategies by *thedesk*. This echoes findings from Stallman and Kavanagh (2016), in which a participant reported that they would have preferred the website to include a text list of strategies rather than a video discussing these. These findings indicate that students may prefer to be given helpful strategies in an easily accessible list rather than having to generate these themselves or watch videos about different topics.

Further research should be conducted to examine the ideal amount, type and presentation of content that should be included within web-based interventions.

Participants also reported that the functionality of *thedesk* was not ideal, and that it did not use modern personalisation such as run streaks stating the consecutive number of days *thedesk* has been used, notifications and reminders to access the programme to encourage regular use. This links with research on persuasive technology (Fogg, 2002), which refers to design elements of a website or computer program which encourage people to use it in the way that it was intended by the developers. A meta-analysis of research on the relationship between persuasive technology and the intended use of web-based interventions found that persuasive technology elements explained 55% of the variance in adherence in their regression model (Kelders, Nok, Ossebaard, Van Gemert-Pijnen, 2012). The authors analysed different types of persuasive support used within web-based interventions and they included several features which were suggested by participants in the current study. These included praise, rewards, reminders, personalisation, tailoring and self-monitoring. Personalised reminders were utilised during the guided intervention phase of the current study however, and these did not seem to affect participants' usage.

Participants suggested that *thedesk* would work better as an app that could be easily used on mobile devices. This is consistent with a previous study on *thedesk* (Stallman & Kavanagh 2016), in which a participant reported that they would only be likely to use the weekly planning tool if they were able to access it using their mobile phone. The broader research into internet use shows that 58% of website visits come from mobile devices as opposed to traditional computers, and that mobile devices make up 42% of the total time spent online (Enge, 2019). During 2017, people used ten times more mobile data than they had in 2012, which further illustrates this rise in smartphone use (Ofcom, 2019). Data from app stores shows that self-care and wellness apps are an area of growth. In the first quarter of 2018 the top ten wellness apps generated 170% greater profits than they had during the same period of 2017 (Perez, 2018). The feedback from participants as well as broader findings on internet use indicate that *thedesk* would be improved if it could be easily accessed using mobile devices, and that this would optimise the site's usability and acceptability.

Now that the findings in relation to the three research aims have been discussed, the next section will discuss and interpret the additional findings of the current study.

4.2.4 High level of variability in wellbeing and psychological distress

The results of this study showed that participants' levels of wellbeing tended to be highly variable, both on a daily and a weekly basis. Previous research has shown that

students' wellbeing can decrease after they start university and does not return to normal levels until after completing university (Cooke et al. 2007). This is not a steady decline, however, as longitudinal research assessing the wellbeing of students indicates that students' levels of wellbeing "ebbs and flows throughout the degree course" (Bewick et al. 2010. P. 643). Therefore, the findings of this study are consistent with previous research, although to the author's knowledge there is a lack of research which has monitored the levels of wellbeing in a student sample as closely as the current study. In this study, participants attributed their levels of wellbeing to university pressures such as exams and deadlines, the transition between home and university and natural progression and fluctuations in their mental health. This is consistent with the literature, which cites examination stress, financial pressures and transitions as factors affecting the wellbeing and psychological distress of students (Robotham, 2006). Whilst at university, pressures and stressors frequently shift. A student may complete an essay at the start of one week, leading to an increase in their wellbeing, then face another deadline the next week leading to a deterioration in their wellbeing. It should be noted that the majority of participants in this sample did not show reliable changes in their levels of wellbeing, and remained within the normal range throughout the study. Therefore, although wellbeing scores fluctuated, and participants reported variations in their wellbeing during the change interview, their levels of wellbeing remained within the normal range for the majority of the study.

Change is a normal part of the university experience for many students, who live at university during the term times but spend up to five months a year at home during the long holidays. This could lead to a state of flux, in which variations in wellbeing are normal. Interestingly, research on the relationship between positive and negative affect in students and academic success shows that students who are generally happy have the greatest levels of academic success, but that these students benefit from episodes of negative mood states (Barker, Howard, Galambos, Wrosch & Carsten, 2016). Baker et al. concluded that this finding provides evidence that it is important to experience episodes of both positive and negative emotions to facilitate the development of emotion regulation capacity in the transition to adulthood. In addition to external factors, the typical age of the student population could be a cause of the high fluctuation in levels of wellbeing in the student participants of this study. The prefrontal cortex, which "offers an individual the capacity to exercise good judgment when presented with difficult life situations" does not fully develop until the age of 25 (Arain et al. 2013. P 453), and emotional stability has been shown to increase over the human lifespan (Williams et al. 2006). As this study only tracked the wellbeing of a student population, it is not able to determine the extent to which the variability in wellbeing was caused by these age related factors or by the experience of student life itself.

4.2.5 Completing the daily measures seemed to produce changes in participants

This study required a fairly intensive level of involvement from participants, as they were asked to complete a measure every day for up to 14 weeks. It was therefore expected that the study would have a high rate of attrition, as rates of attrition in studies examining web-based interventions can be high (Davies et al. 2014) and higher response burden has been shown to be associated with greater levels of attrition and lower response rates in research (Rolstad, Adler & Rydén, 2011). Attrition was found to be lower than expected. Nine of the 11 participants who started taking part in the study completed it, meaning that attrition was 18%. This can partially be explained by the high levels of reimbursement which were offered to participants who completed all stages of the study, but data from the change interviews indicated that this incentive was not the only factor which caused participants to continue with the study to its end. Many of the participants reported that completing the daily measures had been a positive and enjoyable experience. In fact, completing the measures was cited as an attribution for change more often than using *thedesk*. The experience of completing the daily measures as enjoyable and positive rather than as a burden may have contributed to the lower than expected levels of attrition within the study.

Daily mood tracking has been investigated as a potential means to support people to stay in healthy emotional states and manage mental health problems such as bipolar disorder and depression (Nicholas, Larsen, Proudfoot & Christensen, 2015). Mood tracking has been shown to help people increase awareness of the factors which affect their mood, and to develop their abilities to self-regulate their wellbeing (Church, Hoggan & Oliver 2010; Gay, Pollak, Adams & Leonard, 2011). Tracking is one of the most commonly utilised features within health and wellbeing apps, and a qualitative analysis of app reviews found that users used mood tracking functions in order to learn about the patterns in their mood fluctuations, improve their mood and to develop their skills in self-management (Caldeira et al. 2017). Mood tracking is also widely used in traditional forms of face to face therapy such as CBT (Greenberger & Padesky, 1995) and the use of outcome measures has been shown to increase the effectiveness of therapy (Gondek, Edbrooke-Childs, Fink, Deighton & Wolpert, 2016). Therefore, the finding that some participants reported completing the daily measures as a positive and helpful experience is consistent with the current literature.

4.3 Strengths and limitations of the study

4.3.1 Strengths

This study utilised a mixed-methods design in which both quantitative and qualitative methods were employed. Johnson and Onwuegbuzie (2004) state that mixed-methods research represents a third paradigm in the field of research, the goal of which is not to replace either quantitative or qualitative research but "rather to draw from the strengths and minimize the weaknesses of both" (p. 14-15). Therefore, the use of combined quantitative and qualitative methods is seen as a methodological strength of this study. This is discussed in more detail below.

Quantitative methods are commonly used and accepted within outcome and process research (Elliott, 2010). The use of established measures in quantitative measurement allowed for statistical analysis of the data, as reliable change and clinically significant change could be calculated for the participants. In addition, the use of randomised multi variable baseline periods and the randomised order of the intervention phases increased the internal validity of the study, and meant that causal inferences could be reasonably drawn (Morley, 2018).

The use of a systematic case series design and daily repeated measures meant that a large amount of data was collected. This allowed for in depth analysis, and the development of insight into students' levels of wellbeing on a daily basis over a period of up to 14 weeks. To the author's knowledge, this level of data on the student experience has not been previously collected.

One criticism of quantitative methods is that the operationalisation of constructs, such as wellbeing, into numerical measurements is reductionist. The method also does not allow for the investigation into the thoughts and experiences of those who take part in the research. This study interviewed all of the nine participants who completed the case series, generating a large amount of interview data to be analysed. The majority of the participants were very open in the interviews and discussed a range of topics. Only interview data related to the research questions was included and analysed, the analysis of the interview transcripts in their entirety could be completed as part of further research.

During the interviews, participants were able to talk about their experiences of using *thedesk*. They had the opportunity to give feedback which was helpful in understanding the positive and negative aspects of the programme and to how it could be improved. In addition, the interviews allowed for the collection of data about the different changes experienced by participants and their attribution of these. As well as self-report data from the participants' during the interviews, data regarding participants' usage of

thedesk, was obtained and used to inform the findings and conclusions of this study. Both objective data regarding participants' use and of *thedesk* and their subjective feedback was included, which is regarded as a strength of this study.

The low attrition rate in this study is another strength of the research, as nine of the eleven participants who started the study completed it. This indicates that the attrition bias of the study is likely to be low (Fitzgerald, Gottschalk & Moffitt, 1998). A sample of diverse students was included in this study. The sample of nine participants included students from every year of study, who were studying a variety of courses. The sample included participants with varying levels of psychological distress at recruitment, and included both people who had never sought support from their mental health and those who had. The sample included both men and women, who reported a variety of ethnicities and sexualities. Therefore, the sample included representation from a diverse range of students, which is regarded as a strength of this study. Heterogeneous samples can increase noise within a data set which could be a threat to internal validity, however this was accounted for due to the within-subjects repeated measures design of the study.

4.3.2 Limitations

There were also limitations associated with the design of the current study. The first limitation discussed is the use of the daily measure. The measure was developed using five items, with the aim of measuring the constructs of interest within this study. As these items had not been combined in such a way before however, the psychometric properties of the measure are unknown, as is the level of reliability and validity.

As the measure was newly developed, no data regarding norms was available. This means that it was not possible to determine whether variation in participants' levels of daily wellbeing constituted reliable or clinically significant change. Measurements were taken daily during the study in order to closely monitor the participants' levels of wellbeing and the impact of *thedesk* on these, but participants said that completing the daily measures had helped them to make positive changes more often than using *thedesk* had. This indicates that the daily measurement had its own impact on the wellbeing of the participants. This is known as the measurement effect. It is a threat to internal validity, as it means that changes in wellbeing may not be attributable to the intended independent variable. Participants were sent reminder emails if they had not completed a daily measure, but not if they had not been using *thedesk*. This was because it was not possible to analyse participants' use of *thedesk* until after they had completed the study. This may have left participants with the impression that completing the daily measures was a more important aspect of study participation than using *thedesk*, which is consistent with the majority of participant's fairly low levels of engagement with *thedesk*.

Another potential weakness of the study is the length of the intervention phases. Participants were asked to use *thedesk* over a period of six weeks. This could be longer than people would tend to use *thedesk* naturally, and is significantly longer than the intervention period of two week intervention period employed by Stallman et al. (2019). This may have compromised the ecological validity of the study, as participants may have been requested to use the intervention in a different way than they would have used it independently. The majority of the participants had fairly low levels of engagement with *thedesk*, and used it more during the first intervention phase than the second. This indicates that the combined intervention period of six weeks may have been excessive, and suggests that including a guided intervention phase did not seem to have an impact on participants' engagement with the intervention.

Although the combination of quantitative and qualitative data is considered as a strength of this study, there were some issues with the collection and analysis of the interview data. Due to technical difficulties, the interview with Umbrella was not recorded, so could not be transcribed and analysed in the same way as the other participants' interviews. Notes from the interview recorded the changes she reported, so these could be included in the analysis. In addition, the notes that were made during the interview, and subsequent email contact with Umbrella indicated that her experience of and feedback about *thedesk* was consistent with what was reported by the other participants. Therefore it does seems that Umbrella's interview data not being fully included in the analysis did not have a significant impact on the findings of the study or the themes that were generated.

A final limitation of the study regards the interpretation of the data in order to answer the three research questions. Multiple sources of information had to be taken into account during this process, resulting in a complicated process of interpretation and decision making. Measures were taken to ensure that the conclusions drawn were as objective as possible, such as discussion in research supervision informed by adjudicated single case design (Elliott, 2002). The research team also erred on the side of caution when interpreting the results to avoid Type 1 errors. However, the amount of data collected and the resulting complexity of the interpretations meant that these decisions were not necessarily definitive, which is a limitation of this study.

4.4 Implications for clinical practice

The findings of this study indicate that research on web-based interventions can be complicated and contradictory. The results of this study were inconsistent with the findings of Stallman et al. (2019), who found that participants who used *thedesk* showed statistically significant improvements in their wellbeing. The results within this study

were also not always consistent, as some participants showed improvements in their wellbeing scores but did not report this in interview and vice versa.

This has implications for the use of web-based measures in a clinical context. Research indicates that people are open to using web-based interventions, but as the research into efficacy can be complicated this means that they must be sufficiently evaluated and reviewed before they are recommended to people who are potentially vulnerable. Many of the web-based interventions currently on offer have not been through this process and there seem to be inconsistencies in the interventions which are recommended. Bennion et al. (2017) found that 13 different web-based programmes and 35 different smartphone apps were being recommended across NHS mental health services. Reviews of web-based interventions show that less than half the programmes available for anxiety and depression have any research into their levels of effectiveness (Ashford et al. 2016; Renton et al., 2014).

The majority of the participants in this study did not show significant improvements in their levels of wellbeing or psychological distress. Research shows people who experience non-improvement in therapy experience disappointment, shame and a reinforcement of their negative views about themselves (Radcliffe, Masterson & Martin, 2018). To the author's knowledge, no comparable study has been conducted with participants who utilised web-based interventions but did not experience improvements. However, it could be hypothesised that this group could experience a worsening view of themselves and feelings of hopelessness, as found by Radcliffe et al. (2018). Therefore it is argued that the recommendation of web-based interventions must be done mindfully, with recommendations made in line with the current research evidence.

The majority of the participants did not have high levels of engagement with *thedesk*. These findings suggest that the programme may need updating in order to improve user engagement and satisfaction. Participants reported that the topics covered in *thedesk* were helpful and relevant for the student population, but that more information would have been useful and that the method of delivery needed to be modernised and brought into line with the other interventions on offer. Reminders, notifications and run streaks were raised by the participants in this study as possible ways to improve *thedesk*, and have previously been shown to account for a large proportion of the variance in user engagement with web-based interventions (Kelders et al. 2012). During the change interviews, some of the participants also suggested that they would have used *thedesk* more often if they were able to access it using their mobile devices. This is consistent with national trends on internet use. This has implications for the design of future web-based interventions, ensuring that they are as accessible as possible and are designed in alignment with how the internet is now used. The findings of this study indicate that

students are open to and enthusiastic about using web-based self-help, and there was a suggestion from some participants that they preferred this method of delivery to traditional sources of support such as counselling services or their GP. This is consistent with other research on the topic, and provides support for the use of web-based interventions in meeting the needs of the student population. As discussed above, it is essential that these are properly evaluated before they are recommended to students.

Participants reported that completing the daily measures had been helpful and enjoyable. In the change interviews, participants attributed the changes they had made to the completing the measures more than using *thedesk*. It is likely that the participants spent a greater amount of time completing the measures than using *thedesk* during the study, which may be a partial explanation for this finding. Participants also reported that they had enjoyed completing the quizzes and receiving feedback about their scores as part of using *thedesk*, and were enthusiastic about seeing a graph of their wellbeing scores whilst taking part in the change interviews. As discussed above, this finding is consistent with current research on the use of mood tracking to promote wellbeing and has implications for clinical practice. It supports the use of outcome measures and case tracking during psychological interventions, as well as the use of mood and symptom diaries between appointments.

4.4.1 Implications for university practice

Participants in the current study showed high levels of variation in their wellbeing on both a daily and weekly basis. This finding is consistent currently available research on the wellbeing of students. Research suggests that it is helpful for students who are happy the majority of the time to experience occasional episodes of negative affect (Barker et al. 2016). Therefore, it appears that fluctuations in wellbeing are a normative and potentially beneficial part of the university experience. Universities should make this information available to students, in order to normalise this experience. Students seem to experience episodes of compromised wellbeing and elevated levels of psychological distress that are short lived and they recover from quickly. This raises questions about the efficacy of traditional student counselling services in which students refer themselves, then have to wait for their initial appointment. Further research could be conducted on whether a walk in clinic model could be effective within student counselling services. This is something that it is already being offered three days a week by the counselling service within the University of Leeds.

It could also be possible to address these fluctuations organisationally within universities. University pressures were frequently cited as a cause of increased stress and compromised wellbeing by the participants of this study. Further research could be conducted on how universities could best address student wellbeing organisationally.

Possible strategies could include offering increased support at stressful periods such as during exams, and by ensuring that deadlines and exams are staggered throughout the academic year.

The findings of this study suggest that students are interested and passionate about the topic of student wellbeing. The study advert generated many more potential participants that could be included in the study, and several participants discussed their interest in the topic of student wellbeing in the change interview. The low rate of attrition is also partially attributed to the participants' enthusiasm on the topic of student wellbeing. This indicates that the subject of student wellbeing should remain high on the agenda of universities and student unions. The findings also suggest that students are enthusiastic and interested in web-based interventions for student mental health and wellbeing, and that this is something that can continue to be researched and developed.

4.4.2 Implications for web-based interventions

The current study included detailed feedback from participants regarding aspects of *thedesk* which they had found helpful and not helpful, as well as a systematic search of wellbeing focussed web-based interventions for students. Based on this information, implications and recommendations for web-based interventions are discussed.

Web-based interventions for students should seek to normalise the difficulties and distress associated with the student experience, and to validate common reactions to the shared stressors of the university experience. Psychoeducation, tools and exercises should be included in web-based interventions. Current evidence suggests that web-based interventions informed by CBT, ACT and positive psychology can be effective, so more research should be conducted to determine whether the psychoeducation would benefit from being informed by any particular framework, and which would be the most beneficial exercises to include. It is clear from the interview feedback, as well as from research on internet usage and persuasive technology, that web-based interventions should be accessible via smartphone apps as well as through the internet to encourage and support engagement and regular use. Mood tracking and quizzes could also be usefully included within web-based interventions, further research should be conducted to determine which other interactive elements, if any, support engagement and efficacy.

4.5 Directions for future research

The current study has shown that, although there are aspects of *thedesk* which are positive, it should be updated in order to be as engaging and helpful for students as possible. The findings suggest that the range of topics covered in *thedesk*, the personal feel of the website, the quizzes and the tools such as the mindfulness videos were

experienced as helpful by participants. As *thedesk* continues to be updated and developed, further research to evaluate it will be necessary. As self-efficacy and coping style, which were measured as potential process variables in this study, did not appear to be quite the right fit, further research should also attempt to investigate *thedesk*'s underlying mechanisms of change. Further research could also be conducted on coping style, and whether effective coping varies depending on the nature of the stressor.

The findings suggest that fluctuations in wellbeing are normal amongst the student population. Further research could investigate how this is effected over the course of study, and whether there are any points at which students may be more vulnerable to compromised levels of wellbeing. In addition, research comparing the wellbeing of students and age matched non-student peers could be undertaken in order to determine whether these fluctuations are particular to the student population or whether they are common amongst all young people. Further research could be conducted to evaluate possible ways of addressing these fluctuations in wellbeing, such as offering walk in clinics within university counselling centres or providing psycho-education and mindfulness workshops to students, in order to help normalise these ups and downs as part of the student experience and support students to cope with them.

The daily measure used in this study has not been validated. As it seems that participants are willing to complete a short daily measure, and experience this positively, future research could design and validate a short measure of wellbeing that could be used daily. Completing the daily measures seemed to be helpful for the participants and was often cited as a mechanism for change. A future study could utilise a control group of participants who are only required to complete the measures, and compare this with a group that also used *thedesk*. Future research and evaluation could also test whether it would be feasible to add a daily tracking function to *thedesk*, so that all its users could have access to the benefits of this rather than just those participating in research.

4.6 Conclusions

The findings suggest that *thedesk* did not support the majority of the participants to make improvements in their levels of wellbeing or psychological distress. Engagement with *thedesk* was low amongst the majority of the participants, so perhaps this was a case of the participants not using the resource rather than not finding it helpful. It appears that the site needs to be updated, but there are aspects of it which were experienced as positive and helpful which can be further built upon. Overall, participants seemed to like the idea of a web-based intervention designed specifically for students, and reported that engaging with an intervention focussed on wellbeing had

been helpful. Completing the daily measures was reported as enjoyable and useful by the participants, and this is a feature which can be incorporated into future interventions. Fluctuations in wellbeing seemed to be normal in this student sample. Future policy and interventions should aim to target these students who would not meet the criteria for the diagnosis of a mental health problem, but are likely to experience periods of compromised wellbeing during their time at university.

REFERENCES

Ahmad, Z. R., Yasien, S., & Ahmad, R. (2014). Relationship between perceived social self-efficacy and depression in adolescents. *Iranian Journal of Psychiatry and Behavioral Sciences, 8*(3), 65-74.

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical psychology review, 30(2),* 217-237.

Allgöwer, A., Wardle, J., & Steptoe, A. (2001). Depressive symptoms, social support, and personal health behaviors in young men and women. *Health Psychology*, *20*(3), 223-7.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.

Amirkhan, J. H. (1990). A factor analytically derived measure of coping: The Coping Strategy Indicator. *Journal of personality and social psychology*, *59*(5), 1066-1074.

Amirkhan, J.H. (1994). Criterion validity of a coping measure. *Journal of Personality Assessment, 62,* 242-261.

Andrews, B., & Wilding, J. M. (2004). The relation of depression and anxiety to life-stress and achievement in students. British Journal of Psychology, 95(4), 509–521.

Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., ... & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric disease and treatment*, *9*, 449-461.

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American psychologist*, *55*(5), 469-580.

Aronin, S., & Smith, M. (2016, August 9). One in four students suffer from mental health problems. Retrieved January 28, 2018, from https://yougov.co.uk/news/2016/08/09/quarter-britains-students-are-afflicted-mental-hea/

Ashford, M. T., Olander, E. K., & Ayers, S. (2016). Finding Web-based anxiety interventions on the World Wide Web: A Scoping Review. *JMIR mental health*, *3*(2).

Aspinwall, L. G., & Taylor, S. E. (1992). Modelling cognitive adaptation: A longitudinal investigation of the impact of individual differences and coping on college adjustment and performance. *Journal of personality and social psychology*, *63*(6), 989-1003.

Bandura, A. (1977a). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191-215.

Bandura, A. (1977b). *Social Learning Theory*. Upper Saddle River: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Bandura, A., Jeffery, R. W., & Gajdos, E. (1975). Generalizing change through participant modeling with self-directed mastery. *Behaviour research and therapy*, *13*(2-3), 141-152.

Barker, E. T., Howard, A. L., Galambos, N. L., & Wrosch, C. (2016). Tracking affect and academic success across university: Happy students benefit from bouts of negative mood. *Developmental Psychology*, *52*(12), 2022-2030.

Batterham, P. J., & Calear, A. L. (2017). Preferences for internet-based mental health interventions in an adult online sample: findings from an online community survey. *JMIR mental health*, *4*(2), e26.

Bennion, M. R., Hardy, G., Moore, R. K., & Millings, A. (2017). E-therapies in England for stress, anxiety or depression: what is being used in the NHS? A survey of mental health services. *BMJ open*, *7*(1), e014844.

Bewick, B. M., Gill, J., Mulhearn, B., Barkham, M., & Hill, A. J. (2008). Using electronic surveying to assess psychological distress within the UK student population: a multi-site pilot investigation. *E-Journal of Applied Psychology*, *4*(2).

Bewick, B., Koutsopoulou, G., Miles, J., Slaa, E., & Barkham, M. (2010). Changes in undergraduate students' psychological well-being as they progress through university. *Studies in Higher Education*, *35*(6), 633-645.

Bewick, B. M., Trusler, K., Barkham, M., Hill, A. J., Cahill, J., & Mulhern, B. (2008). The effectiveness of web-based interventions designed to decrease alcohol consumption—a systematic review. *Preventive medicine*, *47*(1), 17-26.

Blanco, J. A., & Barnett, L. A. (2014). The effects of depression on leisure: Varying relationships between enjoyment, sociability, participation, and desired outcomes in college students. *Leisure Sciences*, *36*(5), 458-478.

Bolton, P. (2014). *Tuition fee statistics*. London: Commons library.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Broglia, E., Millings, A., & Barkham, M. (2018). Challenges to addressing student mental health in embedded counselling services: a survey of UK higher and further education institutions. *British Journal of Guidance & Counselling*, *46*(4), 441-455.

Bryant, R. A., & Harvey, A. G. (1995). Avoidant coping style and post-traumatic stress following motor vehicle accidents. *Behaviour research and therapy*, *33*(6), 631-635.

Buote, V. M., Pancer, S. M., Pratt, M. W., Adams, G., Birnie-Lefcovitch, S., Polivy, J., & Wintre, M. G. (2007). The importance of friends: Friendship and adjustment among 1st-year university students. *Journal of Adolescent Research*, *22*(6), 665-689.

Caldeira, K. M., Arria, A. M., O'Grady, K. E., Vincent, K. B., & Wish, E. D. (2008). The occurrence of cannabis use disorders and other cannabis-related problems among first-year college students. *Addictive Behaviors*, *33*(3), 397-411.

Caldeira, C., Chen, Y., Chan, L., Pham, V., Chen, Y., & Zheng, K. (2017). Mobile apps for mood tracking: an analysis of features and user reviews. In *AMIA Annual Symposium Proceedings* (Vol. 2017, p. 495). American Medical Informatics Association.

Caprara, G. V., & Gerbino, M. (2001). Affective perceived self-efficacy: The capacity to regulate negative affect and to express positive affect. *Self-efficacy assessment*, 35-50.

Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. Int J Behav Med. 1997; 4:92–100.

Chemers, M. M., Hu, L. T., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational psychology*, *93*(1), 55-64.

Chesney, M. A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology*, *11*(3), 421–437.

Choubisa, R., & Singh, K. (2018). Development and validation of a web-delivered positive psychological intervention in an Indian milieu: lessons from a limited pilot randomized controlled trial. *Cogent Psychology Cogent*, *5*(1), Article 1488512.

Church, K., Hoggan, E., & Oliver, N. (2010, October). A study of mobile mood awareness and communication through MobiMood. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries* (pp. 128-137). ACM.

Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: problems, progress, and potential in theory and research. *Psychological bulletin*, *127*(1), 87-127.

Cooke, R., Barkham, M., Audin, K., Bradley, M., & Davy, J. (2004). Student debt and its relation to student mental health. *Journal of Further and Higher Education*, *28*(1), 53-66.

Cooke, R., Bewick, B. M., Barkham, M., Bradley, M., & Audin, K. (2006). Measuring, monitoring and managing the psychological well-being of first year university students. *British Journal of Guidance & Counselling*, *34*(4), 505-517.

Connell, J., Barkham, M., & Mellor-Clark, J. (2008). The effectiveness of UK student counselling services: an analysis using the CORE System. *British Journal of Guidance & Counselling*, *36*(1), 1-18.

Coughlan, S. (2016, July 21). University tuition fees rise to £9,250 for current students. Http://www.bbc.co.uk/news. Retrieved July 31, 2017.

Cunningham, J. A., Gulliver, A., Farrer, L., Bennett, K., & Carron-Arthur, B. (2014). Internet interventions for mental health and addictions: current findings and future directions. *Current psychiatry reports, 16(12),* 521-525.

Davidson, C., & Wilson, K. (2013). Reassessing Tinto's concepts of social and academic integration in student retention. *Journal of College Student Retention: Research, Theory & Practice, 15*(3), 329-346.

Davies, E. B., Morriss, R., & Glazebrook, C. (2014). Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of university students: a systematic review and meta-analysis. *Journal of medical Internet research*, *16*(5), e130.

Day, V., McGrath, P. J., & Wojtowicz, M. (2013). Internet-based guided self-help for university students with anxiety, depression and stress: a randomized controlled clinical trial. *Behaviour research and therapy*, *51*(7), 344-351.

Department for Education. (2016, December 1). Employment and earnings outcomes of higher education graduates: experimental statistics using the Longitudinal Educational Outcomes (LEO) data: further outcomes. *Office of National Statistics*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/573831/SFR60_2016_LEO_main_text_v1.1.pdf

de Vibe, M., Solhaug, I., Rosenvinge, J. H., Tyssen, R., Hanley, A., & Garland, E. (2018). Six-year positive effects of a mindfulness-based intervention on mindfulness, coping and well-being in medical and psychology students; Results from a randomized controlled trial. *PloS one*, *13*(4), e0196053.

Drapeau, A., Marchand, A., & Beaulieu-Prévost, D. (2012). Epidemiology of psychological distress. In *Mental illnesses-understanding, prediction and control*. IntechOpen.

Eccles, J., Templeton, J., Barber, B., & Stone, M. (2003). Adolescence and emerging adulthood: The critical passage ways to adulthood. In M. H. Bornstein, L. Davidson, C. L. M. Keyes, & K. A. Moore (Eds.), *Crosscurrents in contemporary psychology. Well-being: Positive development across the life course* (pp. 383-406). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers. Eisenberg, D., Gollust, S. E., Golberstein, E., et al (2007) Prevalence and correlates of depression, anxiety, and suicidality among university students. American Journal of Orthopsychiatry, 77, 534–542.

Elliott, R. (1999). *Client change interview protocol*. Network for Research on Experiential Therapies.

Elliott, R. (2010). Psychotherapy change process research: realizing the promise.

Psychotherapy Research, *20*(2), 123–135.

Elliott, R. (2014). Hermeneutic single-case efficacy design: An Overview. In K. J. Schneider, J. F. Fraser, & J. F. T. Bugental (Eds.), *Handbook of humanistic psychology: leading edges in theory, practice, and research* (2nd Ed.) (Pp. 351-360). Thousand Oaks: California: Sage.

Enge, E. (2019, April 11). *Mobile vs Desktop Traffic in 2019.* Retrieved from https://www.stonetemple.com/mobile-vs-desktop-usage-study/

Erikson, E. (1968). *Youth: Identity and crisis.* London: *W.W.* Norton & Co.

Eustis, E. H., Hayes-Skelton, S. A., Orsillo, S. M., & Roemer, L. (2018). Surviving and Thriving During Stress: A randomized clinical trial comparing a brief web-based therapist assisted acceptance-based behavioral intervention versus waitlist control for college students. *Behavior Therapy*, *49*(6), 889-903.

Fitzgerald, J., Gottschalk, P., & Moffitt, R. A. (1998). An analysis of sample attrition in panel data. *The Journal of Human Resources, 33*(2), 251-259.

Fogg, B. J. (2002). Persuasive technology: using computers to change what we think and do. *Ubiquity*, *2002*(5), 89-120.

Folkman, S. (2013). Stress: appraisal and coping. In *Encyclopedia of behavioral medicine* (pp. 1913-1915). New York: Springer.

Gadzella, B. M., Masten, W. G. & Stacks, J. (1998) Students' stress and their learning strategies, test anxiety and attributions. *College Student Journal, 32(3),* 416–423.

Gangloff, B., & Mazilescu, C. A. (2017). Normative Characteristics of Perceived Self-Efficacy. *Social Sciences*, *6*(4), 139.

Gani, A. (2016, March 13). Tuition fees 'have led to surge in students seeking counselling', *The Guardian.* Retrieved from https://www.theguardian.com/education/2016/mar/13/tuition-fees-have-led-to-surge-in-students-seeking-counselling

Gay, G., Pollak, J. P., Adams, P., & Leonard, J. P. (2011). Pilot study of Aurora, a social, mobile-phone-based emotion sharing and recording system. *Journal of Diabetes Science and Technology, 5(2),* 325-332.

Gilbert, D. G., Stunkard, M. E., Jensen, R. A., Detwiler, F. R. J. and Martinko, J. M. 1996. Effects of exam stress on mood, cortisol, and immune functioning: Influences of neuroticism and smoker-non-smoker status. *Personality and Individual Differences, 21*, 235–246.

Greenberger, D., & Padesky, C. A. (1995). *Mind over Mood: a cognitive therapy treatment manual for clients*. New York: Guilford Press.

Gulliver, A., Farrer, L., Chan, J. K., Tait, R. J., Bennett, K., Calear, A. L., & Griffiths, K. M. (2015). Technology-based interventions for tobacco and other drug use in university and college students: a systematic review and meta-analysis. *Addiction Science & Clinical Practice*, *10*(1), 15-27.

Harvey, L., Drew, S., & Smith, M. (2006). The first-year experience: a review of literature for the Higher Education Academy. *York: The Higher Education Academy*.

Hefner, J., & Eisenberg, D. (2009). Social support and mental health among college students. *American Journal of Orthopsychiatry*, *79*(4), 491-499.

Hollis, C., Falconer, C. J., Martin, J. L., Whittington, C., Stockton, S., Glazebrook, C., & Davies, E. B. (2017). Annual Research Review: Digital health interventions for children and young people with mental health problems–a systematic and meta-review. *Journal of Child Psychology and Psychiatry, 58(4)*, 474-503.

Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review, 17*, 63-84.

Hunley, H. A. (2010). Students' functioning while studying abroad: The impact of psychological distress and loneliness. *International Journal of Intercultural Relations*, *34*(4), 386-392.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, *59*(1), 12–19.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26.

Kelders, S. M., Kok, R. N., Ossebaard, H. C., & Van Gemert-Pijnen, J. E. (2012). Persuasive system design does matter: a systematic review of adherence to web-based interventions. *Journal of medical Internet research*, *14*(6), e152.

Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: a review of recent literature. *Current opinion in psychiatry*, *20*(4), 359-364.

Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., & Zaslavsky, A. M. (2003). Screening for serious mental illness in the general population. *Archives of General Psychiatry*, *60*(2), 184–189. https://doi.org/10.1001/archpsyc.60.2.184

Kessler R and Wang P (2008) 'The Descriptive Epidemiology of Commonly Occurring Mental Disorders in the United States', *Annual Review of Public Health, 29*, 115–126.

Kenardy, J. A., Cox, C. M., & Brown, F. L. (2015). A web-based early intervention can prevent long-term PTS reactions in children with high initial distress following accidental injury. *Journal of traumatic stress*, *28*(4), 366-369.

Krause, E. D., Kaltman, S., Goodman, L. A., & Dutton, M. A. (2008). Avoidant coping and PTSD symptoms related to domestic violence exposure: A longitudinal study. *Journal of Traumatic Stress*, *21*(1), 83-90.

Latimer, L. A., Batanova, M., & Loukas, A. (2013). Prevalence and harm perceptions of various tobacco products among college students. *Nicotine & Tobacco Research*, *16*(5), 519-526.

Levin, M. E. (2013). *Evaluating a prototype acceptance and commitment training web-based prevention program for depression and anxiety in college students* (Doctoral dissertation, University of Nevada).

Levin, M. E., Haeger, J. A., Pierce, B. G., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior Modification*, *41*(1), 141-162.

Levin, M. E., Hayes, S. C., Pistorello, J., & Seeley, J. R. (2016). Web-based self-help for preventing mental health problems in universities: Comparing acceptance and commitment training to mental health education. *Journal of clinical psychology*, *72*(3), 207-225.

Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health*, *62*(1), 20-30.

Lattie, E. G., Duffecy, J. L., Mohr, D. C., & Kashima, K. (2017). Development and Evaluation of an Online Mental Health Program for Medical Students. *Academic Psychiatry*, *41*(5), 642-645.

Lightsey, O. R., Maxwell, D. A., Nash, T. M., Rarey, E. B., & McKinney, V. A. (2011). Self-control and self-efficacy for affect regulation as moderators of the negative affect–life satisfaction relationship. *Journal of Cognitive Psychotherapy*, *25*(2), 142-154.

Mahmoud, J. S. R., Staten, R. T., Hall, L. A., & Lennie, T. A. (2012). The relationship among young adult college students' depression, anxiety, stress, demographics, life satisfaction, and coping styles. *Issues in mental health nursing*, *33*(3), 149-156.

MacCann, C., Lipnevich, A. A., Burrus, J., & Roberts, R. D. (2012). The best years of our lives? Coping with stress predicts school grades, life satisfaction, and feelings about high school. *Learning and Individual Differences*, *22*, 235-241. doi:10.1016/j.lindif.2011.08.004

McKenzie, K., Murray, K. R., Murray, A. L., & Richelieu, M. (2015). The effectiveness of university counselling for students with academic issues. *Counselling and Psychotherapy Research*, *15*(4), 284-288.

Mirowsky, J., and C.E. Ross. 2002. Selecting outcomes for the sociology of mental health: Issues of measurement and dimensionality. *Journal of Health and Social Behavior, 43*, 152-170.

Morley, S. (2017). *Single case methods in clinical psychology: A practical guide*. London: Routledge.

Mowbray, C. T., Mandiberg, J. M., Stein, C. H., Kopels, S., Curlin, C., Megivern, D., ... & Lett, R. (2006). Campus mental health services: Recommendations for change. *American Journal of Orthopsychiatry*, *76*(2), 226-237.

Musiat, P., Conrod, P., Treasure, J., Tylee, A., Williams, C., & Schmidt, U. (2014). Targeted prevention of common mental health disorders in university students: randomised controlled trial of a transdiagnostic trait-focused web-based intervention. *PLoS One*, *9*(4), e93621.

Nakhaee, A., Shahabizadeh, F., & Erfani, M. (2013). Protein and lipid oxidative damage in healthy students during and after exam stress. *Physiology & behavior*, *118*, 118-121.

Ng, V., Koh, D. and Chia, S.-E. 2003. Examination stress, salivary cortisol, and academic performance. Psychological Reports 93: 1,133–1,134.

Nicholas, D. B., Fellner, K. D., Frank, M., Small, M., Hetherington, R., Slater, R., & Daneman, D. (2012). Evaluation of an online education and support intervention for adolescents with diabetes. *Social Work in Health Care*, *51*(9), 815-827.

Nicholas, J., Larsen, M. E., Proudfoot, J., & Christensen, H. (2015). Mobile apps for bipolar disorder: a systematic review of features and content quality. *Journal of medical Internet research*, *17*(8), e198.

Nordby, K., Klingsieck, K. B., & Svartdal, F. (2017). Do procrastination-friendly environments make students delay unnecessarily?. *Social Psychology of Education*, *20*(3), 491-512.

Ofcom. (2019, January 5). *Ringing the changes: do phone numbers still matter?* Retrieved from https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2019/ringing-changes-do-phone-numbers-still-matter

Office for National Statistics. (2016, July 7). Methodology: Personal Well-being frequently asked questions. Retrieved February 09, 2018, from https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbeingfrequentlyaskedquestions#how-does-ons-measure-personal-well-being.

Paciello, M., Ghezzi, V., Tramontano, C., Barbaranelli, C., & Fida, R. (2016). Self-efficacy configurations and wellbeing in the academic context: A person-centred approach. *Personality and Individual Differences*, *99*, 16-21.

Perez, S. (2018, April 2). *Self-care apps are booming.* Retrieved from https://techcrunch.com/2018/04/02/self-care-apps-are-booming/

Pretorius, N., Rowlands, L., Ringwood, S., & Schmidt, U. (2010). Young people's perceptions of and reasons for accessing a web-based cognitive behavioural intervention for bulimia nervosa. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association*, *18*(3), 197-206.

Pineles, S. L., Mostoufi, S. M., Ready, C. B., Street, A. E., Griffin, M. G., & Resick, P. A. (2011). Trauma reactivity, avoidant coping, and PTSD symptoms: A moderating relationship?. *Journal of abnormal psychology*, *120*(1), 240.

Radcliffe, K., Masterson, C., & Martin, C. (2018). Clients' experience of non-response to psychological therapy: A qualitative analysis. *Counselling and Psychotherapy Research*, *18*(2), 220-229.

Randall, E. M., & Bewick, B. M. (2015). Exploration of counsellors perceptions of the redesigned service pathways: A qualitative study of a UK university student counselling service. *British Journal of Guidance & Counselling*, *44*(1), 86-98. doi:10.1080/03069885.2015.1017801

Reavley, N. J., Cvetkovski, S., Jorm, A. F., & Lubman, D. I. (2010). Help-seeking for substance use, anxiety and affective disorders among young people: results from the 2007 Australian National Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry*, *44*(8), 729-735.

Reid, G. M., Holt, M. K., Bowman, C. E., Espelage, D. L., & Green, J. G. (2016). Perceived social support and mental health among first-year college students with histories of bullying victimization. *Journal of Child and Family Studies*, *25*(11), 3331-3341.

Renton, T., Tang, H., Ennis, N., Cusimano, M. D., Bhalerao, S., Schweizer, T. A., & Topolovec-Vranic, J. (2014). Web-based intervention programs for depression: a scoping review and evaluation. *Journal of medical Internet research*, *16*(9), e209.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological bulletin*, *138*(2), 353-387.

Richardson, T., Elliott, P., Roberts, R., & Jansen, M. (2017). A longitudinal study of financial difficulties and mental health in a national sample of British undergraduate students. *Community mental health journal*, *53*(3), 344-352.

Ridner, S. L., Newton, K. S., Staten, R. R., Crawford, T. N., & Hall, L. A. (2016). Predictors of well-being among college students. *Journal of American college health*, *64*(2), 116-124.

Rini, C., Vu, M. B., Lerner, H., Bloom, C., Carda-Auten, J., Wood, W. A., ... & Keefe, F. J. (2018). A qualitative study of patient and provider perspectives on using web-based pain coping skills training to treat persistent cancer pain. *Palliative & supportive care*, *16*(2), 155-169.

Roberts, R., Golding, J., Towell, T., Reid, S., Woodford, S., Vetere, A., et al. (2000). Mental and physical health in students: The role of economic circumstances. *British Journal of Health Psychology*, *5*(3), 289–297.

Robotham, D., & Julian, C. (2006). Stress and the higher education student: a critical review of the literature. *Journal of further and higher education*, *30*(02), 107-117.

Rolfe, H. (2002). Students' demands and expectations in an age of reduced financial support: the perspectives of lecturers in four English universities. *Journal of Higher Education Policy and Management*, *24*(2), 171-182.

Rolstad, S., Adler, J., & Rydén, A. (2011). Response burden and questionnaire length: is shorter better? A review and meta-analysis. *Value in Health*, *14*(8), 1101-1108.

Royal College of Psychiatrists. (2011). *Mental Health of Students in Higher Education.* College report CR166, Royal College of Psychiatrists.

Rubin, M., Evans, O., & Wilkinson, R. B. (2016). A longitudinal study of the relations among university students' subjective social status, social contact with university friends, and mental health and well-being. *Journal of Social and Clinical Psychology*, *35*(9), 722-737.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual review of psychology*, *52*(1), 141-166.

Ryan, M. L., Shochet, I. M., & Stallman, H. M. (2010). Universal online interventions might engage psychologically distressed university students who are unlikely to seek formal help. *Advances in Mental Health*, *9*(1), 73-83.

Salem, D. A., Bogat, G. A., & Reid, C. (1997). Mutual help goes on-line. *Journal of Community Psychology*, *25*(2), 189-207.

Scheier, M. F., Weintraub, J. K., & Carver, C. S. (1986). Coping with stress: divergent strategies of optimists and pessimists. *Journal of personality and social psychology*, *51*(6), 1257-1264.

Schwarzer, R., & Jerusalem, M. (1995). Optimistic self-beliefs as a resource factor in coping with stress. In *Extreme stress and communities: Impact and intervention* (pp. 159-177). Springer, Dordrecht.

Scott, K. (2000, May 17) Fifth suicide at Edinburgh University. *The Guardian,* p. 9.

Seiffge-Krenke, I., & Klessinger, N. (2000). Long-term effects of avoidant coping on adolescents' depressive symptoms. *Journal of youth and adolescence*, *29*(6), 617-630.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychological bulletin*, *129*(2), 216-269.

Smith, H. M., & Betz, N. E. (2002). An examination of efficacy and esteem pathways to depression in young adulthood. *Journal of Counselling Psychology*, *49*(4), 438-448.

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, *45*(4), 249-257.

Stallman, H. M. (2017a). *Care · Collaborate · Connect: Student Success*. Adelaide: University of South Australia.

Stallman, H. M. (2017b). My Coping Plan [mobile application]. Available from https://play.google.com/store/apps/details?id=au.edu.unisa.mycopingplan.

Stallman, H. M., & Kavanagh, D. J. (2016). Development of an internet intervention to promote wellbeing in college students. *Australian Psychologist*, *53*(1), 60-67.

Stallman, H. M., Kavanagh, D. J., Ralph, A. (2012). *thedesk*: Promoting student success and wellbeing. Brisbane, Australia: The University of Queensland. Retrieved from www.*thedesk*.org.au

Stallman, H. M., Ohan, J. L., & Chiera, B. (2019). Reducing distress in university students: A randomised control trial of two online interventions. *Australian Psychologist*, *54*(2), 125-131.

Stansfeld L, Clark C, Bebbington P, King M, Jenkins R and Hinchliffe S (2016) 'Common mental disorders' in McManus S, Bebbington P, Jenkins R and Brugha T (eds) *Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014,* NHS Digital.

Stellefson, M., Hanik, B., Chaney, B., Chaney, D., Tennant, B., & Chavarria, E. A. (2011). eHealth literacy among college students: a systematic review with implications for eHealth education. *Journal of medical Internet research*, *13*(4), e102.

Tamres, L. K., Janicki, D., & Helgeson, V. S. (2002). Sex differences in coping behavior: A meta-analytic review and an examination of relative coping. *Personality and social psychology review*, *6*(1), 2-30.

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., ... & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health and Quality of life Outcomes*, *5*(1), 63-76.

Thorley, C. (2017). *Not By Degrees: Improving student mental health in the UK's universities.* Institute for Public Policy Research. Retrieved from https://www.ippr.org/files/2017-09/1504645674_not-by-degrees-170905.pdf

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of educational research*, *45*(1), 89-125.

Tubaishat, A., & Habiballah, L. (2016). eHealth literacy among undergraduate nursing students. *Nurse education today*, *42*, 47-52.

UCAS. (2017). Mature students' guide. Retrieved from https://www.ucas.com/file/35436/download?token=2Q6wiw-L

UCAS. (2018, August 16.) *A record percentage of young people are off to university.* Retrieved from https://www.ucas.com/corporate/news-and-key-documents/news/record-percentage-young-people-are-university

Universities UK. (2015). *Student mental wellbeing in higher education: good practice guide*. London: Universities UK.

U.S. Public Health Service. (1999). *Mental health: A report of the Surgeon General*. Rockville: National Institute of Mental Health.

Viskovich, S., & Pakenham, K. I. (2018). Pilot evaluation of a web-based acceptance and commitment therapy program to promote mental health skills in university students. *Journal of clinical psychology*, *74*(12), 2047-2069..

Wei, M., Russell, D. W., & Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: A longitudinal study. *Journal of Counselling Psychology, 52(4)*, 602-615.

Werner-Seidler, A., Afzali, M. H., Chapman, C., Sunderland, M., & Slade, T. (2017). The relationship between social support networks and depression in the 2007 National Survey of Mental Health and Well-being. *Social psychiatry and psychiatric epidemiology*, *52*(12), 1463-1473.

White, A., Kavanagh, D., Stallman, H., Klein, B., Kay-Lambkin, F., Proudfoot, J., ... & Young, R. (2010). Online alcohol interventions: a systematic review. *Journal of medical Internet research*, *12*(5), e62.

Williams, L. M., Brown, K. J., Palmer, D., Liddell, B. J., Kemp, A. H., Olivieri, G., ... & Gordon, E. (2006). The mellow years?: Neural basis of improving emotional stability over age. *Journal of Neuroscience*, *26*(24), 6422-6430.

Wilson, K. T., Bohnert, A. E., Ambrose, A., Davis, D. Y., Jones, D. M., & Magee, M. J. (2014). Social, behavioral, and sleep characteristics associated with depression symptoms among undergraduate students at a women's college: a cross-sectional depression survey, 2012. *BMC women's health*, *14*(1), 14-18.

Wilson, A., G. Mcintyre, N. Quinn, F. Buchan, and T. Tinklin. (2006). *Understanding and promoting student mental health in Scottish higher education*. Retrieved from http:// www.scotland.gov.uk/Resource/Doc/156894/0042198.pdf

World Health Organisation. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.

World Health Organisation (2014, August). *Mental health: a state of well-being.* Retrieved from https://www.who.int/features/factfiles/mental_health/en/

Yazedjian, A., Toews, M. L., Sevin, T., & Purswell, K. E. (2008). " It's a Whole New World": A Qualitative Exploration of College Students' Definitions of and Strategies for College Success. *Journal of College Student Development*, *49*(2), 141-154.

Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in higher education*, *46*(6), 677-706.

Zhang, H., Chang, K., Zhang, F., Greenberger, E., & Chen, C. (2011). Mental health problems and coping styles of urban and rural high school students in China. *Journal of Community Psychology, 39,* 1019- 1030. doi:10.1002/jcop.20492.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In *Handbook of self-regulation* (pp. 13-39).

Appendix A: Systematic Literature Search Terms

Students	Wellbeing Focussed	Web-based Intervention
student*.tw. or universit*tw.mp. or college*.tw	Wellbeing.tw OR well-being.tw. or mentaladj3health.tw.) or coping.tw. or psychological.mp.) adj3 distress.tw.) or happiness.tw. or psychological ADJ3 functioning.tw	(e-health or ehealth).tw. or computer*tw.mp. or PC.tw. or smartphone*.tw. or app*.tw. or webbased.tw. or web-based.tw. or internet.tw. or software.tw

Appendix B:
School of Medicine Research Ethics Committee Favourable Opinion Letter

UNIVERSITY OF LEEDS

Faculty of Medicine and Health Research Office
School of Medicine Research Ethics Committee (SoMREC)

Room 9.29, level 9
Worsley Building
Clarendon Way
Leeds, LS2 9NL
United Kingdom

✆ +44 (0) 113 343 1642

21 June 2018

Miss Daisy Dorothy Walton
Psychologist in Clinical Training
Leeds Institute of Health Sciences
Faculty of Medicine and Health
Clinical Psychology, Level 10
Worsley Building
University of Leeds
Clarendon Way
LEEDS LS2 9NL

Dear Daisy

Ref no: **MREC17-076**

Title: **What is the impact of using the desk on undergraduate students' wellbeing? A systematic case series**

Your research application has been reviewed by the School of Medicine Ethics Committee (SoMREC) and I can confirm that ethics conditional approval is granted based on the following documentation received from you:

Document	*Version*	*Date Submitted*
Ethics form 10.05.18	1.1	15/05/2018
Email templates 10.05.18	1.1	15/05/2018
PIS case series 10.05.18	1.1	15/05/2018
PIS recruitment screening 10.05.18	1.1	15/05/2018
Portal advert 20.03.18	1.0	20/03/2018
wemwbs 14 item	1.0	20/03/2018
General Self Efficacy Scale	1.0	20/03/2018
CORE10	1.0	20/03/2018
core OM	1.0	20/03/2018
Coping Strategies Indicator	1.0	20/03/2018

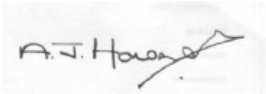
Please notify the committee if you intend to make any amendments to the original research ethics application or documentation. All changes must receive ethics approval prior to implementation. Please contact the Faculty Research Ethics Administrator for further information (fmhuniethics@leeds.ac.uk)

Ethics approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, risk assessments and all other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

Yours sincerely



Dr Anthony Howard, Co-Chair, SoMREC, University of Leeds
(Approval granted by Co-Chair Dr Anthony Howard on behalf of the committee).

Appendix C: Participant Information Sheets

Appendix C1: Participant information sheet recruitment screening

UNIVERSITY OF LEEDS

Student Wellbeing Survey

6% complete

Page 2: Participant Information Sheet

You are being invited to take part in a research project.

Please take the time to read the following information carefully, to help you decide whether or not you would like to participate in the study. It is important to understand why the research is being done and what it will involve.

What is the purpose of this study?

The study will explore the effect of a new website on student wellbeing and psychological distress. The following survey is to check whether you are eligible to take part.

Why have I been invited to take part?

Full-time undergraduate students at the University of Leeds who were under 22 when they started their current degree are being invited to complete this survey.

What will be involved if I agree to take part in this study?

This study involves two stages. During the first stage you are invited to complete this survey, which will ask you questions about wellbeing, coping and psychological distress, in order to determine whether you are eligible to take part in the second stage of the study. Everyone who completes the first stage of the study and gives their email address will be have the opportunity to opt in to be entered into a prize draw to win a £20 Amazon voucher. Whether you complete the second stage of the study will have no effect on your chances of winning the prize draw.

If you choose to complete the recruitment screening survey and to give your email address, you may be invited to complete the second stage of the study by email. In the second stage of the study you will be asked to use a self-help website designed specifically for students, to complete daily and weekly surveys on how you are feeling, and to attend an interview with the researcher at the University of Leeds. If you are invited to take part in the second stage of the study you will receive more information about what will be involved by email. Students who consent to being involved in the second stage of the study and who go on to complete it will receive up to £50 for their participation.

If you complete this survey, you provide contact details, and you disclose a risk to yourself or to others, you may be contacted by the researcher Daisy Walton and for your own safety and the safety of others, your details may be passed to the University of Leeds Mental Health Advisor. Not all students who complete this survey will be contacted, if you require support you should contact one of the support services listed below.

Not everyone who completes the survey will be invited to take part in the second part of the study.

Do I have to take part in the study?

Taking part in this study is voluntary, participants can withdraw at any time without giving a reason however, any responses already provided will be retained due to anonymity of responses.
If you decide to take part in the first stage of the study, you can withdraw at any time by using the exit button on your internet browser. You do not have to give a reason for this. If you are invited to take part in the second part of the study, you are under no obligation to do so, as taking part in the second part of the study is also voluntary. You do not have to give a reason for not wanting to take part.

What will happen to the information obtained by the study?

Your answers on the questionnaires will be used to determine your eligibility for taking part in a research study. All of the data obtained will be treated as confidential and treated as stored securely as is required by the Data Protection Act. The data collected at both the first and second stage of the study will be used as part of a thesis for a Doctorate in Clinical Psychology and may be written up for publication. No identifying information about you will be included in the report.

Who has reviewed this study?

This study has been reviewed by the Institute of Health Sciences School of Medicine Research Ethics Committee, University of Leeds MREC17-076.

How do I take part?

You can take part in this study by completing the consent form on the following page and taking part in the survey answering the survey questions.

Support

It is possible that you may find some of the questions in this survey distressing. You can exit the survey at any time without giving a reason.

If you feel you require support for your mental health, please contact your GP and book an appointment. You can also contact:

The University of Leeds Counselling and Wellbeing Service
Email: scc@leeds.ac.uk
Phone: 0113 343 4107

Leeds Improving Access to Psychological Therapies
Email: leedsiapt@nhs.net
Phone: 0113 843 4388

If you feel you are in crisis and are concerned for the immediate safety of you or those around you, please call 999.

< Previous

Next >

UNIVERSITY OF LEEDS

Student Wellbeing Survey

13% complete

Page 3: Consent Form

I confirm that I have read and understood the information sheet for the study.

I understand that my responses to the survey will remain confidential.

I understand that, should I disclose a credible risk to myself or to others, any contact information I have provided can be passed onto the University of Leeds Mental Health Advisor.

I understand that my participation is voluntary and I can withdraw at any time without giving a reason.

I agree to take part in the first stage of the study.

If you understand the information provided and agree consent to taking part in the first stage of the study please click on the next button.

< Previous

Next >

Appendix C2: Participant information sheet case series

Student Wellbeing Research

0% complete

Page 1: Participant Information Sheet

You are being invited to take part in a research study. Before you decide whether you would like to take part, you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Take your time to decide whether or not to take part.

What is the purpose of the study?

This study aims to test whether an online self-help website developed specifically for university students helps students to cope more effectively with the pressures of university life, improve psychological wellbeing, and reduce psychological distress.

Why have I been invited?

This study is recruiting fulltime undergraduate students at the University of Leeds, who were under 21 when they started their degree. Participants in the study must not be receiving any current psychological support or taking any medication for their mental health. You have been invited to take part because your answers in the recruitment screening survey indicate that you meet these criteria, and you volunteered to receive further information about this stage of the study.

Do I have to take part?

It is up to you to decide, participation is voluntary. You are asked to read this information sheet to help you decide, and to click continue if you consent to take part. You have at least fourteen days to decide whether or not to consent. You are free to withdraw from the study at any time, without giving a reason.

What will happen to me if I take part?

This research study will last for up to 17 weeks. For these weeks you will be asked to complete daily and weekly questionnaires. For six weeks of the study you will be asked to use an online resource designed specifically to improve the wellbeing of students. For three of these weeks you will receive weekly support emails from the researcher. At the end of the study you will be asked to participate in an interview about your experiences of being involved in the study and using the online website. The interview will be with the researcher Daisy Walton and will take approximately an hour to an hour and a half to complete. This interview will be recorded, with the audio file being kept securely on University of Leeds software.

Expenses and payments

As explained in the original advert for this study, you have already had the opportunity to be entered into a prize draw for a £20 Amazon Gift voucher as a thank-you for completing the screening questions. Whether or not you decide to take part in the study will not affect your chances of winning this prize.

If you decide to take part in this second study, you will receive up to £10 as reimbursement for your time for each completed phase of the study. This study contains five phases including the interview, so you will receive a total of £50 if you complete the whole study. If you complete part of the study you will receive up to £20 reimbursement. Reimbursements will be paid in cash, at a meeting with the head researcher on University of Leeds premises once the study has been completed.

What will I have to do?

- Every day you will be asked to complete an online questionnaire. These questionnaires will be one of the following:
    - A short online DAILY questionnaire which will take approximately 2 minutes to complete
    - A WEEKLY online questionnaire which will take approximately 5-10 minutes to complete
    - A longer questionnaire up to every THREE WEEKS which will take approximately 20 minutes to complete. This longer battery of questions will be completed four times throughout the study.
- During two phases of the study you will be expected to use an online self-help website. You will be able to choose which parts of this website seem relevant to you and to decide what you would like to focus on. The website contains lots of different information about how to improve your wellbeing, and things for you to try to manage the pressures of student life.

What are the possible disadvantages and risks of taking part?

During this study, you will be asked to answer questions about your mood, your psychological wellbeing, anxiety, and ability to cope. You may find thinking about some of these topics distressing. If, at any time during the study, you are feel too distressed to continue you are free to withdraw. You will also be given the contact details of sources of support through the University and the NHS, these are listed at the bottom of this form.

Your data will be kept confidential. As the researcher has a duty of care to keep you and those around you safe, if at any time during the study, there is a concern that you may be likely to hurt yourself or those around you, the researcher may contact you about this by email. If we believe you are at immediate risk to yourself or to others your contact information may be passed to the University of Leeds Mental Health Advisor. Not all students who take part in the study will be contacted – if you require assistance it is important you contact one of the support services listed below.

What are the possible benefits of taking part?

The website you will use, if you choose to take part in this study, is a web-based programme specifically designed to help students improve their wellbeing. It is thought that, by using this website you may be able to improve your psychological wellbeing and reduce psychological distress. The information we get from this study will help to increase understanding of the effectiveness of the website, and could help other students access web support if it is shown to be effective. If you successfully complete all phases of this study, you will receive £50.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researcher who will do their best to answer your questions. The researcher's contact details can be found at the bottom of this sheet. If you do not want to contact the researcher directly about any concerns, you can contact their supervisor whose details are also at the bottom of this sheet. If at any time during the study you require psychological support, you should contact one of the support services listed below.

Will my taking part in the study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Data will be collected using Bristol Online Surveys, which is a secure platform endorsed by the University of Leeds. Your questionnaire data will be anonymised and given a research code, known only by the researcher. Data you enter into the web-based programme will also be kept confidential, on a secure server hosted by the University of Queensland. The researcher will not have access to any text or photos you upload to the programme, but will receive information about which parts of the programme you have used and how many times you have logged into the system. If you complete the end of study interview your interview will be audio recorded. This audio recording will be transcribed and anonymised. All data will be stored securely on a University of Leeds password protected secure drive. Only the researcher and project supervisors will have access to the data.

What will happen if I don't carry on with the study?

You are free to withdraw from this study at any time. If you withdraw from the study, your data will be used in the research to look at differences between those who completed the study and those who did not. This will be used in the report, but no information about you specifically will be included. Any data, including interview quotes, included in the write-up of findings will be anonymised. . If you do not want your data to be used in this way please contact the lead researcher at Daisy Walton, at umddw@leeds.ac.uk before December 2018.

Who is organising or sponsoring the research?

This research is being carried out for a thesis, as part of a Doctorate in Clinical Psychology at the University of Leeds. The researcher is Daisy Walton, whose contact details can be found below.

Who has reviewed this study?

This study has been reviewed by the Institute of Health Sciences School of Medicine Research Ethics Committee, University of Leeds [insert ethics approval number once approval granted].

How do I take part?

You can take part in this study by completing the consent form on the following page, and clicking "continue" to your first daily survey. You have up to 14 days to decide whether you would like to take part so you do not have to do this immediately.

How do I take part?

You can take part in this study by completing the consent form on the following page, and clicking "continue" to your first daily survey. You have up to 14 days to decide whether you would like to take part so you do not have to do this immediately.

Further information and contact details:

The lead researcher:

Daisy Walton

Psychologist in Clinical Training at the University of Leeds

Email: umddw@leeds.ac.uk

Supervisors:

Dr Ciara Masterson

Lecturer in Clinical Psychology at the University of Leeds

Email: C.Masterson@leeds.ac.uk

Dr Bridgette Bewick

Associate Professor in Health Research at the University of Leeds

Email: B.M.Bewick@leeds.ac.uk

Dr Helen Stallman

Senior Lecturer in the School of Psychology, Social Work and Policy at the University of South Australia.

Email: Helen.Stallman@unisa.edu.au

Support

If you feel that you require further support for your mental health, please contact your GP and make an appointment. You can also contact:

University of Leeds Counselling and Wellbeing Service

Email: scc@leeds.ac.uk

Phone: 0113 343 4107

Leeds Improving Access to Psychological Therapies

Email: leedsiapt@nhs.net

Phone: 0113 843 4388

If you feel you are in crisis and are concerned for the immediate safety of you or those around you, please call 999.

Next >

UNIVERSITY OF LEEDS

Student Wellbeing Research

7% complete

Page 2: Consent Form

- I confirm that I have read and understood the information sheet for the study
- I understand that my responses to the survey will remain confidential
- I understand that, should I disclose a credible risk to myself or to others, any contact information I have provided can be passed onto the University of Leeds Mental Health Advisor
- I understand that my participation is voluntary and I can withdraw at any time without giving a reason
- I understand that as a participant in this study I will be asked to complete a battery of questionnaires/items every day for up to 17 weeks.
- I understand that the final phase of the study is a face-to-face interview which will be audio recorded and transcribed.

- I understand that for completing all phases of the study I will receive £50 as reimbursement for my time.

- I understand that if I do not complete all phases of the interview the maximum I will receive as reimbursement of my time is £20

- I agree to take part in this second stage of the study

If you understand the information provided and consent to take part in the case series please **click next** and go on to complete your first daily survey.

You have 14 days to decide whether you would like to take part in the study, so you do not need to do this straight away.

< Previous

Next >

Appendix D: Measures

Appendix D1: The WEMWBS

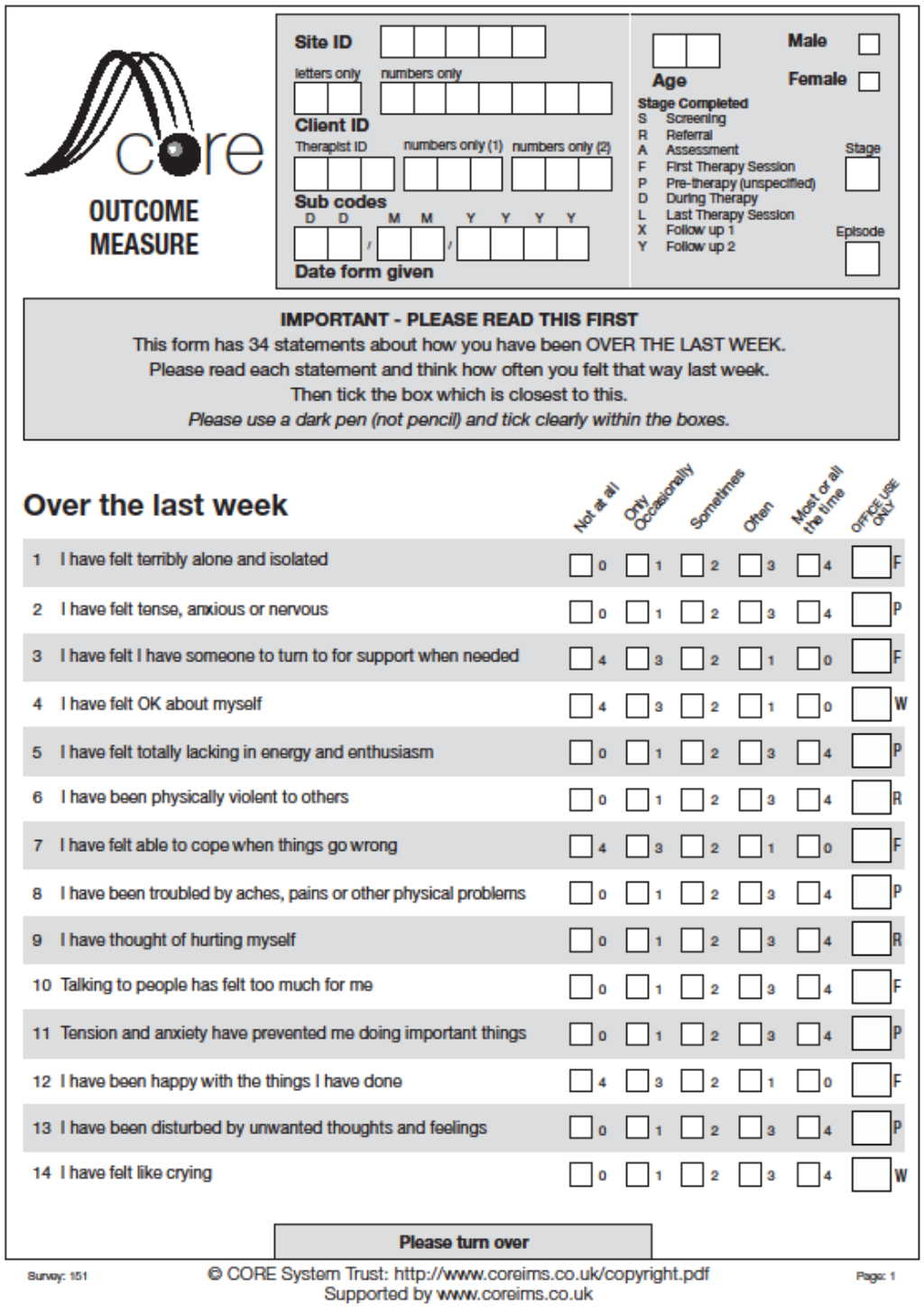
The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.
Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick–Edinburgh Mental Well-being Scale (WEMWBS)

Appendix D2: The CORE-OM



core

OUTCOME MEASURE

Site ID

letters only | numbers only

Client ID

Therapist ID | numbers only (1) | numbers only (2)

Sub codes

D D / M M / Y Y Y Y

Date form given

Age

Male

Female

Stage Completed

S Screening
R Referral
A Assessment
F First Therapy Session
P Pre-therapy (unspecified)
D During Therapy
L Last Therapy Session
X Follow up 1
Y Follow up 2

Stage

Episode

IMPORTANT - PLEASE READ THIS FIRST

This form has 34 statements about how you have been OVER THE LAST WEEK.
Please read each statement and think how often you felt that way last week.
Then tick the box which is closest to this.
Please use a dark pen (not pencil) and tick clearly within the boxes.

Over the last week

		Not at all	Only Occasionally	Sometimes	Often	Most or all the time	OFFICE USE ONLY
1	I have felt terribly alone and isolated	0	1	2	3	4	F
2	I have felt tense, anxious or nervous	0	1	2	3	4	P
3	I have felt I have someone to turn to for support when needed	4	3	2	1	0	F
4	I have felt OK about myself	4	3	2	1	0	W
5	I have felt totally lacking in energy and enthusiasm	0	1	2	3	4	P
6	I have been physically violent to others	0	1	2	3	4	R
7	I have felt able to cope when things go wrong	4	3	2	1	0	F
8	I have been troubled by aches, pains or other physical problems	0	1	2	3	4	P
9	I have thought of hurting myself	0	1	2	3	4	R
10	Talking to people has felt too much for me	0	1	2	3	4	F
11	Tension and anxiety have prevented me doing important things	0	1	2	3	4	P
12	I have been happy with the things I have done	4	3	2	1	0	F
13	I have been disturbed by unwanted thoughts and feelings	0	1	2	3	4	P
14	I have felt like crying	0	1	2	3	4	W

Please turn over

Survey: 151

Page: 1

Over the last week

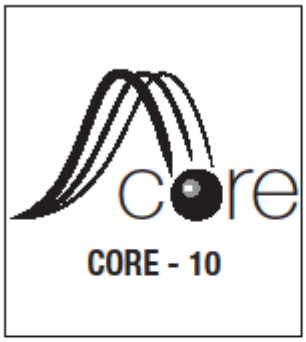
	Not at all	Only Occasionally	Sometimes	Often	Most or all the time	OFFICE USE ONLY
15 I have felt panic or terror	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
16 I made plans to end my life	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ R
17 I have felt overwhelmed by my problems	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ W
18 I have had difficulty getting to sleep or staying asleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
19 I have felt warmth or affection for someone	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0	☐ F
20 My problems have been impossible to put to one side	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
21 I have been able to do most things I needed to	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0	☐ F
22 I have threatened or intimidated another person	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ R
23 I have felt despairing or hopeless	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
24 I have thought it would be better if I were dead	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ R
25 I have felt criticised by other people	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ F
26 I have thought I have no friends	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ F
27 I have felt unhappy	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
28 Unwanted images or memories have been distressing me	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
29 I have been irritable when with other people	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ F
30 I have thought I am to blame for my problems and difficulties	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ P
31 I have felt optimistic about my future	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0	☐ W
32 I have achieved the things I wanted to	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0	☐ F
33 I have felt humiliated or shamed by other people	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ F
34 I have hurt myself physically or taken dangerous risks with my health	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ R

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

	(W)	(P)	(F)	(R)	All items	All minus R
Total Scores	☐	☐	☐	☐	☐	☐
Mean Scores (Total score for each dimension divided by number of items completed in that dimension)	☐	☐	☐	☐	☐	☐

Survey: 151

Appendix D3: The CORE-10



Site ID

letters only | numbers only

Client ID

Therapist ID | numbers only (1) | numbers only (2)

Sub codes

D D / M M / Y Y Y Y

Date form given

Age

Male ☐ Female ☐

Stage Completed

S Screening
R Referral
A Assessment
F First Therapy Session
P Pre-therapy (unspecified)
D During Therapy
L Last Therapy Session
X Follow up 1
Y Follow up 2

Stage

Episode

IMPORTANT – PLEASE READ THIS FIRST

This form has 10 statements about how you have been OVER THE LAST WEEK.
Please read each statement and think how often you felt that way last week.
Then tick the box which is closest to this.
Please use a dark pen (not pencil) and tick clearly within the boxes.

Over the last week		Not at all	Only Occasionally	Sometimes	Often	Most or all the time
1	I have felt tense, anxious or nervous	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
2	I have felt I have someone to turn to for support when needed	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0
3	I have felt able to cope when things go wrong	☐ 4	☐ 3	☐ 2	☐ 1	☐ 0
4	Talking to people has felt too much for me	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
5	I have felt panic or terror	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
6	I made plans to end my life	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
7	I have had difficulty getting to sleep or staying asleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
8	I have felt despairing or hopeless	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
9	I have felt unhappy	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
10	Unwanted images or memories have been distressing me	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4

Total (Clinical Score*) ☐

* **Procedure**: Add together the item scores, then divide by the number of questions completed to get the mean score, then multiply by 10 to get the Clinical Score.

Quick method for the CORE-10 (if all items completed): Add together the item scores to get the Clinical Score.

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

Appendix D4: The GSE

General Self-Efficacy Scale (GSE)

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough	☐	☐	☐	☐
2. If someone opposes me, I can find the means and ways to get what I want.	☐	☐	☐	☐
3. It is easy for me to stick to my aims and accomplish my goals.	☐	☐	☐	☐
4. I am confident that I could deal efficiently with unexpected events.	☐	☐	☐	☐
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	☐	☐	☐	☐
6. I can solve most problems if I invest the necessary effort.	☐	☐	☐	☐
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	☐	☐	☐	☐
8. When I am confronted with a problem, I can usually find several solutions.	☐	☐	☐	☐
9. If I am in trouble, I can usually think of a solution	☐	☐	☐	☐
10. I can usually handle whatever comes my way.	☐	☐	☐	☐

Appendix E: Advertising Materials

Appendix E1: Poster

Appendix E2: Recruitment flyers

Research on Improving the Wellbeing of Students

Complete the student wellbeing survey and be in with a chance to win a **£20 Amazon voucher.**

Scan the QR code or use the URL to access the survey.

https://leeds.onlinesurveys.ac.uk/studentwellbeingsurvey

Research on Improving the Wellbeing of Students

Complete the student wellbeing survey and be in with a chance to win a **£20 Amazon voucher.**

Scan the QR code or use the URL to access the survey.

https://leeds.onlinesurveys.ac.uk/studentwellbeingsurvey

Research on Improving the Wellbeing of Students

Complete the student wellbeing survey and be in with a chance to win a **£20 Amazon voucher.**

Scan the QR code or use the URL to access the survey.

https://leeds.onlinesurveys.ac.uk/studentwellbeingsurvey

Research on Improving the Wellbeing of Students

Complete the student wellbeing survey and be in with a chance to win a **£20 Amazon voucher.**

Scan the QR code or use the URL to access the survey.

https://leeds.onlinesurveys.ac.uk/studentwellbeingsurvey

Appendix E3: Recruitment database email advert

The Student Wellbeing Study

Ethical Approval Number: MREC017-076

Who is eligible?

- Full time undergraduate students at the University of Leeds
- Who were under 22 when they **started** their degree
- And are not currently receiving support or taking medication for their mental health.

What will I have to do?

- The study will last between 11 and 14 weeks. Every day during the study you will be asked to complete one online questionnaire. These questionnaires will be one of the following:

  - A short online DAILY questionnaire which will take approximately 1-2 minutes to complete
  - A WEEKLY online questionnaire which will take approximately 5 minutes to complete
  - A longer questionnaire up to every THREE WEEKS which will take approximately 10-20 minutes to complete. This longer battery of questions will be completed four times throughout the study.

- For six weeks of the study you will be asked to use an online self-help website. You will be able to choose which parts of this website seem relevant to you and to decide what you would like to focus on. The website contains lots of different information about how to improve your wellbeing, and things for you to try to help you manage the pressures of student life.

-

At the end of the study participants will be asked to complete an interview with the researcher about their experiences of using the website. This will take place on University of Leeds premises and be arranged for a time which suits you.

Payment

If you decide to take part in this study, you will receive up to £10 as reimbursement for each phase you complete. This study contains five phases including the interview, so you will receive a total of £50 if you complete the whole study. If you complete part of the study you will receive up to £20 reimbursement. Reimbursements will be paid in cash, at a meeting with the head researcher on University of Leeds premise, once the study has been completed.

I'm interested, what do I do next?
If you are interested in taking part in this study, please visit the link below. This contains the full participant information sheet and the recruitment survey which will take approximately 10-20 minutes to complete. Please include a correct email address so that the researcher can contact you.

https://leeds.onlinesurveys.ac.uk/studentwellbeingsurvey

Please note that not everyone will be eligible to take part in the study, but everyone who completes the survey will have the opportunity to be entered into a prize draw to win a £20 Amazon Voucher.

I have a question or concern.
If you have any questions or concerns please do not hesitate to contact me. You can also contact one of the project supervisors who are listed below.

Ciara Masterson: c.masterson@leeds.ac.uk

Bridgette Bewick b.m.bewick@leeds.ac.uk

Appendix F: Email Templates

Appendix E1: Start of baseline

Dear NAME,

Thank you for volunteering to take part in the study on student wellbeing. As part of the study you will be asked to complete surveys each day. These can be accessed from the link below, which we recommend that you bookmark to make it easier for you. I will also be sending you a daily reminder email to help you with this, you will get this at TIME each day, as you requested.

URL

For part of the study, you will be asked to use a website designed to help students improve their wellbeing and to cope with the stress of university life. You don't need to do this yet, I will send you an email with more information when that part of the study begins.

During the study, you might feel that you require support for your mental health. Research shows that many students do whilst at university, as it can be a stressful time. I encourage you to seek help if you need it, and for your reference I include information regarding some different ways you can get support below.

Thanks again for agreeing to take part in the student wellbeing study, you will receive your first survey reminder email tomorrow at TIME.

Kind Regards,

Daisy Walton
Doctoral Researcher

Leeds IAPT, provide talking and online treatments for people with common mental health problems. You can refer yourself on 0113 843 4388 or book an appointment with your GP and they can make a referral on your behalf.

Student Counselling Centre, run by the University of Leeds specifically for students. Contactable on 0113 343 4107 or scc@leeds.ac.uk.

It is also really important that you seek support if, at any time, you feel that you may be a risk to yourself or those around you. You can make an appointment with your GP who can refer you to the appropriate service or if you feel you require urgent support out of hours you should contact:

The Leeds Single Point of Access Team on 0300 300 1485
The Samaritans on 116 123
Leeds Night Line, a telephone line for students in distress which runs every night during term time, from 8pm to 8am: 01133801285.

Appendix E2: Unguided intervention phase

Dear NAME,

Thank you for continuing to be a part of this research study. You have now completed the first/second phase of the study and you have earnt X pounds so far as reimbursement for your time.

For the next six/three weeks of the study you will have/will continue to have access to *thedesk*:

https://www.thedesk.org.au/

DELETE IF SECOND INTERVENTION PHASE: *thedesk* is designed to help students manage their psychological wellbeing and to cope with student life. I encourage you to explore and use the website. Please create an account using the same email address we use to contact you. I will not have access to any text or photos that you upload to thedesk, or the answers to any quizzes you complete. But I will receive information about which parts you have used, and how many times you have logged in to the system.

Please use the programme in the way you think will be most helpful to you over the next three weeks. I hope you find it useful.

Kind Regards,

Daisy

Appendix E3: Guided intervention phase 1

Dear NAME,

Thank you for continuing to be a part of this research study. You have now completed the first/second phase of the study and you have earnt X pounds so far as reimbursement for your time.

For the next six/three weeks of the study you will have/will continue to have access to *thedesk*:

https://www.thedesk.org.au/

DELETE IF SECOND INTERVENTION PHASE: *thedesk* is designed to help students manage their psychological wellbeing and to cope with student life. I encourage you to explore and use the website. Please create an account using the same email address we use to contact you. I will not have access to any text or photos that you upload to thedesk, or the answers to any quizzes you complete. But I will receive information about which parts you have used, and how many times you have logged in to the system.

As part of the study you have completed a number of questionnaires. Below you'll find feedback on your scores:

- Your questionnaire scores indicate that, like many other students, you may be experiencing some difficulties with/[anxiety/ feeling down/feeling isolated/doing the things you need to]/related difficulties.

thedesk includes tools and information designed to help students to with this in the staying calm/feeling good/staying connected/getting things done section - why not visit the website today (https://www.thedesk.org.au/) and pick one piece of advice or strategy to implement next week.

Kind Regards,

Daisy

Appendix E4: Guided intervention phase 2

Dear NAME,

Thank you for continuing to be a part of this research study. Last week I suggested that you take a look at the Staying Calm/Feeling Good/Staying Connected/Getting Things Done module of *thedesk*. I hope you have found it useful.

This week, I suggest you have a look at the Staying Calm/Feeling Good/Staying Connected/Getting Things Done module, as your scores during this study indicate that this may remain an area you might like to focus on/that, like many students, you may be experiencing some difficulties which this section could help with.

thedesk includes tools and information designed to help students to manage all sorts of difficulties, why not visit the website today (https://www.thedesk.org.au/) and pick another piece of advice or helpful strategy to implement next week.

Kind Regards,

Daisy

Appendix E5: Guided intervention phase 3

Dear NAME,

Thank you for continuing to be a part of this research study. Last week I suggested that you take a look at the Staying Calm/Feeling Good/Staying Connected/Getting Things Done module of *thedesk*. I hope you have found it useful.

This week, I suggest you go back and have a look at the Staying Calm/Feeling Good/Staying Connected/Getting Things Done module(s) {again, as research shows that in order to improve our wellbeing it is best if we implement strategies consistently/}

{ that like many students you may also be experiencing some difficulties which this section could help with.}

thedesk includes tools and information designed to help students to manage all sorts of difficulties, why not visit the website today (https://www.thedesk.org.au/) and pick another piece of advice or helpful strategy to implement next week.

Kind Regards,

Daisy

Appendix E5: Follow up phase 1

Dear NAME,

Thank you for continuing to be a part of this research study. You have now completed the third phase of the study and you have earned X pounds so far as reimbursement for your time. I really value your involvement and the commitment you have shown by completing the first three phases.

I hope you have found using *thedesk* over the last six weeks useful. For the next three weeks you are not required to use the programme, please continue to complete your daily measures as usual. You will continue to receive the daily reminders and please let me know if you have any issues or concerns.

Kind Regards,

Daisy

Appendix E6: Follow up phase 2

Dear NAME,

You have now completed the last phase of the student wellbeing study. Thank you so much for the time and effort you have invested, I really appreciate it.

Your involvement in this study is so valuable and will help us to know whether *thedesk* is a useful tool for students. The final stage of the study is to meet me to collect your reimbursement and to complete the interview, for which you will earn an additional ten pounds, on top of the X you have already earned. These will take place in the Worsley Building, and will last about an hour. The interviews are a chance for you to tell me about your experience of using *thedesk*, and of taking part in the study in general.

I have the following time slots available for the interview, please let me know by email which one suits you best, or if you require a different time.

SLOTS

Thanks again for taking part in the study. You have completed the last of the surveys, so I have cancelled your daily reminder email. As always, please do not hesitate to contact me if you have any questions, comments or concerns.

Kind Regards,

Daisy

Appendix E7: Daily reminder email

Dear NAME,

This is your daily survey reminder. Please go to URL to complete the survey.

Kind Regards,

Daisy Walton
Doctoral Researcher,
University of Leeds

Appendix E8: Measure reminder email 1

Dear NAME,

Thank you for participating in the student wellbeing study. Special thanks for the surveys you've completed.

I've noticed that you haven't been able to complete the surveys over the last couple of days? Student life can be busy and hectic. It can be difficult to find time. Remember, you can continue with the study even if you miss the odd day. I'm hoping you will have time to complete today's survey.

Here's the link to today's survey:

URL

You don't need to complete every single survey to complete the study. To get the maximum payment of £10 for each phase, you need to complete 80% of the surveys during that phase. You are still on track to do this, as long as you don't miss more than NUMBER surveys for the rest of this phase.

We ask you complete at least 50% of the surveys for each phase in order to stay in the study, you will get paid five pounds for each phase if you complete over half the surveys.

So good news - you are eligible to complete the study. We value your involvement. Please let me know if there's anything I can do to make it easier for you to complete the measures, or if you have any questions.

With thanks,
Daisy

Appendix E9: Measure reminder email 1.1

Dear NAME,

Thank you, you're doing really well with completing the surveys for the student wellbeing study. But I've noticed that you've missed a COUPLE/A FEW of the surveys? This is normal, as I know just how busy student life can be. But I just wanted to remind you, that to get the full reimbursement of 10 pounds for each phase, you need to complete at least 80% of the surveys in that phase. This adds up to a maximum of 50 pounds reimbursement for completing the whole study.

So, you can only miss X more surveys during the rest of this phase and still get paid the full ten pounds. Although as long as you complete over 50% of the surveys in this phase you can still carry on in the study and will get paid five pounds.

Please let me know if there's anything I can do to make it easier to complete the measures, or if you have any questions or concerns.

Kind Regards,
Daisy

Appendix E10: Measure reminder email 2

Dear NAME,

Thanks you for taking part in the student wellbeing study and for completing the surveys so far.

You haven't been completed the surveys over the last couple of days, I'm sending you this email to check in with you and ask if there's anything I can do to make it easier for you to complete the measures?

Here's the link to today's survey: URL

You're not expected to complete every single survey during this study, we know how busy student life can be. We do ask that you complete as many as you can and at least 50% of the current phase.

You are still eligible to complete the study. We value your involvement. Please do get in touch if there is anything we can do to make it easier.

With thanks,
Daisy

Appendix E11: Measure reminder email 3

Dear NAME,

In order to have useful data for the student wellbeing study, we need as many completed surveys as possible.

At the minute you have completed X% of this phase, so you're still eligible for the study. We ask that you complete as many surveys as possible, and at least 50%. So, we ask that you complete all remaining surveys in this phase.

Here's the link to today's survey: URL

If there is anything I can do to make it easier for you to complete the surveys, please let me know.

With Thanks,
Daisy

Appendix E12: Measure reminder email 4

Dear NAME,

You haven't been able to complete surveys recently. I know how busy student life can be, so understand that it may have been difficult to find the time.

It will not be possible for you to complete 50% of the surveys of this phase, which is the minimum we require for the data to be useful. Therefore, you have now been taken out of the study. I have cancelled your daily reminder email so you should stop receiving these.

I really appreciate your involvement in the research. As you completed X% of the last X phase(s) you have earned X pounds for your time. I can give this to you in cash if we arrange to meet on campus over the next few weeks? In general, Mondays and Fridays are better for me, let me know when would be a good time for you to meet.

For your reference, details of how you can seek support if (like many students) you feel you require support for your mental health are included below. You can also book an appointment with your GP.

Kind Regards,
Daisy

The University of Leeds Counselling and Wellbeing Service
Email: scc@leeds.ac.uk
Phone: 0113 343 4107
Leeds Improving Access to Psychological Therapies
Email: leedsiapt@nhs.net
Phone: 0113 843 4388

The Big White Wall
https://www.bigwhitewall.com/V2/LandingV2.aspx

If you feel you are in crisis and are concerned for the immediate safety of you or those around you, please call 999.