Investigating the sustained effects of a values-based micro-intervention for social media use in emerging adults

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature: 

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Overview

This thesis outlines the theoretical background and explores the sustained effects of a values-based micro-intervention for social media use (SMU) in emerging adults and is divided into three parts.

Part one of this thesis is a conceptual introduction. It reviews the literature on the impact of SMU on mental health and wellbeing, as well as the literature on values-based interventions (informed by acceptance and commitment therapy) and micro-interventions, concluding with an argument for the development of a values-based micro-intervention for SMU in emerging adults.

Part two is an empirical study, which explores the sustained (from one week follow-up) effects of a values-based micro-intervention for SMU in emerging adults using a randomised controlled trial design. Results show that the intervention was not effective in creating the hypothesised sustained changes in online values-consistent behaviour, or the secondary wellbeing-related concepts. The findings are discussed and suggestions for future SMU interventions and research are made. This was a joint project with another trainee clinical psychologist (Anna Taylor) who explored the immediate effects of the intervention.

The final section is a critical appraisal of the conceptual introduction and empirical paper. It reflects on the professional and personal challenges faced during the research process, and on what was learned from both a research and clinical perspective.

Impact Statement

Social media use (SMU) is a ubiquitous part of everyday life, especially for adolescents and emerging adults (Pew Research Centre, 2018). Research shows that SMU can have both positive and negative impacts on wellbeing-related concepts, depending on the quality rather than the quantity of use (Tibber & Silver, 2022; Yang et al., 2021). This research project addressed the following gaps in the existing research base: the provision of longitudinal rather than cross-sectional data (Karim et al., 2020), a focus on wellbeing-related rather than psychopathology-related outcomes (Meier & Reinecke, 2021) and the development of an intervention for SMU that is not focused on abstinence of problematic SMU but on creating beneficial SMU (Steele et al., 2020).

The literature on SMU impacts on mental health and wellbeing has been widely criticised for conceptual confusion (Kross et al., 2021). Therefore, the conceptual introduction aims to provide a clear overview of the evidence base drawing on two categorical models/frameworks (Meier & Reinecke, 2021; Yang et al., 2021). Additionally, it summarises the evidence for values-based and micro-interventions, suggesting that these may be effective in creating SMU that is beneficial for wellbeing, which is a so far unexplored direction of SMU intervention research.

The empirical paper was grounded in empirical evidence and theory, drawing on research on SMU impacts, as well as theories of acceptance and commitment therapy (ACT, Hayes et al., 1999). Although there has been some research into interventions for problematic SMU, this is the first study to examine the effects of a SMU intervention which focuses on creating beneficial qualities of SMU in non-problematic users of SM and draws on ACT theory.

Both papers highlight the importance of creating qualities of SMU that maximise the benefits and minimise the risks of social media (SM). Such findings have a range of implications.

For clinical practice, results highlight the importance of clinicians routinely enquiring about how individuals engage with SM. Findings suggest that engaging in passive SMU, connecting with

communication partners with less strong ties and using SMU with motives linked to compensation can cause negative mental health and wellbeing outcomes (Tibber &Silver, 2022; Yang et al., 2021). Therefore, clinicians may use psychoeducation and cognitive techniques to reduce these qualities of SMU. Furthermore, these findings could be applied to educational settings, informing the school curriculum and guiding interventions promoting beneficial SMU.

Both the empirical paper and conceptual introduction highlight gaps in the existing literature and important directions for future research. These include a greater emphasis on research employing longitudinal designs, further exploring the mediating and moderating factors of SMU impacts on mental health and wellbeing and drawing on conceptual frameworks to enable comparisons between outcomes. Findings also suggest potential avenues for intervention studies including the addition of mindfulness components to values components in future SMU interventions and/or creating more interactive interventions with prompts to continue engagement in strategies learned.

The researchers plan to disseminate the findings of the empirical paper by combining them with those of the partner study on immediate effects (Taylor, 2023) and publishing the work in peer reviewed journals.

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Part 1: Conceptual Introduction

Abstract

This conceptual introduction provides a narrative overview of the literature relevant to the corresponding empirical paper which evaluates the sustained effects of a values-based micro-intervention for social media use (SMU) in emerging adults.

The conceptual introduction is structured into three main sections. The first defines the key concepts of social media (SM), emerging adults and wellbeing. The second summarises and critiques the current evidence base on the impacts of SMU on mental health and wellbeing, and the third summarises and critiques the current evidence base for values interventions and micro-interventions. Finally, a concluding section summarises the argument for creating a values-based micro-intervention for SMU in emerging adults, with an aim to capitalise on the benefits and minimise the risks of SMU. The resulting empirical project will evaluate the sustained effects of this intervention from one-week follow-up using a randomised controlled trial (RCT) design with 18-29-year-old participants.

Introduction

It is a familiar scene. Walking down a street or into a café you will quickly notice that most people, especially young adults, are glued to their phones. Most likely, they are liking an Instagram post, messaging a friend on WhatsApp, or tweeting about a social justice issue. In other words, they are using social media (SM). A prominent question for researchers is now: How can we ensure SM is being used in a helpful, rather than a harmful way? This project aims to develop and evaluate a values-based micro-intervention with the primary aim of increasing online values-consistent behaviour (VCB) and associated secondary benefits.

Statistics shows that 65% of American adults use SM, with 18–29-year-olds being most likely to do so. 90% of adults in this age group use SM, a 78-percentage point increase since 2005 (Perrin, 2015). Along with this increase in social media use (SMU), there has been an increase in concern regarding the negative impacts it may have on youth and young adults, for example whether it causes social isolation and mental health problems (Berryman et al., 2018). The corresponding research shows mixed results, with SMU being linked to negative, positive and neutral outcomes in systematic reviews (Best et al., 2014; Naslund et al., 2020). Due to these often contradictory and complex findings, further research has focused on factors moderating and mediating the relationship between SMU and wellbeing. Studies show that how and why people use SM, as well as who the users are, can influence whether benefits or harms to wellbeing are typically found (Kross et al., 2021; Tibber & Silver, 2022; Yang et al., 2021). As SMU is such an integral part of everyday life, interventions that aim to minimise the risks and maximise the benefits of SMU are key.

Values-based interventions draw on Acceptance and Commitment Therapy (ACT) principles and have been used to successfully reduce distress and increase the frequency of positive behaviour in line with values in multiple populations (Rahal & Gon, 2020). Micro-interventions can be a particularly effective format for such interventions as their focused approach targets specific areas of behaviour change (e.g., Chase et al., 2013; Gloster et al., 2020).

This conceptual introduction will summarise and critique the literature on the above subjects, concluding in an argument for creating a values-based micro-intervention for SMU in emerging adults, with an aim to capitalise on the benefits and minimise the risks of SMU.

Section 1: Definitions

1. Defining social media

Since the conception of the internet, technology has been used increasingly to facilitate social interaction and communication (Kaplan & Haenlein, 2010). Nowadays, we refer to internet platforms used for social interaction as *social media* (SM). However, the definition of SM lacks clarity in the literature due to its multiple and overlapping functions (Kross et al., 2021).

To aid the definition of a subject as complex as SM, I consider its origins. In the early 2000s, the term *Web 2.0* was coined to describe the move away from sites which were solely created and published by individuals (e.g., Britannica online), to sites that were continuously modified by all users in a participatory and collaborative fashion (e.g., blogs, wikis) (Kaplan & Haenlein, 2010). Around this time, the term *user generated content* (UGC) was introduced to describe online content that was published to public or social networking sites, showed creative effort and was created outside of professional routines and practices (Vickery & Wunsch-Vincent, 2007). Current examples of UGC are YouTube videos and online reviews on TripAdvisor (Luca, 2015).

Both Web 2.0 and UGC describe the beginnings of the internet being used socially by individuals to share information in a continuous fashion. In 2010 these two terms were combined to define SM as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (Kaplan & Haenlein, 2010, p. 61).

Ellison and Boyd (2013) went on to define *social networking sites* as subsets of SM that have uniquely identifiable roles (current examples include Facebook, Instagram and Tik Tok). They defined these sites as consisting of user-supplied content, being able to publicly articulate connections that could be viewed by others and being able to consume, produce, and/or interact with streams of UGC.

While the above definitions are useful in understanding the origins of SM, in the year 2023, one the key difficulties in conceptualising SM are more pertinent than ever: the rapid expansion of SM platforms, the speed at which users change which SM platform they use (Carr & Hayes, 2015) and the overlapping functions that different SM platforms can have (Nesi et al., 2018). For example, Instagram can be used to post images, watch videos, chat to friends, comment on content, and more.

For the purposes of this thesis, I therefore align with Nesi et al's (2018) conclusion: that an inclusive definition of SM most likely captures the broad range of online experiences currently available on SM. Nesi et al. (2018) summarise that they consider (as I will for this study) "social media to include social network sites, such as Facebook, Twitter, and Instagram. We also consider social media to include other socially interactive technologies, such as text messaging, photograph sharing, online dating, and instant messaging, along with the platforms that allow for such activities (e.g., WhatsApp, Tinder, chat rooms)" (p. 270).

1.2. Measuring social media use

A further challenge in research on SMU is how to measure and quantify it. Historically, devices could be used to monitor technology use objectively. For example, Nielsen boxes could measure television usage precisely, and studies using them showed that this data was more accurate than self-reported television usage figures (Otten et al., 2010). Modern technology such as SM presents more of a challenge, as its use is more difficult to measure objectively (e.g., Kaye et al., 2020). Although server data may exist for platform-specific SMU, it is more difficult to obtain and use for research due to ethical and privacy concerns (Zimmer, 2010), as well as corporate self-protection. Instead, researchers must rely primarily on self-report measures, which are criticised for their often-questionable reliability and validity (Hussey & Hughes, 2020).

A further difficulty in the measurement of SMU is that studies are often interested in both *quantity* and *quality* of SMU and vary in their approaches of measuring these. Some studies measure

quantity of SMU through duration (e.g., minutes spent on SM in a day; Riehm et al., 2019), whilst others measure this through frequency (e.g., days of SMU in a week; Pantic et al, 2012). Studies assessing quality of SMU use varying self-report measures. For example, the Social Media Use Integration Scale (SMUIS, Jenkins-Guarnieri et al., 2013) is used to assess the degree to which people are emotionally connected to their SMU, while the Passive Active Use Measure (PAUm; Gerson et al., 2017) is used to assess whether Facebook users engage in active or passive SMU (defined below). These differences in focus of measurements of SMU, combined with the difficulties in validating self-report measures, make outcomes of studies on SMU difficult to compare and draw inferences from.

2. Defining emerging adults

Concerns about the impact of SMU on mental health and wellbeing are often raised regarding adolescents (e.g., Ivie et al., 2020), due to the simultaneous increase in adolescent SMU and adolescent mental health problems (Kim, 2017). However, research regarding SMU impacts on the age group above adolescents, namely 18-29-year-olds, is also highly important.

Arnett et al. (2014) define this age group as *emerging adults.* They argue that a new definition for this age group is needed, as the current experience of this period of life is vastly different compared to 50 years ago. Historically, this period was marked by the establishment of a stable adult life, including entry into marriage, parenthood and stable employment (Arnett, 1998). However, due to the now very different social, political and economic environment, this transition to adulthood has become much longer, and is marked by much more instability, with frequent changes in employment (Moreno Mínguez, 2018), relationships and a later start to parenthood (Douglass, 2007). The term *emerging adults* conceptualises this development of a longer entrance into adulthood.

A recent study by the Pew Research Centre (Auxier & Anderson, 2021) assessed adult SMU via a large (n = 1,502) telephone survey. The percentage of adults in each age group who self-reported that they used SM were as follows: 84% for 18–29-year-olds, 81% for 30-49-year-olds, 73%

for 50-64-year-olds, and 45% for those aged 65 and over. These findings highlight the value in exploring the impacts of SMU for emerging adults, as outcomes are applicable to the majority of this age group. In addition to being heavy SM users, emerging adults are also at a key developmental stage of identity formation (Villanti et al., 2017). According to Arnett's theory of emerging adulthood this centres on love, work and worldviews (Arnett, 2000). SMU contributes to identity formation by facilitating the process of reflecting on how we see ourselves and how others see us (Weber et al., 2008).

Therefore, the experimental study in this thesis will recruit emerging adults as they are heavy SM users as well as being at a key stage of identity formation which is influenced by SMU, making research on their SMU highly relevant.

3. Defining wellbeing

The definition of *wellbeing* has been a concern since the time of the ancient Greek philosophers (Kashdan et al., 2008), with Aristotle first defining the concepts of hedonia and eudaimonia in *Nichomachean ethics* (Aristotle, 4th Century BCE/1985). Hedonic wellbeing refers to the experience of happiness, a feeling which can come and go and be influenced by external events, and the absence of unhappiness, while eudaemonic wellbeing refers to living life with meaning and purpose in accord with internal virtues (Kashdan et al., 2008). Research on wellbeing still frequently falls into one of these two camps (Ryan & Deci, 2001).

Modern psychological research is faced with a further difficulty when defining wellbeing, which is the differentiation and overlap between wellbeing and mental health (Tennant et al., 2007). The literature shows an ongoing debate as to whether mental wellbeing and mental illness represent two ends of a single spectrum or two separate dimensions (Stewart-Brown et al., 2009). For example, the World Health Organization (WHO) defines mental health as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life,

can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2001a, p. 1), suggesting that wellbeing is embedded within the concept of mental health.

One way in which mental health research differentiates between mental health and wellbeing is by focusing on either psychopathology or psychological wellbeing (Meier & Reinecke, 2021). In other words, poor mental health is equated with psychopathology and positive mental health is equated with wellbeing. Lahey et al. (2017) state that the classic definition of psychopathology is "any pattern of behaviour—broadly defined to include actions, emotions, motivations, and cognitive and regulatory processes—that causes personal distress or impairs significant life functions, such as social relationships, education, work, and health maintenance" (p. 3). Contrastingly, wellbeing is defined by Yang et al (2021) as "a state characterized by the presence of positive indicators and/or absence of negative indicators of wellness" (p. 1).

As I wish to focus on creating beneficial SMU in this study, I will use Yang et al's (2021) definition of wellbeing to assess the effects that the hoped-for beneficial SMU might have.

3.1. Measuring wellbeing

In research, the way the two concepts of mental health and wellbeing are measured further aids their differentiation.

Mental health is often measured with a focus on negative outcomes, such as measuring rates of adult depression with the PHQ-9 (Kroenke et al., 2001), rates of adult anxiety with the GAD-7 (Spitzer et al., 2006), or rates of child anxiety and depression with the RCADS (Chorpita et al., 2000).

Conversely, wellbeing is measured with scales focusing on positive outcomes. In 2018, an interdisciplinary workshop on the measurement of wellbeing was held at Harvard University to create recommendations on which measures to use for wellbeing outcomes. Van der Weele et al. (2020) summarised the outcome of these discussions, reiterating the difficulty in conceptualising

wellbeing. For psychological research, they recommend measures which assess a range of aspects of psychological wellbeing, including life satisfaction, positive affect, meaning, purpose and personal growth.

Section 2: Literature review - social media use impacts on mental health and wellbeing

1. Prevalence of social media use

SMU has become a ubiquitous part of everyday life in the last two decades, especially for young people. Data shows that in the US 85% of adolescents aged 13-17 use at least one SM platform (Pew Research Centre, 2018) and 84% of 18-29-year-olds use at least one SM platform (Pew Research Centre, 2021). Due to a simultaneous rise in mental health problems and SMU in adolescents and emerging adults (Kim, 2017; Twenge et al., 2019), there has been an increase in concern and research regarding the impact of SMU on mental health and wellbeing (e.g., Boulianne & Theocharis, 2020; Ivie et al., 2020).

2. The puzzle of social media impacts on mental health and wellbeing

However, this research has not yielded a clear direction of impact that SMU has on mental health and wellbeing. Meta-analyses and systematic reviews have found negative, positive and neutral outcomes for both adults and adolescents (Baker & Algorta, 2016; Best et al., 2014).

Reviews have found that SMU is associated with both positive and negative mental health outcomes, for example increased (Ivie et al., 2020) and decreased (Seabrook et al., 2016) symptoms of depression and anxiety. Similarly, findings are mixed for wellbeing-related outcomes, as reviews have found associations between SMU and negative wellbeing-outcomes, such as increased loneliness (Erfani & Abedin, 2018) and decreased life satisfaction and self-esteem (Saiphoo et al., 2020), and positive wellbeing-outcomes, including increased social support, social connectedness (Winstone et al., 2021) and increased self-esteem (Best et al., 2014).

The mixed and conflicting results of this research may in part be due to methodological limitations which the literature is criticised for. These include a lack of validated measures and a focus on cross-sectional data compared to longitudinal data, which causes difficulties in making inferences about causality (Karim et al., 2020; Kross et al., 2021; Tibber & Silver, 2022). The evidence base has also been criticised for having small effect sizes and weak correlations (Orben et al., 2019; Huang et al., 2017). A recent umbrella review of the impacts of SMU in adolescents illustrates this, finding a majority of weak or inconsistent associations between SMU and mental health in the reviews it assessed (Valkenburg et al., 2022). Additionally, the literature is criticised for a lack of focus on psychological wellbeing outcomes compared to psychopathology outcomes, meaning that there is a bias towards exploring the negative effects of SMU (Meier & Reinecke, 2021).

2.1. Conceptual confusion: the jingle jangle problem

A further criticism of the literature on the impacts of SMU on wellbeing and mental health is a general lack of clarity in defining concepts which makes it difficult to compare and interpret findings (Kross et al., 2021).

The term *jingle-jangle problem* (Kelley, 1927) describes this conceptual confusion and is defined as either different terms being used to describe the same process, and/or the same terms being used to describe different processes. This is highly prevalent in the literature on SMU and wellbeing, possibly due to the fast pace at which technology and this field of research moves (Carr & Hayes, 2015). For example, social media and digital screen time are used interchangeably, and wellbeing is used to refer to both depression and life satisfaction (Kross et al., 2021).

Although the jingle-jangle problem is in part a positive sign of an evidence base bringing together a diversity of researchers, it causes difficulty in creating a clear shared understanding of psychological phenomena (Meier & Reinecke, 2021), can cause meaningful distinctions to be missed (Stoycheff et al., 2017) and can make it difficult to compare and interpret findings (Kross et al., 2021). This was demonstrated in a specification curve analysis, which found that the relationship

between digital technology use and adolescent wellbeing differed drastically, depending on how researchers operationalised these concepts (Orben & Przybylski, 2019).

3. Towards conceptual clarity

In 2021, Meier and Reinecke addressed this conceptual confusion by developing two frameworks to help categorise the literature on SMU and mental health and wellbeing. The first organises *computer-mediated communication* (CMC) into channel-centred and communication-centred levels of analysis (Figure 1), and the second organises mental health into psychopathology and psychological wellbeing. I will draw on these frameworks to further outline the current evidence base of the impact of SMU on wellbeing.

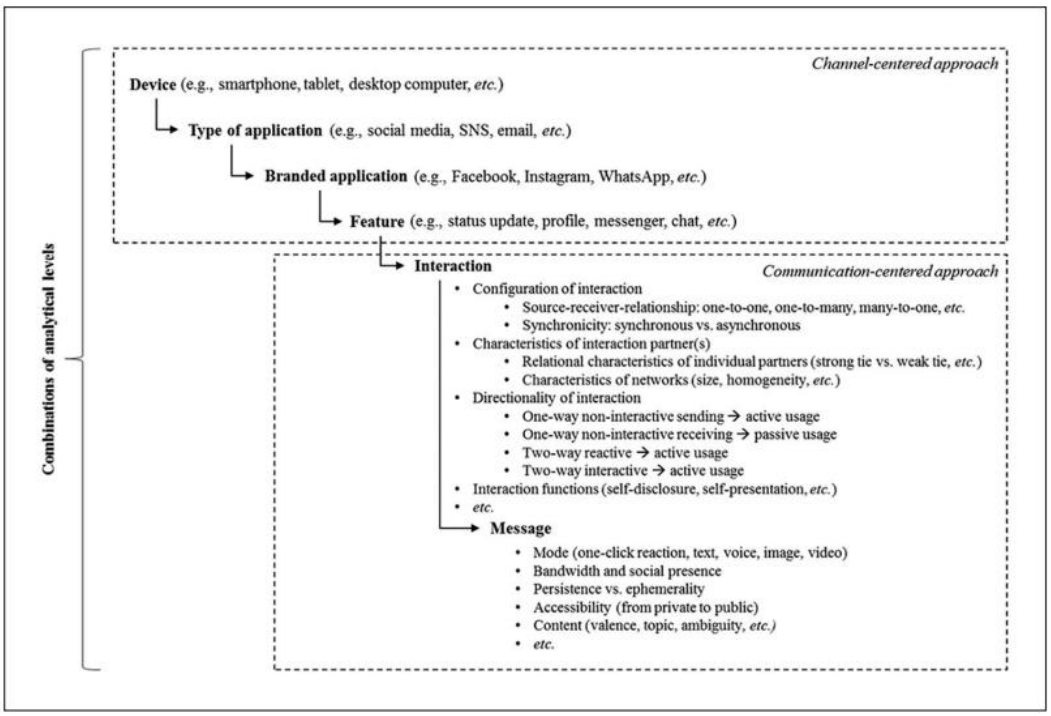

Figure 1

The hierarchical computer-mediated communication (CMC) taxonomy (Meier & Reinecke, 2021)

3.1. Channel-centred impacts

The CMC framework defines four *channel-centred levels of analysis*: the device (e.g., smartphone), type of application (e.g., SM), application brand (e.g., Instagram) and

application/brand feature (e.g., posting photos). In their corresponding meta-review, Meier and Reinecke (2021) found that research focuses on these levels in the form of the impact of frequency or intensity of SMU rather than on communication-centred levels of analysis. Tibber & Silver (2022) further highlight that channel-centred studies tend to focus on either one SM platform or focus on cross-platform data without differentiating between them, making it difficult to assess the different effects of SM platforms and their features.

Systematic reviews and meta-analyses on channel-centred levels of analyses have found similar outcomes: that there is a weak association between higher SMU levels and poorer mental health (Lee et al., 2022; Orben & Przybylski 2020a), including symptoms of depression (Ivie et al., 2020), anxiety and psychological distress (Keles et al., 2020). However, this effect may be bi-directional as high levels of SMU may impact mental health negatively, but poorer mental health may also drive increased SMU (Tibber & Silver 2022). When it comes to psychological wellbeing, a meta-analysis found small (Appel et al., 2020) and a meta-review found no (Meier & Reinecke, 2021) associations between higher levels of SMU and factors such as loneliness, self-esteem, and life satisfaction. However, in their meta review, Meier and Reinecke (2021) did find consistent evidence that higher levels of SMU were moderately associated with increased social capital and support.

In summary, current research suggests that the impacts of SMU on mental health and wellbeing are only weakly linked to channels of SMU. i.e., whether/how much it is used.

3.2. Communication-centred impacts

Communication-centred levels of analysis are defined by Meier & Reinecke (2021) as the characteristics and functions of a SM interaction (e.g., active or passive usage; defined below) and the message itself (e.g., private or public). In their meta-analysis, the authors found that the evidence for communication-centred levels of analysis were scarce and inconsistent. However, they did find consistent evidence that communication-centred measures (e.g., attitudes toward Facebook, social comparison on SM) resulted in two to three times larger effect sizes than channel-

centred ones (e.g., time spent on SM), and that among all 34 reviews assessed, the most common narrative conclusion was that effects depended on moderators and/or mediators (Meier & Reinecke, 2021).

This is in line with the general conclusion in the literature: that there are mediating and moderating factors which determine the type of impact that SMU has on individuals (Baker & Algorta, 2016; Kross et al., 2021; Tibber & Silver, 2022; Yang et al., 2021).

4. The multi-dimensional model of social media use

A useful model which aids categorisation of the current evidence base for these moderating and mediating factors is the Multi-Dimensional Model of SMU (MMSMU, Yang et al., 2021; Figure 2). This summarises that there are three key dimensions of communication-centred SMU which impact mental health and wellbeing outcomes: activities performed, motives for SMU and communication partners connected with. I will draw on this framework/review to further summarise the current evidence base.

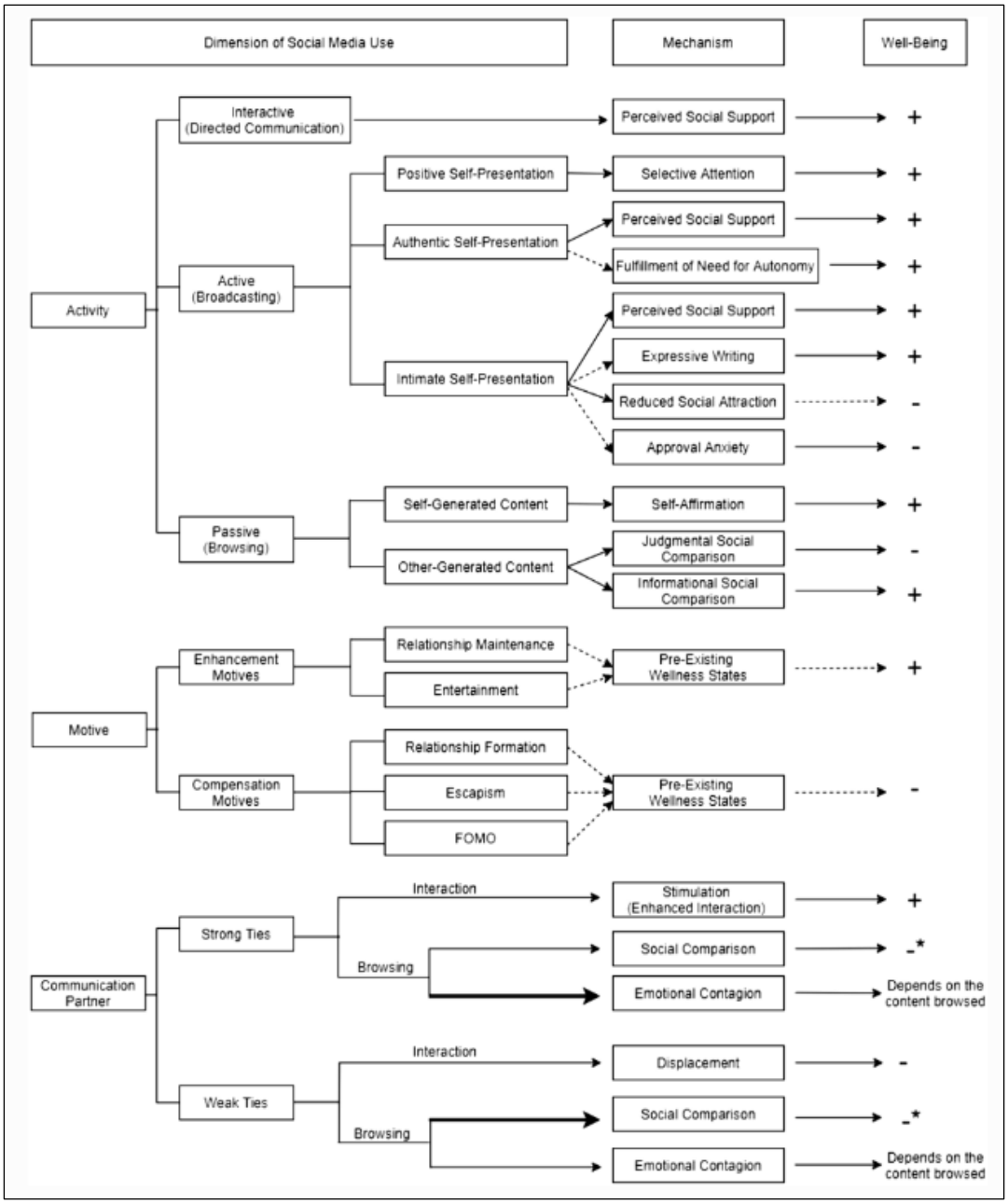

Figure 2

The Multidimensional Model of Social Media Use (Yang et al., 2021)

4.1. Activities

There are many kinds of activities that can be engaged with on SM. For example, sending direct messages to a friend, posting photos of oneself, searching for information and browsing celebrities' profiles. Research has found that these different types of activities have a bearing on

whether SMU leads to positive or negative outcomes (Karim et al., 2020; Orben, 20202; Tibber & Silver, 2022; Yang et al., 2021). In particular, research has found that *interactive* activities on SM lead to positive outcomes, and *passive* activities on SMU lead to negative outcomes (Yang et al., 2021).

4.1.1. Interactive SMU

Interactive SMU is defined as an interaction directed at a specific communication partner, for example messaging. Diary studies have found positive effects of interactive SMU, including increased self-esteem (Subrahmanyam et al., 2020) and perceived closeness (Manago et al., 2020). Liu et al. (2019) conducted a meta-analysis on the impacts of different SM activities and found interactive SMU was associated with greater psychological wellbeing, which was measured as a composite score of self-esteem, life satisfaction, anxiety, depression, loneliness and stress. However, the effect size was small, suggesting that interactive communication alone may not predict outcomes of SMU.

The positive effects of interactive SMU may be due to feelings of social connectedness, defined as emotional connectedness and a sense of belonging between an individual and other people (Baumeister & Leary, 1995) which are created during interactive activities on SM (Clark et al., 2018; Neubaum & Krämer, 2015). This is supported by findings from a structural equation modelling study (Frison & Eggermont, 2016) which found that a greater number of Facebook interactions and more frequent Facebook communication through messaging were associated with higher perceived social support, which contributed to lower levels of loneliness and depressed mood.

4.1.2. Passive SMU

Passive SMU is defined as observing online content, for example browsing (Yang et al., 2021) and has been found to be associated with negative wellbeing outcomes, such as increased depressed mood and anxiety (Frison & Eggermont, 2016), lower self-esteem in an experimental study (Burnell et al., 2020) and body image issues in a recent review (Vandebosch et al., 2022). These negative effects of passive SMU are hypothesised to be due to a decrease in self-esteem that is

created through upward social comparison to other people viewed on SM (Tibber et al., 2020; Schmuck et al., 2019), which research suggests may be more common when engagement is passive (Burnell et al., 2019; Verduyn et al., 2017). Additionally, the presence of envy during browsing has been found to lead to worse wellbeing outcomes during passive SMU (Valkenburg et al., 2022), suggesting that envy is a further mediating factor.

However, there is evidence to suggest that when assessing within-person, as opposed to between-person data, passive SMU has positive, negative and neutral impacts on wellbeing (Beyens et al., 2020). Moreover, a recent summary of three meta-analyses highlighted that evidence for the negative impacts of passive SMU is contradictory which was linked, in part, to the conceptual confusion in the literature (Valkenburg et al., 2022). Thus, the evidence suggests that levels of interactivity and passivity play an important role in SMU impacts but are not solely responsible for mental health and wellbeing outcomes.

4.2. Motives

To assess motives for SMU, research draws on Uses and Gratifications Theory (U&G; Katz et al., 1974) which posits that individuals actively use media to fulfil/gratify their personal needs and goals. This suggests that motives for SMU vary due to a difference in needs and goals that individuals are aiming to gratify and is supported by survey evidence which found that motives for SMU varied amongst individuals and depended on personality traits and SM platforms used (Kircaburun et al., 2020). A systematic review (Pertegal et al., 2019) found that common reasons for SMU included information seeking, maintaining relationships and expressing oneself. However, despite varying motives for SMU, there is evidence to suggest that adolescent and emerging adult motivations for SMU are often social in nature (e.g., Cheung et al., 2011; Huang & Su, 2018).

Fear of missing out (FoMO) has been identified in the literature as a motive that causes problematic SMU (e.g., Balta et al., 2020). FoMO describes the experience of worrying that one will miss out on positive experiences with others if one is not constantly connected with them (Yang et

al., 2021). This may be particularly relevant to adolescents and emerging adults as their SMU is highly social and thus provides more opportunities to experience FoMO. This is supported by findings from a survey study which found that FoMO fully mediated the relationship between adolescents' social needs for popularity and belonging and SMU (Facebook) and was related to greater stress about SMU (Beyens et al., 2016).

Overall, findings suggest that motives linked to *enhancement* lead to better wellbeing (e.g., Perugini & Solano, 2021). These are defined as motives which aim to enhance neutral or positive states of affairs, for example improving the quality of existing relationships, or seeking information when it is needed (Yang et al., 2021). Meanwhile, motives linked to c*ompensation* lead to poorer wellbeing (e.g., Rae & Lonborg, 2015). These are defined as motives which aim to compensate for real or perceived insufficiencies or to avoid negative experiences (Yang et al., 2021), for example coping with the fear of being rejected by engaging with others anonymously online (Gadekar & Ang, 2020).

However, the direction of this relationship is unclear as it is possible that those who use SM for compensation have lower baseline wellbeing, meaning that wellbeing and motives may form a cycle (Yang et al., 2021). The authors state that further research is required to disentangle this process, and I add that further investigation is required to truly understand the impact of different SMU motives on impacts on mental health and wellbeing.

4.3. Communication partners

Research shows that who we connect with on SM can have an impact on whether we benefit from SMU. Evidence suggest that connecting with people with stronger ties (e.g., existing close friends) on SM creates positive outcomes such as increased social support and satisfaction with life (Burke and Kraut, 2016). This may occur through stimulation which is defined as enhancing existing social resources through increased contact and maintenance of relationships (Winstone et al., 2021).

In contrast, interacting with people with weaker ties on SM is typically linked to negative outcomes such as decreased self-esteem (Eşkisu et al., 2017) and poorer social adjustment (Yang & Lee, 2020). This may occur through displacement which is defined as displacing time spent socialising with others offline with solitary online activities such as gaming (Winstone et al., 2021).

However, there is also evidence that while SMU can displace positive activities, it can also displace neutral or unpleasant activities which is beneficial (Hall et al., 2019a). Additionally, there is longitudinal evidence which demonstrates that online-only friends can be a protective factor for adolescents (Massing-Schaffer et al., 2022) and that online communities can be a source of support for marginalised groups, for example transgender young people (Selkie et al., 2020). Thus, there is more evidence for interactions with communication partners with strong ties having positive wellbeing outcomes, than evidence for interactions with communication partners with weak ties having negative wellbeing outcomes.

5. Social enhancement and compensation

A further key theory to consider is the *social enhancement hypothesis*, or the *rich-get-richer* hypothesis. This states that SMU allows those who already have a strong social network offline to enhance this which in turn creates wellbeing benefits, and that SMU creates negative wellbeing outcomes for those who do not have a strong offline network as they are using it to compensate for insufficiencies rather than enhance existing strengths (Kraut et al., 2002; Valkenburg et al., 2005; Perugini and Solano, 2020).

There is also evidence for the opposing *social compensation hypothesis*, which suggests that those who do not have a strong social network offline can create this online and reap the benefits (e.g., Ellison et al., 2007). However, evidence from a large survey (1,392 college students) found more evidence for the social enhancement hypothesis (Gadekar and Ang, 2020). Thus, it may be that the impacts of SMU depend on an individual's baseline social network.

6. Summary of social media use impacts

In summary, research shows that whether SMU has positive, negative or neutral impacts on mental health and wellbeing is not dependent on *which SM platform* is used, or *how much* SM is used (Meier & Reinecke, 2021) but on *how, why and by whom* SM is used (Yang et al., 2021). The current evidence base suggests that SMU is most beneficial when it is used interactively, when the motive for use is enhancement and when the people connected with already have strong ties (Yang et al., 2021). However, further scientific exploration is required to fully understand the relationship between these mediating and moderating factors.

Section 3: Creating an intervention for beneficial social media use

1. Previous interventions in social media use

Drawing on the evidence that qualitative factors moderate and mediate the effects of SMU on mental health and wellbeing, researchers are calling for interventions which improve the quality of SMU rather than changing the quantity of SMU (Steele et al., 2020) and that enhance the benefits and minimise the risks of SMU (Kross et al., 2021).

This thesis will suggest the development of such an intervention. I will first review previously undertaken SM interventions and then outline the background theory for our suggested intervention.

1.1. Abstinence

Some researchers have used SM abstinence as a form of SMU intervention, in the hope that the negative effects of SMU might be resolved by a disengagement from SM. However, in a brief review of the evidence base Hartanto et al (2021) concluded that most studies which manipulated levels of SMU found either neutral or negative impacts of SM abstinence. For example, Hall et al. (2021) assessed the impact of one to four weeks of SM abstinence in young people, and found there was no main effect on loneliness, wellbeing, or quality of day. Two further abstinence-based studies found a decline in life satisfaction and an increase in negative affect and loneliness (Vally & D'Souza,

2019), as well as withdrawal symptoms such as craving and boredom and to relapses (Stieger and Lewetz, 2018). These findings are in line with the evidence summarised by Meier & Reinecke (2021): that channel-centred levels of SMU are not the key to its impact on mental health and wellbeing.

In addition, the high prevalence of SMU in modern everyday life means that an abstinence approach is not ecologically valid or sustainable. Moreover, abstinence may also risk the user missing out on benefits of SMU, such as social capital and support (e.g., Best et al., 2014).

1.2. Interventions for problematic social media use

To date, non-abstinence-based SM interventions have mostly focused on improving wellbeing in individuals with problematic SMU, rather than in individuals without problematic SMU.

One example of such a study is that of Hou et al (2019) who designed and assessed a one-week intervention for SM addiction based on the cognitive-behavioural therapy (CBT) technique of cognitive restructuring. They randomly allocated participants with SM addiction to an intervention or control (no instruction) group and found that the intervention effectively reduced SM addiction and improved mental health (anxiety, depression and sense of adequacy) and self-esteem. However, the sample size was small (n = 22 in each group), the control group was not matched and there was no follow-up data to assess sustained effects.

Paeschke et al. (2023) are currently assessing an intervention for problematic SMU in adolescents, which consists of eight 60–90-minute weekly sessions based on CBT techniques, for both the parent and the adolescent. Pilot-study data has shown promising effects on a decrease of parental stress perception and an increase of family functioning, as well as on digital media related disorder symptom reduction in affected adolescents. However, the pilot study does not have a control group and has a small sample size (n = 30) reducing its interpretability. The results of the larger scale study currently being conducted will shed light on the efficacy of this intervention.

While these examples show some promise in interventions for problematic SMU, there are issues in both study designs, as well as differences in definitions of problematic SMU. This reflects the findings of a systematic review of treatments for internet gaming disorder and internet addiction (Zajac et al, 2017) which found that there was a lack of well-designed treatment outcome studies and limited evidence for the effectiveness of any treatment modality. The review highlighted that studies were limited by methodological issues, such as small sample sizes, a lack of control groups and little information on treatment adherence. Once again, the authors concluded that the literature lacked consistent definitions of and established instruments to measure internet gaming disorder and internet addiction.

2. Values-based interventions

There is a need for interventions for SMU which do not focus on abstinence or problematic SMU, but instead create qualities of SMU that lead to positive wellbeing outcomes. Based on Yang et al's (2021) findings that SMU is most beneficial when it is used interactively and with motives for enhancement, Tibber et al (under review) suggest that enhancement and escapist motivations may align with values-consistent and values-inconsistent behaviour, respectively. Therefore, I suggest that a values-based intervention for SMU will bring about qualities of SMU which have been linked to positive wellbeing outcomes.

I will outline the theoretical background of this approach, followed by a review of the current evidence base for values-based interventions.

2.1. Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT) is a behavioural therapy created by Steven Hayes, Kirk Strohsal and Kelly Wilson (Hayes et al., 1999). It is based on a functional contextualist approach, meaning that, unlike other behaviour therapies, it understands events as a whole, as ongoing and in a context (Hayes et al., 1999). It also draws on relational frame theory (RFT, Hayes et al., 2001). This is the idea that relating one concept to another is the foundation of all human

language which can be detrimental when conditioned language associations are negative, for example thinking “don’t get anxious” activates feelings connected to the word “anxiety” and makes you anxious. Thus, ACT assumes that the psychological processes of a normal human mind are often destructive and create psychological suffering, and that suffering is a part of life (Harris, 2006).

One mechanism through which suffering is generated by the mind is through experiential avoidance. This is the avoidance of unpleasant private experiences, such as low mood or anxiety. ACT posits that by attempting to control our emotions, avoiding negative and seeking positive emotions, we often do things that are helpful in the short term, but harmful in the long term (Hayes & Pierson, 2005). For example, drinking alcohol alleviates distress in the moment, but causes mental and physical health issues in the long term (Cavicchioli et al., 2020).

The main process through which ACT creates positive change is through the creation of *psychological flexibility* (Lin et al., 2018) which is defined as the tendency to engage in behaviours which are in line with one’s values, despite internal or external challenges that arise (Lin et al., 2018). ACT therefore does not aim to reduce symptoms directly, but to alter a person’s relationship with their thoughts and feelings, so that these become less threatening/have less control over them, and to help a person create a meaningful life through living in line with their values (Harris, 2006).

The creation of psychological flexibility is operationalised as the product of six core sub-processes in ACT: *acceptance, defusion, self-as-context, present moment awareness, values* and *committed action* (Hayes, 1999). Therefore, psychological flexibility is created, not by changing one’s thoughts and feelings, as standard CBT might do, but by learning to react more mindfully to difficult experiences, so that they are not seen as barriers to valued engagement (Ciarrochi & Blackledge, 2013).

ACT has a strong evidence-base, with reviews finding that ACT is effective in both clinical and non-clinical populations (Stenhoff et al., 2020) and for a variety of difficulties including anxiety, depression, substance use, pain and transdiagnostic groups (Gloster et al., 2020). Additionally,

studies have shown that higher levels of psychological flexibility are associated with a lower probability of having a psychiatric disorder (Donaldson-Feilder et al., 2004) and better psychological health (Kashdan & Rottenberg, 2010). A recent study also found an association between higher levels of psychological flexibility and higher levels of positive, values-consistent SMU and better mental health (Tibber et al, Under Review).

Drawing on these findings, I hypothesise that an intervention which increases psychological flexibility will also increase SMU that is associated with better wellbeing-related outcomes.

2.2. Values and committed action

A key component of ACT is to help an individual to clarify their values and act as in line with these values as possible (Reilly et al., 2019). Indeed, according to Hayes et al. (2012), "all ACT techniques are eventually subordinated to helping the client live in accord with his or her chosen values" (p. 322).

In ACT, values are defined as "chosen, verbally constructed consequences of dynamic, evolving patterns of activity for which the predominant reinforcer becomes intrinsic to the behavioural pattern itself" (Wilson, 2009; p. 66). In other words, if an individual acts in line with their values, they will live a life that they find meaningful, and be living in a *values-based* way. Reilly et al. (2019) provided a further, more simple definition of values as "guiding principles that are ongoing reflections of what an individual finds meaningful" (p. 1). Thus, according to both definitions, values are not set in stone but are evolving. They are like a compass that can guide individuals through life and help them map out the actions that they want to take.

Individuals have many and different values, such as creativity, honesty and kindness, and there are no 'correct' values. However, while the idea of values and living in line with these is a positive one, there are many things which can get in the way of acting in line with values (Hayes et al., 2013). One is that individuals may not be clear on their values. Another is that individuals may base their values on dominant rules or social approval, rather than their own authentic beliefs. For

example, someone might think “a good person values productivity over rest” and continue to work, even though their authentic value would be rest. A further barrier to valued living is the wish to avoid difficult feelings; for example, someone might value honesty but avoid telling the truth to avoid the discomfort of hurting someone’s feelings.

Thus, ACT aims to increase wellbeing by 1) helping an individual to clarify what their values are and 2) guide them to commit to acting in line with these values despite potential discomfort that may arise.

2.3. Evidence base: values-based interventions

Findings show that living and acting in line with one’s values is beneficial for general wellbeing (Rogers, 1965), mental health (Michelson et al., 2011) and social functioning (McCracken et al., 2015). Therefore, some interventions have focused on values work *alone* to create positive change in both clinical and non-clinical populations. These focus on clarifying what a person finds meaningful and thus provide a framework for guiding decision making and promoting meaningful and committed action as well as long-term behaviour change (Scheier et al., 2006).

For example, Castro et al. (2016) evaluated the impact of a series of values clarification and committed action workshops on direct care staff working with clients with severe developmental disabilities. Results showed that staff demonstrated 11–16 more instances of spontaneous engagement with clients following the workshops relative to their baseline levels, indicating the effectiveness of values-interventions in creating positive behaviour change. Further values-based interventions have been successful in increasing participants’ likelihood to donate to charities (Engle & Follette, 2018), decreasing weight related experiential avoidance in participants with obesity (Wallin et al., 2018) and increasing engagement with therapeutic tasks (Katz et al., 2016).

In a systematic review of 17 values-based intervention studies including clinical and non-clinical populations (Rahal & Gon, 2020) results showed that all the interventions assessed had the desired effect on the outcomes variables chosen. However, the interventions assessed varied in their

design, scope and length making outcomes difficult to compare. In addition, the authors highlighted that the majority of these studies relied on self-report measures, rather than observed behaviours, leading to potential bias in results. Thus, the evidence base for values-based intervention is promising but requires the addition of studies which are comparable in design and which assess observed, rather than self-reported, behaviours.

3. Micro-interventions

3.1. Defining micro-interventions

Micro-interventions are a particular form of brief intervention which are designed to be delivered in the context of a person's daily life with little burden on the individual, especially when distributed digitally (Baumel et al., 2020). Micro-interventions consist of exercises which target specific symptoms, rather than having a broad clinical aim (Fuller-Tyszkiewicz et al., 2019). For example, while a parent training program may have the overall goal of reducing a child's disruptive behaviours, a micro-intervention will have a much more focused target, for example guiding the parents in small steps to increase their positive attention toward desired behaviours of their child (Baumel et al., 2020).

The brief nature of micro-interventions carries multiple benefits. Firstly, they are more easily accessible and there is less risk of disengagement as they do not require much on an individual's time (Baumel et al., 2020). Secondly, they aim to lead to immediate positive effects (Fuller-Tyszkiewicz et al., 2019), meaning they are more ethically viable than longer term experimental intervention. Thirdly, due to their targeted approach, micro-interventions can test the isolated effects of brief activities which allows researchers to assess which particular resources are more effective when treating a target condition (Bunge et al., 2016).

However, while the brevity of micro-interventions is efficient and focused, allowing for high internal validity, there is little research into their macro-level and long-term impacts (Fuller-Tyszkiewicz et al., 2019). Thus, the depth and scope of micro-intervention impacts may be limited.

3.1. Evidence base: micro-interventions

To date, there are no systematic reviews or meta-analyses on the effectiveness of micro-interventions. I will therefore summarise the findings of several studies assessing the impact of micro-interventions on target symptoms and behaviours, including for addiction, couples and body image.

For addiction, Beadman et al (2014) assessed the impacts of three ACT-informed micro-interventions for smokers: reappraisal, cognitive defusion, and suppression. Results showed that the reappraisal and defusion micro-interventions led to immediate and sustained (one week follow-up) reductions in cravings to smoke (Beadman, 2014). However, the study was limited by self-report measures, losses at follow-up and brief instructions. A further study (Kamboj et al., 2017) also drew on ACT theory and compared the effects of a micro-intervention consisting of eleven-minute mindfulness exercises to a matched control for individuals at risk from harm from alcohol use. Results showed a significant reduction of alcohol consumption in the past week at one-week follow-up for the experimental group, compared to the control group. However, the authors highlight that their assessment of alcohol use disorder in participants may not have been adequate.

For couples, Gloster et al (2020) compared the effects of a 15-minute micro-intervention focused on creating psychological flexibility compared to a waitlist control and found an increase in prosocial and decrease in selfish behaviour in dyads of couples that took part after one week. However, this study was again limited by self-report data and a lack of follow-up data.

For body image, Fuller-Tyszkiewicz et al. (2019) randomly allocated participants to a waitlist-control or a micro-intervention which they could access for 21 days. This contained a series of brief video activities (e.g., gratitude tasks, breathing, and relaxation) which have been empirically linked to a decrease in body dissatisfaction. Results showed that the micro-intervention was successful in creating greater improvements in body satisfaction at post-intervention for the intervention group than the waitlist controls which in turn was predictive of greater post-intervention symptom

improvement and retention (at three weeks). However, it is unclear how often participants engaged with the material over the 21-day period.

In summary, micro-interventions have been found to successfully change target symptoms and behaviours. However, as with values-based interventions, their assessment is limited by self-report measures and differences in design, making it difficult to compare and draw inferences from findings.

4. Values-based micro-interventions

While the suggested intervention is the first values-based micro-intervention for SMU that I am aware of, there have been studies which have combined values-based and micro-intervention designs, which I will review below.

Chase et al. (2013) examined the impact of online goal-setting training with and without personal values exploration on grade point average (GPA). Second year psychology majors completed one of three experimental conditions: goal-setting training alone, values training plus goal-setting training, and a waitlist. Results showed that the combination of goal setting and values training significantly improved GPAs over the next semester, whereas goal setting alone had no effect. This study further demonstrates the effectiveness of values-based interventions in creating behaviour change, as well as the feasibility of incorporating values into a micro-intervention design.

Firestone et al. (2019) developed and tested a single session, online, self-guided values-intervention called the *Living Your Values* (LYV) program for undergraduates. Their study showed a significant pre-intervention to follow-up increase in valued living for leisure, recreation, community and citizenship values, but no significant changes in psychological wellbeing. Thus, this study suggests that a micro-intervention design can facilitate changes in valued living. However, this study was limited by the absence of a control group, meaning it is not certain that the outcome was caused by the intervention, rather than other variables.

In summary, the evidence supports potential measurable and sustained effects of micro-interventions when they are properly targeted at an aetiological or maintenance factor, including micro-interventions focused on values. However, as the evidence base for this type of intervention is limited, further research with designs including control groups and follow-up measures is required to assess which interventions are most effective.

Section 4: Concluding section

1. Summary

Despite the mixed results in the literature on the effects of SMU on wellbeing and mental health it is clear that quality of SMU influences the positive or negative direction of these effects (Kross et al., 2021; Orben, 2020; Tibber & Silver, 2022). It is also clear that abstaining from SM is not sustainable in the modern world and may lead to a loss of the positive impacts of SMU (e.g., Best et al., 2014). Therefore, there is a call to use knowledge on how SM impacts wellbeing, i.e., through interactive use, with close communication partners and with motives for enhancement (Yang et al., 2021) to develop interventions which will maximise the benefits and minimise the risks of SMU. (Kross et al., 2021). This area of research is particularly relevant to emerging adults as the majority of this age group use SM (Anderson & Auxier, 2021) and emerging adults are at a key stage of identity formation, which SM contributes to (Weber et al., 2008).

Values-based interventions, derived from ACT theory, are evidenced to have positive impacts on behaviour change in participants in both clinical and non-clinical populations (Rahal & Gon, 2020). Micro-interventions are brief interventions targeting specific symptoms (Baumel et al., 2020) which alleviate barriers to intervention access and allow testing for isolated effects of brief activities (Bunge et al., 2016). Evidence from micro-interventions shows promising results for positive behaviour change in various populations (e.g., Beadman, 2014; Kamboj et al., 2017), including those that focus on values (e.g., Chase et al., 2013).

I therefore propose developing a values-based micro-intervention focused on SMU for emerging adults, as I hypothesise that such an intervention may improve individuals' relationships with their SMU, minimising its risks and maximising its benefits. Additionally, this study will address criticisms of the literature by including clearly defined concepts and an experimental design with a control group and follow-up data (Kross et al., 2021).

2. Aims of this thesis

The present study aims to develop and test the impact of a values-based micro-intervention on emerging adults' engagement with SM. It draws on literature that highlights both the risks and benefits of SMU for emerging adults' wellbeing, as well as the putative mechanisms at play in this relationship, including passive vs. active engagement.

This study aims to fill a gap in the literature by:

1. Developing an online values-based micro-intervention for emerging adults
2. Evaluating the sustained effects this intervention has on (i) participants' value consistent behaviour and (ii) their positive evaluation of SMU, general wellbeing and social connectedness.

The experimental study will use a randomised controlled trial design, comparing outcomes between an experimental and control group at baseline and follow-up (from one week).

Primary hypothesis:

- H1: At follow-up, participants in the experimental group will report higher levels of online values-consistent behaviour (VCB) relative to participants in the control group at follow-up, and relative to their own scores at baseline.

Secondary hypotheses:

- H2: At follow-up, participants in the experimental group will report greater improvements in their positive evaluation of their SMU relative to participants in the control group.
- H3: Relative to participants in the control group, participants in the experimental group will report greater improvements in general wellbeing between baseline and follow-up.
- H4: Relative to participants in the control group, participants in the experimental group will report greater improvements in social connectedness between baseline and follow-up.
- H5: In the experimental group, participants' scores on psychological flexibility at baseline will correlate with any improvements described in H1-H4 at follow-up.

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Part 2: Empirical Paper

Investigating the sustained effects of a values-based micro-intervention for social media use in emerging adults

Abstract

Aims: Research shows that *how* we use social media (SM) has more of an impact on our wellbeing than *how much* we use it. In this study, we drew on theories of acceptance and commitment therapy (ACT) and evidence that values-consistent behaviour (VCB) is associated with positive wellbeing to develop an online values-based micro-intervention to promote VCB in the online world for emerging adults. It was hypothesised that an increase in online VCB would result in a more positive evaluation of social media use (SMU), an increase in social connectedness and an increase in general wellbeing at follow-up. It was also hypothesised that higher levels of baseline psychological flexibility would be associated with improvements at follow-up in the intervention group.

Method: A randomised controlled trial design was used to evaluate the impact of the intervention. Participants (n = 135) were randomly allocated to the intervention (n = 74) or control (n = 61) condition, and either completed a values-based or matched control intervention, followed by five minutes of SMU. The sustained effects of the intervention were analysed from baseline to follow-up (from one week post intervention) in relation to self-reported measures of online VCB, positive evaluation of SMU, general wellbeing and social connectedness.

Results: Analyses showed that participants in the intervention group did not report a significant increase in online VCB, positive evaluation of SMU, social connectedness and general wellbeing, compared to the control group at follow-up. Both groups reported an increase in social connectedness at follow-up (relative to baseline) with a small effect size ($\eta 2=0.008$). Additionally, higher baseline psychological flexibility was negatively correlated with improvements in online VCB in the intervention group ($p = .022$).

Conclusion: The current values-based micro-intervention did not create a sustained increase in online VCB, or the associated outcomes of positive evaluation of SMU, social connectedness and general wellbeing. These findings suggest that the intervention was either not sufficient in facilitating the values and committed action processes of ACT, or that these processes alone were

not sufficient to equip participants with the skills to make sustained behaviour changes on SM. Therefore, future interventions should strengthen the values and committed action processes, for example by using more interactive components, and should incorporate the facilitation of the mindfulness processes of ACT. Future studies must also consider the baseline psychological flexibility of the sample, as this could lead to a ceiling effect. Additionally, further studies may wish to explore the impact of values clarification on social connectedness that was found in this study.

Introduction

1. Overview

Since social media (SM) has become mainstream there has been a concern regarding the potential negative effects of social media use (SMU), especially on young minds (e.g., Ivie et al., 2020). Research shows that SMU carries both risks and benefits (e.g., Best et al., 2014) depending on the quality of use rather than the quantity use (Kross et al., 2021; Orben, 2020; Tibber & Silver, 2022). We draw on theories of acceptance and commitment therapy and evidence linking values-consistent behaviour with positive wellbeing (e.g., McCracken et al., 2015; Michelson et al., 2011; Rogers, 1965) to propose a values-based intervention for SMU. We hypothesise that this will encourage beneficial qualities of SMU in young people and will lead to associated benefits.

2. Social media use in young people

The use of SM, defined in this study as websites, apps and digital tools that allow people to interact and communicate (Nesi et al., 2018) is highly prevalent in the modern world and is most common among adolescents and young adults (Poushter et al., 2018). In the US 85% of adolescents aged 13-17 use at least one SM platform (Pew Research Centre, 2018) and due to the simultaneous rise in mental health problems and SMU in adolescents (Kim, 2017; Twenge et al., 2019) there has been an increase in research regarding the impact of SMU on adolescent mental health and wellbeing (e.g., Boulianne & Theocharis, 2020; Ivie et al., 2020). Beyond adolescence 18-29-year-olds also have high levels of SMU, with 90% using at least one SM platform in the US (Pew Research Centre, 2019c). Therefore, it is important for SMU research to expand beyond adolescents to 18–29-year-olds who, as well as being heavy SM users, are at a key developmental stage of identity formation (Arnett, 2015; Villanti et al., 2017) which SMU contributes to (Manago, 2015; Weber et al., 2008). This study will focus on SMU in 18-29-year-olds using Arnett et al's (2015) definition of *emerging adults* to describe this age group.

3. The puzzle of social media use impacts on mental health and wellbeing

Meta-analyses and systematic reviews have found mixed effects of SMU on mental health and wellbeing in both adults and adolescents (Baker & Algorta, 2016; Best et al., 2014). Commonly reported negative effects include increased symptoms of depression and anxiety (e.g., Ivie et al., 2020), increased loneliness (e.g., Erfani & Abedin, 2018) and decreased life satisfaction and self-esteem (e.g., Saiphoo et al., 2020). Commonly reported positive effects include increased social support, social connectedness (e.g., Winstone et al., 2021) and an increase in self-esteem (e.g., Best et al., 2014). However, these associations are often contradictory, small in their effect sizes and weak in their correlations (Orben et al., 2019; Huang et al., 2017). This was demonstrated in a recent umbrella review of adolescent SMU which found a majority of weak or inconsistent associations between SMU and mental health (Valkenburg et al., 2022).

These mixed and conflicting results are in part due to methodological limitations of the literature, including a lack of validated measures and a focus on cross-sectional data compared to longitudinal data (Karim et al., 2020; Kross et al., 2021; Tibber & Silver, 2022). The literature is also criticised for a lack of clarity in defining concepts which makes it difficult to compare and interpret findings (Kross et al., 2021) and a lack of focus on psychological wellbeing outcomes, compared to psychopathology outcomes (Meier & Reinecke, 2021). This study aims to address the latter gap in research by focusing on psychological wellbeing which will be defined as "a state characterized by the presence of positive indicators and/or absence of negative indicators of wellness" (Yang et al., 2021, p. 1).

4. Mediating and moderating factors

Alongside the methodological criticisms described above the conflicting results of research on SMU outcomes have led researchers to conclude that there are mediating and moderating factors which determine the type of impact that SMU has on individuals (Baker & Algorta, 2016; Kross et al., 2021; Orben et al., 2020). In other words, it is not *whether/how much* SM is used but

how/why it is used that decides what impact it has. In their Multi-Dimensional Model of SMU, Yang et al (2021) explored the relationship between three key dimensions of SMU and a range of mental health and wellbeing outcomes: activities performed, communication partners connected with and motives for SMU. We will draw on this model to summarise the current evidence base.

4.1. Activities

Research has linked *interactive* activities on SM to positive outcomes, and *passive* activities on SM to negative outcomes (Yang et al., 2021). Interactive SMU is defined as an interaction directed at a specific communication partner, such as messaging, while passive SMU is defined as observing online content, such as browsing (Yang et al., 2021). Studies have found that interactive SMU is associated with greater psychological wellbeing (Liu et al., 2019), higher self-esteem (Subrahmanyam et al., 2020) and perceived closeness (Manago et al., 2020). Meanwhile passive SMU has been found to be associated with negative wellbeing outcomes, such as increased depressed mood (Frison & Eggermont, 2016). The positive effects of interactive SMU may be due to feelings of social connectedness, defined as emotional connectedness and a sense of belonging between an individual and other people (Baumeister & Leary, 1995) which are created during interactive activities on SM (Clark et al., 2018; Neubaum & Krämer, 2015). The negative effects of passive SMU may be due to a decrease in self-esteem that is created through upward social comparison to other people viewed on SM (Tibber et al., 2020; Schmuck et al., 2019) which research suggests may be more common when engagement is passive (Burnell et al., 2019; Verduyn et al., 2017).

4.2. Communication partners

With respect to communication partners, evidence suggests that connecting with people with *stronger ties* (e.g., existing close friends) on SM creates positive outcomes such as increased social support and satisfaction with life (Burke and Kraut, 2016). This may occur through stimulation: enhancing existing social resources through increased contact and maintenance of relationships

(Winstone et al., 2021). In contrast, interacting with people with *weaker ties* on SM is typically linked to negative outcomes such as decreased self-esteem (Eşkisu et al., 2017) and poorer social adjustment (Yang & Lee, 2020). This may occur through displacement: displacing time spent socialising with others offline with solitary online activities such as gaming (Winstone et al., 2021).

However, there is longitudinal evidence which demonstrates that online-only friends can be a protective factor for adolescents (Massing-Schaffer et al., 2020) and that online communities can be a source of support for marginalised groups, such as transgender young people (Selkie et al., 2020). Thus, it may be that further factors moderate the relationship between communication partner ties and wellbeing outcomes in SMU.

4.3. Motives

Research on motives for SMU shows that these are highly individual and depend on personality traits and SM platforms used (Kircaburun et al., 2020). This is in line with Uses and Gratifications Theory (U&G; Katz et al., 1974) which posits that individuals actively use media to fulfil their personal needs and goals. Although individual motives for SMU are variable, for example relationship maintenance, search for information and pastime (Perugini & Solano, 2020), there is evidence to suggest that young adults' motivations for SMU are often social (e.g., Cheung et al., 2011; Huang & Su, 2018).

Overall, findings suggest that motives linked to *enhancement* lead to better wellbeing (e.g., Perugini & Solano, 2020). These are motives which aim to enhance neutral or positive states of affairs, for example improving the quality of existing relationships (Yang et al., 2021). Meanwhile, motives linked to c*ompensation* lead to poorer wellbeing (e.g., Rae & Lonborg, 2015). These are motives which aim to compensate for real or perceived insufficiencies or to avoid negative experiences (Yang et al., 2021), for example coping with the fear of being rejected by engaging with others anonymously online (Gadekar & Ang, 2020).

However, the direction of the relationship between compensation motives and negative wellbeing is unclear (as in much of the existing research; Tibber & Silver, 2022) as it is possible that those who use SM for compensation have lower baseline wellbeing, meaning that wellbeing and motives may form a cycle (Yang et al., 2021).

5. Creating an intervention for beneficial social media use

Previously, SM interventions have focused on abstinence to minimise the risks of SMU (e.g., Hunt et al., 2018; Hall et al., 2021; Vally & D'Souza, 2019). However, these studies were broadly not effective (Hartanto et al., 2021). Additionally, abstinence is not an ecologically valid approach, given that SMU is highly present in everyday life and abstinence deprives individuals of the benefits of SMU (e.g., Best et al., 2014). Therefore, there is a need for interventions that focus on improving the quality of SMU rather than changing the quantity of SMU (Steele et al., 2020) and that enhance the benefits and minimise the risks of SMU (Kross et al., 2021).

Drawing on the findings that behaviour on, and motives for, SMU play a critical role in the type of wellbeing impact that SMU has (Tibber & Silver, 2022; Yang et al., 2021) we hypothesised that a values-based intervention, drawing on theories of acceptance and commitment therapy (ACT), would encourage qualities of SMU which would lead to positive wellbeing outcomes.

5.1. Acceptance and commitment therapy

ACT (Hayes, 1999) is a behavioural therapy which is evidenced in reviews to be effective in both clinical and non-clinical populations (Gloster et al., 2020; Stenhoff et al., 2020). It is operationalized as the product of six core sub-processes: acceptance, defusion, self-as-context, present moment awareness, values and committed action (Hayes, 1999) and creates positive change through the cultivation of *psychological flexibility*. This is defined as the tendency to engage in behaviours which are in line with one's values, despite internal or external challenges that arise (Lin et al., 2018). In research, higher levels of psychological flexibility have been linked to better psychological health (Kashdan & Rottenberg, 2010) and more recently to higher levels of positive,

values-consistent SMU and better mental health (Tibber et al, Under Review), supporting the use of ACT principles in the creation of an intervention for SMU.

5.2. Values as a mechanism for behaviour change

In ACT, the behaviour change processes of values and committed action consist of helping individuals to clarify what their values are and to help them commit to engaging in *values-consistent behaviour* (VCB). Values are defined as an individual's guiding principles that are an ongoing reflection of what they find meaningful (Reilly et al., 2019), for example creativity, honesty, and kindness. Findings show that living and acting in line with one's values is beneficial for general wellbeing (Rogers, 1965), mental health (Michelson et al., 2011) and social functioning (McCracken et al., 2015). A lack of values-based living has been linked in meta-analyses to negative outcomes such as depression and anxiety (Tunç et al., 2023). Values-based interventions have been found to successfully increase the frequency of positive behaviour in line with values and reduce distress in multiple populations in reviews (Rahal & Gon, 2020).

Tibber et al (under review) suggest that the effects of enhancement and escapist motivations for SMU identified by Yang et al (2021) may align with values-consistent and values-inconsistent behaviour respectively, supporting the proposed use of a values-intervention for SMU.

5.3. Micro-interventions as a targeted approach

To deliver such a values-based intervention for SMU, we propose the use of a micro-intervention design. Micro-interventions are defined as interventions which aim to achieve a "highly focused objective using in-the-moment elements" (Baumel et al., 2020, p.3). They are shorter than standard intervention packages and are expected to have an immediate positive impact on targeted symptoms (Fuller-Tyszkiewicz et al., 2019). Thus, micro-interventions have the benefit of testing isolated effects of brief activities (Bunge et al., 2016), being cost and time effective and being easily distributed and accessed, especially when delivered online (Elefant et al., 2017).

Current research using micro-interventions shows promising results, with findings of positive behaviour change in a variety of settings in clinical and non-clinical populations (Chase et al., 2013; Gloster et al., 2020; Gobin et al., 2022; Fuller-Tyszkiewicz et al., 2019; Van Cappellen et al., 2020). As our proposed intervention focused on creating positive behaviour change on SM, we hypothesised that a micro-intervention would be an effective way to target this specific area of behaviour change and assess whether the values-component of ACT is a vehicle for creating such change.

6. Aims and hypotheses

The present study aimed to develop and test the sustained effects of a values-based micro-intervention for emerging adults' SMU. It draws on literature that highlights the risks and benefits of SMU for wellbeing as well as the putative mechanisms at play in this relationship. This study aimed to address some of the critiques of the current literature by providing longitudinal rather than solely cross-sectional data, aiming to create positive online behaviours rather than focusing on problematic SMU and focusing on outcomes in psychological wellbeing in a non-clinical sample rather than on psychopathology in a clinical sample.

The study aimed to:

1. Develop an online values-based micro-intervention for emerging adults
2. Evaluate the sustained effects this intervention has on: (i) participants' online VCB (ii) and participants' positive evaluation of SMU, as well as their general wellbeing and social connectedness.

The hypotheses tested were as follows:

Primary hypothesis:

- H1: At follow-up, participants in the intervention group will report higher levels of online VCB relative to participants in the control group at follow-up, and relative to their own scores at baseline.

Secondary hypotheses:

- H2: At follow-up, participants in the intervention group will report greater improvements in their positive evaluation of their SMU relative to participants in the control group.
- H3: Relative to participants in the control group, participants in the intervention group will report greater improvements in general wellbeing between baseline and follow-up.
- H4: Relative to participants in the control group, participants in the intervention group will report greater improvements in social connectedness between baseline and follow-up.
- H5: In the intervention group, participants' scores on psychological flexibility at baseline will correlate with any improvements described in H1-H4 at follow-up.

Method

1. Design

The design used for this experimental study was a parallel group randomised controlled trial (RCT) which was conducted online via Qualtrics. Following the consent process, participants were randomly allocated by Qualtrics to the intervention or control group (1:1 ratio). To begin, both groups completed a battery of baseline (T1) measures. Participants then completed either the experimental or control intervention, depending on their allocation, and were then asked to use SM for five minutes. Following this, both groups completed a battery of post-intervention (T2) measures. From one week post study completion, all participants were contacted via email to complete the battery of follow-up (T3) measures (Figure 1; Appendix 9).

This manuscript was written according to the Consolidated Standards of Report Writing (CONSORT) guidelines on randomised controlled trials (Bennett, 2005).

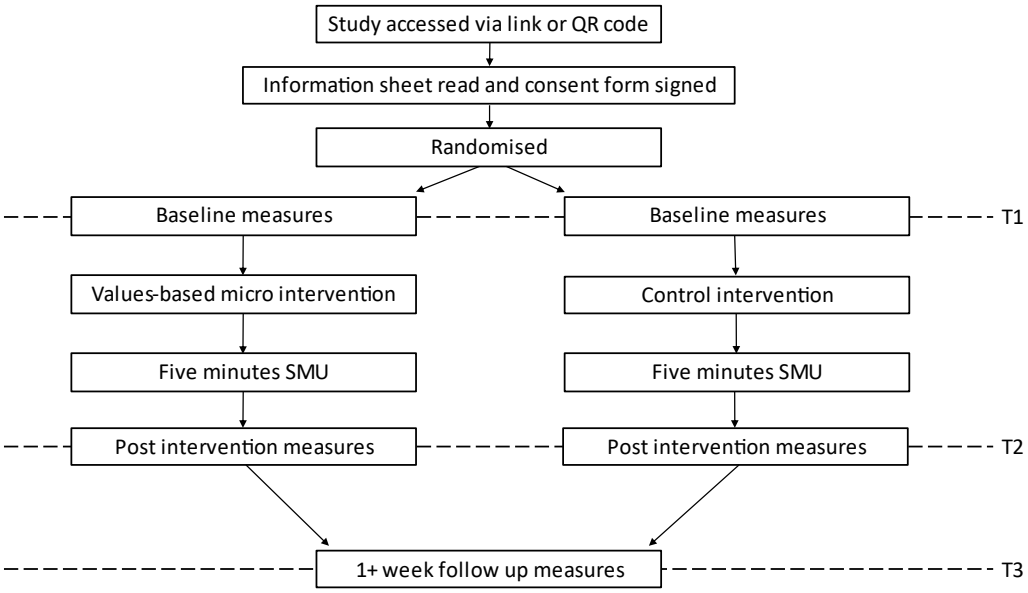

Figure 1

Flowchart of study design

2. Joint project and pre-registration

This study was part of a joint study conducted alongside another trainee (Anna Taylor). While this study focused on the sustained effects of the intervention (comparison of T1 and T3), the partner study focused on the immediate effects of the intervention (comparison of T1 and T2) (Appendix 1). The project was preregistered on open science framework (OSF) as a joint project and will be written up jointly for publication. The study design preregistered on OSF was adhered to throughout.

3. Participants

3.1. Eligibility criteria

In total, 464 participants were recruited from the general population between July 2022 and January 2023. Inclusion criteria were: aged 18-29 years old, user of at least one social media platform and sufficient speaker and reader of English to complete the study.

3.2. Data collection

Participants were recruited via an advert (Appendix 2) which was made public in the following online and offline locations: SM platforms such as Instagram, Facebook and LinkedIn, online recruitment platforms such as Reddit and paper-based adverts posted in the university and surrounding community. Participants followed a link or QR code which directed them to the study on Qualtrics. Participants were informed on the advert that they would be entered into a prize draw with a chance to win one of ten £25 amazon vouchers upon full study completion.

3.3. Recruitment

Recruitment for the overall study began in July 2022. Data used in this study stems from participants who participated in the study between the start of recruitment and January 2023. At the point of write up recruitment is ongoing and will conclude once 200 complete data sets have been obtained.

3.4. Consent process

Before participating in the study, all participants were supplied with the participant information sheet (Appendix 3). This included the email addresses of the research team who participants were encouraged to contact them if they had any questions. Participants then gave their informed consent to participate in the study via a consent form (Appendix 4) on REDCAP (Research Electronic Data Capture, Harris et al., 2009). This is a web-based survey tool that is compliant with GDPR (General Data Protection Regulation).

Participants were informed at the start of the intervention that it would take approximately 20 minutes to complete. At the start of the follow-up measures participants were informed this would take approximately 15 minutes to complete.

3.5. Data storage

To protect participant confidentiality, all identifiable information was stored on the secure data base UCL Data Safe Haven which was solely accessible by the research team. Anonymous unique identifier codes were generated for each participant to link pseudonymised data bases. This information was used to identify and contact participants who had not yet completed their follow-up measures, and to match baseline, post-intervention and follow-up data sets for data analyses.

4. Interventions

4.1. Development and design

The values-based micro-intervention was developed by the research team by drawing on ACT theory and designs of previous micro-interventions (e.g., Chase et al., 2013; Gloster et al., 2020). It was presented to participants via Qualtrics which they accessed from their personal digital devices. In the finalised values-based intervention participants began by reading some psychoeducational information on values, including a definition of values, why values are important and how values relate to SMU. They then completed the Valued Living Questionnaire (VLQ, Wilson et al., 2010) as an exercise to identify their values and clarify how consistently they were living in line with these in the last week, once for their offline life and once for their online life. At this stage, participants were also asked to identify three values that were particularly important to them. Following this, they were asked to identify one to three values-consistent goals they wanted to work on with respect to their SMU. See Appendix 5 for the full values-based intervention.

Following the methods of Katz et al. (2016), the control intervention was developed to match the content of the experimental intervention in text length and style, questionnaire length and structure, completion duration and types of exercises. In the finalised control intervention participants began by reading some psychoeducational information on colours, including why colours are important, why we have favourite colours and colours on SM. They then completed an exercise to identify their favourite colours from a list and then identified how often they had seen

this list of colours in the last week, once in the offline and once in the online world. At this stage, participants were also asked to identify three things that their favourite colours reminded them of. Following this, they were asked to choose three colours for a colour scheme for a website. See Appendix 6 for the full control intervention.

4.2. Collaboration and feedback

Four ACT peer reviewed trainers were asked for feedback on the acceptability and ACT consistency of the experimental intervention. They were compensated for their time with £25 amazon vouchers. Both the control and experimental interventions were tested by five lay emerging adults from the researchers' personal networks. They were asked for their feedback on the acceptability of both interventions in terms of length and comprehensibility. They were compensated for their time with £10 amazon vouchers. All feedback was incorporated into the final interventions to ensure that they were accessible and that the experimental intervention was theory oriented.

5. Outcome measures

Data were gathered on participant demographics, SMU, VCB, positive evaluation of SMU, social connectedness, general wellbeing and psychological flexibility. Additionally, participants completed an acceptability survey (Appendix 7) which will be reported on in a future study (Lee, in progress).

5.1. Demographics

Basic demographic information was collected including age, gender, and ethnicity.

5.2. Social media use

To assess SMU, participants were asked whether they use SM (yes/no answer) and how long they spend on SM in a typical day (in minutes).

5.3. Values consistent behaviour

Values consistent behaviour (VCB) was measured using the Valued Living Questionnaire (VLQ, Wilson et al., 2010).

The VLQ consists of twelve items, each representing different domains of life, e.g. family, work, spirituality. The VLQ is completed in two parts: first, participants rate these items on importance, i.e., how important this domain is to them, using a ten-point scale from "not important at all" (1) to "extremely important" (10). Second, they rate these items on consistency, i.e., how consistently they have lived in accord with valued behavioural patterns within each domain over the past week, using a ten-point scale from "completely inconsistent" (1) to "completely consistent" (10). In this study, participants were asked to complete the second part of the VLQ twice: once for their online life, and one for their offline life.

The VLQ composite score, which is recommended as the score of interest in research and clinical use (Wilson et al., 2010), is calculated as the mean of the individual composite scores for each domain. Individual composite scores are calculated by multiplying the importance rating by the consistency rating of each domain. The VLQ was not administered at baseline to the control group as – it was feared - this would contaminate the effect of the intervention.

Psychometric evaluations of the VLQ report good test-retest reliability, r = .67 – 8.1, and good to excellent internal consistency, Cronbach's α = .72 - .96 (Wilson et al., 2002; Cotter, 2011).

5.4. Positive evaluation of social media use

Participants' positive evaluation of SMU was measured using the positive evaluation of social media use questionnaire (PESMUQ). This was developed by the research team, drawing on the ACT literature and its conceptualization of values, to evaluate the extent to which individuals see SM as a positive and values-consistent contributor to their lives.

There are two versions (discrete event and general use) of the PESMUQ. The general event version was used in this study as it was concerned with sustained effects. The PESMUQ contains six items of two questions within the three following domains: (i) global evaluation, (ii) evaluation of values-consistency, and (iii) evaluation of social value. Participants are asked to rate each item on a seven-point Likert scale from "strongly disagree" (1) to "strongly agree" (7). For example: "To what extent do you think social media on balance, is good for your mental health and wellbeing?". The PESMUQ is scored by summing the scores of each item, with a higher total score indicating a more positive evaluation of SMU. See Appendix 8 for the full questionnaire. The PESMUQ was not administered at baseline to either group as there was a concern this would prime the control group to consider their values and thus contaminate the effects of the control intervention.

A Chinese translation of the measure has been evaluated with a sample of 6995 University students in China (Tibber et al, under review). It was found to have high internal consistency (Cronbach's $\alpha = 0.9$), and a single factor solution.

5.5. General wellbeing

General wellbeing was measured using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS, Tennant et al., 2007) which covers both subjective wellbeing and psychological functioning.

Participants are asked to rate 14 items related to their wellbeing, for example "I have been feeling optimistic about the future", on a five-point Likert scale from "none of the time" (1) to "All of the time" (5). The WEMWBS is scored by summing the scores of each item, with a higher total score indicating higher levels of general wellbeing.

Psychometric evaluations of the WEMWBS report good test-retest reliability ($r = .83$ at one week, Tennant et al., 2007) as well as good to excellent internal consistency, with Cronbach's $\alpha = .87 - .93$ (Clarke et al., 2011; Lloyd et al. 2012, Tennant et al., 2007). The WEMWBS has good convergent

validity as it correlates positively with other measures of wellbeing such as the World Health Organizational Wellbeing Index (WHO-5, Clarke et al., 2011).

5.6. Social Connectedness

Social connectedness was measured using the Social Connectedness Scale (SCS, Lee & Robbins, 1995).

Participants are asked to rate eight items related to their self-perceived connectedness to others, for example "I feel so distant from people", on a six-point Likert scale from "strongly agree" (1) to "strongly disagree" (6). The SCS is scored by summing the scores of each item, with higher scores indicating higher social connectedness.

Lee & Robbins (1995) found a good test-retest correlation of r= .96 after two weeks and a high internal reliability of Cronbach's α = .91.

5.7. Psychological Flexibility

Psychological flexibility was measured using the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT, Francis et al., 2016). This measures psychological flexibility as conceptualised within the ACT model (Hayes et al., 2011).

Participants are asked to rate 23 items related to their psychological flexibility, for example "I try to stay busy to keep thoughts or feelings from coming" on a seven-point Likert scale from "strongly disagree" (0) to "strongly agree" (6). The CompACT is scored by summing the scores of each item, with twelve items being reverse scored. It yields an overall psychological flexibility score, as well as three sub-scale scores representing different facets of psychological flexibility: openness to experience (CompACT-OE; acceptance and defusion), behavioural awareness (CompACT-BA; self-as-context and present-focused awareness), and valued action (CompACT-VA; values clarity and committed action). Higher scores in the overall scores, as well as the subscale scores, reflect higher

levels of psychological flexibility, openness to experience, behavioural awareness and valued action respectively.

Psychometric evaluations of the CompACT report good test-retest reliability (r = .88 at two weeks, Bayliss, 2018; r = .8 at four weeks, Hajloo et al., 2022) as well as good internal consistency, (Cronbach's α = .89, . 91,. 88,. 85) for the CompACT-OE, CompACT-BA and CompACT-VA subscales respectively (Hajloo et al., 2022). The CompACT has good convergent validity as it correlates positively with other measures ACT processes such as the Acceptance and Action Questionnaire-II (Francis et al, 2016).

5.8. Additional measures not included in this study

This study focused on the *sustained* effects of the intervention and therefore only reports on measures administered at baseline (T1) and follow-up (T3). However, participants also completed measures immediately post-intervention (T2) which are reported elsewhere (Taylor, 2023). Measures administered immediately post-intervention were the PESMUQ, the SCS, and the Positive and Negative Affect Schedule (PANAS, Watson et al., 1988). The PANAS data was not used in the current study and therefore this measure will not be described in detail. See Appendix 9 for a table of all measure administered at all timepoints.

6. Sample size

To estimate the sample size required for this study a series of power calculations were completed on G Power 3.1 (Erdfelder et al., 2009) based on the planned statistical analyses. Planned analyses included independent and paired samples t-tests, mixed ANOVAs and bivariate correlation. These *a priori* analyses were run with α = 0.05, 1-β = 0.8 and a medium effect size of Cohen's *d* = 0.5. To detect a between group difference (independent samples t-test), the *a priori* analysis generated a minimum sample size of n = 128. To detect a within-group difference (paired samples t-test), the *a priori* analysis generated a sample of n = 34. To detect an interaction effect (ANOVA), the *a priori*

analysis generated a sample size of n = 138. Therefore, we aimed to gather n = 138 data sets as this was the largest (minimum) sample size calculated.

7. Ethics

Ethical approval for this study was obtained via University College London (UCL) Research and Ethics Committee (Project ID: 22087) (Appendix 10).

8. Analytical methods

All statistical analyses were carried out using JASP version 17.

8.1. Descriptive statistics and distributions

Descriptive statistics were carried out to describe the sample demographics. Univariate normality of outcome measure distributions was assessed by examining histograms, Q-Q plots, skewness and kurtosis and Shapiro-Wilk tests. Scatter plots were used to examine linearity. Violations of normality are reported in the text and in Appendix 11.

8.2. Comparisons of means

Where data was not available for all groups and timepoints, independent sample t-tests were used to test for differences between control and intervention group outcomes, and paired samples t-tests were used to test for differences between timepoints within the respective groups. Where data was available for all groups and timepoints, mixed ANOVAS were used to test for interactions in outcomes between groups and timepoints. Pearson's correlation analyses were run to test whether baseline differences in psychological flexibility were linked to change scores.

When working with non-normally distributed data, non-parametric tests are typically run (e.g., Harwell, 1988; Kaur & Kumar, 2015). However, it has been argued that normality should be assumed for larger sample sizes (n > 30, Mordkoff, 2016). Research shows that as sample sizes increase the robustness of parametric tests to deviations from normality also increases, while a non-parametric t-test becomes more sensitive to (minor) differences in distribution (Fagerland, 2012).

Thus, in studies interested in differences in means, rather than differences in overall distribution, there is a strong argument for using parametric tests for larger sample sizes. Relatedly, Kwak and Kim (2017) show that, according to the central limit theorem, in a sufficiently large sample the sample mean obtained using random sampling is distributed normally regardless of the original population distribution. Consequently, we chose to run parametric tests for all data, both normally and non-normally distributed. However, non-parametric tests were also run for comparison and reported where results differed.

Outliers were identified as values which lay >3 z scores above or below the mean. Statistical tests were run both with and without outliers and any discrepancies reported.

The results of non-parametric tests and tests with and without outliers can be found in Appendix 12.

8.3. Correlational analyses

Pearson correlation coefficients were run to assess whether levels of baseline psychological flexibility (as measured by the CompACT at T1) were correlated with change scores in online values-consistent behaviour (as measured by the VLQ), general wellbeing (as measured by the WEMWBS) and social connectedness (as measured by the SCS). These change scores were calculated by subtracting T1 scores from T3 scores for participants on each measure.

Results

1. Participant flow

Of the 464 participants who accessed the study via the QR code or study link, 193 discontinued the study during the information/consent process, 65 discontinued the study during the baseline measures and eleven discontinued the study during the intervention (seven from the control group and four from the intervention group). See Figure 2 for details of attrition rates. Of the 195 participants who completed the baseline and post-intervention measures, 141 participants

completed the follow-up (T3) measures. As six participants did not meet age inclusion criteria, complete case analyses were run with a final sample of 135.

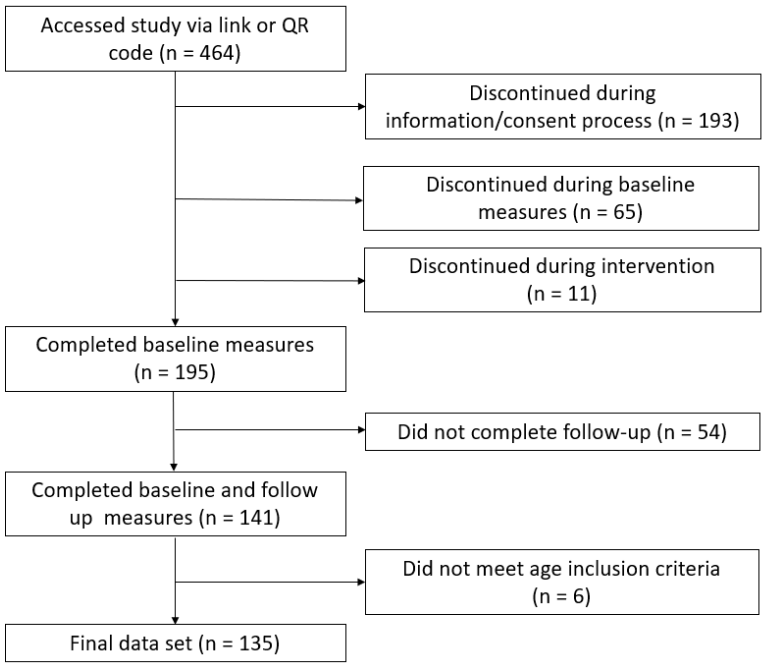

Figure 2

Flowchart of participants

2. Baseline data

2.1. Sample characteristics

The sample demographics are presented in Table 1. Participants (n = 135) had a mean age of 26.3 (*SD*= 3.0) and majority were female (n = 106, 78.5%). All participants identified with the same gender they were assigned at birth. Most participants identified their ethnicity as White (n = 102, 75.6%), followed by Asian or Asian British (n = 18, 13.3%). All participants were SM users and reported spending a mean of 149.3 minutes (around 2.5 hours) on SM in a day (*SD* = 146.2).

Additionally, participants completed the follow-up measures at a minimum of seven days and a maximum of 80 days (around 2.5 months) after the intervention (*M* = 14.0, *SD* = 14.1).

Table 1

Sample characteristics

		Intervention Group		Control Group		Full sample	
		n	*%*	*n*	*%*	*n*	*%*
Sex	Female	50	82.3	56	75.7	106	78.5
	Male	11	17.7	18	24.3	29	21.5
	Prefer not to say	0	0	0	0	0	0
Ethnicity	White	45	73.8	57	77.0	102	75.6
	Mixed	0	0	2	2.7	7	5.2
	Any Other Mixed Background	2	3.3	4	5.4	5	3.7
	Asian or Asian British	12	19.7	6	8.1	18	13.3
	Black or Black British	0	0	3	4.0	4	2.9
	Any Other Ethnic Group	2	3.3	1	1.4	3	2.2
	Prefer not to say	0	0	1	1.4	1	0.7
		M	*SD*	*M*	*SD*	*M*	*SD*
Time on SM		135.0	184.6	160.8	105.6	149.3	146.2
Age		26.4	3.2	26.1	2.9	26.3	3.0
Days between T1 and T3		14.7	14.2	13.4	14.2	14.0	14.2

Note. Time on SM is reported in minutes per day.

2.2. Group differences

A series of independent samples t-tests and chi-square tests were run to assess whether there were any statistically significant differences in demographics, time spent on SM, and days between T1 and T3, between the experimental (n = 61) and control (n = 74) groups. There were no significant differences in age ($t(134) = -0.562$, $p = .575$), gender ($X^2(1) = 0.785$, $p = .376$), ethnicity ($X^2(6) = 9.784$, $p = .134$), time spent on SM ($t(133) = 1.006$, $p = .176$), or days between T1 and T3 ($t(133) = -0.499$, $p = .618$) between groups at T1 (See Tables 2 and 3).

A further series of independent samples t-tests were run to assess whether there were any statistically significant differences in T1 measure scores between the experimental (n = 61) and control (n = 74) groups. There were no significant differences in WEMWBS ($t(134) = -1.431$, $p = .155$), SCS ($t(134) = 0.781$, $p = .436$), CompACT ($t(134) = -0.845$, $p = .399$) and CompACT valued action subscale (CompACT-VA) ($t(134) = -1.042$, $p = .299$) scores between groups at T1 (see Table 4).

Table 2

Independent samples t-test results: T1 intergroup differences in age, time spent on SM and days between T1 and T3

	Intervention Group		Control Group		*t*	df	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*				
Age	26.4	3.2	26.1	2.9	-0.562	134	.575	-0.097
Time spent on SM	135.0	184.6	160.8	105.6	1.006	133	.316	0.176
Days between T1 and T3	14.7	14.2	13.4	14.2	-0.499	133	.618	0.173

Note. Time on SM is reported in minutes per day.

Table 3

Chi-square test results: T1 intergroup differences in gender and ethnicity

		Intervention Group		Control Group		χ2	df	*p*
		n	%	n	%			
Gender	Female	50	82.3	56	75.7	0.785	1	.376
	Male	11	17.7	18	24.3			
Ethnicity	White	45	73.8	57	77.0	9.784	6	.134
	Mixed	0	0	2	2.7			
	Any Other Mixed Background	2	3.3	4	5.4			
	Asian or Asian British	12	19.7	6	8.1			
	Black or Black British	0	0	3	4.0			
	Any Other Ethnic Group	2	3.3	1	1.4			
	Prefer not to say	0	0	1	1.4			

Table 4

Independent samples t-test results: T1 intergroup differences in WEMWBS, SCS, CompACT and CompACT-VA scores

T1	Intervention Group		Control Group		*t* (134)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
WEMWBS	49.7	7.0	47.6	8.8	-1.431	.155	-0.247
SCS	34.7	9.8	36.0	10.2	0.781	.436	0.135
CompACT	86.2	19.8	83.1	22.2	-0.845	.399	-0.146
CompACT-VA	36.3	7.3	34.7	9.2	-1.043	.299	0.174

2.3. Data distributions

Other than the WEMWBS in the control group at T3 (skewness = 2.271, kurtosis = -0.630) and the CompACT-VA in the control group at T1 (skewness = -1.363, kurtosis = 2.152) and T3 (skewness = -1.436, kurtosis = 3.626), all variables had acceptable skewness and kurtosis values between ± 2 (George & Mallery, 2010) (Appendix 11). However, the Shapiro-Wilk test statistics were significant for the following variables, violating assumptions of normality (all $p < .05$; Appendix 11): at T1: VLQ in the intervention group, SCS in both groups and CompACT-VA in the control group; and at T3: VLQ in the intervention group, SCS in both groups, CompACT in the intervention group and CompACT-VA in the control group. Due to the arguments outlined previously parametric tests were undertaken and are reported in the main text.

3. Statistical analyses

The analyses reported in the main body of this thesis assume normality and use parametric tests for the reasons outlined previously. They also include outliers (defined as values >3 z scores from the mean). For data which did not meet normality assumption and/or which contained outliers, analyses were re-run with non-parametric tests and without outliers and reported if outcomes differed. See Appendix 12 for detailed results.

3.1. Values consistent behaviour

An independent samples t-test was conducted to explore whether the intervention group scored higher on online VCB, as measured by the VLQ, than the control group at T3. There was no significant difference between scores for the control (M = 48.9, SD = 12.5) and intervention (M = 50.8, SD = 15.8) groups, $t(134) = -0.756$, $p = .451$ (Figure 3; Table 5).

A paired samples t-test was conducted to explore whether the intervention group scores differed on online VCB between T1 and T3. (Note: ANOVAs were not run since VCB scores were not available for the control group at T1). There was no statistically significant difference between T1 (M = 49.8, SD = 16.7) and T3 (M = 50.8, SD = 15.8), $t(60) = -0.640$, $p = .525$ (Figure 4; Table 6).

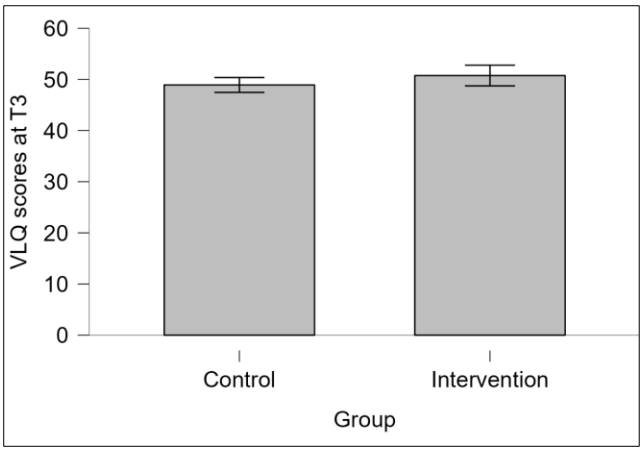

Figure 3

T3 intergroup differences in VLQ scores. Group mean scores and associated standard errors (error bars) are shown for the control and intervention groups at T3

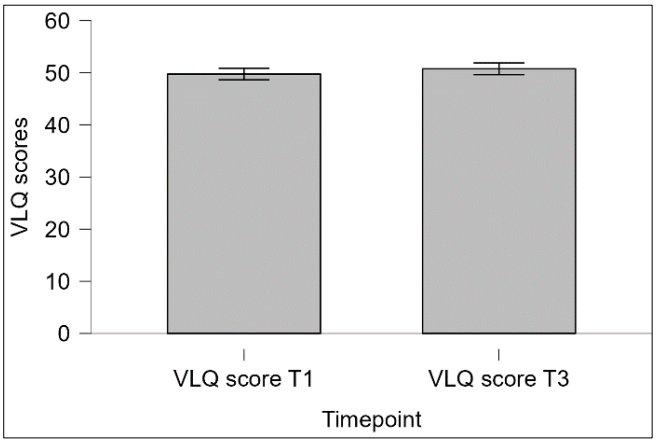

Figure 4

T1 and T3 intervention group VLQ scores. Group mean scores and associated standard errors (error bars) are shown for the intervention group at T1 and T3

As the VLQ was not administered in the control group at baseline, due to feared contamination effects, a mixed ANOVA was run to explore within and between subject differences in VCB as measured by the CompACT-VA, at T1 and T3, as well as in the control and intervention group. There was no significant main effect of time-point, $F(1, 133) = 0.382$, $p = .537$, $\eta 2 < .001$, or group, $F(1, 133) = 1.665$, $p = .199$, $\eta 2 = .010$. Nor was there a significant interaction between group and time-point, $F(1, 133) = 0.002$, $p = .963$, $\eta 2 < .001$ (Figure 5; Table 7).

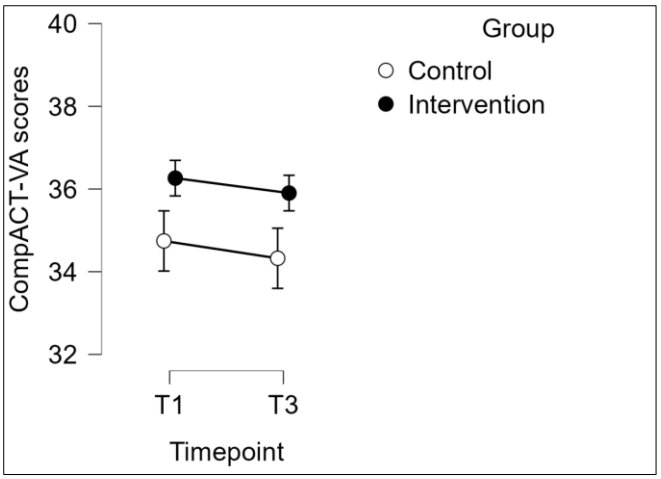

Figure 5

Intergroup differences in CompACT-VA scores at T1 and T3. Group mean scores and associated standard errors (error bars) are shown for the control and intervention groups at T1 and T3

3.2. Positive evaluation of social media use

An independent samples t-test was conducted to explore whether the intervention group scored higher on their positive evaluation of SMU, as measured by the PESMUQ, than the control group at T3. (Note: ANOVAs were not run since PESMUQ scores were not available at T1). There was no significant difference between scores for the control (M = 28.5, SD = 6.3) and intervention (M = 28.3, SD = 5.9) groups, $t(134)$ =0 .140, p = .889 (Figure 6; Table 5).

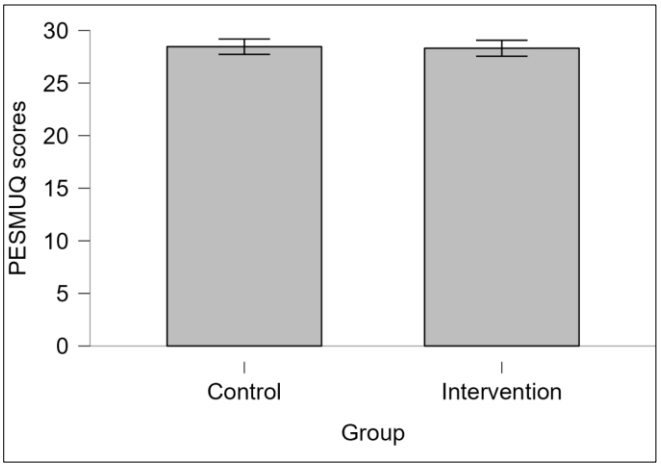

Figure 6

T3 intergroup differences in PESMUQ scores. Group mean scores and associated standard errors (error bars) are shown for the control and intervention groups at T3

3.3. General wellbeing

A mixed ANOVA was run to explore within and between subject differences in subjective wellbeing, as measured by the WEMWBS, at T1 and T3, as well as in the control and intervention group. There was no significant main effect of time-point, $F(1, 133) = 0.098$, $p = .755$, $\eta 2 < .001$, or group, $F(1, 133) = 1.297$, $p = .257$, $\eta 2 = .009$. Nor was there a significant interaction between group and time-point, $F(1, 133) = 0.855$, $p = .357$, $\eta 2 < .001$ (Figure 7; Table 7).

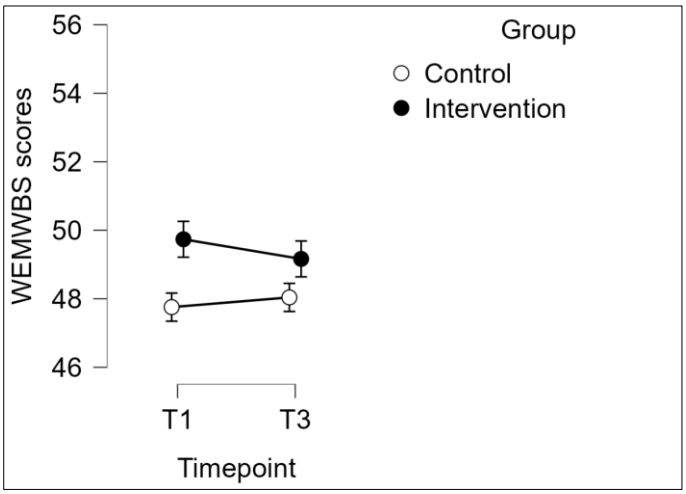

Figure 7

Intergroup differences in WEMWBS scores at T1 and T3. Group mean scores and associated standard errors (error bars) are shown for the control and intervention groups at T1 and T3

3.4. Social Connectedness

A mixed ANOVA was run to explore within and between subject differences in social connectedness, as measured by the SCS, at T1 and T3, as well as in the control and intervention group. There was a significant main effect of time-point, $F(1, 133) = 8.061$, $p = .005$, $\eta 2 = .008$, but not of group, $F(1, 133) = 0.260$, $p = .611$, $\eta 2 = .002$. There was no significant interaction between group and time-point, $F(1, 133) = 0.735$, $p = .393$, $\eta 2 < .001$ (Figure 8; Table 7).

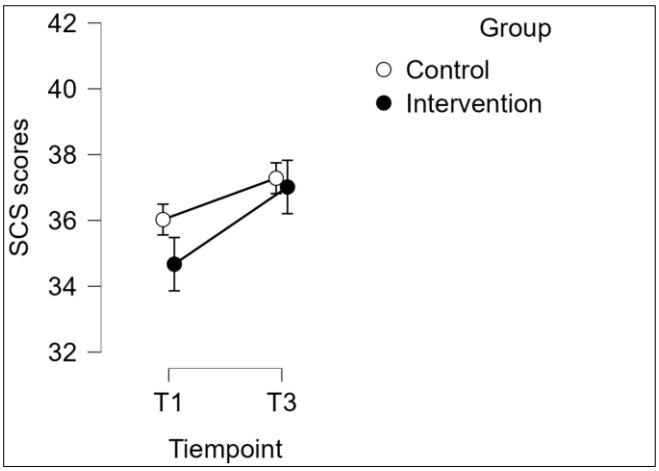

Figure 8

Intergroup differences in SCS scores at T1 and T3. Group mean scores and associated standard errors (error bars) are shown for the control and intervention groups at T1 and T3

3.5. Psychological flexibility

An independent samples t-test was conducted to explore whether there was a baseline difference in psychological flexibility, as measured by the CompACT, between groups. There was no significant difference found (see Table 2).

A Pearson correlation coefficient was run to assess the linear relationship between CompACT scores at T1 and change in VLQ scores between T1 and T3 in the intervention group. There was a statistically significant negative correlation between the two variables $r(60) = -0.293$, $p = .022$ (Figure 9).

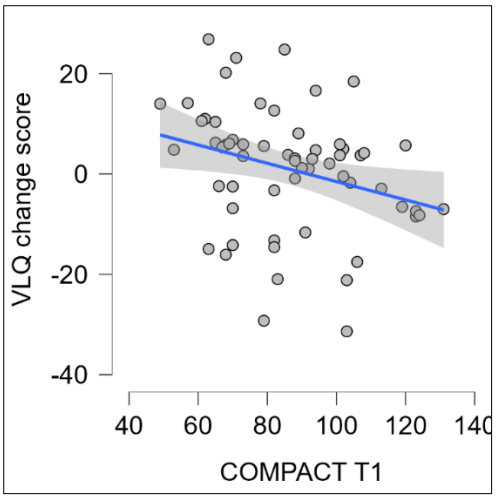

Figure 9

Correlation between T1 CompACT scores and VLQ change scores (from T1 to T3) in the intervention group

A Pearson correlation coefficient was run to assess the linear relationship between CompACT scores at T1 and change in SCS scores between T1 and T3 in the intervention group. There was no statistically significant correlation between the two variables $r(60) = 0.167$, $p = .197$.

A Pearson correlation coefficient was run to assess the linear relationship between CompACT scores at T1 and change in WEMWBS scores between T1 and T3 in the intervention. There was no statistically significant correlation between the two variables $r(60) = 0.051$, $p = .696$.

Table 5

Independent samples t-test results: T3 intergroup differences in VLQ and PESMUQ scores

T3	Intervention Group		Control Group		*t* (134)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
VLQ	50.8	15.8	48.9	12.5	-0.756	.451	-0.131
PESMUQ	28.3	5.9	28.5	6.3	0.140	.889	0.024

Table 6

Paired samples t-test results: VLQ scores at T1 and T3 in the intervention group

	T1		T3		*t* (60)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
VLQ	49.8	16.7	50.8	15.8	-0.640	.525	-0.082

Table 7

ANOVA results: Intergroup differences in WEMWBS, SCS and CompACT-VA subscale scores at T1 and T3

		T1	T3	ANOVA condition	Mean square	*F* (1, 133)	*p*	*η2*
		M (SD)	*M (SD)*					
WEMWBS	In[a]	49.7 (7.0)	49.2 (7.8)	Timepoint	1.406	0.098	.755	< .001
	Con[b]	47.8 (8.8)	48.0 (9.3)	Group	161.115	1.297	.257	.009
				Timepoint* Group	12.295	0.855	.357	< .001
SCS	In	34.7 (9.8)	37.0 (10.0)	Timepoint	216.795	8.061	.005*	.008
	Con	36.0 (10.2)	37.3 (9.7)	Group	44.000	0.611	.611	.002
				Timepoint* Group	19.772	0.735	.393	< .001
CompACT-VA	In	36.3 (7.3)	35.9 (6.4)	Timepoint	10.160	0.382	.537	< .001
	Con	34.7 (9.2)	34.3 (7.8)	Group	160.289	1.665	.199	0.010
				Timepoint* Group	26.579	0.002	.963	< .001

[a] In = Intervention group

[b] Con = Control group

* = $p < .05$

Discussion

1. Summary of findings

Research suggests that the way we behave on SM as well as our motives for SMU affect the likelihood that it has a positive or negative impact on our wellbeing (Yang et al., 2021; Tibber & Silver, 2022). Based on this knowledge and evidence that values-interventions are effective in eliciting positive behaviour change (Rahal & Gon, 2020) we hypothesised that participation in a SM focused values-based micro-intervention would enhance behaviours and motives for SMU that would lead to positive wellbeing outcomes.

However, the results showed that the intervention group did not report a significant increase in online VCB (H1), positive evaluation of SMU (H2), social connectedness (H3) or well-being (H4), compared to the control group at follow-up. This suggests that the intervention was not successful in increasing online VCB at follow-up and thus no associated increases in positive evaluation of SMU, social connectedness and general wellbeing took place.

Additionally, participants in both groups reported an increase in social connectedness at follow-up (H3), and higher baseline psychological flexibility was negatively correlated with improvements in online VCB in the intervention group (H5).

We will first discuss the lack of hypothesised impact of the intervention referring to relevant ACT processes, followed by a discussion of the findings regarding social connectedness and psychological flexibility.

2. Acceptance and commitment therapy processes

In this study, we hypothesised that behaviour change would be facilitated by two behaviour change processes operationalized in ACT (Hayes, 1999), values and committed action, through the following steps:

1) Values: Increasing clarity around what values are and how values-consistent current behaviour is.
2) Committed action: Facilitating an increase in VCB through setting values-consistent goals.

We hypothesised that, if the intervention was successful in creating these processes, changes in positive evaluation of SMU, general wellbeing and social connectedness would be observed. However, as participants did not report a change in their online VCB, we hypothesise that either one or both processes did not take place, or that they did take place but were not maintained at follow-up or could not be detected using our measures.

2.1. Values process

The intervention aimed to facilitate the values process of ACT by asking participants to reflect on what their values were and how values-consistent their current online behaviour was.

As no increase in online VCB was found, one interpretation of the findings is that the intervention was not successful in creating the values process due to the brevity of the intervention. Reported values-interventions that successfully create behaviour change frequently consist of multiple sessions that take place over the course of weeks (e.g., Bojanowska et al, 2022; Castro et al., 2016). However, there are also single session values-interventions which have created desired behaviour changes (e.g., Engle & Follette, 2018), including at follow-up and when delivered online (e.g., Chase et al, 2013; Parker & Kingston, 2022). This suggests that the length of the intervention alone was not the sole barrier to the creation of the values process. However, the referenced single session studies did not all measure changes in VCB directly. For example, Engle and Follette (2018) equated a larger size of charity donation to an increase in VCB, and Parker and Kingston (2022) assessed changes in levels of paranoia, rather than changes in behaviour. This limits the extent to which these results can be compared to those of the present study.

A further hypothesis is that the intervention did not create a sufficient reflection on values, due to the nature of the tasks involved. Successful values-interventions often include exercises such

as writing tasks, for example “write about why a specific human issue matters to you” (Engle & Follette, 2018), or media clips and case examples (Firestone et al., 2019), creating active engagement with the content. Although our intervention did involve some active engagement, for example participants were asked to list three important values, this may not have been sufficient in creating enough engagement to reflect on values in such a way that would bring about behaviour change.

The use of the VLQ as part of the micro-intervention may also have hindered a sufficient reflection on values. In a qualitative study by Barney et al (2019) data from eleven ACT experts was collected regarding measures of the valuing processes. The experts criticised the VLQ for generating incomplete and potentially ACT-inconsistent responses, depending on context. Additionally, the VLQ encourages reflection on domains of values, rather than values per se. It is therefore possible that, as the VLQ may not provide a complete assessment of the valuing process, it is also not comprehensive enough to create the valuing process during this intervention.

2.2. Committed action process

The intervention aimed to facilitate the committed action process by asking participants to set between one and three values-consistent goals for their SMU. As there was no sustained increase in online VCB, another interpretation of the findings is that the intervention was successful in stimulating the values process but not the committed action process.

This may be due to a lack of other ACT processes which were not addressed in the intervention: acceptance, defusion, self-as-context, and present moment awareness (Figure 10; Hayes et al., 2006). In ACT, these processes are all linked to the creation of mindfulness which is defined as the practice of self-regulating one’s attention, alongside adopting an accepting, curious, and open orientation to the present moment (Bishop et al., 2004).

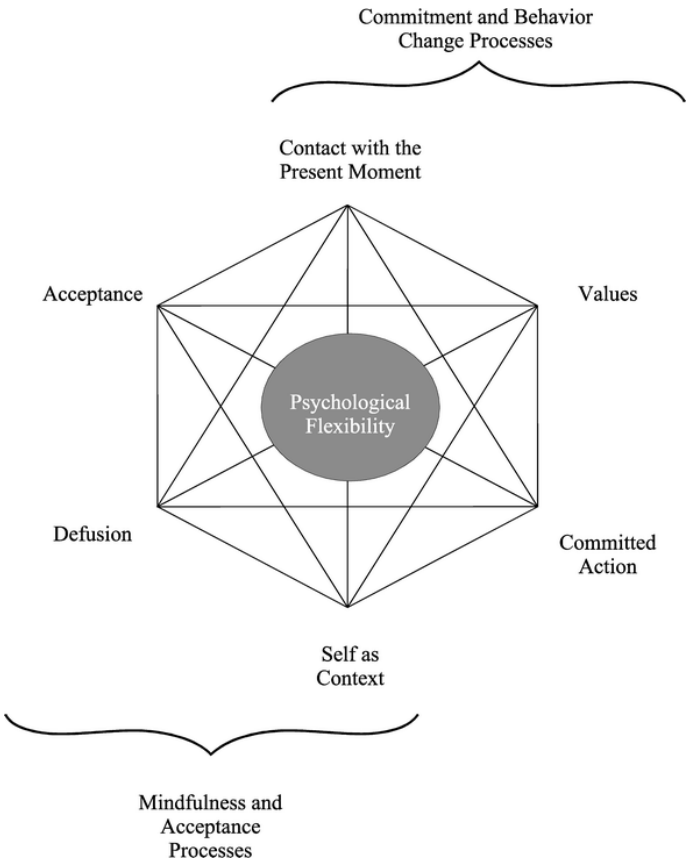

Figure 10

A model of psychological processes ACT seeks to strengthen (Fletcher & Hayes, 2005)

It is possible that, without facilitating these processes, the intervention did not provide participants with enough skills to make sustained online VCB changes. The mindfulness components may have been necessary to allow participants to continue with the task of VCB despite some exposure to pain or discomfort, for example social anxiety caused by reaching out to friends. This is supported by a meta-analysis (Levin et al., 2012) which evaluated the effect of various ACT model components individually. Findings showed that the values component alone had a small effect, but when combined with mindfulness components it had a large effect. Additionally, in Rahal & Gon's (2020) systematic review assessing the effects of the ACT values component, the authors highlighted the challenges in isolating the functional processes of values identification and committed action,

suggesting that the current evidence for values-interventions may be clouded by other processes that are also facilitated in these interventions.

However, it must be noted that Levin and colleague's (2012) study was limited to laboratory-based findings, and there are values-interventions which have successfully created behaviour change without these additional ACT components (e.g., Engle & Follete, 2018; Firestone et al., 2019). Nevertheless, as these studies vary in their measures of behaviour change it is difficult to draw inferences from these and compare their findings to the present study.

Evidence suggests that the mindfulness components of ACT are especially relevant to SMU as mindfulness has been found to be a protective factor against negative patterns of SMU and negative wellbeing impacts of SMU (e.g., Apaolaza et al., 2019; Poon & Jiang 2020; Jones et al., 2022). The mindfulness components of ACT could be added to the present study through the addition of exercises outlined in studies which successfully combined the values and mindfulness components of ACT (e.g., Páez-Blarrina et al., 2008; Wagener & Zettle, 2011).

2.3. Behaviour changes not sustained at follow-up

Another interpretation is that the intervention was successful in creating the values and the committed action processes, but that the related changes in VCB were no longer present at follow-up.

It may be that participants were discouraged from continuing with their VCB due to external responses to these. This is supported by findings related to U&G theory (Katz et al., 1974): Although individuals may seek certain gratifications online, they may not necessarily obtain these (Hussain et al., 2020). In our study, for example, an individual may have set a values-consistent goal of improving their relationship with a friend by messaging them. However, if their friend ignored this message, they did not obtain the gratification they sought. Bae et al (2018) investigated such differences between gratifications sought and obtained on SM and found that individuals indicated a decrease in their intention to continue with SMU when they did not obtain the gratification they sought on SM.

In this example, the individual may have given up on messaging their friends and thus no longer engaged in their values-consistent goal of connecting with their friends. This would be reflected in a lack of change in their online VCB at follow-up.

3. Social connectedness

Social connectedness, as measured by the SCS, did not differ between groups at follow-up. This is expected as we hypothesised a change in social connectedness would be precipitated by a change in online VCB which was not found.

However, social connectedness did increase in *both* groups at follow-up relative to baseline, though this result had a small effect size ($\eta 2=0.008$). As the increase was present in both groups, we hypothesise that it was not the intervention *per se,* but the completion of measures which caused this result. The VLQ was the first questionnaire completed at follow-up, followed by the SCS.

A cross-sectional study found that *meaning in life* is a predictor of social connectedness (Macià et al., 2021). Thus, if completing the VLQ provided a sense of meaning in life for participants this may have created a feeling of social connectedness. This is supported by relational frame theory (RFT, Hayes et al., 2001), which can briefly be summarised as the idea that relating one concept to another is the foundation of all human language. It may be that thinking about values activates pathways of connection in the brain that link to social connectedness. However, the small effect size of this finding means that further research on the impact of values clarification exercises on feelings of social connectedness is needed to assess how generalisable these findings are.

4. Psychological flexibility

Baseline psychological flexibility was not associated with improvements in general wellbeing or social connectedness at follow-up in the values-based intervention group. However, there was a significant *negative* association between baseline psychological flexibility and changes in online VCB

at follow-up, meaning higher levels of baseline psychological flexibility were associated with smaller increases in online VCB at follow-up.

Diary study evidence shows that individuals with higher flexibility have higher VCB (Finkelstein-Fox et al., 2020). Thus, one interpretation of these results is that the intervention was less effective for people who already had higher psychological flexibility as they were already acting in line with their values, i.e., a ceiling effect took place. This links to the sample being potentially biased towards individuals who are either in higher education or have completed higher education (see below) as there is evidence to suggest a link between higher psychological flexibility and better academic outcomes (Hailikari et al., 2022; Jeffords et al., 2020).

5. Limitations

5.1 Micro-intervention design

Although there is evidence to suggest micro-interventions are effective in creating positive behaviour change, there is a limited evaluation of the acceptability, feasibility and efficacy of micro-interventions (Fuller-Tyszkiewicz et al., 2019), with no systematic reviews or meta-analyses conducted to date. Thus, it is possible that using the design of a micro-intervention is a limitation of this study. As discussed, stronger motivations for change may be elicited by an interactive or interpersonal component which are not part of the current study design.

Additionally, at the end of the intervention participants were asked to set goals for their SMU based on their chosen values. However, they were not instructed on timeframes to complete these goals in or asked to continue setting new goals. In Firestone et al's (2019) *Living Your Values* programme, participants were encouraged to complete a daily value journaling exercise over the four weeks between intervention and follow-up. Similar regular check-ins and updates on goals may have yielded more positive outcomes in our study. However, it must be noted that Firestone et al's (2019) study did not include a control group, meaning it was not possible to assess whether the impacts would have taken place without an intervention.

5.2. Participant engagement

Our data shows that, of the participants who continued the study past the point of information/consent, only 23% discontinued during the completion of the baseline measures and only 4% discontinued during the completion of the interventions (see Figure 2). Additionally, of those who completed the follow-up measures, 100% completed them fully. These low drop-out rates suggest that participants engaged well with the measures and interventions.

However, there is evidence to suggest that participants respond to online surveys less accurately than paper-based surveys (Savage & Waldman, 2008) and that responses become briefer the longer a survey is (Galesic & Bosnjak, 2009). Thus, it is possible that participants became bored and/or fatigued during the completion of the measures, meaning these did not reflect their experiences accurately. This could have been addressed by selecting fewer and/or shorter measures or administering the measures in person. A further thesis (Lee, in progress) will explore the results of an included acceptability questionnaire (Appendix 7) which will provide further information on participant engagement.

5.3. Measures

5.3.1. SCS

This study used the eight-item version of the SCS for brevity. However, the SCS was revised in 2001 (Lee et al., 2001) due to psychometric limitations of the original eight-item scale, including negatively phrased items which have the potential to cause a response bias. This was evidenced by a consistent extreme negative skewness in the response distributions by Lee & Robbins, (1995) which was also found in this study (Appendix 10). Lee et al., (2001) also highlight that the original scale does not reflect the full experience of connectedness due to the lack of positively phrased items. Our use of the eight-item SCS may therefore have caused a response bias in participants, as well as not reflecting the participants' full experiences of social connectedness. Thus, the SCS results may not accurately reflect the effect of the intervention on social connectedness.

5.3.2. VLQ

This study used a slightly adapted version of the VLQ which included an "N/A" option for all items. Though there is a strong argument to do so for domains which are not relevant to all individuals, for example parenting, it may also have affected VLQ scores to not reflect participants' full experiences of VCB.

Additionally, the VLQ was not administered to the control group at baseline (Appendix 9) as it contains values clarification items and could have contaminated the effects of the control intervention. Outcomes were therefore only compared within the intervention group between time-points and between groups at follow-up, with no interaction effects analysed. An analysis of interaction effects would have provided more nuance and clarity on changes in VCB. However, the analysis of the CompACT values subscale provides some control for this as this also measures VCB and did not find a significant interaction effect.

5.3.3. PESMUQ

The PESMUQ was not administered at baseline, meaning that any increase in positive evaluation of SMU between baseline and follow-up in either one or both groups could not be measured. Additionally, although initial research on the validity of the PESMUQ is promising (Tibber et al, under review) it is a new measure and requires further research to confirm its robustness.

5.4. Follow-up timeframes

The researchers aimed to gather follow-up data at a one-week follow-up interval. However, not all participants responded to the initial follow-up invitations and were sent reminders up until five months post intervention completion. The data analysed stems from participants who completed the follow-up measures at an average of 14 days after the intervention, with a minimum of seven days and a maximum of 80 days (around 2.5 months) after the intervention. If the intervention only created short-term effects, this may have impacted the findings and skewed them

towards insignificant results. To explore this hypothesis, results of the partner study (Taylor, 2023) on immediate effects need to be reviewed.

6. Generalisability

The generalisability of the findings in this study is restricted by the fact that the sample was skewed towards white (72.3%), female (78.1%) and cis-gendered (100%) participants. The study was also mainly advertised via SM platforms belonging to members of the research team (who's networks were skewed towards individuals with higher education attainments) and through paper adverts on UCL's university campus. It can therefore be hypothesised that the sample was also skewed towards participants who were either in higher education or had completed higher education, though there is no definitive evidence for this.

It is worth noting that there is a general oversampling of Western, Educated, Industrialized, Rich and Democratic (WEIRD) populations in psychological research (Henrich et al. 2010a; Nielsen et al., 2017) which may also be an issue in this study. In retrospect, this could have been addressed by advertising to specifically to non-WEIRD populations or by using inclusion/exclusion criteria regarding WEIRD sample characteristics.

7. Implications and further research

Despite the values-based micro-intervention not having the hypothesised impacts, this study provides important information and directions for further research related to interventions for SMU and the role of values and psychological flexibility in SMU.

1. As SMU carries risks and benefits, future interventions which aim to create SMU will be needed. A values-intervention which incorporates either a deeper reflection on values through more interactive and ongoing tasks, and/or addresses additional ACT mindfulness processes may be more successful in creating a change in online VCB and thus the related benefits.

2. The finding that social connectedness increased after the completion of the VLQ suggests that future studies may wish to explore the effects of values clarification exercises (alone) on feelings of social connectedness. However, the limitations of the brief version of the SCS used in this study and the small effect size found must be considered.
3. The finding that psychological flexibility was associated with less increase in online VCB suggests that future values-based interventions for SMU may wish to continue to assess baseline psychological flexibility to assist with the interpretation of their findings.

Conclusion

This study developed and evaluated a values-based micro-intervention for SMU in emerging adults. The intervention did not create the hypothesised sustained increase in online VCB or the associated outcomes of positive evaluation of SMU, social connectedness and general wellbeing. These findings suggest that the intervention was either not sufficient in facilitating the values and committed action processes of ACT, or that these processes alone were not sufficient to equip participants with the skills to make sustained behaviour changes on SM. Therefore, future interventions should strengthen the values and committed action processes, for example by using more interactive components, and should incorporate the facilitation of the mindfulness processes of ACT.

Future SMU intervention studies must also consider the baseline psychological flexibility in the sample as this may lead to a ceiling effect. The findings of this study also suggest that future research may wish to explore the impact of values-clarification exercises on social connectedness. Furthermore, the insights gained from this thesis will be enhanced once the partner studies on the immediate effects (Taylor, 2023) and the acceptability (Lee, in progress) of the intervention are complete.

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Part 3: Critical Appraisal

Overview

This critical appraisal is a reflection of my experience conducting this research project. I will first outline my personal background and reasons for choosing this project, followed by a reflection of the processes of writing the conceptual introduction and conducting the research for the empirical paper. Finally, I will consider what I have learned from the study findings and how I may apply these in my own clinical practice.

1. Background

Prior to clinical training I was living and working in my hometown of Oxford for four years. In this time, I worked both clinically (in CAMHS) and in research (at the Oxford Centre for Anxiety Disorders and Trauma, OxCADAT). Before this I had completed an undergraduate degree in Psychology and Language Sciences at University College London (UCL) which I now found myself returning to for training.

Thus, I had some research experience prior to training from both my undergraduate degree and my job as a research assistant at OxCADAT. However, during my time as a research assistant my main role was to conduct assessments of post-traumatic stress disorder (PTSD) with participants in a randomised controledl trial (RCT). Thus, I felt more confident in my clinical skills than my research skills when I began training as I had had more experience in practicing these.

2. Selection of a project

When selecting a research project, I took a variety of factors into consideration. I wanted to build my confidence in my research skills and therefore wanted to choose a project which would allow me to experience a research project from setting it up, to collecting data, to analysing data and writing this up. I also wanted to select a project which concerned a subject I was interested in as I knew this would motivate me through what I knew would be a long process. When working with young people in CAMHS, I had become very aware of how much social media (SM) played a role in the young people's lives I worked with. I found myself downloading applications I had never heard of

just to understand what they were talking about. I had also always been interested in acceptance and commitment therapy (ACT) but never had much opportunity to work in it as a modality.

Additionally, I was seeking a project working with a non-clinical population. I knew that obtaining NHS ethics was very difficult, and I also knew I would be working with complex clinical populations on placement and felt that I might want to work with a different kind of presentation in my research.

Therefore, when I saw that Dr Marc Tibber was offering a project on using ACT principles to design an intervention for young people's social media use (SMU) with an RCT design I felt this matched my needs well, in terms of being the type of research experience I wanted, as well as being a topic that interested me. I also liked the idea of doing a joint project as I enjoy working with others and felt it would be beneficial to have a team-mate for this big piece of work.

3. Conceptual introduction

Writing the conceptual introduction was indisputably a daunting prospect. The project pulls together research from a range of areas including social media impacts, ACT, values-based intervention and micro-interventions. At times the information felt overwhelming, and I had to dedicate a lot of time to understanding certain topics. The mediating and moderating factors of the impact of SMU on wellbeing were particularly complex to understand, and I was grateful to be guided to Yang et al's (2021) multi-dimensional model or SMU by my supervisor. This helped me to categorise and understand these factors more thoroughly. Meier and Reinecke's (2021) conceptualisation of levels of SMU effect analysis was also a very helpful framework.

When I first began reading up on the topics relevant to the study, I was also in the midst of my first placement on the course where I was learning cognitive behavioural therapy (CBT) and being evaluated on my clinical skills. It was challenging to switch between my experience on placement and reading papers for my thesis as both topics required different theoretical lenses. There were also still restrictions on in-person socialising in place due to COVID-19 during this time,

and I was isolated having just moved to a new city. Thus, I was not able to seek out the social support I needed at the time, which made the stressful aspects of the course even more challenging.

4. Empirical paper

4.1. Setting up the randomised controlled trial

Setting up the RCT was perhaps the most challenging part of the empirical process for a multitude of reasons. Firstly, it was the first part of the process meaning I had the least experience and confidence and was still finding my feet on the course as a whole. Secondly, we of course wanted the intervention to be successful, so we spent many hours combing through details and making changes which was effortful. Thirdly, this was a joint project. I greatly enjoyed working collaboratively with my research partner, Anna Taylor, but it did mean that we had to be very thorough in coordinating our work on the setting up process and making sure the division of labour was fair.

We had to write up the project proposal, pre-register the project and decide how our projects would differ. The pre-registration in particular was a difficult but valuable part of the process as it highlighted to me the importance of setting out hypotheses before carrying out an experimental project. Of course, we also had to seek ethical approval for our project. This was a valuable learning opportunity as it resulted in us adding acceptability questions to the intervention which will yield useful information in future. We also reduced the follow-up time after the ethics review. This was also a beneficial step as the micro-intervention design limited the impact of the intervention at follow-up.

We then began to work on the intervention itself. I enjoyed this part of the process as I was able to be creative and think about how we might engage participants in our study. Ensuring the control intervention was as closely matched as possible was difficult, but I liked the challenge and was pleased with what I came up with. It was useful to learn how to use Qualtrics, setting it to randomise participants and sending reminder emails for follow-up. When Anna and I were finally

able to make the intervention public it felt like a huge achievement, and I was excited to see what we would find.

4.2. Data collection

Once data collection began, we advertised the study on various platforms and started to see responses coming in. Initially, we received many responses and quickly hit the 100-mark. However, responses began to slow down, and we had to become more creative. Anna and I hung up posters around campus and scheduled SM adverts on our own SM platforms. I even joined Twitter, which I did not have experience of previously, and we slowly but surely recruited enough participants for the study. As my study was concerned with the follow-up data, I was tasked with chasing up participants to complete their follow-up questionnaires. This was a time-consuming process but felt worthwhile as we achieved a high follow-up rate.

We also set up a secure data base for responses to be stored on, which was again a very useful learning process. This would also allow trainees in the years below us to access the study data for future projects. We pseudonymised the data for analysis purposes which again was a very useful learning experience.

In retrospect, I would have made a greater effort to recruit a more diverse sample by advertising off campus or advertising specifically to minority groups. I feel strongly about the overuse of WEIRD (Western, Educated, Industrialized, Rich, and Democratic) samples in research and was disappointed that I had not thought to address this earlier on.

4.3. Data cleaning

Data cleaning was a very time consuming and arduous process that Anna and I completed collaboratively. I am grateful to have had a research partner who I was able to work and communicate with so well throughout a difficult and complicated process.

We exported the data from Qualtrics into excel and scored the questionnaire responses, whilst making sure all responses were aligned with the correct participant identification number. We were careful to document exactly how we had cleaned the data, to ensure we could back track if we made any mistakes. For my analyses, I had the additional challenge of matching baseline and follow-up data sets using the pseudonyms we had allocated. This was also a very time-consuming process, but I enjoyed learning more about how to use excel spreadsheets to my advantage.

4.4. Data analysis

When I finally had my final data set, the task of analysis began. This involved running correlations, t-tests and ANOVAs which we had learnt in statistics lectures but which I needed to revisit. During the analysis, we inevitably realised that we had made some small mistakes in the scoring of questionnaires and had to backtrack to correct these. Thankfully, we had saved multiple backups of the data sets at different time points which meant this process wasn't too arduous. I was very interested to learn about the use of parametric tests with non-normally distributed data above a small sample size. Although the reasoning for this was initially difficult for me to understand, I felt rewarded when I had read enough to understand the rationale.

As I reached the end of my analyses, it became clear that I had not found any statistically significant results. I was initially disappointed by this but with guidance from my supervisor I was able to realise that this was still an interesting finding as I came to write it up.

Our supervisor asked us to present all our results to him before we began the write up. This felt tedious and nerve wracking at the time but was useful in the long run as we had an overview of our results and could copy tables and figures straight into our write up.

4.5. Write up

I had been apprehensive of the write up process throughout the course of the clinical doctorate as I had not written academically in this way for a long time. Thankfully, we had written some case reports which were a useful warm-up exercise.

I found it especially difficult to condense multiple areas of research (SM impacts, SM interventions, ACT and values-interventions, micro-interventions) into a comprehensive introduction that would make sense to the lay reader. Nevertheless, once I had achieved this, I found that the rest of the paper became easier to write as I was very clear in my overview. Additionally, I followed the Consolidated Standards of Report Writing (CONSORT) guidelines on randomised controlled trials (Bennett, 2005) which was particularly helpful in structuring my methods section.

A further area I had not previously considered in detail was following the American Psychological Association (APA) standards for writing up a research project. I am grateful to have gained knowledge in formatting academic writing to this standard as this will be useful in all my future research endeavours.

The most difficult part of the write up was managing all the other parts of the course at the same time. I began a very challenging placement working with refugees and asylum seekers and felt myself stretched and feeling I could not give as much time to my pieces of work as I wanted. I also found myself working in the evenings and finding it difficult to sleep as I was thinking about the write up of the project. I worried about having to do long corrections and the impacts this could have on my life.

I noticed that going to the library to work alongside my research partner allowed me to contain the stress of the write up and started to do this every study day. In this way, I was able to produce a draft of the empirical paper in good time and the weight of the stress began to lift.

5. Reflections

5.1. Reflections on study findings

Our finding that the values and committed action process of ACT were either not created by our intervention or were not sufficient to create sustained changes in VCB was highly interesting.

My discussion of these findings was fruitful in allowing me to consider systematically how the different ACT processes did or did not take place. I had known from early on that this was a complicated area of research as there are many factors that influence whether SM is a force for good or bad. However, I now realise truly how complex these relationships are and find myself still considering the possible links between factors. I have wondered whether simply providing psychoeducation on the putative mechanisms at play would aid individuals to make more informed choices about their SMU. However, I have also found that I have made few changes in my own SMU throughout the study process. This indicates to me that psychoeducation alone may not have much of an impact.

I will be curious to read about future interventions for SMU and to see how SMU develops as a part of everyday life. As this is such a fast paced and ever-changing field, I am sure that many insights will be gained over the next few years.

5.2. Reflections on study strengths

Our empirical study had the strength of a robust theoretical underpinning which had in part been created through writing up the conceptual introduction. This allowed us to identify gaps in, and criticisms of, the literature including a need for longitudinal over cross-sectional data, clear definitions of the concepts we were using, the inclusion of follow-up data and the use of sufficient sample sizes. By addressing gaps and criticisms of the current evidence base we ensured that our study would be a useful contribution to the literature.

A key strength of our study was the use of a robust RCT design with a closely matched control group and follow-up data gathered. This allowed for a clear comparison between groups and timepoints, allowing us to draw inferences about the data outcomes.

5.3. Reflections on study limitations

Whilst we aimed to address criticisms of and gaps in the literature, we were not always successful.

A key challenge in the research area of SMU impacts is the lack of clearly defined concepts. This means that evidence is difficult to compare, making it even more difficult to draw clear conclusions (Tibber & Silver, 2022). Working my way through the evidence base to create a literature review was incredibly challenging, in part due to this issue. Looking back, I would spend even more time on this to ensure I truly understood the complicated associations between the mediating and moderating factors of the association between SMU and wellbeing. I found Kross et al's (2021) review paper and its section on the jingle jangle problem very helpful in understanding the impact of conceptual confusion in research. Setting up and running an RCT is a lot of work, and this experience has highlighted to me how important the theoretical underpinnings are to make sure this work has the most beneficial outcome. Had we spent a little more time understanding the theory and the evidence base, we may have picked up on the importance of mindfulness and added this to the intervention, making it more beneficial.

In future, I will also consider more carefully the measures I use in research. The valued living questionnaire (VLQ; Wilson et al., 2010) was perhaps not the best measure of values-consistent behaviour (VCB) which was the outcome measure for my primary hypothesis. It does not focus on values per se but rather domains of values-based living. The use of an adapted version of a different measure such as the valuing questionnaire (VQ; Smout et al., 2014) may have yielded different results, reflecting VCB more specifically. We also made a mistake in using the wrong version of the social connectedness scale (SCS; Lee & Robbins, 1995) which limited our ability to interpret

outcomes of social connectedness. I would hope to be more careful about using the correct version of a questionnaire in future.

5.3. Impacts on my clinical work

This research experience will also have impacts on my clinical work. In terms of SMU, I will pay much more attention in future to my clients' online life and make sure I ask questions about their relationship with SM. The research project has given me a level of understanding of what qualities of SMU are more and less beneficial for wellbeing and mental health, and I will aim to help my clients engage in SMU which is positive for their wellbeing. For example, I may help them consider how interactive, compared to passive, their SMU is and guide them towards more interactive use.

Moreover, the results of this study have highlighted to me the importance of the mindfulness processes in ACT. Therefore, when working within the ACT model in future, whether regarding online or offline life, I will be thorough in addressing all six core processes of acceptance, defusion, self as context, present moment awareness, values and committed action as I now truly know the value of each component in creating psychological flexibility. I will also consider using a range of different measure to assess my clients VCB. Additionally, our finding that baseline psychological flexibility impacted VCB change scores means that I may consider assessing my clients' psychological flexibility to help me think about what kind of changes they may be able to make using ACT.

6. Conclusions

Overall, the completion of this thesis has been a highly valuable experience for me. To set up and implement an RCT was a brilliant opportunity and I have learnt research skills that I will take forward with me into my career. Although the findings were not as hypothesised, it has been a valuable insight into the nature of research, and I have been able to reflect critically on how I might

do things differently in future. I hope to continue to practice as a research-practitioner in the future, and to draw on the knowledge I have gained during this process to do so.

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Appendices

Appendix 1: Joint thesis declaration

This thesis was a joint project working alongside Anna Taylor. Anna's project explored the immediate effects of the values-based micro-intervention on in the moment affect, positive evaluation of SMU and social connectedness (Taylor, 2023).

Conceptual Introduction: The conceptual introduction was undertaken independently.

Empirical Paper: The selection of relevant questionnaires for the study, ethics application, design of the interventions and recruitment process were undertaken jointly. Additionally, the initial data cleaning and descriptive analyses were undertaken jointly. Each trainee had an equal role in these stages. All subsequent processes were undertaken independently, including analysis and write up of the findings of this study. The two studies will be combined when writing up for publication.

Appendix 2: Advert for study participation

About the study

Research suggests there are both positive and negatives aspects to using social media in terms of its impact on well-being. We are interested in whether using social media in a way that is more closely aligned with your values might be an effective way of increasing its benefits and reducing its risks.

What it involves?

- **Brief online questionnaires and completing a short exercise before looking at social media for 5 minutes**
- **1 week later completing the same questionnaires**

Are you eligible?

- **18-29 years old**
- **English speaking**
- **User of at least 1 social media platform**

Scan here to take part or click the link below

Benefits?

- **Being entered into a prize draw**
- **Contributing to research on social media**

Research Team Contact Details:
Dr Marc Tibber – Clinical Psychologist: m.tibber@ucl.ac.uk

Ethics approval for this study has been obtained through the UCL REC committee
ID number: 22087/001
Data Protection ID number: Z6364106/2022/02/51 social research

UCL

Appendix 3: Participant information sheet

RESEARCH DEPARTMENT OF CLINICAL, EDUCATIONAL AND HEALTH PSYCHOLOGY

Research Team Contact Details:

Dr Marc Tibber – Clinical Psychologist: m.tibber@ucl.ac.uk

Anna Taylor - Trainee Clinical Psychologist: a.taylor.14@ucl.ac.uk

Jennifer Thomson - Trainee Clinical Psychologist: jennifer.thomson.13@ucl.ac.uk

Kloe Lee - Trainee Clinical Psychologist: kloe.lee.12@ucl.ac.uk

Ethical approval for this study has been obtained through the UCL REC committee ID number: 22087/001

The impact of using social media in line with your values

What is this study about?

We are inviting you to take part in a research study that is investigating whether completing a brief online intervention can support emerging adults (18–29-year-olds) to use social media in line with their values (i.e. in line with what is important to them in life) and whether this has an impact on their wellbeing. We have provided a summary

of the study below and what it will involve you doing, so that you can decide whether you would like to take part.

Why are we doing this study?

Research suggests there are both positive and negatives aspects to using social media in terms of its impact on wellbeing. We are interested in whether using social media in a way that is more closely aligned with your values might be an effective way of increasing its benefits and reducing its risks.

We hope that the information we find from this study can help us design resources to people use social media in a healthy and positive way.

Why have I been invited to participate?

By clicking on the link you have an expressed an interest in potentially taking part in the study.

You can take part in the study if you:

- are 18-29 years old
- are a fluent English speaker
- use at least one social media account once per day (on average).

Do I have to take part?

No. Taking part is voluntary. It is your choice whether or not you would like to participate. If you do decide to participate, you will be asked to complete a consent form at the end of this information sheet. If you do agree to take part, you are still free to stop at any point without giving a reason. You also have the right to withdraw your data up to two weeks after you have completed the study.

What will happen if I choose to take part?

You will be randomly allocated into one of two groups. One group will take part in an online 'values-based' intervention. This intervention will consist of identifying and reflecting on what is important to you in life, and then briefly using a social media platform of your choice for 5 minutes. The other group will complete a control task involving questions about your favourite colours before briefly using a social media platform of your choice for 5 minutes. Before and after the intervention you will be asked to complete a survey. [Note: everything will be presented online using Qualtrics, a web-based survey tool which is compliant with General Data Protection Regulation (GDPR)]. We anticipate that the questionnaires will take you 20 minutes to complete.

The survey will ask you questions about:

- Demographic information including: Your name, your age, your sex, your gender identity, your ethnicity. You do not have to provide information about your sex, gender identity and/or ethnicity if you do not want to.
- Social media use, such as time spent on it per day.
- Your emotional wellbeing.
- Your social relationships.
- Your values (what is important to you in life).
- How you respond to challenges in the pursuit of what is important to you.
- How mindful you typically are about your thoughts and feelings during the day.

We will also ask you for your email address so that we ask you to complete another brief survey one week later.

You can opt out of the study at any point with no consequences. If you wish to withdraw your participation from the study and have your data removed after taking part you can do so by contacting Dr Marc Tibber (email address below) up to two weeks after you took part.

Are there any risks to taking part?

There are no major risks to you taking part in this study. The study has undergone a rigorous ethical review to consider possible risk to anyone who participates and gained ethical approval the UCL Research Ethics Committee. If you have any concerns or questions before deciding whether you'd like to take part please contact Dr Marc Tibber (email address below).

Please note that some questions included in the study concern some slightly sensitive topics, such as the following:

- Please select the answer that shows how much you agree or disagree with the following statement: Even around people I know, I don't feel that I really belong.

- Please rate how much you agree with the following statement: Even when something is important to me, I'll rarely do it if there is a chance it will upset me.
- Please select the box that best describes your experience of each over the last 2 weeks: I've been feeling optimistic about the future.

If you are affected by any of the questions and are concerned about your mental health, please contact your GP.
If you are in crisis or experiencing a medical emergency, please ring 999 or attend your local A&E department.

Are there any benefits to taking part?

If you participate to the end of the study (including one week follow-up) you will be given the option of entering a prize draw for one of ten £25 Amazon vouchers. Beyond this, you will be contributing to our understanding of whether our intervention is effective in supporting emerging adults to use social media in a way that maximises the benefits and minimises the risks. We hope that the findings from the study will be used to inform further research and develop resources and interventions to help emerging adults use social media in ways that support their wellbeing.

Who is organising and funding the research?

The study is being undertaken at the department of Clinical, Educational and Health Psychology at University College London (UCL). The department provide us with a small amount of funding to finance this research. The research will contribute to the doctoral theses of three training Clinical Psychologists at UCL.

Has this research been approved?

Yes. The research has been approved by the UCL Research Ethics Committee.

What will happen to my information?

All the information you provide will be stored securely and password protected on the UCL network and will be treated as confidential within the research team. This means only the research team will have access to it. Once we have collected your data it will be pseudo anonymized. This means that only the research team will be able to link your data to your name and age.

Once data analysis is complete, your data will be completely anonymised, so that no one will be able to identify you. The (anonymised) data will then be retained indefinitely for research purposes. These data may be shared with

other researchers in order to help answer future research questions. However, you will not be identifiable from these data. Any information that is no longer required for the research will be destroyed.

As noted, if you decide you want to withdraw from the study you can contact Marc Tibber (email address below) up to two weeks after taking part and we will remove your data.

What will happen to the findings of the study?

The findings of the study will be written up and presented as part of three training Clinical Psychologists' doctoral theses. We also hope to publish the findings in peer-reviewed journals and/or as conference abstracts. In any of these documents it will not be possible to identify you in the write-up.

What if there is a problem during the study?

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated by members of staff during your participation in the study, UCL complaints mechanisms are available to you. Please email Dr Marc Tibber (email below) if you would like more information about this.

Thank you for taking the time to read this information and considering taking part in the study!

Local Data Protection Privacy Notice: The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk. This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice: For participants in health and care research studies, click here. The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices. The lawful basis that will be used to process your personal data are: 'Public task' for personal data and 'Research purposes' for special category data. UCL will keep identifiable information about you for three months after the study has finished. To safeguard your rights, we will use the minimum personally-identifiable information possible. If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk

Research Contact: Dr Marc Tibber (Principal Investigator for the study). m.tibber@ucl.ac.uk

Address: Research Department of Clinical, Educational and Health Psychology, University College London, Gower Street, London, WC1E 6BT

Name and Contact Details of the UCL Data Protection Officer: Alexandra Potts (dataprotection@ucl.ac.uk)

Data Protection ID number: Z6364106/2022/02/51 social research

Please note: *While UCL systems are secure and updated regularly, UCL cannot ensure the security of external email systems, by using email communication you are accepting of these potential risks (e.g. the potential for your emails to be hacked by external parties). If you would like more information on this please ask and more details can be provided before you send on any confidential data*

Appendix 4: Participant consent form

RESEARCH DEPARTMENT OF CLINICAL, EDUCATIONAL
AND HEALTH PSYCHOLOGY

CONSENT FORM FOR VALUES-BASED SOCIAL MEDIA INTERVENTION STUDY

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Evaluation of a Values-Based intervention for social media use in emerging adults
Department: Research Department of Clinical, Educational and Health Psychology
Name and Contact Details of the Researcher(s): Anna Taylor (a.taylor14@ucl.ac.uk) and Jennifer Thomson (Jennifer.thomson13@ucl.ac.uk)
Name and Contact Details of the Principal Researcher: Dr Marc Tibber (m.tibber@ucl.ac.uk)
Name and Contact Details of the UCL Data Protection Officer: Alexandra Potts (data-protection@ucl.ac.uk) **This study has been approved by the UCL Research Ethics Committee: Project ID number: 22087/001**

Thank you for considering taking part in this research. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You can download this consent form by clicking below.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

		Tick Box
1.	*I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction	
2.	*I understand that I will be able to withdraw my data up to two weeks after I complete the study.	
3.	*I consent to participate in the study. I understand that my personal information *(name, age, sex, gender identity, ethnicity and social media use)* will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
4.	**Use of the information for this project only** *I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified. I understand that my data gathered in this study will be stored anonymously and securely. It will not be possible to identify me in any publications.	

5.	*I understand that my information may be subject to review by responsible individuals from the University for monitoring and audit purposes.	
6.	*I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason without my legal rights being affected. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted	

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	unless I agree otherwise.	
7.	I understand the potential risks of participating and know where to seek support should I become distressed during the course of the research, as outlined in the information sheet.	
8.	I understand the direct/indirect benefits of participating.	
9.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
10.	I understand that I will be eligible for entry into a prize draw for my participation once I have completed the one-week follow-up study	
11.	I understand that I will be compensated for the portion of time spent in the study (if applicable) or fully compensated if I choose to withdraw.	
12.	I agree that my anonymised research data may be used by others for future research. [No one will be able to identify you when this data is shared.]	
13.	I understand that the information I have submitted will be published as a report and I wish to receive a copy of it.	
14.	I consent to my data being stored anonymously, using password-protected software and will be used for training, quality control, audit and specific research purposes.	
15.	I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet.	
16.	I am aware of who I should contact if I wish to lodge a complaint.	
17.	I voluntarily agree to take part in this study.	
18.	I consent to my anonymised data being stored securely on the UCL network indefinitely. I understand that other authenticated researchers will have access to my anonymised data.	
19.	I consent to being contacted by email for the follow-up survey approximately one week after I complete this part of the study and consent for my email address to be stored for this purpose.	

_____ _____ _____

Name of participant Date Signature

Appendix 5: Experimental intervention

Welcome to this experiment on social media use. It should take about 15-20 minutes. Please read the information below. You will then be asked to complete some questionnaires, and then set some goals for how you would like to use social media in the future. Finally, you will be asked to use a social media platform of your choice for 5 minutes, and then complete some more questionnaires.

What are values?

Values are what we find meaningful in life. They are not things we want to get or achieve, but instead are the ways we want to behave. When we act in line with our values, we act like the sort of person we want to be. Our values are a compass that can guide us through life and can help us map out the actions that we want to take.

We can have lots of values, and there are hundreds of possible values to choose from. There are no 'wrong' or 'right' values, simply those that feel most true to us. For example, a person who values learning might prioritise studying over seeing their friends, whereas a person who values closeness to others might prioritise spending quality time with the people they love. Other examples of values include: authenticity, honesty, loyalty, independence, persistence, adventurousness.

Think of a time when you were doing something that felt full of meaning and purpose.
Perhaps you felt particularly alive in your family life, with friends, at work, or in doing a hobby. You might have noticed a feeling of excitement, engagement and enjoyment. The activity may have been challenging, but felt worthwhile, nonetheless. For example: going to the gym because you value self-care, or dedicating time to practising an instrument because you value creativity. This is what values are: ways of behaving that feel meaningful, whether or not they bring short-term pleasure.

Why are values important?

Values are important because they help us stick to our chosen direction in life. The more we are aware of our values, the more we are able to make decisions and behave in ways that are in line with our long-term interests rather than doing things that offer immediate gratification but don't bring us meaning. For example, it might feel gratifying in the moment to cancel our plans with friends if we are feeling anxious or unhappy. But if we strongly value social connectedness, we would realise that isolating ourselves will not bring meaning to our lives in the long term. There is evidence that people who live life in line with their values experience greater well-being, life satisfaction, and self-fulfilment, i.e. they feel they are really living up to their potential.

Values and social media use

So far, we have spoken about how knowing your values can help you act or behave in line with what is important to you in life, in general. However, we believe that acting in line with your values may be just as important in your online life as it is for your offline life. We believe that being aware of your values when you are using social media may help you to access more of the benefits of social media, whilst avoiding more of its costs.

For example, if you value connection, social media might help you to connect with friends and family and feel closer to them as a result. If you value creativity, social media might provide you with an opportunity to share your artwork with others and express a part of yourself that is harder to express offline. Relatedly, we believe that holding your values in mind when using social media will make you less likely to drift into more unhelpful online behaviours, e.g. scrolling endlessly or comparing yourself unfavourably to others.

What are my values?

Now that we have explained what values are, and why they are so important (for your online and offline life), we would like to ask you to start thinking about your own values.

To start you doing this, we have listed a number of areas of life that often contain values of importance for people. For example, in the area of friends/social life, some people value supporting and caring for others. In the area of education/training, some people value curiosity and ongoing learning.

Please rate the importance of each area to you (by selecting a number) on a scale of 1-10. 1 means that this area is not at all important. 10 means that this area is extremely important.

	(Not at all)	2	3	4	5	6	7	8	9	10 (Extremely)	⊘ N/A
Family (other than marriage or parenting)	○	○	○	○	○	○	○	○	○	○	○
Marriage/couples/intimate relations	○	○	○	○	○	○	○	○	○	○	○
Parenting	○	○	○	○	○	○	○	○	○	○	○
Friends/social life	○	○	○	○	○	○	○	○	○	○	○
Work	○	○	○	○	○	○	○	○	○	○	○
Education/training	○	○	○	○	○	○	○	○	○	○	○
Recreation/fun	○	○	○	○	○	○	○	○	○	○	○
Spirituality	○	○	○	○	○	○	○	○	○	○	○
Citizenship/Community Life	○	○	○	○	○	○	○	○	○	○	○
Physical self care (diet, exercise, sleep)	○	○	○	○	○	○	○	○	○	○	○
Environmental issues	○	○	○	○	○	○	○	○	○	○	○
Art, creative expression, and aesthetics	○	○	○	○	○	○	○	○	○	○	○

Holding in mind some of the areas of life that you have rated as being important to you, we would now like you to specify **three values** that are particularly important to you. To help you, here are some more example values: authenticity, creativity, caring, connectedness, intimacy, honesty, loyalty, adventurousness, courage, assertiveness, independence, curiosity, fairness, justice.

Now we would like you to rate how well your behaviours lined up with your values in the past week. We'd like you to do this separately for your online

behaviours, and your offline behaviours. Please note, we are not asking about how consistent you would like your behaviours to have been, or how others would judge you, but how consistently you think they have actually been. Whilst you should consider the values you listed above, you may also consider your values more broadly, i.e. additional values that you have not specified.

First, thinking about your ***online life*** over **the past week** (e.g. the way you have used social media platforms such as Facebook, Instagram, Twitter or WhatsApp) please rate from 1-10 how consistent your actions in your ***online life*** have been with your values in each of the areas listed. Note: if you use more than one social media platform, please respond in terms of how consistent your actions have been across them, rather than focusing on any single platform.

1 means that your online behaviours have been completely inconsistent with your values in this area. 10 means that your ***online*** behaviours have been completely consistent with your values.

	1	2	3	4	5	6	7	8	9	10	∅ N/A
Family (other than marriage or parenting)	○	○	○	○	○	○	○	○	○	○	○
Marriage/couples/intimate relations	○	○	○	○	○	○	○	○	○	○	○
Parenting	○	○	○	○	○	○	○	○	○	○	○
Friends/social life	○	○	○	○	○	○	○	○	○	○	○
Work	○	○	○	○	○	○	○	○	○	○	○
Education/training	○	○	○	○	○	○	○	○	○	○	○
Recreation/fun	○	○	○	○	○	○	○	○	○	○	○
Spirituality	○	○	○	○	○	○	○	○	○	○	○
Citizenship/Community Life	○	○	○	○	○	○	○	○	○	○	○
Physical self care (diet, exercise, sleep)	○	○	○	○	○	○	○	○	○	○	○
Environmental Issues	○	○	○	○	○	○	○	○	○	○	○
Art, creative expression, and aesthetics	○	○	○	○	○	○	○	○	○	○	○

Now, thinking about your ***offline life*** over **the past week** e.g. anything you have done in your week that is not related to social media, such as seeing friends face-to-face, going to work or engaging in hobbies, please rate from 1-10 how consistent your behaviours have been with your values. 1 means that your ***offline*** behaviours have been completely inconsistent with your values in this area. 10 means that your ***offline*** behaviours have been completely consistent with your values.

	1	2	3	4	5	6	7	8	9	10	∅ N/A
Family (other than marriage or parenting)	○	○	○	○	○	○	○	○	○	○	○
Marriage/couples/intimate relations	○	○	○	○	○	○	○	○	○	○	○
Parenting	○	○	○	○	○	○	○	○	○	○	○
Friends/social life	○	○	○	○	○	○	○	○	○	○	○
Work	○	○	○	○	○	○	○	○	○	○	○
Education/training	○	○	○	○	○	○	○	○	○	○	○
Recreation/fun	○	○	○	○	○	○	○	○	○	○	○
Spirituality	○	○	○	○	○	○	○	○	○	○	○
Citizenship/Community Life	○	○	○	○	○	○	○	○	○	○	○
Physical self care (diet, exercise, sleep)	○	○	○	○	○	○	○	○	○	○	○
Environmental Issues	○	○	○	○	○	○	○	○	○	○	○
Art, creative expression, and aesthetics	○	○	○	○	○	○	○	○	○	○	○

Setting your own social media goals in line with your values

Values can be particularly helpful when it comes to setting goals. If a value is the compass you are using to head you in a direction, a goal is a specific destination you hope to reach along the way.

Now that you have thought about your values in different areas, and therefore what is important to you in life, we would like you to create some goals in line with your values. We would like you to focus specifically on goals regarding how you would like to use *social media.*

We recommend that you make these SMART goals, meaning that they are:

- **Specific:** They should be well defined, clear, and unambiguous.
- **Measurable:** You should be able to measure your progress toward accomplishing your goals.
- **Achievable:** They should be possible to achieve.
- **Realistic:** They should be within reach.
- **Timely:** You should be able to achieve them by some target date.

This will give you the best chance of achieving your goals that you have set in line with your values.

For example, someone who has identified that they strongly value *closeness* in relationships may create a goal to send a WhatsApp voice note to a family member once a week on a Sunday evening to keep in touch with them. Or, someone who has identified that they value *creativity* may create a goal of starting a photography account on Instagram and posting a new photo twice a week on a Wednesday and Friday.

If you haven't thought about your goals in this way before, or it's been a long time since you've set these kinds of goals, please don't worry if it takes you a few minutes to decide. It's more important for you to approach this task thoughtfully than quickly.
You can set between one and three goals, please list them below.

Goal 1	
Goal 2	
Goal 3	

Time to use social media

We would now like you to open up a social media platform of your choice. Social media can include social networking sites, such as Facebook, Twitter or Instagram, but also messaging and media sharing platforms such as WhatsApp.

Please enter the platform you are going to use:

Now please use the social media platform of your choice for the next **5 minutes** in any way you wish to. After this time, please return to this survey in order to complete a final set of questionnaires. **Please now set yourself a 5 minute timer.**

Appendix 6: Control intervention

Welcome to our programme on colours. The following exercises should take no more than 15-20 minutes to complete. We would like to invite you to read the text below carefully and complete the questionnaires. You will then be asked to create your own colour palette for a project based on the colours you have thought about. Finally, you will be asked to use a social media platform of your choice for 5 minutes, before completing some final questionnaires

Why are colours important?

Although we all know what colours are, have you ever considered why are they important to us as humans? We see colours every time we look around us, although we might not always be consciously aware of this.

Sir Isaac Newton discovered the colour spectrum in the 1700's and saw that each colour is defined by a different wavelength. Psychologists, such as Carl Jung, then went on to study the effects of colour on the human mind. In the present day colour psychology is primarily used in marketing and advertising.

Colour psychology is now a popular area of study, with lots of people being interested in how different colours carry different meanings and therefore have different psychological effects on us. Both cultural differences and personal preference can influence the impact of different colours on us. Our relationship with colours is longstanding, with the first research on colour describing how sunset colours can have a calming effect on humans.

Why do we have favourite colours?

Although one can't objectively designate one colour as superior to another, individuals tend to have different opinions about colours, and most people have a favourite colour. There are various theories as to why we have favourite colours, and not one is universally agreed upon.

Researchers have found that we tend to prefer colours that are associated with survival, safety and health. For example, bluish hues are more popular with adults than yellowish brown ones. The theory is that blue is associated with water and clear skies, while yellows and browns are linked to illness and decay. Thus, one possibility is that having a favourite colour is just a way to keep us safe.

Our life experiences and the culture we grow up in are also likely to play a role in our colour preferences. We see this when someone's favourite colour is also that of their favourite football team, or their favourite piece of clothing. For example, a study found that members of Berkeley University were more likely to favour the school's official colours than rival University Stanford's, suggesting that their favoured colours were influenced by the environments they spent time in.

Colours on social media

Social media websites tend to use certain colours to convey certain things. In fact, one study found that 62 to 90% of visitors assess their first experience on a new website "based on colours alone".

On social media, the colour red, for example, is often used to signal danger or to grab our attention. You will often see it used to advertise sales, or warn of viruses. Blue however, is often used as a calming, trustworthy colour, and is used in the logos of lots of social media platforms such as Facebook and Twitter.

Social media sites might also pay attention to colour contrasts. High contrasts will make text more legible, e.g. white text on a dark background, or vice versa. This is preferable for text heavy social media platforms such as Twitter. This contrast draws attention and can make certain important elements stand out visually. However, too much colour contrast can wear out our eyes, so platforms will often pick one contrast to focus on and use throughout their materials.

What are my favourite colours?

Now that we have explained what colours are, why we might have favourite colours, and how colours are used on social media, we would like you to identify your own favourite colours. To start doing this, we have listed several colours below.

	Dislike a lot (1)	2	3	4	5	6	7	8	9	Like a lot (10)
Blue	○	○	○	○	○	○	○	○	○	○
Yellow	○	○	○	○	○	○	○	○	○	○
Red	○	○	○	○	○	○	○	○	○	○
Purple	○	○	○	○	○	○	○	○	○	○
Turquoise	○	○	○	○	○	○	○	○	○	○
White	○	○	○	○	○	○	○	○	○	○
Black	○	○	○	○	○	○	○	○	○	○
Green	○	○	○	○	○	○	○	○	○	○
Brown	○	○	○	○	○	○	○	○	○	○
Orange	○	○	○	○	○	○	○	○	○	○
Gray	○	○	○	○	○	○	○	○	○	○
Pink	○	○	○	○	○	○	○	○	○	○

Holding in mind the colours that you have rated the highest, we would like you specify **three** things you are reminded of when you think of those colours. This could include anything such as household objects, places, food, the weather, people, animals or scenery:

Now we would like you to give a rating of how often you think you have seen these colours during the last week, once in online environments and once in offline environments. We are not asking you for a specific number of times you have seen each colour. We are asking for your opinion on whether you haven't seen the colours at all, have seen them sometimes, or have seen them a lot.

First, thinking about what you have seen **online** over the past week (on social media platforms, such as Facebook, Instagram, Twitter or WhatsApp) please rate from 1-10 how often you have seen each colour online.

1 means you never see the colour **online**. 10 means you see the colour **online** a lot.

	Never see them (1)	2	3	4	5	6	7	8	9	See them a lot (10)
Blue	○	○	○	○	○	○	○	○	○	○
Yellow	○	○	○	○	○	○	○	○	○	○
Red	○	○	○	○	○	○	○	○	○	○
Purple	○	○	○	○	○	○	○	○	○	○
Turquoise	○	○	○	○	○	○	○	○	○	○
White	○	○	○	○	○	○	○	○	○	○
Black	○	○	○	○	○	○	○	○	○	○
Green	○	○	○	○	○	○	○	○	○	○
Brown	○	○	○	○	○	○	○	○	○	○
Orange	○	○	○	○	○	○	○	○	○	○
Gray	○	○	○	○	○	○	○	○	○	○
Pink	○	○	○	○	○	○	○	○	○	○

Now, thinking about what you have seen **offline** over the past week, e.g. anything you have seen whilst engaging in the ‘real’ world, please rate from 1-10 how often you have seen each colour.

1 means you never see the colour **offline**. 10 means you see the colour **offline** a lot.

	Never see them (1)	2	3	4	5	6	7	8	9	See them a lot (10)
Blue	○	○	○	○	○	○	○	○	○	○
Yellow	○	○	○	○	○	○	○	○	○	○
Red	○	○	○	○	○	○	○	○	○	○
Purple	○	○	○	○	○	○	○	○	○	○
Turquoise	○	○	○	○	○	○	○	○	○	○
White	○	○	○	○	○	○	○	○	○	○
Black	○	○	○	○	○	○	○	○	○	○
Green	○	○	○	○	○	○	○	○	○	○
Brown	○	○	○	○	○	○	○	○	○	○
Orange	○	○	○	○	○	○	○	○	○	○
Gray	○	○	○	○	○	○	○	○	○	○
Pink	○	○	○	○	○	○	○	○	○	○

Creating your own colour scheme

People often use a specific colour scheme when creating a website. This can tie the website together visually, and increase the enjoyment of the person using it.

Some people might like to combine preferred colours, particularly ones that go well together, to create a colour scheme. Others might like to draw on colours that carry meaning or grab attention. For example, in designing a website for a company that organises extreme sports expeditions, someone might create a colour scheme of yellow, red and black, since the colours are highly contrasting (and hence likely to grab attention), and linked to danger in nature (e.g. wasps and banded snakes).

Now that you have established your favourite colours and reflected on how you have encountered colours online and offline, we would like to guide you to create a colour scheme for an imagined website of your choice.

First, please pick a website to design (e.g. a website for a clothes shop):

Now, pick your colour scheme with your reasoning (in brief) in brackets, e.g. ‘red
(symbolises) danger’ or ‘green (favourite colour and complements colour 2)’.
Please pick 3 colours:

Colour 1	
Colour 2	
Colour 3	

The Task

We would now like you to open up a social media platform of your choice. Social media can include social networking sites, such as Facebook, Twitter or Instagram, but also messaging and media sharing platforms such as WhatsApp.

Please enter the platform you are going to use:

Now please use the social media platform of your choice for the next **5 minutes** in any way you wish to. After this time, please return to this survey in order to complete a final set of questionnaires. **Please now set yourself a 5 minute timer.**

Appendix 7: Acceptability questions for experimental intervention

Finally, what did you think about the exercise you completed?

Would you share this exercise with your family or friends?

Yes

No

Maybe

Please explain your answer

How did the exercise/task you participated in today make you feel?

Was the exercise you completed helpful in thinking about the way you would like to use social media?

Can you think of anything we might add or change about the exercise in order to make it more helpful?

Thank you very much for participating in the first part of our study. We will send you a final set of questionnaires in one week's time in order to see how you are getting on. Remember, completing the follow-up questionnaires enters you into a prize draw of ten £25 vouchers!

Appendix 8: Positive Evaluation of Social Media Use Questionnaire – General event version

To what extent do you think social media on balance

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly Agree
is good for your mental health and wellbeing?	○	○	○	○	○	○	○
is a force for good in your life?	○	○	○	○	○	○	○
supports you in living the life you want to live?	○	○	○	○	○	○	○
supports you in your interests and doing things you care about?	○	○	○	○	○	○	○
helps you to feel connected to others?	○	○	○	○	○	○	○
helps you to have meaningful interactions with others?	○	○	○	○	○	○	○

Appendix 9: Measures administered at all timepoints

Supplementary table 1
Measures administered at all timepoints

	Experimental	Control
Baseline	PANAS (state affect)	PANAS (state affect)
	WEMWBS (general wellbeing)	WEMWBS (general wellbeing)
	SCS (social connectedness)	SCS (social connectedness)
	CompACT (psychological flexibility)	CompACT (psychological flexibility)
	VLQ - online and offline (values-consistent behaviour)	
Post intervention	PESMUQ (positive evaluation of social media use)	PESMUQ (positive evaluation of social media use)
	SCS (social connectedness)	SCS (social connectedness)
	PANAS (state affect)	PANAS (state affect)
1+ week follow-up	VLQ - online and offline (values-consistent behaviour)	VLQ - online and offline (values-consistent behaviour)
	PESMUQ (positive evaluation of social media use)	PESMUQ (positive evaluation of social media use)
	SCS (social connectedness)	SCS (social connectedness)
	WEMWBS (general wellbeing)	WEMWBS (general wellbeing)
	CompACT (psychological flexibility)	CompACT (psychological flexibility)

Appendix 10: Ethics approval statement

UCL RESEARCH ETHICS COMMITTEE
OFFICE FOR THE VICE PROVOST RESEARCH

24th May 2022

Dr Marc Tibber
UCL Research Department of Clinical, Educational and Health Psychology

Cc: Anna Taylor and Jennifer Thomson

Dear Dr Tibber

Notification of Ethics Approval with Provisos Project ID/Title: 22087/001: Development and evaluation of short-to-medium-term effects of a values-based micro intervention for social media use in emerging adults

Further to your satisfactory responses to the Committee's comments, I am pleased to confirm in my capacity as Chair of the UCL Research Ethics Committee (REC) that your study has been ethically approved by the UCL REC until **1st September 2023.**

Ethical approval is subject to the following conditions:

Notification of Amendments to the Research

You must seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form' https://www.ucl.ac.uk/researchhttps://www.ucl.ac.uk/research-ethics/responsibilities-after-approvalethics/responsibilities-after-approval

Adverse Event Reporting – Serious and Non-Serious

It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events the Joint Chairs of the Ethics Committee should again be notified via the Ethics

Committee Administrator within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol.

The Joint Chairs will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Final Report

At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes in particular issues relating to the ethical implications of the research i.e. issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

In addition, please:

- ensure that you follow all relevant guidance as laid out in UCL's Code of Conduct for Research;
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.

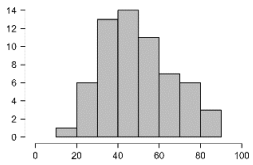
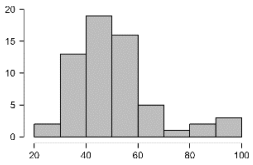
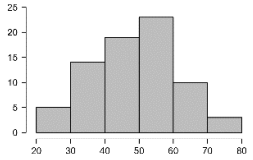
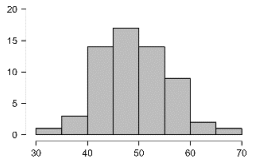
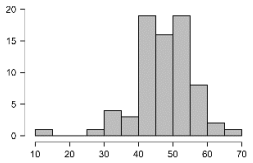
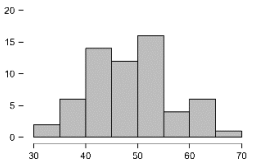
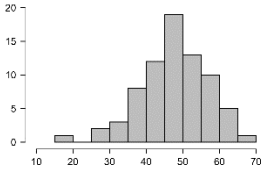
Yours sincerely

Professor Lynn Ang
Joint Chair, UCL Research Ethics Committee

Appendix 11: Distributions

Supplementary table 2

Distributions of VLQ and WEMWBS scores

Variable			Histogram	Skewness (*SE*)	Kurtosis (*SE*)	Shapiro-Wilk statistics	
						SW	*p*
VLQ	T1	In[a]		0.413 (0.306)	-0.458 (0.604)	0.971	.163
	T3	In		0.877 (0.306)	0.932 (0.604)	0.940	.005*
		Con[b]		-0.121 (0.279)	-0.302 (0.552)	0.989	.777
WEMWBS	T1	In		0.026 (0.306)	-0.196 (0.604)	0.941	.991
		Con		-0.630 (0.279)	2.271 (0.552)	0.963	.028*
	T3	In		0.177 (0.306)	-0.586 (0.604)	0.981	.446
		Con		-0.462 (0.279)	0.903 (0.552)	0.981	.327

[a] In = Intervention group

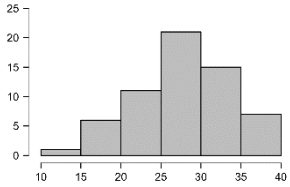
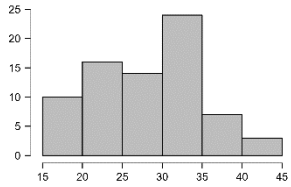
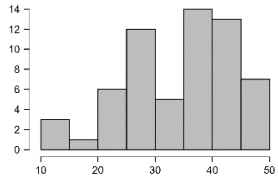
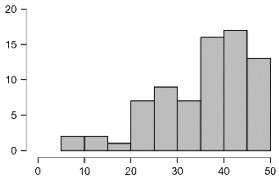
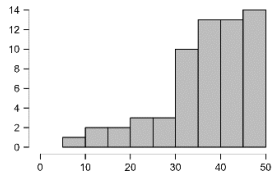
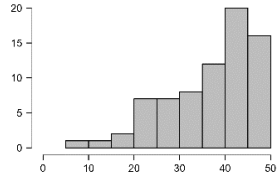
[b] Con = Control group

* = $p < 0.05$

Appendix 11 cont: Distributions

Supplementary table 3

Distributions of PESMUQ and SCS scores

Variable			Histogram	Skewness (*SE*)	Kurtosis (*SE*)	Shapiro-Wilk statistics	
						SW	*p*
PESMUQ	T3	In[a]		-0.11 (0.306)	-0.132 (0.604)	0.987	.744
		Con[b]		-0.012 (0.279)	-0.759 (0.552)	0.976	.170
SCS	T1	In		-0.601 (0.306)	-0.407 (0.604)	0.940	.005*
		Con		-0.898 (0.279)	0.126 (0.552)	0.910	< .001*
	T3	In		-1.125 (0.306)	0.803 (0.604)	0.890	< .001*
		Con		-0.958 (0.279)	0.201 (0.552)	0.900	< .001*

[a] In = Intervention group

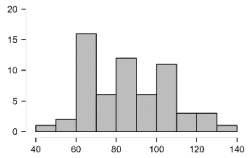
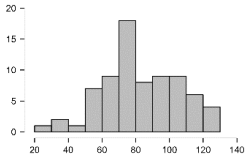
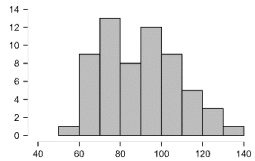
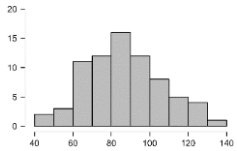
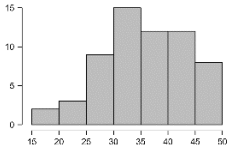
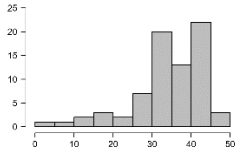
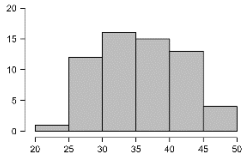
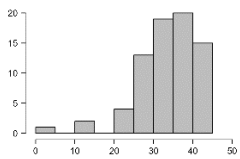
[b] Con = Control group

* = $p < 0.05$

Appendix 11 cont: Distributions

Supplementary table 4

Distributions of CompACT and CompACT-VA subscale scores

Variable			Histogram	Skewness (SE)	Kurtosis (SE)	Shapiro-Wilk statistics	
						SW	*p*
CompACT	T1	In[a]		0.335 (0.306)	-0.666 (0.604)	0.969	.131
		Con[b]		-0.020 (0.279)	-0.355 (0.552)	0.988	.709
	T3	In		0.414 (0.306)	-0.72 (0.604)	0.955	.025*
		Con		0.192 (0.279)	-0.25 (0.552)	0.984	.494
CompACT - VA	T1	In		-0.417 (0.306)	-0.161 (0.604)	0.970	.136
		Con		-1.363 (0.279)	2.152 (0.552)	0.891	< .001*
	T3	In		0.138 (0.306)	-0.899 (0.604)	0.969	.126
		Con		-1.436 (0.279)	3.626 (0.552)	0.897	< .001*

[a] In = Intervention group

[b] Con = Control group

* = $p < 0.05$

Appendix 12: Non-parametric and outlier test results

1. VLQ

Normality: Intervention group at T3 not normally distributed

Outliers: None

Supplementary table 5:

Parametric and non-parametric (Mann-Whitney U) independent samples t-test results: T3 intergroup differences in VLQ scores

	Intervention Group		Control Group		*t* (134)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Parametric	50.8	15.8	48.9	12.5	-0.756	.451	-0.131
	Mdn		*Mdn*		*U*	*p*	Pearson's *r*
Non-parametric – Mann-Whitney U	49.6		49.4		2343.0	.949	-0.007

Supplementary table 6:

Parametric and non-parametric (Wilcoxon) paired samples t-test results: T1 and T3 differences in VLQ scores in the intervention group

	T1		T3		*t* (60)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Parametric	49.8	16.7	50.8	15.8	-0.640	.525	-0.082
	Mdn		*Mdn*		W	*p*	Pearson's *r*
Non-parametric – Wilcoxon	46.6		49.6		810.0	.332	-0.143

2. PESMUQ

Normality: All data normally distributed

Outliers: None

3. WEMWBS

Normality: Control group at T1 not normally distributed

Outliers: Two – control group at T1; control group at T3

Supplementary table 7

Parametric test results: ANOVA results: Intergroup differences in WEMWBS scores at T1 and T3, with and without outliers

		Baseline (T1)	Follow-up (T3)	ANOVA condition	Mean square	*F* (1, 133)	*p*	*η2*
		M (SD)	*M (SD)*					
With outliers	In[a]	49.7 (7.0)	49.2 (7.8)	Timepoint	1.406	0.098	.755	< .001
	Con[b]	47.8 (8.8)	48.0 (9.3)	Group	161.115	1.297	.257	.009
				Timepoint* Group	12.295	0.855	.357	< .001
Without outliers	In	49.7 (7.0)	49.2 (7.8)	Timepoint	1.779	0.123	.726	< .001
	Con	48.2 (7.9)	48.5 (8.6)	Group	81.646	0.749	.388	.005
				Timepoint* Group	11.182	0.773	.381	<.001

[a] In = Intervention group

[b] Con = Control group

Supplementary table 8

Non-parametric test results: Mann-Whitney U test results: Intergroup differences in WEMWBS scores at T1 and T3, with and without outlier

		Intervention Group	Control Group	U	*p*	Pearson's *r*
		Mdn	*Mdn*			
T1	With outliers	50.0	48.0	1958.0	.186	0.100
	Without outliers	50.0	48.0	1958.0	.231	-0.121
T3	With outliers	49.0	48.0	2165.5	.687	0.100
	Without outliers	49.0	48.0	2165.5	.787	-0.027

4. SCS

Normality: Not normally distributed in both groups at both timepoints

Outliers: Two - control group at T3; intervention group at T3

Supplementary table 9

Parametric SCS results: mixed ANOVA: Intergroup differences in SCS scores at T1 and T3, with and without outliers

SCS		Baseline (T1)	Follow-up (T3)	ANOVA condition	Mean square	*F (1, 133)*	*p*	η2
		M (SD)	*M (SD)*					
With outlier	In[a]	34.7 (9.8)	37.0 (10.0)	Timepoint	216.795	8.061	.005*	.008
	Con[b]	36.0 (10.2)	37.3 (9.7)	Group	44.000	0.611	.611	.002
				Timepoint* Group	19.772	0.735	.393	< .001
Without outliers	In	35.0 (9.6)	37.5 (9.3)	Timepoint	243.867	9.121	.003*	.010
	Con	36.4 (9.9)	37.7 (9.1)	Group	41.530	0.273	.602	.002
				Timepoint* Group	24.439	0.914	.341	.001

[a] In = Intervention group

[b] Con = Control group

* = $p < 0.05$

Supplementary table 10

Non-parametric test results: Mann-Whitney U test results: Intergroup differences in SCS scores at T1 and T3, with and without outlier

		Intervention Group	Control Group	U	*p*	Pearson's *r*
		Mdn	*Mdn*			
T1	With outliers	37.0	39.0	2487.5	.309	0.102
	Without outliers	37.0	39.0	2486.5	.246	0.117
T3	With outliers	39.0	40.0	2302.0	.844	0.020
	Without outliers	39.0	40.0	2301.5	.739	0.034