Exploration of a Novel Trans-Diagnostic Cognitive Behavioural Model of Social Media Use in Emerging Adult Populations

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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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Date: 7th June 2024

Overview

Part One: Literature Review

Part one is a systematic review exploring links between mindfulness, mental health, and social media use, with a specific focus on quantitative research.

Part Two: Empirical Paper

Part two is an empirical study, testing predictions emerging from a novel trans-diagnostic cognitive behavioural model of social media use in emerging adults. It explores participants' motivations for going online, behaviours when online, mode of engagement, and their resulting wellbeing outcomes, after both a positive and negative experience of using social networking sites. The results suggest that social networking site use which is active, mindful, and motivated by enhancing the user's social network, is associated with benefits to mood and feelings of social connectedness.

Part Three: Critical Appraisal

Part three is a critical appraisal of the process of undertaking the research project. It includes both professional and personal reflections on each stage of the research process, considerations for future research, and learning to be taken forward into future practice.

Impact Statement

Social media use is one of the most popular online activities and has transformed the way we connect and interact with others. Despite research largely focussing on the harms of social media use on mental health / wellbeing, there is a developing evidence base which highlights potential benefits for social media engagement, driven by how the user engages with the technology. This conceptualisation is beneficial in helping users to understand how to use technology in a way which harnesses the benefits and ameliorates the harms.

The systematic review focused on links between mindfulness, mental health, and social media use. Overwhelmingly, findings supported an association between mindfulness and better mental health and more beneficial patterns of social media use. Further, mindfulness was often found to mediate / moderate associations between mental health and social media use in a protective manner.

The empirical paper aimed to test predictions relating to key components of Tibber and Silver's (2022) model of the effects of social media on mental health and wellbeing. A key finding of the research was that social networking site use which is active, mindful, and motivated by enhancing the user's social network, is associated with enhanced mood and increased feelings of social connectedness. Similar to the findings from the literature review, the empirical paper highlights that *how* individuals use social networking sites, influences their wellbeing outcomes.

Both papers highlight the importance of a contextualist perspective of social media use and wellbeing, which emphasises how the user interacts with the technology and the environment, rather than how much time or how often they use social media. This has implications for clinical practice, as clinicians can use this knowledge to help individuals formulate their social media use, and identify areas of use which are harmful, and therefore could be supported through intervention, as well as areas of use which are beneficial, and that the user should consciously continue. Regarding potential interventions, these should

focus on promoting active and mindful use that is motivated by enhancing the social network, as per the findings of the empirical paper. Tibber and Silver (2022) suggest targets and ideas for intervention pertaining to these patterns of engagement (amongst others) in their paper.

In terms of research settings, both papers highlight gaps in the existing literature and directions for future research. There is a need for more experimental and longitudinal studies, as well as investigation of the affordances of UK social media platforms and how these may be associated with wellbeing. Furthermore, research should explore different mindfulness practices as targets for intervention, to see which are most effective. Lastly, the distinction between active and passive use requires further study, given the empirical paper found it too broad a distinction to be of clinical utility.

It is hoped that both the systematic review and empirical paper will be disseminated by publication in peer-reviewed journals. Furthermore, there are plans to disseminate the findings to the clinical community by presenting a poster at the BPS Cyberpsychology conference in July 2024.

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Part One: Literature Review

Systematic Review of Quantitative Studies Exploring Links Between

Mindfulness, Mental Health, and Social Media Use

Abstract

Aims: There is growing interest in inter-individual differences linked to risk and resilience in the associations between social media use and mental health. This paper aimed to systematically review empirical studies exploring links between mindfulness, social media use, and mental health, in order to explore the possibility that mindfulness may play a protective role.

Methods: Systematic searches of PsychInfo, Medline, and Web of Science databases were undertaken for all relevant studies from database inception to September 2023. Included studies were subject to quality assessment using a standardised quality assessment rating tool.

Results: Twenty-one studies met inclusion criteria. Mindfulness was modelled variably as an independent variable, dependent variable, mediator, and moderator. Overwhelmingly, results suggested that mindfulness was associated with better mental health and more beneficial patterns of social media use, and mediated / moderated associations between the two in a protective manner. Existing studies were limited by predominance of cross-sectional designs, a paucity of research in non-'WEIRD' samples, and a bias towards inclusion of young people.

Conclusions: Social media use has been linked to a range of mental health risks as well as benefits. This systematic review suggests that mindfulness may be an important inter-individual difference that determines whether such risks or benefits are likely to be accrued, and thus implicates it as a potential target for intervention. Further longitudinal and experimental research is needed to establish underlying directions of causality, and ultimately, explore its potential integration in mental health interventions.

Introduction

The use of social media is one of the most popular online activities and has arguably transformed how people connect and interact. As of January 2023, there were over 4.76 billion social media users worldwide, up from 1.86 billion in 2013 (Kemp, 2023), thus 59% of the global population were found to use social media, a growth which has been driven by an increase in the use of mobile devices (Dixon, 2023). Such omnipresence of the digital world in our pockets has altered the way we interact with others. The average internet user spends 151 minutes per day on social media and messaging apps (Dixon, 2023), and it has never been easier to remain connected, especially with the increase in types of social media apps and platforms available.

The emerging adult population, defined by Arnett (2014) as 18 to 29 years old, are amongst those who use social media most heavily (Petrosyan, 2023), and have grown up with it as a constant presence in their lives (Meola, 2023). It is thought that emerging adults may be particularly susceptible to both the harms and benefits of the online world because of their developing identity and the centrality of social developmental processes at this stage (Tibber & Silver, 2022). Data from We Are Social and Meltwater (2023) shows that across the age range from 16 to 64 years, the primary driver for using social media was to connect with friends and family, i.e. known others.

Associations between social media and mental health

The prevalence of mental health difficulties is increasing, including for young people / adolescents (McElroy et al., 2023), with an estimated 25% more people living with mental disorders in 2019 compared to 2000 (World Health Organisation, 2022). This trajectory intensified during the COVID-19 pandemic, with an estimated global increase of 28% and 26% for major depressive and anxiety disorders respectively, over a period of only one year (World Health Organisation, 2022). In particular, the emerging adult population was at higher risk of poor mental health during the pandemic (O'Connor et al., 2021). As well as the COVID-19 pandemic and its associated difficulties, a multitude of other factors have been

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suggested as contributing to an upward trend in mental health difficulties, including rising income inequality (Patel et al., 2018), austerity (Knapp, 2012), and increasing educational pressure for young people (Högberg, 2021).

Despite its potential to harness social connection (vital to wellbeing in an inherently social species [Jose et al., 2012]), it has been suggested that increasing levels of social media use may be linked to the growing prevalence of mental health difficulties. For example, in their quantitative study examining cultural changes in mental health outcomes and screen time across three generations of adolescents ('Gen X', 'Millennials', and 'iGen'), Twenge et al. (2018) found that adolescents who spent more time on social media and electronic devices such as smartphones, had significantly higher levels of depressive symptoms and were more likely to have at least one suicide-related outcome, compared to peers who spent more time on non-screen activities. In a further cross-sectional paper using a large population-based survey, Twenge and Campbell (2018) reported similar findings, showing that those who used screens more were more likely to have a diagnosis of anxiety or depression, have been treated by a mental health professional, or have taken medication for a psychological or behavioural issue. However, a review of key studies by Orben (2020) suggests that whilst the association between social media use and psychological wellbeing is on average negative, correlations are typically small, and the literature is largely cross-sectional and exploratory, such that definitive conclusions cannot be made.

To complicate matters further, whilst much existing research is cross-sectional, precluding conclusions about underlying directions of causality, experimental and longitudinal studies have reported conflicting results. Whilst Twenge et al. (2018) and Haidt et al. (ongoing) have argued that increasing social media use drives mental health difficulties, some longitudinal research suggests a reversed direction of causality. In an empirical reply to Twenge et al. (2018), for example, Heffer et al. (2019) analysed longitudinal data from a sample of 594 adolescents who were surveyed for two years, and 1,132 undergraduate students who were surveyed for six years, and found no significant relationship between social media use and subsequent depressive symptoms in both

samples for males or females, but found that adolescent females who experienced greater depressive symptoms tended to use social media more across time. Taken together, the existing literature therefore support possible bidirectional effects (Ferguson, 2024; Green, 2021).

In addition, whilst much of the research base adopts a 'concern-centric' view that focuses solely on the *harms* of social media, there is growing evidence of *benefits* of social media to mental wellbeing, which are linked to particular patterns of engagement (de Leeuw & Buijzen, 2016; Schønning et al., 2020). For example, evidence suggests that social media may provide opportunities for self-exploration, peer-engagement, and self-disclosure, with potential (positive) impacts on social capital, self-esteem, and mental health (Erfani & Abedin, 2018; Uhls et al., 2017).

A contextual approach to social media use: person- and technology-related factors

Whilst debate continues as to whether social media is harmful or beneficial to mental health (Sharma et al., 2020), such a 'causasionist' approach lacks nuance, and is incapable of integrating the range of existing literature. Further, much existing research has operationalised social media use in terms of frequency or duration of use [e.g., Sampasa-Kanyinga and Lewis (2015)], assuming that every social media users' experience is the same, and that all platforms are equally helpful / harmful, which is clearly not the case (Beyens et al., 2020; Tibber et al., 2023).

In response to these limitations, more recent research and theory has started to move away from examining whether social media helps or harms users (and hence whether we should restrict use or stop using it altogether), to a consideration of the different *ways* in which it may be used in order to harness the benefits and ameliorate the harms. In line with this shift from a 'causationist' to a more 'contextualist' approach to understanding social media / mental health links, there is growing interest in how the user, technology, and environment interact.

Multiple technology- and person-related factors have been found to mediate and moderate the association between social media and mental health. Moving beyond exploration of particular social media brands and platforms (Tibber et al., 2023), technology-focused factors include features and affordances of social media platforms and apps, which can affect the users' experience. Example features, taken from Nesi's Transformation Framework (Nesi et al., 2018a, 2018b), include the 'permanence' (i.e. extent to which content or messages remain accessible following an original interaction or post), 'publicness' (i.e. the extent to which social media can be used to communicate with a public audience of peers, but also strangers, to an extent that would not be possible offline), and 'visualness' (i.e. the extent to which a medium emphasises photograph or video sharing) of social media communication, for example, which may differ considerably from offline / face-to-face communication.

Person-related factors, in contrast, include characteristics of the individual such as age, gender, and personality. For example, examining data from the US 2016 General Social Survey, Hardy and Castonguay (2018) found that higher social media use was associated with better wellbeing for 18-29 year olds, but poorer wellbeing for 30-49 year olds, and those aged 50 and above. In addition, a longitudinal study of 17,409 individuals implicated distinct developmental windows of sensitivity to social media use in adolescence, which vary as a function of age and gender (Orben et al., 2022). Thus, associations between social media use and lower life satisfaction were elevated in females at 11-13 years of age, in males at 14-15 years of age, and in males *and* females at 19 years of age.

Mindfulness as a person-related factor

One person-related factor that has received some attention in the context of social media research is mindfulness. Although there are many definitions, mindfulness is commonly defined as an awareness of the present moment that emerges through paying attention in a non-judgemental manner (Kabat-Zinn, 2003). Mindfulness is often conceptualised in two forms: state mindfulness, which is the state of being mindful in any

given moment (Bishop et al., 2004), and trait mindfulness, which is a person's predisposition to being mindful (Brown & Ryan, 2003). Trait mindfulness differs between individuals due to multiple factors including genetics, the way they have been socialised, and whether they have undergone any attention training (Quaglia et al., 2015). Without intervention, trait mindfulness is relatively stable over time (Brown & Ryan, 2003); however, it has been shown to be amenable to cultivation through mindfulness training (Quaglia et al., 2016).

Associations between mindfulness and mental health

Research has fairly consistently shown positive associations between mindfulness and mental health, such that higher levels of mindfulness are linked to better mental health. A systematic review into mindfulness and psychological health by Tomlinson et al. (2018), for example, found that individuals with high trait mindfulness benefit from enhanced psychological outcomes including lower levels of depression, anxiety, and eating disorder symptoms, as well as more adaptive cognitive processing, and better emotional processing. Mindfulness training, including through mindfulness-based intervention programmes such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) has also been linked to reductions in symptoms of depression, anxiety, and levels of stress (Alsubaie et al., 2017). Even those who engage in a minimum of once weekly mindfulness meditation have been found to have better psychological wellbeing compared to matched non-meditators (Baer et al., 2012). In addition, despite caution in framing social media use through a lens of behavioural addiction, mindfulness interventions have been linked to positive health behaviours and used in the treatment of addictions (Rosenthal et al., 2021). Therefore, research suggests that not only does mindfulness predict better mental health, but that these effects can be enhanced by both structured interventions and regular meditation practice, which are accessible to the wider population.

Associations between mindfulness and social media

Given its links to mental health and positive behavioural change (Keng et al., 2011), research has begun to explore the possibility that mindfulness may be related to healthier

social media use, and have the potential to protect against patterns of use that are associated with poorer mental health and wellbeing. For example, a systematic review by Sun (2022) into mindfulness and "*excessive social media use*" (p.1287), found that 9 of the 11 studies included reported a significant association between low levels of mindfulness and higher levels of compulsive / problematic social media use. (The remaining two studies reported no significant findings).

In terms of the potential underlying mechanisms, in their cognitive-behavioural conceptualisation of the role of social media in adolescent mental health, Tibber and Silver (2022) proposed that mindfulness "*may increase the user's awareness of the consequences of their online behaviour and the material to which they are exposed, facilitate a more critical appraisal of the information with which they engage, and further, enable them to be more selective in who / what they chose to connect with / attend to*" (p.27). With this increased awareness and critical eye, they suggest that individuals are able to choose to connect with content on social media that aligns with their values, with potential knock-on effects on mental health (Tibber & Silver, 2022).

The effect of mindfulness on the association between social media and mental health

Against this backdrop, a number of studies exploring the association between mindfulness and social media use have also begun to incorporate measures of mental health outcomes (Sun, 2022). In these, mindfulness has variably been modelled as a mediating, moderating and / or predictor variable. For example, studies have demonstrated that high levels of trait mindfulness can mediate / moderate associations between self-esteem and psychological symptoms (depression, anxiety, and stress), and Facebook addiction (Eşkisu et al., 2020); self-esteem and materialism, and upward social comparisons online (Hu et al., 2022); and whilst at work, levels of burnout and intensity of social media use (Charoensukmongkol, 2016). Additionally, mindfulness has been shown to reduce feelings of distress, negative emotions, hostility, and antisocial tendencies after feeling left out during a simulation social media environment where participants received fewer likes

(Poon & Jiang, 2020). Overall, the research suggests that more mindful patterns of social media use may be associated with positive wellbeing and mental health, and / or protect against the potential harmful effects of online engagement.

Aim of the review

With numbers of social media users projected to approach six billion in 2027 (Dixon, 2023), it is important for public health that we understand how to harness the benefits and ameliorate the harms of social media use. This paper aims to systematically review empirical studies that explore links between mindfulness, mental health, and social media, with a view to examining what effects mindfulness may have on the relationship between mental health and social media use. Whilst existing reviews have explored associations between mindfulness and mental health (Enkema et al., 2020; Sevilla-Llewellyn-Jones et al., 2018; Tomlinson et al., 2018), mindfulness and social media use (Meynadier et al., 2023; Sun, 2022), and social media use and mental health (Alonzo et al., 2021; Huang, 2022; Karim et al., 2020) separately, to our knowledge no reviews have explored these three topics together. Whilst the review is driven by an interest in the potential for mindfulness (state and / or trait) to mediate and / or moderate documented effects of social media use on mental health, because of the relative novelty of the area, and the expectation of a relatively small body of literature, I did not want to focus on a set of specific / narrow research questions. Instead, the intention was to review (and synthesise the findings of) any research within the inclusion criteria that explores links between mindfulness, mental health, and social media use, with a view to identifying the current status of research in this area, as well as existing strengths and weaknesses in the literature, and foci for future research.

Methods

This review attempts to synthesise quantitative research into mindfulness and mental health in social media users. Methods and results are conducted and reported in line with PRISMA guidelines (Liberati et al., 2009). A meta-analytic approach was not implemented as

it is deemed inappropriate to aggregate effect sizes where studies differ significantly in sample characteristics, methodology, outcome variables, and analytic approaches (Sharpe, 1997). Instead, a narrative synthesis of the reviewed literature was undertaken, with the aim of identifying main findings in the literature, strengths and limitations of the literature, as well as recommendations for future research.

Search strategy

Relevant articles were identified by searching PsycInfo (Ovid), Medline (Ovid), and Web of Science (Core Collection) from database inception to September 2023. The systematic search was carried out on 29.9.23, and an alert system was set up to notify the author of papers relevant to the search strategy, such that they could be included up until the point of completing data extraction and commencing data synthesis.

Search terms used were based on three key concepts: (1) mindfulness, (2) mental health, and (3) social media. Terms for each were identified using synonyms within the general language, as well as searching the relevant literature for terms specific to the field. In Ovid platforms (PsycInfo and Medline) terms were mapped to subject headings to ensure a comprehensive search. Conceptualisations of the three terms are detailed below.

Mindfulness

Terms for mindfulness were generated by identifying synonyms within general language and relevant literature. The following source was used:

1) Synonyms were derived from a review paper of trait mindfulness measures (Pallozzi et al., 2017).

Mental health

Aligned with Meier and Reinecke's (2021) perception that there is a lack of conceptual clarity within the field of social media / mental health research, their organising framework was adopted, which conceptualises mental health in terms of psychological wellbeing as well as psychopathology.

Terms for psychological wellbeing were derived from multiple sources including:

1) Meier and Reinecke's (2021) meta-review into computer-mediated communication, social media, and mental health.

2) Huang's (2017) meta-analysis into time spent on social network sites and psychological well-being.

Relevant synonyms for psychopathology (e.g., 'mental illness', 'psychological disorder') and diagnostic categories (e.g., 'depression', 'anxiety', 'bipolar') were derived from multiple sources including:

1) Barratt et al.'s (2016) systematic review and meta-analysis into the epidemiology of mental health attendance at emergency departments.

2) Published diagnostic classification systems:

    a. DSM-4 (American Psychiatric Association, 1994);

    b. DSM-5 (American Psychiatric Association, 2013);

    c. ICD-10 (World Health Organisation, 1992);

    d. ICD-11 (World Health Organisation, 2019);

    e. IAPT Psychological therapies annual report (NHS, 2022).

Social media

Terms for social media were identified by considering synonyms used within general language as well as the research literature. General terms for social media, allied technologies, and functionalities, as well as popular platform names, were derived from multiple sources including:

1. Meier and Reinecke's (2021) meta-review into computer-mediated communication, social media, and mental health.

2. A Global Web Index (2023) report detailing the most popular social media platforms worldwide.

This generated four search terms for mindfulness (combined using the OR operator), 104 search terms for mental health (combined using the OR operator), and 24 search terms for social media (combined using the OR operator). These were in turn combined using the AND operator. See Appendix 1 for full details.

Inclusion and exclusion criteria

Studies were deemed suitable for inclusion if they met the following criteria: (i) written in English; (ii) original quantitative study; (iii) peer reviewed and published; (iv) included a measure of mindfulness; (v) included a measure of mental health; and (vi) included a measure related to social media use (see Appendix 2 for full details). There were no restrictions in terms of participant demographics, publication period, or intervention.

Screening and selection

Papers were stored and organised using EndNote reference management software. Duplicates were removed initially with the EndNote function, then manually removed to ensure accuracy. To determine whether inclusion criteria were met, all records were screened in two phases. In the first, titles and abstracts of all studies retrieved from the search were read to screen for studies which seemed relevant, with a focus on mindfulness, mental health, and social media. Where there was uncertainty due to insufficient information, studies were included for full-text screening. In the second stage, the full article of all records was read in order to exclude studies which did not meet the inclusion criteria.

Data extraction and quality assessment

All studies that met inclusion criteria were coded for key variables to facilitate synthesis of findings and quality assessment of the study. These included: date of data collection; country study was conducted in; sample size; sample population (e.g., general or clinical, plus any other details of importance); summary participant demographics including age, gender, ethnicity; method of data collection; sampling strategy; study design (e.g., experimental, cross-sectional, longitudinal etc.); measure(s) of mindfulness included;

measure(s) of mental health included; type of social media site(s) examined; measure(s) of social media included; type and level of analyses undertaken; any sub-analyses included; other variables / covariates modelled; key findings and associated significance; how mindfulness was modelled (i.e. dependent variable, independent variable, mediator, moderator, covariate); and information to assist with assessment of study quality and risk of bias (see below).

The quality of eligible studies was evaluated using the Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004). This assessment tool was developed to assess a variety of study designs using 14 criteria (see Appendix 3). Two additional (custom-written) criteria were used to assess study quality: (xv) presence or absence of measures of effect size for main outcomes, and (xvi) whether or not outcomes were assessed using *valid* and *reliable* measures of mental health, mindfulness, and social media (Downs & Black, 1998). These were scored separately to the Standard Quality Assessment Criteria for Evaluating Primary Research Papers (see Appendix 3 for scoring information).

To reduce the likelihood of errors and bias, all screening, selection, and coding stages (including study quality assessment) were independently undertaken by a second reviewer who was blind to the first reviewer's decisions. Where there were disagreements, the two reviewers met to discuss these and made a final decision.

Where data were missing from a study, a request was made for this information to the authors.

Results

This section is comprised of four parts: study selection, overview of the study characteristics, quality analysis, and summary of the findings. Driven by the data, the findings are presented in five sub-sections, reflecting how studies conceptualised / modelled

mindfulness, as: 1) independent variable, 2) dependent variable, 3) mediator variable, 4) moderator variable, and 5) other variable.

Study selection

The search yielded 1332 papers. Figure 1 provides a PRISMA flow diagram (Liberati et al., 2009) of the screening and selection process. Of the 67 papers that were full-text screened, the main reasons for exclusion were no empirical data, and lack of measures for one or several of the three key constructs (social media, mental health, mindfulness). Overall, 21 papers were identified as being eligible for inclusion.

Overview of study characteristics

See Table 1 for an overview of study characteristics. Additional information pertaining to study characteristics is available in Appendix 4.

All 21 studies included were published between 2016 and 2023, with 14 studies published in or after 2020 (66.67%), highlighting the recent growth in interest in this field. Of the 18 studies that reported dates of data collection, eight studies collected data after March 2020 (44.44%) and thus after the start of the COVID-19 pandemic.

Of the 20 studies that reported the country where data were collected, six gathered data in the US (30%) and four in China (20%), with individual studies contributing data from Spain, Germany, the Netherlands, Turkey, Pakistan, Qatar, Australia, Ecuador, Iran, Italy, Norway, and the UK.

The sample sizes included in final analyses ranged from 143 to 1612, with a mean of 467.19 (std dev=380.94). The total number of participants across the 21 studies was 9811.

The most common sample population, found in nine of the 21 studies (45%), was current university students. Three of these nine studies included other samples alongside current university students, including former university students, workers, and the general population under age 25. A further seven studies recruited from the general population

(33.33%), with two stipulating that participants had to be daily / regular users of mobile messenger / smartphones and social media. Three studies recruited participants of secondary / high school age (14.29%), and one study recruited a sample of young people aged 10-17 (4.76%). The remaining study had a population of employees of universities and the IT field, who were employed and currently working from home (4.76%).

The age of participants ranged from 10 to 72. Of the 21 studies, only 19 reported mean age. The mean overall age across these studies was 22.68 (std dev=6.87).

Eighteen of the 21 studies had a greater proportion of females (85.71%), ranging from 34% to 88.9%. Only two of the 21 studies included reported where participants had identified as a gender identity other than male or female (9.52%).

Four of the 21 studies did not collect information regarding ethnicity (19.05%), whilst five did not report whether they collected information on ethnicity (23.81%). Of the remaining 12 studies, nine reported 'White / Caucasian' participants as the largest ethnic group (75%).

All 21 studies collected data via surveys. The most frequent method was online surveys (76.20%).

Twenty of the 21 studies reported their sampling strategy. Of these, 12 studies utilised convenience sampling (60%; two of the 12 also utilised snowball sampling, and one also used cluster random sampling), and six studies utilised volunteer sampling (30%). Other sampling techniques included stratified, and random.

The most common study design, used in 15 of the 21 studies (71.43%), was cross-sectional. Four had longitudinal designs (19.05%), and two had experimental designs, both of which included an experimental and a control arm (9.52%).

The most commonly used mindfulness measure, used in 12 out of the 21 studies (57.14%), was the Mindful Attention Awareness Scale (MAAS). Other scales included the Child and Adolescent Mindfulness Measure, Five-Facet Mindfulness Questionnaire, Freiburg

Mindfulness Inventory, Trait Mindfulness Questionnaire, and Cognitive and Affective Mindfulness Scale-Revised.

The most commonly used mental health / wellbeing construct, used in eight of the 21 studies (38.10%), was depression, most commonly measured with the Patient Health Questionnaire (62.5%). Seven studies measured self-esteem (33.33%), most commonly with the Rosenberg Self-Esteem Scale (85.71%). Other mental health constructs examined included anxiety, stress, life satisfaction, conduct problems, post-traumatic stress disorder (PTSD), and general wellbeing / affect.

With respect to the type of social media site(s) examined, general social media use was measured most commonly, in 16 of the 21 studies (76.19%). Three studies studied single platforms including WhatsApp (9.52%) and Facebook (4.75%), and one examined instant messaging. One study used a fake social networking platform built purposefully for the study.

Out of the 21 studies, one study did not include a social media measure, due to its experimental manipulation (manipulation of number of likes participants received on a custom-built platform). The most commonly used social media construct, used in eight of the remaining 20 studies (40%), measured social media addiction / problematic social media use, most often measured using the Bergen Social Media Addiction scale (50%). Seven studies measured time spent on social media / social networking sites (35%). Other social media constructs included social media comparison, frequency of use, fear of missing out (FOMO), and ostracism.

Seventeen of the 21 studies included further variables in their analysis (alongside mindfulness, mental health, and social media measures; 80.95%). Within the 17 studies, the number of other variables included ranged from 1 to 14, with gender and age included most frequently (94.12% and 82.35% respectively).

Authors of all 21 papers were contacted to request additional information that was not available in the publication. Of these, 15 authors responded (71.43%).

Figure 1

PRISMA flow diagram for study identification, screening, and review

| Identification of studies via databases and registers |

Identification

Records identified from PsycInfo, Medline, and Web of Science
(n = 1332)

PsycInfo (n = 291)
Medline (n = 335)
Web of Science (n = 706)

Duplicates removed
(n = 502)
- Removed via EndNote function
(n = 362)
- Removed manually
(n = 140)

Screening

Records after duplicates removed
(n = 830)

Records screened based on titles and abstracts
(n = 830)

Records excluded
(n = 763)

Full-text articles assessed for eligibility
(n = 67)

Records excluded (n = 46)
- No empirical data (n = 7)
- No measure of social media use (n = 17)
- No measure of mindfulness (n = 11)
- No measure of mental health (n = 11)

Included

Studies included in review
(n = 21)

Table 1

Summary of studies included. SM = social media; SNS = social networking site; IM = instant messaging; MH = mental health; FOMO = fear of missing out; MAAS = Mindful Attention Awareness Scale; RSES = Rosenberg Self-Esteem Scale; PHQ = Patient Health Questionnaire; BSMAS = Bergen Social Media Addiction Scale; variable type = type of variable that mindfulness was conceptualised as; DV = dependent variable; IV = independent variable.

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
Apaolaza, Hartmann, D'Souza & Gilsanz (2019)	346	17-26y (M = 18.73; SD = 1.41); 51.7% female; 100% Spanish / Caucasian	Cross-sectional	Scale developed by Turel & Osatuyi (2017) who adapted 5 items stemming from the 'act with awareness' dimension of the *Five-Facet Mindfulness Questionnaire* to the context of SM use	**Self-esteem:** 6 items from the *RSES* **Social anxiety:** 6 items from the *Social Anxiousness Scale* **Perceived stress:** 5 items from the *Perceived Stress Scale*	**Compulsive SM use:** Adapted version of *Compulsive Buying Scale* for SNS use (adapted by Turel & Osatuyi, 2017)	Mindfulness directly predicted lower compulsive SNS use and higher self-esteem ($ps < 0.001$). The indirect effect of mindfulness on compulsive SNS use was driven by mediating pathways through self-esteem & anxiety ($p = .005$). Mindfulness also had a negative indirect effect on perceived stress mediated by a pathway through (increased) self-esteem, & (reduced) anxiety & compulsive SNS use ($p = .007$).	IV
Baker, Krieger & LeRoy (2016)	386	18-64y (M = 21.98; SD = 5.22); 80.84% female; 49.86% White / Caucasian, 27.79% Asian, 12.53% Black / African American, 8.17% multi-ethnic, 1.36% Native American / Alaskan Native, and	Cross-sectional	*MAAS*	**Depressive symptoms:** *Center for Epidemiological Studies - Depression Scale*	**Time spent social networking:** Assessed with 3 (custom-written) items exploring time spent looking at others' information, updating their own information, and doing something else.	FOMO predicted lower mindful attention & higher levels of depression ($ps < .001$).	DV or correlate

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
		0.27% Native Hawaiian / Pacific Islander						
Bauer, Loy, Masur & Schneider (2017)	211	16-42y (M = 23; SD = 3.35); 54% female; Not collected	Cross-sectional	**Day specific mindfulness** *MAAS* (short version) **Mindfulness during IM** *MAAS* (short version) adapted for IM use	**IM related positive affect:** *Self-Assessment Manikin* **Stress:** 1 item adapted from the *Perceived Stress Scale* which was used as a single-item measure in previous research ("Did you feel stressed by Instant Messaging today?"); & 1 item to assess perceived day-specific stress ("If you review your day, did you feel stressed during the day?")	**Motivation to use IM:** 4 items on autonomous motivation to use IMs (custom-written / drawing on the *Friendship Self-Regulation Questionnaire*)	Mindfulness during IM predicted higher IM-related positive affect & lower stress levels ($ps < .001$). Day-specific mindfulness was positively related to autonomous motivation to use IMs ($p = .003$), which, in turn, was positively related to positive affect ($p < .001$) & negatively related to stress ($p < .001$). Day-specific mindfulness was further directly related to positive affect ($p < .001$), but not to stress ($p = .294$).	IV
Brailovskaia & Margraf (2022)	1049	18-72y (M = 24.60; SD = 6.76); 71.6% female; 100% White / Caucasian	Cross-sectional	*Freiburg Mindfulness Inventory* (brief version)	**Positive MH:** *Positive Mental Health Scale*	**Addictive SM use:** Brief version of the *BSMAS*	Positive MH was negatively associated with addictive SM use. The association was moderated by mindfulness, such that higher levels of mindfulness weakened the relationship ($ps < .001$).	Moderator
S. M. Coyne et al. (2023)	1231	10-17y (M = 14.5; SD = 2); 54.8% identified as cisgender female, 38.9% as cisgender male, and 6.3%	Cross-sectional	Modified *MAAS*	**Depression:** *PHQ-9* **Emotional problems:** 5 items measuring emotional problems	**SM time:** Daily use (hours) **Active or passive use:** 3 custom-written items measuring active use, and 1 measuring passive use	Mindful media use did not significantly predict depression ($p = .47$), emotional problems ($p = .31$), or conduct problems ($p = .51$). (*NB. Mindful media use was not*	IV

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
		as transgender, gender nonbinary, or other; 0.3% American Indian or Alaska Native, 9.0% Asian, 15.0% Black, 15.1% Hispanic or Latinx, 0.1% Pacific Islander, 57.1% White, 3.3% mixed and / or another race or ethnicity			from the *Strengths and Difficulties Questionnaire* **Conduct problems:** 5 items measuring conduct problems from the *Strengths and Difficulties Questionnaire*	**SM comparison:** Frequency ratings of 3 social comparison behaviours **Taking intentional breaks:** single item (custom written) **Problematic SM use:** 7 items related to SM habits, adapted from *Problematic Use of Mobile Phones Scale* **Cleaning and curating:** 2 custom-written items measuring frequency of cleaning or curating SM feed / followers	*examined as a predictor of included SM measures).*	
Du, Kerkhof & van Konigsbruggen (2021)	Time 1: 594, Final time point: 270	16-60y (M = 33.8; SD = 9.78); 73% female; Not collected	Three-wave longitudinal (interval of 4 months between each time point)	*MAAS*	**Life satisfaction:** *Satisfaction with Life Scale*	**Self-control failure:** *Social Media Self-Control Failure Scale* **Length of time spent on SM:** Daily use (minutes) **Frequency of visiting SM sites per day**	*NB. Where more than one model / path is significant, the strongest association has been reported.* Within subjects analyses partially supported a longitudinal association between SM self-control failure & mindfulness (p = .018), such that SM self-control failure at T1 indicated lower mindfulness at T2, & lower mindfulness at T2 indicated more SM self-control failure at T3. Within subjects analyses also partially supported a cross-sectional correlation within the individual (p = .010), such that when people had lower SM self-control failure they tended	IV & DV

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
							to have higher levels of mindfulness. At the between-person level, people who had higher levels of SM self-control failure tended to show lower mindfulness ($p < .001$). At the within person level, exploratory analyses looking at mindfulness and wellbeing found that mindfulness partially predicted life satisfaction ($p = .034$). At the between person level, there was a positive correlation between mindfulness & life satisfaction in all models ($p = .002$). Overall, there was some indication that mindfulness was positively associated with life satisfaction & negatively with SM self-control failure.	
Eşkisu, Cam, Gelibolu & Rasmussen (2020)	298	18-40y (M = 21.61; SD = 2.20); 64.1% female; Not collected	Cross-sectional	*MAAS*	**Depression & anxiety:** *Depression Anxiety Stress Scale* **Self-esteem:** *RSES*	**Facebook addiction:** *Chen Internet Addiction Scale* modified for Facebook	Mindfulness completely mediated an association between psychological symptoms & Facebook addiction, & self-esteem & Facebook addiction. When testing the "indirect model" connecting psychological symptoms & self-esteem with Facebook addiction through mindfulness, mindfulness was negatively predicted by psychological symptoms, & positively predicted by self-esteem. Additionally,	IV & mediator

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
							mindfulness was significantly & inversely associated with Facebook addiction (all ps < .001). In a direct path between the two, mindfulness was found to directly predict Facebook addiction (p < .01)	
Gu, Liu & Chen (2022)	317	Not reported clearly. No participants <18, some >55; 51.4% female; Not reported	Cross-sectional	*Trait Mindfulness Questionnaire* (Scale developed by Turel and Osatuyi [2017] who adapted five items stemming from the act with awareness dimension of the *Five-Facet Mindfulness Questionnaire* to the context of social media use)	**Self-esteem:** *RSES*	**SM rumination:** Adapted *Social Media Rumination Questionnaire* **Upward social comparison:** *Upward Social Media Comparison Questionnaire* **Duration of SM use:** Daily use (hours)	Mindfulness and SM rumination were significantly negatively correlated (p = .006). However, upward social comparison fully mediated the effect of mindfulness on SM rumination (95% boot CI = -0.139, -0.03). Self-esteem moderated the first step of the indirect effect (p = .013), such that the effect was not present at high levels of self-esteem.	IV
Hong, Liu, Ding, Fu, Zhen & Sheng (2021)	439	16-26y (M = 20.37; SD = 1.79); 58.1% female; 100% Han Chinese	Cross-sectional	*Child and Adolescent Mindfulness Measure* (Chinese version)	**Psychological distress:** *Kessler Psychological Distress Scale*	**SM exposure to COVID-19 information:** *Social Media Exposure Questionnaire*	Rumination mediated the effects of exposure to COVID-19 information online on distress (coefficient 95% CI = 0.04, 0.21). Mindfulness moderated the first step of the indirect effect (p < 0.05), such that the effect was not present at high levels of mindfulness.	Moderator
Hu, Liu & Ma (2022)	880	12-18y (M = 14.78; SD = 1.81); 51.82% female; Not reported	Cross-sectional	*Child and Adolescent Mindfulness Measure* (Chinese version)	**Self-esteem:** *RSES* (Chinese version)	**Upward social comparison:** *Upward Social Comparison Scale* (Chinese version) adapted from the *Iowa-Netherlands Comparison*	Self-esteem mediated the effects of upward social comparisons on materialism (coefficient 95% CI not specified). Mindfulness moderated the direct effect and the first step of the	Moderator

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
				Orientation Measure			indirect effect (*p*s < 0.001), such that both effects were weaker at higher levels of mindfulness.	
Jones, Hook, Podduturi, McKeen, Beitzell & Liss (2022)	371	17-24y (M = 19.33; SD = 1.59); 78.7% identified as female, 18.6% identified as male, 2.2% identified in a different way; 71.7% White, 8.6% Latinx, 7.5% African American / Black, 5.7% Multiracial, 1.9% South Asian, 1.6% East Asian, 1.6% Other, 0.5% Middle Eastern, 0.3% Native Hawaiian or other pacific Islander, 0.5% Chose not to identify	Cross-sectional	*Five Factor Mindfulness Questionnaire* (5 subsets of mindfulness measured: non-react, observe, aware, describe, and non-judge)	**Depression:** *PHQ-8*	**SM engagement:** *Social Media Engagement Scale for Adolescents* (measuring 3 subsets of engagement: affective, behavioural, and cognitive)	Four out of five facets of mindfulness (awareness, non-judgement, non-reactivity, and describe) mediated the relationship between the affective subscale of SM engagement and depression (*p*s < 0.01). One subscale (awareness) also mediated the relationship between the cognitive and the behavioural subscale of SM engagement and depression (*p* < 0.01).	Mediator (though looked at subscales)
Kircaburun, Griffiths & Billieux (2019)	470	14-18y (M = 16.29; SD = 1.17); 59.6% female; 100% Turkish	Cross-sectional	*MAAS*	**Depression:** *Short Depression-Happiness Scale*	**SM addiction:** *BSMAS*	Mindfulness mediated the association between trait emotional intelligence and problematic SM use (*p* < .001), with serial mediation through depression (*p* < .01) & also rumination (*p* < .001).	Mediator
Li, Mu, Wang, Xie, Zhang & Liu (2022)	421	12-17y (M = 14.20; SD = 0.95); 48.22% female; 100%	Brief longitudinal	*Child and Adolescent Mindfulness Measure*	**Psychological wellbeing:** *Flourishing Scale*	**Cyber-ostracism:** *Cyber-ostracism Experience Scale*	Rumination mediated the effect of cyber-ostracism on psychological wellbeing (95% CI = 0.12, 0.04).	Moderator

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
		Chinese					Mindfulness moderated the direct effect ($p < .001$) & the first step of the indirect effect ($p = .01$). The effect was not present at higher levels of mindfulness, therefore high mindfulness protects against problematic associations with psychological wellbeing & rumination.	
Lutz (2023)	214	18-58y (M = 26; SD = 6.14); 61% female; Not collected	Seven-day long diary (longitudinal)	*MAAS* (short version)	**Self-esteem:** Self-esteem item of the *Need-Threat Scale* **Daily affect:** Valence dimension of the *Self-Assessment Manikin*	**Frequency of messenger use** **Ostracism via messengers:** First 3 items of the *Ostracism Short Scale*, plus a 4th item adapted from the *Workplace Ostracism Scale* **Desire to use messengers:** Custom-written single item	Mindfulness did not moderate an observed association & self-esteem ($p = .211$).	Moderator
Majeed, Irshad, Fatima, Khan & Mubbashar Hassan (2020)	Time 1: 347, Final time point: 267	21-30y: 108 31-40y: 80 41-50y: 54 50≤: 25; 34% female; Not reported	Brief longitudinal (Time-lagged: 3 time points, minimum 7 days between each)	*MAAS*	**Depression:** *PHQ-9*	**Problematic SM use:** 6-item scale adapted from a previously published source constructed using the *Bergen Facebook Addiction Scale*	Fear of COVID-19 mediated the relationship between problematic SM use during COVID-19 & depression (95% CI = 0.07, 0.20). Mindfulness moderated the first step of the indirect pathway ($p < 0.05$), such that the effect was weakened at higher levels of mindfulness.	Moderator
Moqbel, Alshare, Erskine & Bartelt	198	M = 39; 48% female; Not reported	Cross-sectional	Adapted from the 'act with awareness' dimension of the	**Depression:** *PHQ-2*	**SM addiction:** Adapted from Charlton (2002), which was recently used by Moqbel	Mindfulness mediated the association between SM addiction & depression ($p < 0.05$).	Mediator (also checked as an IV & moderator)

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
(2023)				*Five Factor Mindfulness Questionnaire,* used by Turel & Osatuyi (2017)		and Kock (2018) with a change of the IT artifact to WhatsApp **Healing use of social media:** Adapted from Xu et al. (2012) *Need for Escapism* subscale with a change of the IT artifact to WhatsApp		
Passavanti et al. (2021)	1612	M = 28, SD = 9.36; 60% female; Not reported	Cross-sectional	*MAAS*	**Depression:** *PHQ-9; Depression, Anxiety & Stress Scale* **Anxiety:** *Depression, Anxiety & Stress Scale* **Stress:** *Depression, Anxiety & Stress Scale; Perceived Stress Scale* **Post-traumatic stress disorder:** *Event Scale-Revised*	**Amount of time spent on social networks:** Daily / weekly use (hours)	Mindfulness & time on SM were separately modelled in relation to the four MH variables, but were not included in the same analysis. Although mindfulness was modelled as a covariate, results show that lower mindfulness scores were associated with higher scores on stress, depression, anxiety, and post-traumatic stress disorder scales ($ps < .01$). More time spent on SM was associated with higher scores on stress, anxiety, & depression scales ($ps < .05$).	Covariate
Poon & Jiang (2020)	191	M = 35.28; SD = 12.08; 67% female; 75.4% Caucasian, 10.5% Asian, 6.8% African, 4.7% Hispanic, 2.6% other	Experimental with two conditions (one group receives 5 likes, one group receives 1)	*MAAS*	**Psychological distress & negative emotion:** *Need Satisfaction Index*	N/A (manipulation of likes)	Mindfulness was negatively associated with psychological distress ($p = .013$) & negative emotion ($p < .001$). Relative to participants who received 5 likes, those who only received 1 like reported higher levels of psychological distress and negative emotion ($ps < .001$). Mindfulness	Moderator

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
							moderated both effects (p = .048 & p = .007 respectively) in a protective manner.	
Throuvala, Griffiths, Rennoldson & Kuss (2020)	Baseline: 261; Final sample at analysis: 143	18-32y (M = 20.72; SD = 3.12); 82% female; 63.6% White	Experimental with 2 conditions (1 group takes part in the intervention including engaging with mindfulness exercises, self-monitoring of smartphone usage, mood tracking; 1 group is a control)	*MAAS*	**Stress:** *Perceived Stress Scale* **Anxiety:** *Generalized Anxiety Disorder-7*	**FOMO:** *FOMO Scale* **Duration of SM use:** Daily use (hours) **SM addiction / problematic SM use:** *BSMAS*	Participants in the intervention condition experienced an increase in mindful attention & a decrease in stress, anxiety, FOMO, & problematic SM use (ps < 0.001).	DV
Weaver & Swank (2021)	278	18-53y (M = 20.5, SD = 5.4); 88.9% female, 10.4% male, 0.4% no response; 70.9% White, 14.4% Hispanic / Latino, 7.6% Asian / Pacific Islander, 3.6% African American, 3.2% multiracial, 0.4% Native American	Cross-sectional	*MAAS*	**Life satisfaction:** *Satisfaction with Life Scale* **Self-esteem:** *RSES*	**FOMO:** *FOMO Scale* **Problematic SM Use:** *Social Media Use Questionnaire*	Mindful attention positively correlated with life satisfaction & self-esteem, & negatively correlated with problematic SM use & FOMO (ps < .01). Mindful attention mediated the relationship between FOMO & problematic SM use (p < .01).	Correlate & mediator
Yang, Holden & Carter (2017)	219	18-23y (M = 18.29; SD = 0.75); 74% female; 41% White, 38% Black, 11% Bi- or Multi-Racial / Ethnic, 5% Latinx, 3%	Cross-sectional	10 items of the *Cognitive & Affective Mindfulness Scale-Revised*	**Self-esteem:** *RSES*	**SM self-presentation:** *Social Media Self-Presentation Scale* (measuring breadth, depth, positivity, authenticity) adapted from the *Facebook Self-Presentation Scale*	Mindfulness predicted self-esteem across all facets of SM self-presentation (breadth, depth, positivity, and authenticity) (ps < 0.001). There was a negative association between self-esteem & depth (p < 0.05).	IV & moderator

Study	Sample size (N)	Participant characteristics (age, gender, ethnicity)	Study design	Measure(s) of mindfulness	Measure(s) of mental health	Measure(s) of social media	Main findings	Variable type
		Asian, 2% Middle Eastern, 1% Native American				**Time spent on most frequented SM platform:** Daily use (hours)	Mindfulness moderated the association (p = .039), such that the effect was weaker at higher levels of mindfulness. There was a positive association between self-esteem & authenticity (p < .01). Mindfulness moderated the association (p = .022), such that the effect was stronger at higher levels of mindfulness.	

Table 2

Summary of quality assessment. SM=social media.

Study	Quality score (%)	Effect size reported	Measurement reliability & validity
Apaolaza, Hartmann, D'Souza & Gilsanz (2019)	72.73	Yes	2/3
Baker, Krieger & LeRoy (2016)	77.27	Yes	2/3
Bauer, Loy, Masur & Schneider (2017)	86.36	Yes	0/3
Brailovskaia & Margraf (2022)	95.45	Yes	3/3
S. M. Coyne et al. (2023)	100	Yes	3/3
Du, Kerkhof & van Konigsbruggen (2021)	95.45	Yes	3/3
Eşkisu, Cam, Gelibolu & Rasmussen (2020)	90.91	Yes	3/3
Gu, Liu & Chen (2022)	90.91	No	2/3
Hong, Liu, Ding, Fu, Zhen & Sheng (2021)	77.27	No	2/3
Hu, Liu & Ma (2022)	95.45	Yes	3/3
Jones, Hook, Podduturi, McKeen, Beitzell & Liss (2022)	81.82	Yes	3/3
Kircaburun, Griffiths & Billieux (2019)	90.91	Yes	3/3
Li, Mu, Wang, Xie, Zhang & Liu (2022)	95.45	Yes	3/3
Lutz (2023)	95.45	Yes	1/3
Majeed, Irshad, Fatima, Khan & Mubbashar Hassan (2020)	90.91	No	3/3
Moqbel, Alshare, Erskine & Bartelt (2023)	63.64	Yes	2/3
Passavanti et al. (2021)	72.73	N/A	2/3
Poon & Jiang (2020)	73.08	Yes	2/2 *NB. No SM measure due to experimental manipulation*
Throuvala, Griffiths, Rennoldson & Kuss (2020)	85.71	Yes	3/3
Weaver & Swank (2021)	72.73	Yes	3/3
Yang, Holden & Carter (2017)	90.91	Yes	1/3

Quality analysis

See Table 2 for a summary of quality scores for each study included. The quality scores ranged from 63.64% to 100%. The main reasons for losing points on the quality index were the method of subject selection [two of the 21 papers scored zero (9.52%), 17 scored one (80.95%)], not controlling for confounding variables [five of the 21 papers scored zero (23.81%), and three scored one (14.29%)], a lack of well-defined outcome and exposure measures [six of the 21 papers scored one (28.57%)], and not including an estimate of variance for main outcomes [two of the 21 papers scored zero (9.52%), and two scored one (9.52%)]. In terms of the extra (custom-written) quality items included, three studies failed to include a measure of effect size for main outcomes. With respect to reliability and validity of measures used to measure mindfulness, mental health, and social media, 12 of the 21 studies scored maximally (57.14%). Two, three, and eight studies lost points for invalid and / or unreliable measures of mindfulness, mental health, and social media respectively. (NB. Only 20 of the 21 studies had social media measures, as Poon & Jiang [2020] had an experimental manipulation). See Appendix 5 for further detail in relation to specific studies.

Summary of findings

Mindfulness was conceptualised and modelled in every possible position within correlation, regression, and path analyses, i.e. as independent variable (n=7; 33.3%), dependent variable (n=3; 14.29%), mediator (n=5; 23.81%), moderator (n=8; 38.1%), correlate (n=1; 4.76%), and covariate (n=1; 4.76%). Four of the 21 papers modelled mindfulness as more than one type of variable within the same study (19.05%), e.g., as an independent variable and moderator within separate analyses.

Two of the 21 studies (S. M. Coyne et al., 2023; Passavanti et al., 2021) did not include the three variables of interest (i.e. mindfulness, social media, and mental health) within the same analysis / analyses, despite including all three within the paper (hence their inclusion in this review).

In the following sections, the findings will be summarised separately with respect to papers that modelled mindfulness as an independent variable, dependent variable, mediator, moderator, covariate, and correlate.

Independent variable

In seven of the 21 studies included (33.33%), mindfulness was modelled as an independent variable / predictor variable (Apaolaza et al., 2019; Bauer et al., 2017; S. M. Coyne et al., 2023; Du et al., 2021; Eşkisu et al., 2020; Gu et al., 2022; Yang et al., 2017). All of these studies employed cross-sectional designs, with the exception of Du et al. (2021) which used a longitudinal design (NB. data were collected at three time points, each with an interval of four months), although this did not preclude the authors from using (unmerited) causal language.

Of these seven studies, mindfulness was modelled as a predictor of both social media *and* mental health outcomes in three studies, as a predictor of social media only in two studies, and mental health only in two studies.

With respect to predicting social media constructs, in five studies (Apaolaza et al., 2019; Bauer et al., 2017; Du et al., 2021; Eşkisu et al., 2020; Gu et al., 2022) the authors interpreted their findings as showing that mindfulness had a 'beneficial' impact on social media outcomes; thus, higher levels of mindfulness were associated with decreased problematic usage (e.g., compulsive use) or increased beneficial usage (e.g., autonomous motivation). No studies showed an association between mindfulness and more problematic patterns of usage / decreased beneficial use, or the absence of an association. Social media constructs examined included compulsive use, autonomous motivation, self-control failure, addiction, and rumination.

In two studies (Apaolaza et al., 2019; Gu et al., 2022), the *indirect* effect of mindfulness on social media outcomes was found to be mediated by other variables. Apaolaza et al. (2019) found that the beneficial (i.e. negative) effect of mindfulness on

compulsive social networking site use was mediated by a pathway through (increased) self-esteem and (reduced) anxiety. Gu et al. (2022) found that the beneficial (i.e. negative) effect of mindfulness on social media rumination was completely mediated by (reduced) upward social comparison.

With respect to predicting mental health, in four studies (Apaolaza et al., 2019; Bauer et al., 2017; Du et al., 2021; Yang et al., 2017), mindfulness was interpreted as having a 'beneficial' effect on mental health, such that higher levels of mindfulness were associated with increased wellbeing or reduced psychopathology. Whilst one study (S. M. Coyne et al., 2023) found no significant association between mindfulness and mental health outcomes, no studies reported findings consistent with a harmful impact of mindfulness on mental health. Mental health constructs examined included self-esteem, affect, stress, depression, emotional problems, conduct problems, and life satisfaction.

Apaolaza et al. (2019) also explored mediating / intervening variables in paths between mindfulness and mental health outcomes, and found that the beneficial effect of mindfulness on stress levels was mediated by a pathway through (increased) self-esteem, and (reduced) anxiety and compulsive social networking site use.

Dependent variable

In three of the 21 studies (14.29%), mindfulness was modelled as a dependent variable. The study designs were cross-sectional (Baker et al., 2016), longitudinal (Du et al., 2021), and experimental (Throuvala et al., 2020).

In two of the three studies, analyses explored whether mindfulness was predicted by a social media variable: fear of missing out (FOMO) (Baker et al., 2016), and social media self-control failure (Du et al., 2021). In both studies, there was a significant negative relationship between social media variables and mindfulness, such that higher levels of FOMO predicted lower levels of mindfulness, and higher levels of social media self-control failure were associated with lower levels of mindfulness.

No studies explored whether mindfulness was predicted by a mental health variable / mental health variables.

Finally, Throuvala et al. (2020) had participants complete an intervention comprised of mindfulness exercises, self-monitoring of smartphone usage, and mood tracking. The intervention was found to have significant beneficial impacts on mindfulness, mental health outcomes (stress, anxiety, FOMO), and levels of problematic social media use.

Mediator

In five out of the 21 studies (23.81%), mindfulness was modelled as a mediator (Eşkisu et al., 2020; Jones et al., 2022; Kircaburun et al., 2019; Moqbel et al., 2023; Weaver & Swank, 2021). All employed cross-sectional designs.

In two of the studies, the potential mediating role of mindfulness was explored in associations between social media and mental health variables (Jones et al., 2022; Moqbel et al., 2023), in two studies between mental health and social media variables (Eşkisu et al., 2020; Kircaburun et al., 2019), and in one study between two social media variables (Weaver & Swank, 2021). Social media constructs examined included addiction, engagement, problematic use, 'healing' use, and FOMO. Mental health variables examined included depression, anxiety, stress, and self-esteem. In the mediating pathways described below, higher levels of mindfulness were consistently associated with better mental health / less psychopathology and/or less SM use / less problematic SM use.

Four out of the five studies ran simple (three-term) mediation models, with mindfulness modelled as a single mediating variable (Jones et al., 2022; Kircaburun et al., 2019; Moqbel et al., 2023; Weaver & Swank, 2021). These studies showed that mindfulness was a significant mediator between the two variables. Specifically, mindfulness was found to mediate an association between social media engagement and depression, trait emotional intelligence and problematic social media use, social media addiction and depression, and FOMO and problematic social media use.

In addition, other more complex models were also run. Thus, one of the studies described above (Kircaburun et al., 2019) also ran a more complex model whereby, as well the mediating role of mindfulness in the relationship between trait emotional intelligence and problematic social media use, a serial mediation through two other variables was also explored (rumination and depression: i.e. (i) trait emotional intelligence –> mindfulness –> rumination –> problematic social media use, and (ii) trait emotional intelligence –> mindfulness –> depression –> problematic social media use). (*NB. trait emotional intelligence and rumination were not included as mental health variables in our original search terms).* The findings showed that mediating pathways through mindfulness, rumination, and depression fully accounted for the association between trait emotional intelligence and problematic social media use.

In another study (Eşkisu et al., 2020), two separate mediating paths were represented within the same model, whereby the mediating role of mindfulness in the relationship between two mental health outcomes and Facebook addiction was explored ([i] psychological symptoms [depression, anxiety, stress] –> mindfulness –> Facebook addiction, and [ii] self-esteem –> mindfulness –> Facebook addiction). Mindfulness was found to fully mediate the association between mental health and Facebook addiction across the two separate paths.

Finally, one study (Jones et al., 2022) explored the potentially mediating role of five separate facets of mindfulness (non-reactivity, observe, awareness, describe, and non-judgement) in a presumed association between social media engagement and depression. All facets except 'observe' were found to play a significant mediating role.

Moderator

In eight out of the 21 studies (38.10%), mindfulness was modelled as a moderator (Brailovskaia & Margraf, 2022; Hong et al., 2021; Hu et al., 2022; Li et al., 2022; Lutz, 2023; Majeed et al., 2020; Poon & Jiang, 2020; Yang et al., 2017). Four of these featured cross

sectional designs (Brailovskaia & Margraf, 2022; Hong et al., 2021; Hu et al., 2022; Yang et al., 2017), three longitudinal (Li et al., 2022; Lutz, 2023; Majeed et al., 2020), and one experimental (Poon & Jiang, 2020). *(NB. in the longitudinal studies, data were collected at three months after baseline [Li et al., 2022], every day for seven days [Lutz, 2023], and at three time points, with a minimum of seven days between each [Majeed et al., 2020]).*

Of the eight, four employed basic three-term moderation analyses (Brailovskaia & Margraf, 2022; Lutz, 2023; Poon & Jiang, 2020; Yang et al., 2017), with mindfulness modelled as a moderator in the association between two variables.

In one of these (Brailovskaia & Margraf, 2022), mindfulness was explored as a moderator in an association between positive mental health and (less) addictive social media use (i.e. between a mental health variable and a social media variable). However, counter to the authors' prediction, high levels of mindfulness did not strengthen this association, but in fact weakened it. Second, Yang et al. (2017) found that mindfulness moderated the relationship between self-esteem and two social media variables (depth of social media self-presentation and authenticity of self-presentation on social media), both in a beneficial / protective manner.

In the two remaining studies, mindfulness was examined as a moderator in the relationship between a social media variable and a mental health variable. First, Poon and Jiang (2020) found that mindfulness moderated the effect of a social media manipulation on mental health outcomes. Specifically, relative to participants who received five likes, those who only received one like reported higher levels of psychological distress and negative emotion, an effect that was diminished in participants who were higher in mindfulness. Second, Lutz (2023) found that mindfulness did not significantly moderate the negative relationship between ostracism and self-esteem.

The remaining four studies used moderated mediation analyses (Hong et al., 2021; Hu et al., 2022; Li et al., 2022; Majeed et al., 2020). In two of these, mindfulness was tested

for its capacity to moderate both a direct effect between the dependent and independent variables, and the first step of the indirect effect (Hu et al., 2022; Li et al., 2022). Hu et al. (2022) found that lower self-esteem mediated the effect of upward social comparison on higher levels of materialism, and mindfulness moderated these paths as noted: thus, upward social comparisons were *less* predictive of both low self-esteem (indirect path) and higher levels of materialism in those with greater levels of mindfulness (direct path). Second, Li et al. (2022) found that greater levels of rumination mediated the effect of cyber-ostracism on poorer psychological wellbeing, and mindfulness moderated these paths as noted: thus, the effects of cyber-ostracism on rumination (indirect path) and psychological wellbeing (direct path) were eradicated at high levels of mindfulness.

Finally, in the remaining two studies, mindfulness was tested for its ability to moderate only the first step of an indirect effect (Hong et al., 2021; Majeed et al., 2020). Both studies modelled a social media variable as a predictor of a mental health variable, with indirect / mediating through a variable that was not part of our original search terms (rumination and fear of COVID-19). In Hong et al. (2021), mindfulness moderated the association between online exposure to COVID-19 information and distress, and in Majeed et al. (2020), it moderated the association between problematic social media use during COVID-19 and depression, again, both in a protective manner.

Other

One of the 21 studies (4.76%) included modelled mindfulness as a covariate (Passavanti et al., 2021) rather than being included in primary hypotheses. Specifically, mindfulness was included as a covariate in a number of analyses exploring the association between psychological impacts of COVID-19 and: (i) sociodemographic variables (e.g., gender, education, income), (ii) patterns of free time use (e.g., 'during the lockdown period, do you usually go out for a walk or exercise', 'during the lockdown period, do you usually go out for non-essential shopping?'), and (iii) communication variables (e.g., 'how often did you use smartphone and computer to keep in touch and / or stay on social networks before the

epidemic?', 'what is your main source of information on health and infection?'). Whilst the findings of these analyses are not reported here, it is worth noting that additional analyses showed that lower levels of mindfulness were associated with higher levels of stress, depression, anxiety, and symptoms of post-traumatic stress disorder (PTSD).

Finally, in the remaining study, mindfulness was modelled as a correlate (Weaver & Swank, 2021), i.e. with no assumed / proposed underlying direction of causality. The authors found that mindfulness positively correlated with mental health variables (life satisfaction and self-esteem) and negatively correlated with problematic social media outcomes (problematic social media use and FOMO).

Discussion

This paper aimed to systematically review empirical research exploring links between mindfulness, mental health, and social media use, with a view to examining the potential for mindfulness to act as a protective factor in the relationship between mental health and social media engagement. Overall, 19 of the 21 papers included in this review were broadly consistent with this possibility; in contrast, one study (S. M. Coyne et al., 2023) found no link between mindfulness and mental health (depression, emotional problems, and conduct problems), and one study found that mindfulness did not moderate an effect between cyber-ostracism and self-esteem (Lutz, 2023). In contrast, no papers presented findings consistent with a detrimental role for mindfulness in the association between social media use and mental health (or independently with either of these constructs for that matter).

This review is the first to examine the links between mindfulness, mental health, and social media together. The findings are broadly consistent with existing systematic reviews that suggest that mindfulness is (independently) linked to more positive / less problematic patterns of social media use (Alsubaie et al., 2017; Baer et al., 2012) and better mental health outcomes (Sun, 2022). Given well documented associations between problematic patterns of social media use and poorer mental health (Twenge & Campbell, 2018; Twenge

et al., 2018), however, it is perhaps not surprising that when mindfulness is associated with either better mental health or healthier ways of using social media, positive associations are also seen with the other construct, suggesting a potential network of linked and mutually influencing constructs (though more on causality below).

However, whilst this review aimed to systematically review empirical studies exploring links between mindfulness, mental health, and social media, it is important to note that many of the papers independently examined links between mindfulness and social media, and mindfulness and mental health, rather than links between all three constructs. Therefore, only 12 of the 21 papers reviewed can tell us about the interaction between mindfulness, social media, and mental health. In terms of mediating pathways, four of the 21 studies found that mindfulness was a significant mediator, two in the association between social media and mental health variables (Jones et al., 2022; Moqbel et al., 2023), and two in the association between mental health and social media variables (Eşkisu et al., 2020; Kircaburun et al., 2019), suggesting that mindfulness can influence these associations in a protective manner. In terms of moderating pathways, two studies found that mindfulness moderated the relationship between social media and mental health variables in a protective manner (Poon & Jiang, 2020; Yang et al., 2017), whilst one found that mindfulness in fact weakened the relationship between positive mental health and addictive social media use (Brailovskaia & Margraf, 2022), and another did not find a significant moderating effect of mindfulness (Lutz, 2023). In terms of the four moderated mediation analyses, mindfulness was again found to be protective in the relationship between social media use and mental health outcomes (Hong et al., 2021; Hu et al., 2022; Li et al., 2022; Majeed et al., 2020). Therefore, 10 of the 12 studies which examined links between all three constructs suggest that mindfulness may have a protective effect on social media use and mental health outcomes. Whilst further research exploring the interaction between all three constructs is necessary, the implications of the findings outlined here are that manipulation of mindfulness

through intervention may have beneficial consequences for both positive mental health and social media use outcomes.

In terms of the underlying mechanisms of action, Tibber and Silver (2022) placed the mode of engagement (mindful or mindless) central in their model, conceptually and diagrammatically, with connections feeding into processing biases, thoughts, feelings and sensations, as well as behaviours, suggesting a potential to shape a broad range of processes, and as a result, the likelihood that benefits and / or risks of engagement are accrued. Broadly speaking, the findings are in support of this proposal.

With respect to thoughts and processing biases, the model suggests that mindfulness "*ameliorates information processing biases by enabling greater attentional control and access to internal and external signals that carry potentially relevant information",* and enables the user to *"process / weigh up the potential benefits and costs of their behaviour using this information"*, i.e. essentially to think and process information in a more helpful way that takes into consideration the full range of relevant information available (p.26) (Tibber & Silver, 2022). Consistent with this perspective, the review suggests that mindfulness is linked to less social media rumination (Gu et al., 2022; Hong et al., 2021), and less fear of missing out (Throuvala et al., 2020; Weaver & Swank, 2021), as well as moderating a reduction in rumination at high levels (Hong et al., 2021).

With respect to behaviours, feelings and sensations, the model proposes that mindfulness enables the user to engage with social media "*in a manner that is in the service of their needs and values (behaviours), the net effect of which is (typically) to […] reduce negative and increase positive affective states (feelings / sensations) and drive more adaptive cycles of thoughts, feelings and sensations"* (p.26-27) (Tibber & Silver, 2022). Once again, the studies included broadly support this notion, with mindfulness being linked to a range of more helpful / less harmful patterns of use, including less compulsive use (Apaolaza et al., 2019), less addictive and problematic patterns of social media use (Bauer et al., 2017; Brailovskaia & Margraf, 2022; Eşkisu et al., 2020; Kircaburun et al., 2019;

Throuvala et al., 2020; Weaver & Swank, 2021), and less failure in social media self-control (Du et al., 2021), as well as more positive mental health and wellbeing outcomes, including lower levels of anxiety (Passavanti et al., 2021; Throuvala et al., 2020), stress (Bauer et al., 2017; Passavanti et al., 2021; Throuvala et al., 2020), PTSD (Passavanti et al., 2021), depression (Jones et al., 2022; Moqbel et al., 2023; Passavanti et al., 2021), and distress / negative emotion (Poon & Jiang, 2020), and higher levels of self-esteem (Apaolaza et al., 2019; Weaver & Swank, 2021; Yang et al., 2017), positive affect (Bauer et al., 2017), and life satisfaction (Du et al., 2021; Weaver & Swank, 2021).

Taken together, therefore, the findings implicate mindfulness in a range of social media associated cognitive, affective, and behavioural processes, seemingly in a beneficial manner. What is lacking however, is a sense of if / how they are causally linked. Whilst studies suggest a potential mediating role of mindfulness in the association between less problematic social media use and better mental health (e.g., Apaolaza et al, 2019; Weeks, 2023), these and most others in the review were cross-sectional in nature, therefore it was not possible to infer underlying directions of causality (despite authors often using unwarranted causal language). Nonetheless, four studies employed longitudinal designs (Du et al., 2021; Li et al., 2022; Lutz, 2023; Majeed et al., 2020), and two studies used experimental designs (Poon & Jiang, 2020; Throuvala et al., 2020).

With respect to the longitudinal studies, while Lutz (2023) found that mindfulness did not moderate an effect between cyber-ostracism and self-esteem, the findings of Du et al. (2021), Li et al. (2022), and Majeed et al. (2020) were all consistent with mindfulness being beneficial, predicting reductions in harmful social media use (e.g., social media self-control failure, cyber-ostracism, problematic social media use), or improvements in mental health outcomes (e.g., life satisfaction, psychological wellbeing, depression) across time. However, the longitudinal designs all employed relatively short follow up periods (maximum four months [Du et al., 2021]), and are therefore of limited value in understanding long-term implications of use. In addition, whilst longitudinal designs may assess for one of the pre-

requisites of causality (temporal precedence), they are unable to definitively demonstrate causality. For this, experimental designs are needed.

With respect to the experimental studies, Poon and Jiang (2020) showed that individuals with high mindfulness reported lower levels of negative mental health outcomes after receiving less attention on social media; consistent with Tibber and Silver (2022), therefore, this study suggests that mindfulness may either enable a more realistic evaluation of information, with consequences for emotional and affective outcomes, or, simply facilitate more adaptive emotional responses to difficult online experiences. In the other experimental study included, participants who completed an intervention promoting mindful use of social media (amongst other factors), showed an increase in mindful attention, and a reduction in poor mental health and negative social media use outcomes compared to control participants (Throuvala et al., 2020). This suggests that active manipulation of mindfulness (i.e. through intervention) may result in changes in social media use and mental health, although it is unclear how these two effects were related; for example, did mindfulness independently effect social media use and mental health, or was one a knock-on effect of the other?

Conceptualisation of mindfulness

The wider mindfulness literature has been criticised for its lack of conceptual clarity, representing a challenge to the creation of agreed-upon, reliable, and valid instruments for measuring mindfulness (Malinowski, 2008). Leaving aside the issue of state versus trait conceptualisations (more on this below), Daniel et al. (2022) highlighted how different theoretical conceptualisations of mindfulness have led to self-report scales and measures which differ considerably in content structure. Thus, whilst some conceptualise mindfulness as a single factor, unified construct, e.g., the Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003), others conceptualise mindfulness as a latent construct comprised of multiple factors, e.g., the Five-Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2006),

which conceptualises mindfulness as being composed of the following five sub-processes: 'observing', 'describing', 'acting with awareness', 'non-judging', and 'non-reactivity'.

Such heterogeneity in conceptualisation was also reflected in the papers reviewed here. Thus, whilst the majority of papers used the Mindful Attention Awareness Scale (Brown & Ryan, 2003), or else some other measure that conceptualised mindfulness as a single factor construct (the Child and Adolescent Mindfulness Measure [Greco et al., 2011], Freiburg Mindfulness Inventory [Kohls et al., 2009], and Cognitive and Affective Mindfulness Scale-Revised [Feldman et al., 2007]), three papers (Apaolaza et al., 2019; Gu et al., 2022; Moqbel et al., 2023) explored associations between key variables, whilst drawing on a single facet of mindfulness; specifically using a scale developed by Turel and Osatuyi (2017), which is based only on the 'acting with awareness' subscale of the Five-Facet Mindfulness Questionnaire (Baer et al., 2006). In addition, one paper (Jones et al., 2022) tested for associations between each of the five subscales / facets of the Five-Facet Mindfulness Questionnaire (Baer et al., 2006) and key variables of interest using mediation analyses.

Whilst exploring associations between key variables of interest and particular facets of mindfulness may be useful in exploring underlying mechanisms, as well as informing potential sub-skills to target in interventions, such variation in how a construct of interest is conceptualised can lead to important variation in how it is operationalised, measured, and statistically modelled, resulting in seeming discrepancies in the literature. Nonetheless, the findings reported here suggest largely convergent findings irrespective of whether mindfulness was conceptualised as a single-factor construct, or as comprised of multiple facets / sub-processes; see Jones et al. (2022) however, which showed that not all facets behaved identically.

Interestingly, mindfulness measures used in studies included in this review measured *trait* rather than *state* mindfulness (Five-Facet Mindfulness Questionnaire; Mindful Attention Awareness Scale; Freiburg Mindfulness Inventory; Trait Mindfulness Questionnaire; Child and Adolescent Mindfulness Measure; Cognitive and Affective Mindfulness Scale-Revised).

As noted, trait mindfulness refers to a person's (largely stable across time) predisposition to being mindful (Brown & Ryan, 2003); as such, its inclusion in cross-sectional research in which an individual's level of mindfulness is not being manipulated makes sense. Nonetheless, it would be interesting to consider the use of *state* mindfulness measures such as the State Mindfulness Scale (Tanay & Bernstein, 2013) or Toronto Mindfulness Scale (Lau et al., 2006) in experimental research. If short-term beneficial effects were observed, these could inform the development and testing of brief micro-interventions, potentially built into the technology itself, designed, for example, to promote mindful engagement at the moment of logging on to a social media site or when about to post content.

Quality of reviewed literature

With respect to the formal quality assessment tool used, since Kmet et al. (2004) did not provide standardised cut-offs for their measure, it is difficult to give an overall rating of literature quality. Nevertheless, only five of the 21 studies included scored below 75% on the tool (23.81%).

Digging into the specifics of the quality assessment tool, 19 of the 21 studies lost points on the method of subject selection. This was predominantly because the study recruited participants online (n=16), which may have introduced biases with respect to socioeconomic status, motivation for engagement, and gender into the sample (Blumenberg et al., 2019). Additionally, papers lost points for recruiting students (most often university students) without a rationale for doing so (n=8), e.g., a particular interest in this target population. This therefore calls into question the generalisability of the findings to the wider population in terms of identity characteristics as, for example, students are more likely to be of higher socioeconomic status and have higher IQ, and thus more subsequent life opportunities, compared to a general population sample.

The second most common reason for losing points on the quality assessment tool was not controlling for confounding variables, on which eight of the 21 studies lost points. It

was determined *a priori* that studies should at a minimum control for both age and gender (either as a control / predictor / confounder variable or through sensitivity analyses), as these factors have been shown to covary with both social media use and mental health (Booker et al., 2018). Lack of controlling for these confounding variables could thus decrease the internal validity of the studies, and lead to over- or under-estimation of observed associations. In addition, there is a possibility that some of the observed effects may have been driven by third variable effects / confounding effects, leading potentially to some false positives being observed within the data. However, as studies which did control for age and gender also overarchingly found mindfulness to be beneficial / protective, it suggests that this may not be the case.

The third most common reason for lost points was due to a lack of well-defined outcome and exposure measures. This was reinforced by the additional quality measures included, which found that the most common weakness was the lack of a valid and reliable measure of social media. Many studies used single-item, self-report measures of time spent on social media, or custom-written / previously unvalidated measures of behaviours or psychological processes linked to social media use, such as cyber-ostracism, online social comparison, and motivations for social media engagement. As eight studies lost points for using invalid or unreliable measures of social media use, perhaps the conclusion that mindfulness protects against harmful social media use should be more tentative, given there is some uncertainty to whether social media use / engagement is being accurately measured within the literature included in this review. The wider literature base has criticised the reliability of validated self-report social media measures when compared with objective data (P. Coyne et al., 2023), which further calls into question the single-item and unvalidated measures which were utilised in some studies within this review. Therefore, this suggests that until research more broadly uses objective measures, or self-report questionnaires improve, that the accuracy in which social media use is being measured, and therefore conclusions around its associations with mindfulness, may be limited. In comparison, only

three studies lost points for invalid or unreliable measures of mental health, suggesting that conclusions relating to mindfulness protecting against poor mental health may be more robust.

Other limitations of the literature, not identified by the quality assessment tool, include the paucity of research on non-WEIRD (White, Educated, Industrialized, Rich, and Democratic) samples (Henrich et al., 2010), a pattern that is seen in the wider mental health literature more generally, and which may have been exacerbated by our inclusion criteria of including only English language papers.

In addition, the research was focused mainly on young people, with a mean age of 22.68 years old (std dev=6.87) across the 19 studies which reported age. This is perhaps not surprising given that adolescents and emerging adults are amongst those who use social media most heavily (Petrosyan, 2023), and are therefore the target of greatest concern when it comes to the effects of social media use on mental health. This may not be entirely unwarranted; as Orben et al. (2022) has highlighted windows of developmental sensitivity to the negative effects of social media use, which occur between 14-15 years old for *males*, and 11-13 years old for *females*, with a further sensitivity seen for both males *and* females at age 19. However, with children using social media from as young as three years old (Ofcom, 2023), it is of utmost importance that research includes a younger sample to determine whether the potential beneficial effects of mindfulness extend to this population.

As noted, the majority of the studies included in the review were cross-sectional in design (all but six studies), such that the research as it currently stands is largely unable to speak to underlying directions of causality, a criticism that is characteristic of social media research (Bekalu et al., 2023) as well as mindfulness research more generally (Nature Mental Health, 2023).

Finally, whilst the included studies explored a range of mental health variables, these related primarily to common affective disorders, including anxiety, depression, and PTSD

(Our World in Data, 2019; World Health Organisation, 2022). Other prevalent mental health conditions, including severe and enduring mental illnesses (SMI) such as bipolar, schizophrenia, and eating disorders were not included. Given the growing research base documenting the potential harmful links between social media use and body dissatisfaction and eating disorders (Marks et al., 2020), for example, it is imperative (I would argue) that research of this kind be extended to explore links to mental health more broadly. Further, given the growing recognition of the potential benefits of social media use alongside the risks, there may be merit in further studies exploring associations with positive mental health and wellbeing, though a predominant focus of potential harms has been documented elsewhere (Bekalu et al., 2023; Orben, 2020).

Overall, despite limitations in the quality of the literature as outlined above, there was high consistency in findings across studies, with no studies showing negative effects of mindfulness, in relation to social media use and wellbeing independently, or in associations between the three variables. Therefore, despite potential file drawer effects, it seems unlikely that there is a net negative effect of mindfulness. Therefore, the consistency of findings suggests that should mindfulness have an effect, then it is likely positive one, though limitations such as cross-sectional designs, poor measures, and biased samples mean that the underlying mechanisms and generalisability of findings remain unclear.

Limitations of the review

There are a number of limitations of this review. First, whilst many social media users access platforms via their smartphones, the review did not include studies of smartphone use more broadly. However, this was intentional, since the core interest of the thesis was on the potential protective role of mindfulness in the association between *social media use* as a social technology, and mental health; thus, smartphones are used for a wider range of purposes than can be explained by social media, although arguably this may be decreasingly so with the growing list of features offered by social media and blurring of functionalities between different digital technologies (Nesi et al., 2018a, 2018b). In addition,

much of the literature on mobile phone use (more generally) has tended to focus almost exclusively on 'problematic smartphone use', such that the research is arguably biased towards the harms of engagement, whilst de-emphasising the potential benefits.

A further limitation was that the range of search terms used to define mindfulness was quite narrow, including only 'mindfulness', 'mindful', 'trait mindfulness', and 'state mindfulness'. As a result, the review may have missed some findings, which may have been captured if a broader range of overlapping constructs had been included, e.g., 'decentred awareness', 'psychological flexibility', and 'meta-cognition'.

Implications

The near ubiquitous use of social media means that it is paramount that we learn how to use these powerful technologies to harness their benefits and ameliorate their harms. It is also becoming increasingly evident that reductionistic, causationist / deterministic assumptions, and dose-response models based on the notion of screen time or *frequency* of social media use (etc.), which lend themselves to calls for social media abstinence or periods of 'digital detox' are unrealistic in today's increasingly digitally connected world (Radtke et al., 2022), which includes the use of screens for social connection, work, education, entertainment etc. (Clayton & Clayton, 2022).

In this context, the hunt for individual differences linked to risk and resilience, and relatedly, viable targets for intervention, is crucial. Whilst further longitudinal and experimental work is necessary, the findings from this review suggest that mindfulness may play a protective role in the association between social media use and mental health. This is useful for two reasons: first, because it means that assessments of trait mindfulness may be helpful in identifying individuals or groups that are particularly vulnerable to the harms of social media. Second, and crucially, it identifies a potential target for intervention. Thus, studies have shown that mindfulness can be targeted and trained, both in formal group intervention programs such as Mindfulness-Based Cognitive Therapy (MBCT) and

Mindfulness-Based Stress Reduction (MBSR) (Gu et al., 2015), as well as in private mindfulness practice in daily life (Kemper, 2017; Linardon, 2023). In addition, mindfulness-based approaches have been shown to be highly effective in supporting behavioural change (Schuman-Olivier et al., 2020).

Tibber and Silver (2022) have convincingly argued that given the growing ubiquity of social media use and links to mental health and wellbeing, exploration of clients' online lives should play an integral part of the assessment process (as well as, where indicated, formulation and intervention) in community mental health services. In their model, they posit that an individual's *mode* of engagement (habitual / automatic vs. intentional / purposeful or, said another way, mindful vs. mindless) represents a crucial process in determining whether benefits or harms of engagement are likely to be accrued. The findings of this systematic review broadly support this notion, and arguably, indicate the potential value in exploring the extent to which social media (and digital technologies more generally) are engaged with mindfully and purposefully versus automatically. To this end, basic questions such as "when you go online, do you tend to know what you are hoping to get out of it…are you aware of how much time you have spent on it?" etc., along with a clarification of typical online behaviours engaged in (e.g., passive scrolling vs. purposeful connection with friends), could be a good place to start when formulating triggers for distress. Relatedly, in their cognitive behavioural conceptualisation of social media use, Tibber and Silver (2022) also make recommendations which are in line with the findings of this review, to help individuals cultivate their capacity for mindful online engagement, such as using basic reminders to encourage them to check in with themselves, and track the consequences of their social media use, for example, how it is making them feel.

Future research

The findings of this review suggest that mindfulness plays a potentially protective role in the association between social media use and mental health. However, future

experimental and longitudinal research (with longer follow-up) is needed to identify underlying mechanisms of action and directions of causality.

Studies should also explore the potential for mindfulness as a target for intervention in supporting healthy social media use (and potentially in the treatment of difficulties linked to social media use). In relation to this, important questions to explore are whether such interventions and mindfulness practices should be informal and embedded within standard clinical practice, e.g., cultivation of purposeful / intentional engagement with social media and self-monitoring skills during engagement, vs. more formal (i.e. "on the cushion") meditation practices, with the hope that these will generalise to everyday life. In relation to the latter, it will be important to identify particular forms of meditation and practice that are most effective, e.g., group interventions vs. one-to-one instruction, and insight meditation vs. loving-kindness meditation etc. In addition, it is important to exercise caution in terms of how mindfulness interventions are developed and delivered, given recent findings suggesting that universal mindfulness interventions may not always be beneficial (Kuyken et al., 2022).

Future research should also account for the experience of younger children. Many social media sites impose limits that children should be 13 years old to sign up (Childnet, n.d.), although these are in practice extremely difficult to apply. Thus, a report from Ofcom (2023) found that 64% of children aged 3-17 have used social media apps. At such a critical time in development, it is even more important that we understand how interventions such as mindfulness could facilitate safe and healthy use which promotes better wellbeing.

Conclusions

The findings reported support a potentially protective role for mindfulness in the association between social media use and mental health, whilst identifying existing gaps and weaknesses in the literature. It is hoped that findings from this review and recommendations for future research will (ultimately) help inform the development of public health recommendations and social media interventions and resources, with the aim of cultivating

positive and healthy online patterns of engagement. Mindfulness has been demonstrated to

promote both positive social media engagement and better mental health, therefore is

deemed a beneficial trait to study further, especially in relation to young people's mental

health, and development of interventions which could be implemented effectively across

society.

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Part Two: Empirical Paper

Exploration of a Novel Trans-Diagnostic Cognitive Behavioural Model of Social Media

Use in Emerging Adult Populations

Abstract

Aims

This project aims to test predictions to emerge from Tibber and Silver's (2022) trans-diagnostic cognitive behavioural model of the role of social media use in mental health and wellbeing in emerging adults. Specifically, the model proposes that certain motivations for engagement, online behaviours, and modes of engagement (amongst other factors) are differentially associated with positive and negative online experiences, and further, that certain platforms and platform features may interact with these processes. Specifically of relevance here, the model hypothesises that social media use that is active, mindful, and driven by enhancement motivations will result in better mood and increased social connectedness.

Methods

Participants were 352 18-29 year old social networking site (SNS) users, recruited online and via word of mouth. Participants completed an online questionnaire which asked them to recall two SNS experiences - one positive and one negative - and answer a series of questions / questionnaires in relation to these. Survey items included reflections on their motivations for engagement, online behaviour, and mode of engagement (mindful vs. mindless) in relation to each, as well as shifts in mood and social connectedness associated with the experiences.

Results

The findings were broadly in line with Tibber and Silver's (2022) model, whereby SNS use which is active, mindful, and motivated by enhancing the user's social network was associated with benefits to wellbeing. In terms of mediating and moderating pathways, only the mediation of relationship formation on positive mood through active use in the positive SNS condition was significant. Qualitative findings demonstrated that individuals often had positive experiences on SNSs when they felt connected to others, through conversation and

sharing content, as well as when making new friends. In contrast, participants often had negative experiences when receiving negative communication from others, viewing negative comments, or when scrolling through content.

Conclusions

Overall, this project has demonstrated the clinical utility of Tibber and Silver's (2022) model as a way to formulate the benefits and harms of SNS use in emerging adults. Future research should aim to further test the model, to extend our understanding of the benefits and harms associated with affordances of UK platforms, as well as exploring the active / passive distinction further, to establish a more contextualised understanding of SNS use and its associated outcomes for wellbeing. Lastly, the model would benefit from integrating users' social and cultural identity, to consider how this may intersect with their SNS use and wellbeing.

Introduction

Social media is an increasingly popular online activity that has changed our ability to connect and interact with others. As of January 2024, 5.04 billion people were active social media users, up from 1.87 billion in 2014, meaning 62.3% of the global population are now connected via social media apps / websites (Kemp, 2024). Of this increasing digital population, emerging adults, defined by Arnett (2014) as 18 to 29 years old, are some of the most frequent social media users (Petrosyan, 2023); perhaps unsurprisingly, given social media has been a constant presence throughout their development (Meola, 2023). It is estimated that the average social media user spends 143 minutes daily using social media (Kemp, 2024). Nevertheless, considering only the *amount* of time spent online disregards consideration of the types of online activities individuals engage with, and their associated effects.

Whilst social media platforms enable creation and sharing of content, a subset of social media, known as social networking sites (SNSs), allow users to *"(1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system"* (p.211) (Boyd & Ellison, 2007). Data from We Are Social and Meltwater (2023) shows that the primary driver for social media use for all age ranges between 16 and 64 years is connecting with friends and family, a behaviour easily facilitated by SNSs. In January 2024, social networking was the most popular digital activity for 16 to 24 year olds (compared to frequency of visiting / using other online activities such as chat and messaging, search engines and portals, and shopping), with 96.9% having visited a social network in the past month (Kemp, 2024). Such data demonstrates how social connection is a significant part of life for many individuals, and something which can be facilitated by the online sphere.

Associations between social media and mental health

As mental health difficulties continue to increase, both for the general population (World Health Organisation, 2022), as well as for young people / adolescents specifically (McElroy et al., 2023), researchers have questioned whether rising social media use may play a part. Whilst much of the research base has been criticised for being cross-sectional and exploratory with small negative associations between social media use and wellbeing (Orben, 2020; Orben & Przybylski, 2019), experimental and longitudinal studies have shown conflicting results. For example, whilst Twenge et al. (2018) and Haidt et al. (ongoing) have asserted that increasing social media use drives mental health difficulties, longitudinal research over a six year period from Heffer et al. (2019) suggests a reversed direction of causality, such that adolescent females who experienced greater depressive symptoms tended to use social media more across time. However, no significant relationship was found for males overall, or females of undergraduate age. Overall, the current literature base supports possible bidirectional effects between social media use and mental health outcomes (Ferguson, 2024; Green, 2021).

Despite the majority of research focussing on the *harms* of social media use on mental health and wellbeing, a developing evidence base has highlighted potential *benefits*, resulting from specific ways of engaging with the technology (de Leeuw & Buijzen, 2016; Schønning et al., 2020). For instance, there is evidence that social media may give rise to possible positive consequences for mental health outcomes, self-esteem, and social capital, facilitated by increased opportunities for peer-engagement, self-disclosure, and self-exploration (Erfani & Abedin, 2018; Uhls et al., 2017). In addition, a large scale study (N = 2,414,294) by Vuorre and Przybylski (2023) concluded that 84.9% of associations between mobile internet connectivity and wellbeing (including life satisfaction, negative and positive experiences, and social life satisfaction) were positive and statistically significant, compared to only 0.45% which demonstrated significant negative associations, suggesting that mobile internet access likely benefits wellbeing overall.

Contextualising social media use: person- and technology-related factors

Whilst much of the literature continues to adopt a 'causationist' approach regarding whether social media is harmful or beneficial to mental health, research has started to move towards a more nuanced 'contextualist' perspective, which shifts the emphasis away from the *how much* of social media engagement, i.e. the time and frequency of use (Meier & Reinecke, 2021), towards a consideration of *how,* i.e. how the user, technology, and environment interact.

In line with this approach, there are many technology- and person-related factors that have been found to influence associations between social media and mental health. With respect to person-level factors, age and gender have been identified as potentially important individual characteristics. For example, longitudinal research from Orben et al. (2022) suggested the presence of distinct developmental windows of social media sensitivity in adolescence, which vary by age and gender, with associations between social media use and lower life satisfaction found to be higher in females at age 11-13, in males at age 14-15, and in both males *and* females at age 19. Similarly, a large scale study by Vuorre and Przybylski (2023) found that negative associations between internet use and wellbeing were observed only in young women aged 15 to 24 years old. In addition, Hardy and Castonguay (2018) examined data from the US 2016 General Social Survey and found that the association between higher social media use and wellbeing varied as a function of age, with better wellbeing seen for those aged 18-29, but poorer wellbeing seen for those aged 30 and over. With respect to technology-related factors, Nesi's transformation framework (Nesi et al., 2018a, 2018b) outlines how different features and affordances of each social media platform / app can lead to varying online experiences, and therefore have varying consequences for wellbeing (more on this below), and Tibber et al. (2023) have shown how different social media platforms are differentially associated with outcomes (self-reported stress and academic attainment).

With respect to underlying theory, Tibber and Silver's (2022) cognitive behavioural conceptualisation of the positive and negative effects of social media on mental health and wellbeing (see Figure 1) attempts to integrate theory, research, and knowledge from clinical practice, and provides broad predictions about the nature of personal and technological factors that may influence outcomes. The model proposes that an individual's motivations for social media use, the behaviours they engage in whilst online, and their mode of engagement, interact with their thoughts, feelings, and sensations, and determine the likelihood with which the user will experience the benefits and / or harms of social media engagement, with consequences for mental health and wellbeing. The model also proposes that platform features and affordances feed and shape such processes.

Figure 1

Tibber and Silver's (2022) cognitive behavioural conceptualisation of the positive and negative effects of social media on mental health and wellbeing

Specifically, the model suggests that the extent to which the benefits or harms of

engagement are experienced are due, in large part, to the extent to which engagement

leads to satisfaction of core needs for acceptance and belonging / greater social
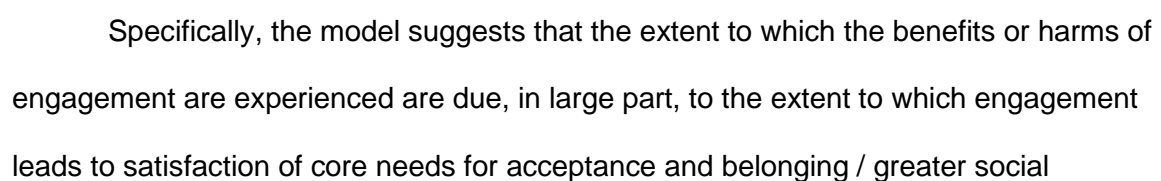
connectedness (*consequences*), as per the interpersonal-connection behaviours framework (Clark et al., 2018), on which the conceptualisation explicitly draws. Further, it suggests that certain aspects of engagement are likely to increase / decrease the likelihood of this resulting. For example, when an individual is motivated by developing / maintaining their social network (*motivations*) and engages in an active and mindful way (*mindful mode of engagement*), they are more likely to engage in behaviours that take them towards things and people they care about (*approach / social approach behaviours*), and as a result, meet core needs for acceptance and social connectedness, with consequent benefits to wellbeing. In contrast, when engagement is motivated by avoiding and escaping from the offline world, and is passive and habitual (*mindless mode of engagement*), the user is likely to feel less socially connected, with resulting negative implications for wellbeing.

The model also draws on a standard cognitive behavioural cycle, which outlines how thoughts, feelings, and behaviours are interconnected, as *per* offline engagement, and can influence one another (Beck, 1979), as well as that thoughts occur in the context of beliefs about the self, others, and the world (Wenzel, 2012). The model also conceptualises how, as *per* the offline world, information experienced online is distorted (or interpreted) through processing biases, including cognitive distortions and attentional biases. Tibber and Silver (2022) note that processing biases are an important consideration for those suffering from mental health difficulties, given links between the two; for example, depression being associated with increased negativity bias, over-generalisation, social comparison etc. (Goggin, 2005). However, Tibber and Silver (2022) acknowledge that a more critical evaluation of the content consumed (as seen under a more mindful mode of engagement) can help to reduce proposed negative effects of information processing biases, for example, by allowing a deeper and more realistic processing of incoming data.

Lastly, alongside person-related factors, the model incorporates how specific features and affordances of different online platforms can affect the users' experience, and

result in benefits or harms depending on the context, in accordance with Nesi's transformation framework (Nesi et al., 2018a, 2018b), on which the conceptualisation also explicitly draws. Whilst social media is inherently designed to capture attention and maintain engagement (Lupinacci, 2021), the transformation framework (Nesi et al., 2018a, 2018b) proposes a set of characteristics which, although present in both online and offline communication, are transformed by the social media context, and vary on a continuum depending on the social media platform / app. Respectively, temporal delays in social exchanges (*asynchronicity*), the degree to which content remains accessible after sharing (*permanence*), exposure to a large and / or public audience (*publicness*), ease of access (*availability*), reduced cues, including interpersonal cues such as vocal tone and facial expression (*cue absence*), the availability of indicators of social metrics, such as likes and comments (*quantifiability*), and the emphasis on photographic and video content (*visualness*). Such affordances vary between platforms, and the framework suggests that they commonly transform peer experiences in certain ways, including amplifying certain experiences and demands, altering the way interactions are perceived or experienced, and increasing the immediacy of interactions. Such changes in communication are not inherently positive or negative, but can result in varying consequences for wellbeing, depending on the individual and their context. For example, research from Tibber et al. (2023) found that different platforms were differentially associated with stress levels, putatively due to their individual features and affordances, which invite distinct levels of engagement; however, the research was cross-sectional, precluding any conclusions about causal relationships.

For clarity, a hypothetical clinical example is outlined to illustrate the conceptualisation and how person- and technology-related factors interact to benefit / harm wellbeing. A young person, Bella, goes online in order to escape from a difficult time at school (*escapist motivation)*, where she has fallen out with some friends. She scrolls her newsfeed (*passive behaviour),* not taking anything in or being aware of her repeated scrolling (*habitual use*), to help distract herself from how she is feeling. In fact, she ends up

feeling more lonely and upset (*feelings),* as she sees pictures of people her age having fun. She thinks to herself "I have no friends, nobody likes me, I'm a terrible person" *(thoughts).* The features and affordances of the SNS platform mean that there are many images / videos that Bella has access to (*availability),* which will likely enhance her feelings of isolation. In addition, she can see metrics of friendship and connectedness such as likes, shares, and comments *(quantifiability)*, which compound her comparison to others, and feeling of having no friends. All these factors, alongside the attention capturing nature of the SNS itself, mean that Bella is unable to effectively self-monitor her mood or critically evaluate the content that she is engaging with (*information bias).* As a result of going online to escape, and engaging in passive and habitual SNS use, Bella's wellbeing and sense of connectedness is reduced (*consequence: increased sense of disconnection*).

In turn, consider how, given small differences in initial conditions, online engagement might instead have led to *positive* consequences. After falling out with some friends at school, Bella decides to go online to connect with a different group of friends from dance class (*social approach motivation).* She messages the group chat that she shares with them, as well as commenting on pictures and videos of the troupe at a recent dance competition (*active behaviour).* She feels proud when looking at how well they did, and happy when speaking to her friends (*feelings).* She thinks to herself "I can't wait to see them all at class tomorrow, we are going to have a great time learning a new routine" *(thoughts).* In this instance, the many images / videos that Bella has access to (*availability*) which have lots of positive comments and likes *(quantifiability)* promote an enhanced state of wellbeing. As Bella is in a positive and calm state of mind, it is easier for her to self-monitor her mood and evaluate the content that she is engaging with critically (*information bias)*, such that when she sees that someone has left a negative comment under the dance video, she is able to rationalise that this is just one person's opinion, whom she does not even know, and therefore is not particularly affected by what they have to say. As the SNS inherently captures her attention, Bella starts to passively scroll through her newsfeed which includes pictures from the school friends she has fallen out with *(passive use)*, however she notices

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that this negatively impacts her mood (*feelings*), and therefore decides to log off the platform and WhatsApp her dance friends instead (*mindful use*), which increases her wellbeing and makes her feel more socially connected (*consequence: increased sense of connection*). Overall, as a result of going online to connect with others, and engaging in active and mindful SNS use, Bella's wellbeing and sense of connectedness is enhanced.

Aim of the paper

This thesis tested several predictions related to key components of Tibber and Silver's (2022) model; specifically relating to individuals' motivations for going online (enhancement / escapist), behaviours when online (active / passive), and mode of engagement (mindful / habitual). The project explored how these core processes, relevant to positive and negative SNS experiences, relate to positive and negative mental health and wellbeing outcomes. There was a focus on transdiagnostic outcomes broadly linked to wellbeing and mental health rather than specific to any diagnosis, in order to remain relevant to a general population sample, rather than only a clinical sample. Further, the focus of Tibber and Silver's (2022) model is on common mental health difficulties (i.e. anxiety and depression), as well as common / everyday patterns of social media use.

Our primary outcome variables were 1) mood / affect, which map on to emotions within the core cognitive behavioural cycle, and 2) social connectedness, a predictor of mental health and wellbeing (Wickramaratne et al., 2022), and closely related to feelings of belonging and acceptance, which are conceptualised as crucial in both Tibber and Silver's model (2022), as well as in the interpersonal-connection behaviours framework (Clark et al., 2018), in determining whether engagement is broadly helpful or harmful.

To address these aims, participants were asked to recall a positive SNS experience, and then self-report via questionnaires their motivations, behaviours, mode of use, mood, and social connectedness, and then do the same for a recalled negative SNS experience, to facilitate a direct comparison (presented in counter-balanced order).

The research focused on emerging adults (18 to 29 year olds [Arnett, 2014]), as this age group are amongst those who use social media / SNSs most heavily, and may (I propose) be particularly susceptible to both the harms and benefits of the online world, because of their developing identity and the centrality of social developmental processes at this stage (Granic et al., 2020). In addition, the project focussed on SNSs as a subset of social media, because of their greater conceptual clarity and focus on social / interpersonal processes (in line with the focus of the model).

The project aimed to identify areas of future research needed to strengthen the model, potentially indicating any adjustments / adaptations needed, and therefore its clinical utility as a tool for formulation for clinicians and public health services, with the ultimate purpose of informing interventions to help individual's use social media in ways that are more likely to accrue the potential benefits and ameliorate the potential harms of the technology; an especially important task for public health given that numbers of social media users are estimated to approach six billion in 2027 (Dixon, 2023).

Hypotheses

Eight hypotheses were tested in total. The first (H1), explored how key variables of interest (motivations, behaviours, mode of engagement) would be differentially associated with self-reported positive and negative SNS experiences. H2-H4 dug deeper into these associations, exploring how these same key variables would be associated with outcome variables of interest (mood [positive and negative] and social connectedness; tested separately for both the positive and negative SNS experiences). Lastly, H5-H8 examined proposed pathways relating to the interactions between the key variables and outcomes. Hypotheses and related literature are outlined below.

H1: (a) Enhancement motivations, active use, and higher levels of mindful engagement will be higher when participants reflect on a self-reported *positive* experience of SNS use, compared to a *negative* experience of SNS use. In contrast, (b) compensatory

motivations, passive use, and lower levels of mindful engagement will be higher in self-reported *negative* experiences on SNSs, than in self-reported *positive* experiences.

Since enhancement motivations, active use, and mindful engagement have been linked to positive outcomes such as reduced psychopathology and enhanced wellbeing (Adnan & Mavi, 2015; Poon & Jiang, 2020; Teppers et al., 2014; Wright et al., 2013), and conversely compensatory motivations, passive use, and habitual engagement have been linked to negative outcomes such as reduced wellbeing (Perugini & Solano, 2021; Teppers et al., 2014) (see below for more details), it was expected that the former would be more commonly reported when participants reflect on a positive SNS experience than when they reflect on a negative SNS experience, and the latter would be more commonly reported when participants reflect on a negative SNS experience compared to a positive SNS experience.

H2: (a) Enhancement motivations will be associated with positive outcomes (positive mood and higher social connectedness), and (b) compensatory motivations will be associated with negative outcomes (negative mood and lower social connectedness). *NB. H2-H4 encompass both positive and negative SNS conditions, however the conditions were analysed separately.*

Tibber and Silver's (2022) model similarly proposes that social media use is likely to be beneficial when *"motivations for use…are primarily for social enhancement purposes, with a focus on cultivating and maintaining deep and genuine connections"* (p.15), and likely to be harmful when *"motivations for use…directly conflict with satisfaction of core needs relating to belonging and acceptance"* (p.15-16), i.e. where individuals use social media motivated by escape or avoidance. The reasons for this, they explain, are that social motivations are especially relevant for young people, who developmentally are still forming their social identity (Crosnoe & Johnson, 2011); thus social media engagement with the primary motivation of maintaining relationships (and arguably, *building* relationships also), is

likely to result in satisfaction of core needs relating to acceptance and belonging, with (positive) consequences for wellbeing.

In support of this perspective, Yang et al.'s (2021) Multidimensional Model of Social Media Use also proposed that enhancement motivations, related to social connectedness and maintaining existing relationships, may be associated with benefits such as reduced psychopathology, including decreased levels of depression (Wright et al., 2013), and enhanced social, emotional, and personal wellbeing outcomes (Perugini & Solano, 2021), including increased life satisfaction (Adnan & Mavi, 2015).

Conversely, Yang et al.'s (2021) model suggests that *compensatory* motivations, such as meeting new people online or escapism from one's offline life, may be associated with negative outcomes such as poorer social, emotional, and personal wellbeing (Perugini & Solano, 2021). Whilst much of the related research is cross-sectional (Yang et al., 2021), therefore precluding conclusions relating to causation, longitudinal research from Teppers et al. (2014) suggests that using Facebook to make new friends (*enhancement*) was associated with decreased loneliness, whereas Facebook use to compensate for challenges occurring offline (*escapist*) was associated with increased levels of loneliness. Of note, Teppers et al. (2014) characterised making new friends as an enhancement motivation, whereas Yang et al. (2021) characterised it as an escapist motivation.

H3: (a) Active use will be associated with positive outcomes (positive mood and higher social connectedness), and (b) passive use will be associated with negative outcomes (negative mood and lower social connectedness).

In terms of online behaviours, Tibber and Silver's (2022) model distinguishes between social *approach* and social *avoidance* behaviours, whereby an individual's behaviour moves them *towards* or *away* from the world, their goals, and values, respectively. Here, a dimension of online behaviour that was deemed to be broadly related to approach

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and avoidance behaviours was explored, specifically, active and passive use (respectively), since these have a stronger existing research base, and are more easily operationalised.

Active use refers to online behaviours which involve direct exchanges with another individual or individuals, such as messaging others or commenting on content, as well as non-targeted exchanges such as posting a status update, where individuals may not receive a response (Verduyn et al., 2017), and is likely to be essential to social approach behaviours. In contrast, passive use refers to behaviours such as scrolling the newsfeed or browsing others' profiles, where content is consumed without a social engagement aspect, and may be more likely when engagement is avoidant or escapist. These associations are theoretically underpinned by the Uses and Gratification theory (Katz et al., 1973), which suggests that users are *active* agents who are motivated to seek media related to their needs and goals in a goal-directed way. Thus, approach and avoidance actually relate to the underlying *functions* of behaviour, rather than their explicit form, making them difficult to capture in a simple self-report questionnaire.

In relation to wellbeing outcomes related to active / passive use, a meta-review by Meier and Reinecke (2021) found that active interactions, such as replying, commenting, and liking, were associated with positive wellbeing ($r = .14$, 95% CIs = 0.08, 0.20), whilst passive content consumption, such as browsing, searching, and monitoring, was associated with negative wellbeing ($r = -.14$, 95% CIs = -0.20, -0.80). It is important to note, however, that a critical scoping review published the following year by Valkenburg et al. (2022), concluded that most included studies did *not* support the hypothesised associations between active use and increased wellbeing and passive use and decreased wellbeing, with the authors suggesting that research should consider the *content* of social media (e.g., the valence, platform affordances), its senders (e.g., pre-existing mood, motivation), and receivers (e.g., person-specific susceptibilities) into account.

H4: (a) Higher levels of mindful engagement will be associated with positive outcomes (positive mood and higher social connectedness), whereas (b) lower levels of

mindful engagement will be associated with negative outcomes (negative mood and lower social connectedness).

Tibber and Silver's (2022) model also conceptualises users' *mode* of engagement as critical, distinguishing between the extent to which they engage with social media intentionally and mindfully, rather than automatically and mindlessly. Mindfulness is commonly defined as an awareness of the present moment that emerges through paying attention in a non-judgemental manner (Kabat-Zinn, 2003), and has been demonstrated to benefit psychological outcomes, as well as cognitive and emotional processing (Tomlinson et al., 2018). Tibber and Silver (2022) suggest that *"a more intentional / purposeful mode of engagement may increase the user's awareness of the consequences of their online behaviour and the material to which they are exposed, facilitate a more critical appraisal of the information with which they engage, and further, enable them to be more selective in who / what they chose to connect with / attend to. [Whereas] a more automatic / habitual mode of engagement will mean that the user is likely to be less aware of the consequences of their online behaviour and the material to which they are exposed, less critical of the information that they engage with, and further, less selective in who / what they connect with / attend to."* (p.27). Both brief longitudinal and experimental findings from Li et al. (2022) and Poon and Jiang (2020), respectively, alongside the literature review presented in part one of this thesis, support a potentially beneficial / protective role for mindfulness in the association between social media use and mental health.

With reference to the above literature, the following mediating / moderating pathways are hypothesised.

H5 & H6: For positive SNS experiences, an association between enhancement motivations and wellbeing (increased positive affect and social connectedness) will be (H5) partially mediated by active engagement, and further, (H6) the first step in this path will be moderated by a mindful mode of engagement.

It is hypothesised that the relationship between enhancement motivations and positive wellbeing (increased positive affect and social connectedness) may be at least partly driven / mediated by active use of the SNS, for example, commenting on posts, due to the social nature of such behaviours (Pit et al., 2022). In addition, it is hypothesised that the relationship between enhancement motivations and active use will be moderated by mindful use, such that the more mindful an individual is, the more they will have insight into their use and be able to use the SNS actively, which may in turn benefit the wellbeing outcomes they experience.

H7 & H8: For negative SNS experiences, an association between escapist motivations and wellbeing (increased negative affect and decreased social connectedness) will be (H7) partially mediated by passive engagement, and further, (H8) the first step in this path will be moderated by a habitual mode of engagement.

In contrast, it is hypothesised that the relationship between escapist motivations and reduced wellbeing (increased negative affect and decreased social connectedness) may be at least partly driven / mediated by passive use of the SNS, for example, scrolling the feed, as passive behaviour has been associated with negative outcomes such as reduced social connection and wellbeing (Roberts & David, 2023). In addition, it is hypothesised that the relationship between escapist motivations and passive use will be moderated by habitual use, such that the more habitual an individual's use is, the less likely they are to recognise that they are using the SNS passively, which may in turn reduce their wellbeing outcomes.

(Note: the term 'mediated' is used to mean a statistical relationship, without necessary causal or temporal connotation.)

Methods

Ethical approval was obtained from the UCL Research Ethics Committee (24279/001) (see Appendix 6 for approval letter).

Participants

Participants were recruited offline via word-of-mouth, as well as online via social media, email, and the UCL research participant pool (an online recruitment database). Inclusion criteria for participation included being 18-29 years of age, sufficiently fluent in English to engage with the written materials, and a SNS user (defined as using at least one site, on average at least once per day).

A power analysis using G*Power3 (Faul et al., 2007) based on a small effect size of 0.02 (with alpha set at .05, beta at 0.8, and nine predictors) highlighted a minimum required sample size of 311 for regression analyses, which also left the study well-powered for t-test analyses. The aim therefore was to recruit up until 311 full data sets were collected.

Design and procedure

The study has a correlational, cross-sectional, within-participants design. Participants who were interested in participation were directed to the study via a web link included in advertising materials. The participation information sheet (see Appendix 7), consent form, and survey were all completed on Qualtrics, an online survey platform.

Following a brief introduction to the study, participants were provided with an information sheet, which included details about how their data would be used, how participation was entirely voluntary, the benefits and disadvantages of taking part, and that they could withdraw at any time up until survey completion. Following this, they were asked for their consent to participate in the study. After consenting was completed, participants were directed to the survey.

After survey completion, participants were invited to provide their email address in order to enter a prize draw with the potential to win one of six shopping vouchers (2x £50; 4x £25) for participating. Email addresses were stored securely in a separate database from survey responses.

The survey

Participants were primed to think about a recent positive and negative experience of using SNSs before being asked to complete a series of questionnaires exploring core processes involved in both (details below). Specifically, they were prompted with the following: "Please think about a recent time when you used a social networking site, and it was a (positive / negative) experience. NB. Please make sure this is a relatively common day-to-day experience, rather than something out of the ordinary such as (winning the lottery / identity theft)". These two conditions (positive experience and negative experience on SNSs) were presented in a counterbalanced order across participants to avoid order effects.

Measures and data collected

The survey was initially piloted with five individuals from the target population before the full study was run, to ensure the questionnaire was intelligible, had face validity, and ran smoothly on different devices and operating systems. Minor adjustments were made based on their feedback. The five individuals were recruited via convenience sampling, and were paid £10 each to compensate them for an hour of their time.

In the final survey participants were asked to provide their age and gender, and complete a number of questionnaires and survey items (detailed below), which explored their motivations for going online, behaviours when online, degree of mindfulness prior to online engagement (mindful initiation of engagement) and whilst online (mindful engagement online), and consequences after SNS use.

Motivation: enhancement vs. escapist

As no single measure was deemed ideally suited to the needs of the study in exploring enhancement and escapist motivations, subscales from several existing, well-established questionnaires were employed.

To construct a measure of enhancement motivations, three items from the social connectedness subscale (example item: "I used the social networking site to feel connected

with people") and three items from the new friendships subscale (example item: "I used the social networking site to meet new people") were taken from the Scale of Motives for Using Social Networking Sites (SMU-SNS) (Pertegal et al., 2019) (n=6 in total). Participants endorsed items using a seven-point Likert scale ranging from "completely untrue" to "completely true". Both the social connectedness subscale and new friendships subscale have high internal consistency (Cronbach's alpha = .83 and .87, respectively), and the authors (Pertegal et al., 2019) reported that the overall SMU-SNS is a "*valid and reliable measure*" (p.1).

To construct a measure of escapist motivations, four items that make up the escapism subscale were taken from Gao et al. (2017) (example item: "This SNS helps me escape from problems and pressures"), with one single (custom-written) question added (n=5 in total) to provide more of a *social* focus, which the original subscale lacked. Items were reworded slightly to ensure they captured motivations rather than outcomes (example item reworded as "I used the SNS to escape from problems and pressures"). Participants endorsed items using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". The escapism subscale (in its original form) has high internal consistency (Cronbach's alpha = .76), and good convergent validity (AVE values = >0.5) and discriminant validity (HTMT ratios = <0.85) (Gao et al., 2017).

In order to equate response options across all items measuring motivations (enhancement and escapist), all responses were given using a seven-point Likert scale.

Behaviour: active vs. passive

Active and passive behaviour were measured using the 13-item Passive Active Use Measure (PAUM) (Gerson et al., 2017) (example active item: "I engaged in chatting on Facebook chat"; example passive item: "I engaged in viewing photos"). Some items were reworded to make the measure focus on SNS use more generally, rather than Facebook use specifically (example active item reworded as: "I engaged in chatting on a messenger tool

when on the SNS"). The original measure scored participants on a five-point Likert scale ranging from "Never (0% of the time)" to "Very frequently (close to 100% of the time)" to capture how frequently individuals performed the proposed activities. For the purpose of this study, however, a five-point Likert scale was retained but reworded to capture how much time participants spent using each feature of the SNS *during the experience they were reflecting on*: "Not at all; a little bit; for some of the time; for most of the time; for the whole time". All factors within the scale (in its original form) demonstrated adequate internal consistency (Cronbach's alpha: Active social α=.80; Active non-social α=.78; Passive α=.70), and good discriminant validity, as determined by correlational data which suggested it measures distinct constructs from other relevant scales (Gerson et al., 2017).

In the original study, Gerson et al. (2017) found the scores factor analysed into active social, active non-social, and passive. However, the present study collapsed active social and active non-social into a single active score, due to concerns with the validity of some of the classifications. For example, Gerson et al. (2017) found that posting photos was classed as active social, but posting videos was classed as active non-social.

Mode: mindful vs. habitual

To construct a measure of mindful initiation of engagement, i.e. the act of picking up one's phone / logging on to the SNS mindfully or habitually, three items from the acting with awareness subscale (example item: "I find myself doing things without paying attention") were taken from the Five-Facet Mindfulness Questionnaire (FFMQ-15) (Baer et al., 2008), and reworded to relate to the experience of going on SNSs (example item reworded as "I found myself going on the SNS without paying attention"). The original measure scored participants on a five-point Likert scale ranging from "Never or very rarely true" to "Very often or always true" to capture how true the statements were of the individual. For the purpose of this study, a five-point Likert scale was retained but reworded to increase relevance given the adjustments made: "Completely disagree" to "Completely agree". The subscale (in its

original form) has adequate internal consistency (Cronbach's alpha = .68), and good construct validity as determined by regression and mediation analyses (Baer et al., 2008).

To construct a measure of mindfulness once the participant is online, i.e. to capture mindful engagement rather than mindful initiation of engagement, five items were taken from the behavioural awareness subscale of the Comprehensive Assessment of Acceptance and Commitment Therapy processes (COMPACT) (Francis et al., 2016) (example item: "I rush through meaningful activities without being really attentive to them"). Items were reworded to relate to the experience of going on SNSs (example item reworded as "I rushed through meaningful activities on the SNS without being really attentive to them"). Participants endorsed items using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". The subscale (in its original form) has high internal consistency (Cronbach's alpha = .87), and good convergent validity (r = .78) with an established ACT process measure (AAQ-II) (Francis et al., 2016).

Outcome measures: affect and social connection

Mood was measured using the 10-item International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) (Thompson, 2007). In the original questionnaire, participants were asked to "Indicate the extent you have felt this way over the past week… (e.g., a little)" for 10 emotions. For the purposes of this research, the questionnaire was adapted to measure the *change* in mood states from pre-SNS use to post-SNS use (example item: "After going on the SNS, I felt that my feeling of upset had…[e.g., decreased a little]"). The original measure scored participants on a five-point Likert scale ranging from "Never" to "Always"; in order to reflect rewording of the questionnaire the five-point response scale was reworded to: "Decreased a lot; decreased a little; no change; increased a little, increased a lot". All factors (in the original form of the questionnaire) had high internal consistency (Positive affect α=0.75; Negative affect α=0.80), and good convergent validity as determined by correlations with measures of subjective wellbeing and happiness (Thompson, 2007).

Social connectedness was measured using the eight-item Social Connectedness Scale - Revised (SCS-R) (Lee & Robbins, 1995) (example item: "I feel disconnected from the world around me"). Again, the questionnaire was adapted to measure the *change* in social connectedness from pre-SNS use to post-SNS use (example item: "By the end of my time on the SNS, I felt more disconnected from the world around me"). Participants endorsed items using a six-point Likert scale ranging from "strongly agree" to "strongly disagree". The subscale (in its original form) has high internal consistency (Cronbach's alpha = .91), and good content validity as determined by a panel of judges who evaluated the consistency of items with operational definitions (Lee & Robbins, 1995).

Appendix 8 details the full list of items and associated response options for each of the above described measures.

Additional items

In addition to the questionnaires outlined above, participants were asked the following four (custom-written) questions in order to gain an understanding of the context of their online positive and negative experience: (i) "Please describe (in just a few words) the nature of the positive experience you had in mind when answering the questions, e.g., an enjoyable exchange with a friend"; (ii) "What platform did the positive experience occur on?"; (iii) "Please describe (in just a few words) the nature of the negative experience you had in mind when answering the questions e.g., an argument with someone about an issue I care about;" (iv) "What platform did the negative experience occur on?". Participants gave their responses in open text form. In addition, the following two (custom-written) questions were included to use as covariates in several regression models (as described below): (i) "How many close friends do you have offline?; (ii) "How many close friends do you have online?".

Analyses

Data were exported from Qualtrics and imported into Excel. Due to the high prevalence of what seemed like responses from 'bots' (automated software programmed to

complete tasks such as online surveys [Storozuk et al. [2020]) , data were excluded (prior to analysis of stated hypotheses) for the following reasons: (i) if participants failed a basic attention check (did not click option three when specified to), (ii) if participants reported being different ages when asked twice throughout the study as an attention check, (iii) where open text responses were clearly unrelated to the question, (iv) where there were duplicated answers in quick succession, (v) where responses referenced never having had a positive or negative online experience, and (vi) where responses did not sound like a human, i.e. lengthy answers which were attributed to being bot stock answers, some of which have been highlighted previously as indicators of bot responses (Lebrun et al., 2024). (See Appendix 9 for more detailed information about the criteria for exclusion). Data were then exported into STATA (version 18; College Station, TX: StataCorp LLC) for analysis.

Hypothesis 1 was tested with a series of paired samples t-tests to observe any differences in the outcome variables across recalled positive and negative online SNS experiences.

Hypotheses 2-4 were analysed using a series of univariate and forward stepwise multivariate multiple regression analyses. Analyses were run separately for three outcome variables: change in mood (positive and negative) and sense of connectedness after using the SNS. In addition, analyses were run separately for positive and negative experiences of SNS use.

For each analysis, outcome variables were regressed on the following key predictors: (i) motivations for going online (enhancement [social connection motivation and relationship formation] and escapist); (ii) behaviour when online (active and passive); (iii) mode of engagement (habitual and mindful, split into mindful initiation of engagement, and mindful engagement once online).

All predictors and covariates (described above) were initially run separately in univariate analyses, in order to explore their independent predictive abilities (Group 1 Models).

Motivations, behaviours, and modes of engagement were then analysed (separately for each of these three classes of predictors) using forward stepwise regression (Group 2 Models), to see which motivations / behaviours / modes of engagement showed the greatest predictive ability after accounting for covariance *within* the class of predictors. All retained variables were then added simultaneously into a multivariate model (Group 3 Models).

Subsequently, Group 3 Models were rerun to see if they survived after controlling for basic demographic covariates (age and gender; Group 4 models), then with all covariates (age, gender, number of offline friends, and number of online friends; Group 5 Models).

The following assumptions of linear regression analyses were tested: normality of residuals, homoscedasticity, and multicollinearity. Several measures were found to violate the assumption of normality (positive experience on SNS: positive mood, negative mood, social connectedness; negative experience on SNS: negative mood) and homoscedasticity (positive experience on SNS: positive mood, negative mood; negative experience on SNS: negative mood). The assumption of multicollinearity was met for all measures. To address violations of homoscedasticity, the full multivariate models were re-run with weighted least squares. Despite violations in normality, parametric tests were still run due to the large sample size (Mordkoff, 2016; Schmidt & Finan, 2018). The main results section outlines where any additional analyses, run due to violations detailed above, led to any major changes in findings.

To test hypotheses H5-H8, path analyses were run using Hayes' PROCESS macro (Hayes, 2018) on SPSS Statistics (version 29) (IBM Corp, 2023). Two separate sets of models were run, relating to a recalled positive and a recalled negative SNS experience.

For the positive experience on SNS, relationship formation motivation was used to characterise enhancement motivations, as social connectedness motivation (i.e. relationship maintenance) was not included in any of the final full multivariate models (Group 5 models). Mood (positive and negative) and social connectedness were again run separately as outcomes. For both positive and negative experiences, both mindful initiation of engagement and mindful engagement online were included and run separately in moderated mediation models, as the variables were both included in the Final Controlled Multivariate Models. All predictors and outcomes were run separately, which therefore extended the previous path analysis H5-H8 hypotheses:

H5: For positive SNS experiences, an association between relationship formation motivation and (i) increased positive mood / (ii) social connectedness will be partially mediated* by active engagement.

H6: The first step in the indirect path described in H5 will be moderated by (i) mindful initiation of engagement / (ii) mindful engagement online.

H7: For negative SNS experiences, an association between escapist motivations and (i) increased negative mood / (ii) social connectedness will be partially mediated* by passive engagement.

H8: The first step in the indirect path described in H7 will be moderated by (i) mindful initiation of engagement / (ii) mindful engagement online.

*Note: the term 'mediated' is used to mean a statistical relationship, without necessary causal or temporal connotation.

Finally, to analyse participants' free-text responses, a chi-squared test was run using SPSS to analyse potential differences in the frequencies of platforms reported for positive and negative experiences. In addition, a simple qualitative analysis, based on the principles of thematic analysis (Braun & Clarke, 2006), was undertaken to further understand the

nature of positive and negative SNS experiences. Project supervisor (MT) fed into the process of the qualitative analysis.

Results

The survey was completed by 831 participants. When applying exclusion criteria (see Appendix 9), two participants (<1%) were removed due to not providing consent to participate, and a total of 477 participants (57%) were excluded because they failed the 'bot-checks' (36 [4%], 14 [2%], 362 [44%], 39 [5%], 18 [2%], and 8 [1%] failing criteria one to six [see Appendix 9], respectively). This resulted in a final analytic sample of 352 participants. Items were reverse scored where necessary, and summary scores for each subscale calculated (see Appendix 10 for descriptive statistics). Participants ranged in age from 18 to 29 years old (mean=22.68, STDEV=3.53). The sample included 69 (19.6%) participants that identified as male and 278 (79.0%) that identified as female; in addition, one participant identified as 'genderqueer', one participant self-identified their sex (but not gender) as being female, and three participants identified as 'non-binary'.

Validity checks

Factor analysis and internal consistency

The measures included in the study were often subscales from validated measures and / or included custom-written items; consequently, internal consistency checks were run for each scale / subscale generated. Raw scores were factor analysed (see Appendix 11 for factor analysis output), and Cronbach's alpha calculated using STATA (see Appendix 12 for all alpha scores).

All measures exhibited a single factor solution and medium-to-high internal consistency, with the exception of the following measures: passive use (in the negative experience of SNS condition only) and positive mood (in the negative experience of SNS condition only) both exhibited a two-factor solution, whilst the passive subscale overall (for both positive and negative experiences of SNS) did not meet medium-to-high levels of

internal consistency, with alpha levels of .62 and .55 for the positive and negative experience of SNS, respectively. On the basis of factor loadings, item 11 (browsing the feed passively [without liking or commenting anything]) was removed from the measure of passive SNS use (PAUM; Gerson et al., 2017), which resulted in a single factor solution and increased alphas (.73 and .67 for the positive and negative experience conditions, respectively).

With regards to positive mood exhibiting a two-factor solution (in the negative experience of SNS condition only), it was hypothesised, on the basis of factor loadings, that 'alert' may have been interpreted in different ways by different users. Thus, whilst 'alertness' may be perceived as a positive emotion associated with feeling awake and positively excited (as intended by the I-PANAS-SF), it may also be linked to a negative emotion associated with hypervigilance and being in a state of threat and high anxiety. Whilst associated Cronbach's alphas in the original measure were ≥.70, removing item three (alert) from the measure of affect (I-PANAS-SF; Thompson, 2007) resulted in a single factor solution, and further, increased alphas (.73 and .78, for positive and negative experiences of SNS, respectively). Consequently, the 'alert' item was dropped from the measure.

Finally, it is unclear from the literature whether the 'relationship formation' subscale measures enhancement or escapist behaviours due to conflicting opinions. For example, Yang (2021) characterised relationship formation as an escapist behaviour, as they describe how the formation of new online friends occurs at the expense of nurturing offline relationships; however, without this context, making new friends online could also be seen as an enhancement motivation to grow one's social network, as per Teppers et al. (2014). Therefore, Cronbach's alpha was calculated (for both positive and negative experiences of SNS) when combining 1) relationship maintenance and relationship formation motivations, and 2) escapist and relationship formation motivations. For both positive and negative experiences, combining relationship maintenance and relationship formation (i.e. into a single enhancement measure) *increased* the alpha level (see Appendix 12), whereas combining escapism and relationship formation motivations (i.e. into a single escapism

measure) *decreased* the alpha level. Despite this potentially justifying collapsing relationship maintenance and relationship formation motivations into a single overarching enhancement measure, the factor analysis demonstrated a two-factor loading. Therefore, it was decided to keep all three subscales separate to allow for the model to demonstrate potential conceptual differences between the concepts, and potentially address the existing conflict in the literature as to how relationship formation functions.

All other subscales were retained as described in the methods section.

Comparing key variables across positive and negative SNS experiences

In order to test H1, a series of paired samples t-tests were run, comparing scores for key variables across both scenarios (positive and negative SNS experiences), e.g., exploring levels of approach behaviours in the positive and negative scenarios.

As shown in Table 1, significant differences were found for all variables (all ps<.001, apart from passive SNS use [p<.05]). A Bonferroni correction was applied to counteract the familywise error rate due to running ten paired samples t-tests, resulting in a corrected alpha criterion of 0.005. With the corrected criterion, all significant findings remained significant, apart from passive use (p<.05).

With respect to the direction of such effects, results provided partial support for H1: as hypothesised, participants reported higher enhancement motivations (social connection motivation and relationship formation; $t_{(351)}$=6.53, p<.001, Cohen's d=0.35 and $t_{(351)}$=5.36, p<.001, Cohen's d=0.29, respectively), active use ($t_{(351)}$=9.21, p<.001, Cohen's d=0.49), and mindful engagement (mindful initiation of engagement, and mindful engagement online; $t_{(351)}$=3.95, p<.001, Cohen's d=0.21 and $t_{(351)}$=5.87, p<.001, Cohen's d=0.31, respectively) in *positive* SNS experiences (relative to negative SNS experiences). In contrast, compensatory use (escapism) was significantly higher in relation to *negative* SNS experiences than in *positive* online SNS experiences ($t_{(351)}$=-3.71, p<.001, Cohen's d=-0.20). Counter to the

prediction of H1, however, passive use was significantly higher in the *positive* SNS condition ($t_{(351)}$=2.51, *p*<.05, Cohen's *d*=0.13).

Finally, despite not being included in H1, the outcome variables (mood [positive and negative] and social connectedness) were also compared across *positive* and *negative* SNS experience conditions. As would be expected, positive mood ($t_{(351)}$=12.87, *p*<.001, Cohen's *d*=0.69) and social connectedness ($t_{(351)}$=13.21, *p*<.001, Cohen's *d*=0.70) were significantly higher in the *positive* SNS experience condition, and negative mood was significantly higher in the *negative* SNS experience condition ($t_{(351)}$=-13.83, *p*<.001, Cohen's *d*=-0.74).

Table 1

T-test outcomes comparing variables across positive and negative SNS experiences

| Subscales | Mean | Standard deviation | 95% confidence interval | | Paired t-test | | | |
			Lower	Upper	*t*-value	Degrees of freedom	Significance	Effect size (Cohen's *d*)
POS social connection motivation	5.06	1.22	4.93	5.18	6.53	351	<.001	0.35
NEG social connection motivation	4.57	1.37	4.42	4.71				
POS relationship formation	3.55	1.78	3.36	3.74	5.36	351	<.001	0.29
NEG relationship formation	3.19	1.76	3.01	3.38				
POS escapism	3.77	1.44	3.61	3.92	-3.71	351	<.001	-0.20
NEG escapism	4.04	1.38	3.88	4.20				
POS active	2.46	0.85	2.37	2.54	9.21	351	<.001	0.49
NEG active	2.16	0.87	2.07	2.25				
POS passive	3.27	0.93	3.17	3.37	2.51	351	<.05	0.13
NEG passive	3.17	0.91	3.07	3.26				
POS mindful initiation of engagement	2.99	1.12	2.87	3.10	3.95	351	<.001	0.21
NEG mindful initiation of engagement	2.74	1.16	2.62	2.86				
POS mindful engagement online	4.21	1.41	4.06	4.36	5.87	351	<.001	0.31
NEG mindful engagement online	3.82	1.47	3.66	3.97				
POS positive mood	3.40	0.67	3.33	3.47	12.87	351	<.001	0.69
NEG positive mood	2.94	0.78	2.86	3.02				
POS negative mood	2.74	0.70	2.67	2.81	-13.83	351	<.001	-0.74
NEG negative mood	3.31	0.71	3.24	3.39				
POS social connectedness	4.40	1.04	4.29	4.50	13.21	351	<.001	0.70
NEG social connectedness	3.60	1.19	3.47	3.72				

Predictors of mood and social connectedness in positive and negative SNS experiences

To test H2-H4, multiple regression analyses were run, whereby outcome variables were regressed on key predictors (motivations, behaviours, and modes of use). These were run separately for positive and negative online experiences.

Positive online experiences

Positive mood. Considering positive experiences of SNS first, a series of univariate regression analyses were run, with positive mood as the outcome variable (Group 1 Models; see Table 2).

Social connection motivation (coefficient=0.09, CI=0.04, 0.15, $p<.01$), relationship formation motivation (coefficient=0.12, CI=0.08, 0.16, $p<.001$), active use (coefficient=0.21, CI=0.13, 0.29, $p<.001$), passive use (coefficient=0.14, CI=0.06, 0.21, $p<.001$), mindful initiation of engagement (coefficient=0.12, CI=0.06, 0.18, $p<.001$), and mindful engagement online (coefficient=0.10, CI=0.05, 0.15, $p<.001$) were all *positively* correlated with positive mood. Only escapism (coefficient=-0.03, CI=-0.08, 0.02, $p=.21$) was *negatively* correlated with positive mood.

Following this, as noted, a series of forward stepwise regression analyses were run, with analyses run separately for each variable category (motivations, behaviours, mode of engagement; *partial multivariate analyses)* (Group 2 Models; see Table 2). All variables were put forward for inclusion, with the exception of escapism, since this was not significant in the univariate analyses ($p=.21$). In terms of motivations, only relationship formation was retained (coefficient=0.11, CI=0.07, 0.16, $p<.001$); in terms of behaviour, only active use was retained (coefficient=0.18, CI=0.08, 0.28, $p<.001$); finally, in terms of mode of engagement, only mindful engagement online was retained (coefficient=0.06, CI=-0.02, 0.13, $p=.134$). Thus, social connection motivation, passive use, and mindful initiation of engagement were not retained (ps>.05).

All variables retained in the *partial multivariate analyses* were subsequently added (simultaneously) to a full multivariate model (Group 3 Models; see Table 2). This model was significant ($F_{(3, 348)}$ = 21.60, $p<.001$) and accounted for 15% of the variance in positive mood (adjusted R^2 = 0.15). Further, relationship formation (coefficient=0.09, CI=0.05, 0.13, $p<.001$), active use (coefficient=0.11, CI=0.02, 0.21, $p<.05$), and mindful engagement online (coefficient=0.10, CI=0.05, 0.14, $p<.001$) remained significant, and were all positively associated with positive mood. Therefore, when people used SNSs actively, mindfully, and to make new friends, they were more likely to experience positive mood.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 2). This model was significant ($F_{(5, 340)}$ = 13.98, $p<.001$) and accounted for 16% of the variance in positive mood (adjusted R^2 = 0.16). All included predictors (relationship formation, active use, and mindful engagement online) remained significant (ps≤0.01).

Finally, the full multivariate analyses were re-run with all covariates included (age and gender, in addition to the number of offline friends, number of online friends; *full controlled multivariate analyses)* (Group 5 Models; see Table 2). This model was significant ($F_{(7, 338)}$ = 10.63, $p<.001$) and accounted for 16% of the variance in positive mood (adjusted R^2 = 0.16). All included predictors (relationship formation, active use, and mindful engagement online) remained significant (ps<0.05).

Table 2

Regression analyses showing the regression of positive mood after a positive experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
Predictor	Coefficient (95% CIs)	p value	Coefficient (95% CIs)	p value	Coefficient (95% CIs)	p value	Coefficient (95% CIs)	p value	Coefficient (95% CIs)	p value
SNS use variables										
Social connection motivation	0.09 (0.04-0.15)	**<.01**	0.03 (-0.03-0.09)	.38	-	-	-	-	-	-
Relationship formation	0.12 (0.08-0.16)	**<.001**	0.11 (0.07-0.16)	**<.001**	0.09 (0.05–0.13)	**<.001**	0.10 (0.05-0.14)	**<.001**	0.09 (0.05-0.14)	**<.001**
Escapism	-0.03 (-0.08-0.02)	.21	-	-	-	-	-	-	-	-
Active use	0.21 (0.13-0.29)	**<.001**	0.18 (0.08-0.28)	**<.001**	0.11 (0.02-0.21)	**<.05**	0.12 (0.03-0.21)	**.01**	0.10 (0.01-0.19)	**<.05**
Passive use	0.14 (0.06-0.21)	**<.001**	0.04 (-0.05-0.13)	.37	-	-	-	-	-	-
Mindful initiation of engagement	0.12 (0.06-0.18)	**<.001**	0.7 (-0.03-0.16)	.18	-	-	-	-	-	-
Mindful engagement online	0.10 (0.05-0.15)	**<.001**	0.6 (-0.02-0.13)	.13	0.10 (0.05-0.14)	**<.001**	0.10 (0.05-0.15)	**<.001**	0.09 (0.05-0.14)	**<.001**
Demographics										
Age	0.01 (-0.01-0.03)	.58	-	-	-	-	0.01 (-0.00-0.03)	.145	0.01 (-0.01-0.30)	.25
Gender	-0.08 (-0.25-0.10)	.39	-	-	-	-	-0.02 (-0.19-0.14)	.789	0.00 (-0.17-0.17)	1.00
Number of offline friends	0.00 (-0.00-0.01)	.08	-	-	-	-	-	-	0.00 (-0.00-0.00)	.26
Number of online friends	0.00 (0.00-0.00)	**<.001**	-	-	-	-	-	-	0.00 (-0.00-0.00)	.14

Negative mood. A series of univariate regression analyses were run, with negative mood as the outcome variable (Group 1 Models; see Table 3).

Social connection motivation (coefficient=-0.06, CI=-0.12, -0.00, $p<.05$), relationship formation motivation (coefficient=-0.07, CI=-0.11, -0.03, $p<.001$), active use (coefficient=-0.15, CI=-0.24, -0.07, $p<.001$), passive use (coefficient=-0.08, CI=-0.16, -0.01, $p<.05$), mindful initiation of engagement (coefficient=-0.17, CI=-0.24, -0.11, $p<.001$), and mindful engagement online (coefficient=-0.13, CI=-0.18, -0.08, $p<.001$) were all *negatively* correlated with negative mood. Only escapism (coefficient=0.00, CI=-0.05, 0.05, $p=.96$) was *positively* correlated with negative mood.

Following this, all variables were run in a series of forward stepwise regression analyses (*partial multivariate analyses*; Group 2 Models; see Table 3), with the exception of escapism, since this was not significant in the univariate analyses ($p=.96$). In terms of motivations, only relationship formation was retained (coefficient=-0.07, CI=-0.11, -0.02, $p<.01$); in terms of behaviour, only active use was retained (coefficient=-0.15, CI=-0.26, -0.05, $p<.01$); finally, in terms of mode of engagement, only mindful initiation of engagement was retained (coefficient=-0.12, CI=-0.22, -0.02, $p<.05$). Thus, social connection motivation, passive use, and mindful engagement online were not retained (ps>0.05).

The *full multivariate analysis* model (Group 3 Models; see Table 3) was significant ($F_{(3, 348)} = 15.77$, $p<.001$) and accounted for 11% of the variance in negative mood (adjusted $R^2 = 0.11$). Further, active use (coefficient=-0.11, CI=-0.21, -0.02, $p<.05$), and mindful initiation of engagement (coefficient=-0.17, CI=-0.23, -0.11, $p<.001$) remained significant, and were negatively associated with negative mood. However, relationship formation became non-significant (coefficient=-0.04, CI=-0.09, -0.01, $p=.09$). Therefore, when people used SNSs actively and mindfully, they were less likely to experience negative mood.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 3). This model

was significant ($F_{(5, 340)}$ = 9.57, *p*<.001) and accounted for 11% of the variance in negative mood (adjusted R^2 = 0.11). Out of the included predictors, mindful initiation of engagement (*p*<.001) and active use remained significant (*p*<.05), however relationship formation became non-significant (*p*=.09).

Finally, the *full controlled full multivariate analyses* model (Group 5 Models; see Table 3) was significant ($F_{(7, 338)}$ = 8.26, *p*<.001) and accounted for 13% of the variance in negative mood (adjusted R^2 = 0.13). Out of the included predictors, only mindful initiation of engagement remained significant (*p*<.001).

Table 3

Regression analyses showing the regression of negative mood after a positive experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

Predictor	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables										
Social connection motivation	-0.06 (-0.12- -0.00)	**<.05**	-0.02 (0.08-0.4)	.54	-	-	-	-	-	-
Relationship formation	-0.07 (-0.11- -0.03)	**<.001**	-0.07 (-0.11- -0.02)	**<.05**	-0.04 (-0.09-0.01)	.09	-0.04 (-0.09-0.01)	.09	-0.4 (-0.08-0.01)	.11
Escapism	0.00 (-0.05-0.05)	.96	-	-	-	-	-	-	-	-
Active use	-0.15 (-0.24- -0.07)	**<.001**	-0.15 (-0.26- -0.05)	**<0.01**	-0.11 (-0.21- -0.02)	**<.05**	-0.11 (-0.21- -0.01)	**<.05**	-0.10 (-0.18-0.02)	.10
Passive use	-0.08 (-0.16- -0.01)	**<.05**	-0.00 (-0.10-0.09)	.96	-	-	-	-	-	-
Mindful initiation of engagement	-0.17 (-0.24- -0.11)	**<.001**	-0.12 (-0.22- -0.02)	**<.05**	-0.17 (-0.23- -0.11)	**<.001**	-0.17 (-0.23- -0.11)	**<.001**	-0.16 (-0.22- -0.09)	**<.001**
Mindful engagement online	-0.13 (-0.18- -0.08)	**<.001**	-0.05 (-0.13-0.02)	.18	-	-	-	-	-	-
Demographics										
Age	0.02 (-0.01-0.04)	.14	-	-	-	-	0.01 (-0.01-0.03)	.291	0.02 (-0.01-0.04)	.15
Gender	-0.02 (-0.21-0.17)	.84	-	-	-	-	-0.05 (-0.23-0.13)	.611	-0.06 (-0.24-0.12)	.50
Number of offline friends	-0.00 (-0.00-0.00)	.36	-	-	-	-	-	-	-0.00 (-0.00-0.00)	.71
Number of online friends	-0.00 (-0.00- -0.00)	**<.001**	-	-	-	-	-	-	-0.00 (-0.00- -0.00)	**<.01**

Social connectedness. A series of univariate regression analyses were run, with social connectedness as the outcome variable (Group 1 Models; see Table 4).

Social connection motivation (coefficient=0.02, CI=-0.07, 0.11, p=.65), active use (coefficient=0.01, CI=-0.12, 0.14, p=.91), mindful initiation of engagement (coefficient=0.21, CI=0.12, 0.31, p<.001), and mindful engagement online (coefficient=0.24, CI=0.17, 0.31, p<.001) were all *positively* correlated with social connectedness. Relationship formation (coefficient=-0.04, CI=-0.10, 0.02, p=.22), escapism (coefficient=-0.24, CI=-0.31, -0.16, p<.001), and passive use (coefficient=-0.08, CI=-0.19, 0.04, p=.20) were all *negatively* correlated with social connectedness.

Following this, escapism, mindful initiation of engagement, and mindful engagement online were run in a series of forward stepwise regression analyses (*partial multivariate analyses*; Group 2 Models; see Table 4). For these, social connection motivation, relationship formation, active use, and passive use were not put forward for inclusion as they were not significant in univariate analyses (all ps>.05). In terms of motivations, escapism was retained (coefficient=-0.24, CI=-0.31, -0.14, p<.001); in terms of behaviour, no variables were run due to both active and passive use being non-significant in the univariate analyses; finally, in terms of mode of engagement, only mindful engagement online was retained (coefficient=0.27, CI=0.16, 0.38, p<.001). Thus, mindful initiation of engagement was not retained (p>.05).

The *full multivariate analysis* model was significant ($F_{(2, 349)}$ = 30.65, p<.001) and accounted for 14% of the variance in social connectedness (adjusted R^2 = 0.14) (Group 3 Models; see Table 4). Further, escapism (coefficient=-0.16, CI=-0.24, -0.09, p<.001) remained significant and was negatively associated with social connectedness, and mindful engagement online (coefficient=0.17, CI=0.09, 0.25, p<.001) remained significant, and was positively associated with social connectedness. Therefore, when people used SNSs to escape, they were *less* likely to feel socially connected; however, when they used SNSs mindfully, they were *more* likely to feel socially connected.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 4). This model was significant ($F_{(4, 341)}$ = 15.16, *p*<.001) and accounted for 14% of the variance in social connectedness (adjusted R^2 = 0.14). All predictors (escapism and mindful engagement online) remained significant (*p*s<.001).

Finally, the *full controlled multivariate analyses* model (Group 5 Models; see Table 4) was significant ($F_{(6, 339)}$ = 10.41, *p*<.001) and accounted for 14% of the variance in social connectedness (adjusted R^2 = 0.14). All predictors (escapism and mindful engagement online) also remained significant (*p*<.001).

Table 4

Regression analyses showing the regression of social connectedness after a positive experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

Predictor	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables										
Social connection motivation	0.02 (-0.07 – 0.11)	.65	-	-	-	-	-	-	-	-
Relationship formation	-0.04 (-0.10-0.02)	.22	-	-	-	-	-	-	-	-
Escapism	-0.24 (-0.31- -0.16)	**<.001**	-0.24 (-0.31- -0.16)	**<.001**	-0.16 (-0.24- -0.09)	**<.001**	-0.16 (-0.23- -0.08)	**<.001**	-0.16 (-0.23- -0.08)	**<.001**
Active use	0.01 (-0.12-0.14)	.90	-	-	-	-	-	-	-	-
Passive use	-0.08 (-0.19-0.04)	.20	-	-	-	-	-	-	-	-
Mindful initiation of engagement	0.21 (0.12-0.31)	**<.001**	-0.04 (-0.19-0.10)	.54	-	-	-	-	-	-
Mindful engagement online	0.24 (0.17-0.31)	**<.001**	0.27 (0.16-0.38)	**<.001**	0.17 (0.09-0.25)	**<.001**	0.17 (0.09-0.25)	**<.001**	0.17 (0.08-0.25)	**<.001**
Demographics										
Age	0.01 (-0.02-0.04)	.53	-	-	-	-	0.02 (-0.01-0.05)	.158	0.02 (-0.01-0.05)	.22
Gender	0.08 (-0.20-0.35)	.57	-	-	-	-	0.18 (-0.07-0.44)	.161	0.20 (-0.06-0.47)	.13
Number of offline friends	0.00 (-0.00-0.01)	.37	-	-	-	-	-	-	0.00 (-0.00-0.01)	.59
Number of online friends	0.00 (-0.00-0.00)	.08	-	-	-	-	-	-	0.00 (-0.00-0.00)	.25

Negative online experiences

Positive mood. Moving onto the negative experiences of SNSs, univariate outcome analyses were run for the positive mood outcome variable, where a similar pattern emerged.

In univariate analyses (Group 1 Models; see Table 5), social connection motivation (coefficient=0.13, CI=0.07, 0.19, *p*<.001), relationship formation motivation (coefficient=0.19, CI=0.14, 0.23, *p*<.001), active use (coefficient=0.38, CI=0.30, 0.47, *p*<.001), passive use (coefficient=0.25, CI=0.17, 0.34, *p*<.001), mindful initiation of engagement (coefficient=0.14, CI=0.07, 0.21, *p*<.001), and mindful engagement online (coefficient=0.11, CI=0.05, 0.16, *p*<.001) were all *positively* correlated with positive mood. Only escapism (coefficient=-0.05, CI=-0.11, -0.00, *p*<.05) was *negatively* correlated with positive mood.

Following this all variables were run in a series of forward stepwise regression analyses (*partial multivariate analyses)* (Group 2 Models; see Table 5). In terms of motivations, only relationship formation was retained (coefficient=0.18, CI=0.13, 0.22, *p*<.001); in terms of behaviour, only active use was retained (coefficient=0.34, CI=0.24, 0.44, *p*<.001); finally, in terms of mode of engagement, only mindful initiation of engagement was retained (coefficient=0.08, CI=-0.03, 0.19, *p*=.14). Thus, social connection motivation, escapism, passive use, and mindful engagement online were not retained (*p*s>.05).

The *full multivariate analysis* model (Group 3 Models; see Table 5) was significant ($F_{(3, 348)}$ = 41.62, *p*<.001) and accounted for 26% of the variance in positive mood (adjusted R^2 = 0.26). Further, relationship formation (coefficient=0.11, CI=0.06, 0.15, *p*<.001), active use (coefficient=0.26, CI=0.16, 0.36, *p*<.001), and mindful initiation of engagement (coefficient=0.11, CI=0.05, 0.18, *p*<.001) all remained significant, and were positively associated with positive mood. Therefore, when people used SNSs actively, mindfully, and to make new friends, they were more likely to experience positive mood.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 5). This model

was significant ($F_{(5, 340)}$ = 24.27, *p*<.001) and accounted for 25% of the variance in positive mood (adjusted R^2 = 0.25). All predictors (relationship formation, active use, and mindful initiation of engagement) also remained significant (*p*s≤.01).

Finally, the *full controlled multivariate analyses* model (Group 5 Models; see Table 5) was significant ($F_{(7, 338)}$ = 17.77, *p*<.001) and accounted for 25% of the variance in positive mood (adjusted R^2 = 0.25). All predictors (relationship formation, active use, and mindful initiation of engagement) also remained significant (*p*<.01).

Table 5

Regression analyses showing the regression of positive mood after a negative experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
Predictor	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables										
Social connection motivation	0.13 (0.07 – 0.19)	**<.001**	0.03 (-0.03-0.09)	.34	-	-	-	-	-	-
Relationship formation	0.19 (0.14 – 0.23)	**<.001**	0.18 (0.13-0.22)	**<.001**	0.11 (0.06-0.15)	**<.001**	0.11 (0.06-0.16)	**.001**	0.11 (0.06-0.16)	**<.001**
Escapism	-0.05 (-0.11 – -0.00)	**<.05**	-	-	-	-	-	-	-	-
Active use	0.38 (0.30 – 0.47)	**<.001**	0.34 (0.24-0.44)	**<.001**	0.26 (0.16-0.36)	**<.001**	0.24 (0.15-0.34)	**<.001**	0.23 (0.13-0.33)	**<.001**
Passive use	0.25 (0.17 – 0.34)	**<.001**	0.07 (-0.02-0.17)	.13	-	-	-	-	-	-
Mindful initiation of engagement	0.14 (0.07 – 0.21)	**<.001**	0.08 (-0.03-0.19)	.14	0.11 (0.05-0.18)	**<.001**	0.10 (0.04-0.17)	**0.001**	0.10 (0.04-0.16)	**<.01**
Mindful engagement online	0.11 (0.05 – 0.16)	**<.001**	0.06 (-0.03-0.14)	.21	-	-	-	-	-	-
Demographics										
Age	0.00 (-0.02-0.02)	.96	-	-	-	-	0.01 (-0.01-0.03)	.435	0.01 (-0.01-0.03)	.58
Gender	-0.14 (-0.34-0.07)	.19	-	-	-	-	-0.05 (-0.23-0.13)	.581	-0.04 (-0.22-0.15)	.70
Number of offline friends	0.00 (-0.00-0.00)	.36	-	-	-	-	-	-	0.00 (-0.00-0.00)	.59
Number of online friends	0.00 (0.00-0.00)	**<.001**	-	-	-	-	-	-	0.00 (-0.00-0.00)	.15

Negative mood. A series of univariate regression analyses were run, with negative mood as the outcome variable (Group 1 Models; see Table 6).

Social connection motivation (coefficient=-0.04, CI=-0.10, -0.01, p=.11), relationship formation motivation (coefficient=-0.07, CI=-0.11, -0.02, p<.01), active use (coefficient=-0.26, CI=-0.34, -0.18, p<.001), passive use (coefficient=-0.10, CI=-0.18, -0.02, p<.05), mindful initiation of engagement (coefficient=-0.12, CI=-0.18, -0.06, p<.001), and mindful engagement online (coefficient=-0.09, CI=-0.14, -0.04, p<.001) were all *negatively* correlated with negative mood. Only escapism (coefficient=0.04, CI=-0.01, 0.09, p=.13) was *positively* correlated with negative mood.

Following this all variables were run in a series of forward stepwise regression analyses (*partial multivariate analyses)* (Group 2 Models; see Table 6), with the exception of social connection motivation and escapism, since they were not significant in the univariate analyses (ps>.05). In terms of motivations, only relationship formation was retained (coefficient=-0.07, CI=-0.11, -0.02, p<.01); in terms of behaviour, only active use was retained (coefficient=-0.29, CI=-0.39, -0.19, p<.001); finally, in terms of mode of engagement, only mindful initiation of engagement was retained (coefficient=-0.08, CI=-0.18, 0.03, p=.15). Thus, passive use and mindful engagement online were not retained (ps>.05).

The *full multivariate analysis* model (Group 3 Models; see Table 6) was significant ($F_{(3, 348)}$ = 18.59, p<.001) and accounted for 13% of the variance in negative mood (adjusted R^2 = 0.13). Further, active use (coefficient=-0.28, CI=-0.38, -0.18, p<.001), and mindful initiation of engagement (coefficient=-0.12, CI=-0.18, -0.06, p<0.001) both remained significant, and were negatively associated with negative mood. However, relationship formation (coefficient=0.02, CI=-0.03, 0.07, p=.41) became non-significant. Therefore, when people used SNSs actively and mindfully, they were less likely to experience negative mood.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 6). This model

was significant ($F_{(5, 340)}$ = 12.81, p<.001) and accounted for 15% of the variance in negative mood (adjusted R^2 = 0.15). Active use and mindful initiation of engagement remained significant (ps≤.001), and relationship formation remained non-significant (p=.50).

Finally, the *full controlled multivariate analyses* model (Group 5 Models; see Table 6) was significant ($F_{(7, 338)}$ = 11.04, p<.001) and accounted for 17% of the variance in negative mood (adjusted R^2 = 0.17). Active use and mindful initiation of engagement remained significant (ps≤.001), and relationship formation remained non-significant (p=.43).

Table 6

Regression analyses showing the regression of negative mood after a negative experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
Predictor	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables										
Social connection motivation	-0.04 (-0.10-0.01)	.11	-	-	-	-	-	-	-	-
Relationship formation	-0.07 (-0.11- -0.02)	**<.01**	-0.07 (-0.11- -0.02)	**<.01**	0.02 (-0.03-0.07)	.41	0.02 (-0.03 – 0.07)	.50	0.02 (-0.03-0.07)	.43
Escapism	0.04 (-0.01-0.09)	.13	-	-	-	-	-	-	-	-
Active use	-0.26 (-0.34- -0.18)	**<.001**	-0.29 (-0.04-0.14)	**<.001**	-0.28 (-0.38- -0.18)	**<.001**	-0.27 (-0.37- -0.18)	**<.001**	-0.24 (-0.34- -0.14)	**<.001**
Passive use	-0.10 (-0.18- -0.02)	**<.05**	-0.05 (-0.04-0.14)	.29	-	-	-	-	-	-
Mindful initiation of engagement	-0.12 (-0.18- -0.06)	**<.001**	-0.08 (-0.18-0.03)	.15	-0.12 (-0.18- -0.06)	**<.001**	-0.11 (-0.17- -0.05)	**<.001**	-0.10 (-0.16- -0.04)	**.001**
Mindful engagement online	-0.09 (-0.14- -0.04)	**<.001**	-0.05 (-0.13-0.04)	.27	-	-	-	-	-	-
Demographics										
Age	-0.03 (-0.05- -0.01)	**.01**	-	-	-	-	-0.03 (-0.05- -0.01)	**<.05**	-0.02 (-0.04- -0.00)	**.03**
Gender	0.22 (0.03-0.41)	**<.05**	-	-	-	-	0.14 (-0.04-0.32)	.14	0.15 (-0.03-0.33)	.11
Number of offline friends	-0.00 (-0.00-0.00)	.98	-	-	-	-	-	-	0.00 (-0.00-0.00)	.23
Number of online friends	-0.00 (-0.00- -0.00)	**<.001**	-	-	-	-	-	-	-0.00 (-0.00- -0.00)	**.001**

Social connectedness. Finally, a series of univariate regression analyses were run, with social connectedness as the outcome variable (Group 1 Models; see Table 7).

Social connection motivation (coefficient=0.04, CI=-0.05, 0.13, p=.42), relationship formation motivation (coefficient=0.03, CI=-0.04, 0.10, p=.47), active use (coefficient=0.36, CI=0.22, 0.50, p<.001), passive use (coefficient=0.13, CI=-0.01, 0.26, p=.07), mindful initiation of engagement (coefficient=0.33, CI=0.23, 0.44, p<.001), and mindful engagement online (coefficient=0.26, CI=0.18, 0.34, p<.001) were all *positively* correlated with social connectedness. Only escapism (coefficient=-0.24, CI=-0.31, -0.16, p<.001) was *negatively* correlated with social connectedness.

Following this all variables were run in a series of forward stepwise regression analyses (*partial multivariate analyses)* (Group 2 Models; see Table 7), with the exception of social connection motivation, relationship formation, and passive use, since they were not significant in the univariate analyses (ps>.05). In terms of motivations, only escapism was retained (coefficient=-0.24, CI=-0.31, -0.16, p<.001); in terms of behaviour, only active use was retained (coefficient=0.36, CI=0.22, 0.50, p<.001); finally, in terms of mode of engagement, both mindful initiation of engagement (coefficient=0.20, CI=0.03, 0.36, p<.05) and mindful engagement online (coefficient=0.14, CI=0.01, 0.27, p<.05) were retained.

The *full multivariate analysis* model (Group 3 Models; see Table 7) was significant ($F_{(4, 347)}$ = 23.20, p<.001) and accounted for 20% of the variance in social connectedness (adjusted R^2 = 0.20). Further, escapism (coefficient=-0.15, CI=-0.23, -0.07, p<.01) and active use (coefficient=0.36, CI=0.23, 0.48, p<.001) remained significant; active use was *positively* associated with social connectedness, whereas escapism was *negatively* associated with social connectedness. However, mindful initiation of engagement (coefficient=0.15, CI=-0.01, 0.31, p=.06) and mindful engagement online (coefficient=0.09, CI=-0.03, 0.22, p=.15) became non-significant. Therefore, when people used SNSs actively, they were more likely to feel socially connected; however, when they used SNSs to escape, they were less likely to feel socially connected.

The full multivariate model was re-run controlling for basic demographic covariates (age and gender; *controlled multivariate analysis;* Group 4 Models; see Table 7). This model was significant ($F_{(6, 339)}$ = 15.37, p<.001) and accounted for 20% of the variance in social connectedness (adjusted R^2 = 0.20). Active use and escapism remained significant (ps≤.001), and mindful initiation of engagement (p=.10) and mindful engagement online (p=.10) remained non-significant.

Finally, the *full controlled multivariate analyses* model (Group 5 Models; see Table 7) was significant ($F_{(8, 337)}$ = 11.61, p<.001) and accounted for 20% of the variance in social connectedness (adjusted R^2 = 0.20). Active use and escapism remained significant (ps≤.001), and mindful initiation of engagement (p=.09) and mindful engagement online (p=.13) remained non-significant.

Table 7

Regression analyses showing the regression of social connectedness after a negative experience of SNS on SNS use indicators and demographic variables. Values in bold indicate significant predictors. The reference category for gender was male.

	Univariate Models (Group 1 Model)		Partial Multivariate Model (Group 2 Model)		Full Multivariate Model (Group 3 Model)		Controlled Multivariate Model (with age and gender) (Group 4 Model)		Full Controlled Multivariate Model (with all demographic variables) (Group 5 Model)	
Predictor	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables										
Social connection motivation	0.04 (-0.05-0.13)	.42	-	-	-	-	-	-	-	-
Relationship formation	0.03 (-0.04-0.10)	.47	-	-	-	-	-	-	-	-
Escapism	-0.24 (-0.31- -0.16)	**<.001**	-0.24 (-0.31- -0.16)	**<.001**	-0.15 (-0.23- -0.07)	**.001**	-0.14 (-0.23- -0.06)	**.001**	-0.14 (-0.23- -0.10)	**.001**
Active use	0.36 (0.22-0.50)	**<.001**	0.36 (0.22-0.50)	**<.001**	0.36 (0.23-0.48)	**<.001**	0.35 (0.23-0.48)	**<.001**	0.34 (0.21-0.47)	**<.001**
Passive use	0.13 (-0.01-0.26)	.07	-	-	-	-	-	-	-	-
Mindful initiation of engagement	0.33 (0.23-0.44)	**<.001**	0.20 (0.03-0.36)	**<.05**	0.15 (-0.01-0.31)	.06	0.13 (-0.03-0.29)	.10	0.14 (-0.02-0.30)	.09
Mindful engagement online	0.26 (0.18-0.34)	**<.001**	0.14 (0.01-0.27)	**<.05**	0.09 (-0.03-0.22)	.15	0.11 (-0.02-0.24)	.10	0.10 (-0.03-0.23)	.13
Demographics										
Age	0.03 (-0.00-0.07)	.07	-	-	-	-	0.04 (0.01-0.07)	**<.05**	0.04 (0.00-0.07)	**<.05**
Gender	-0.21 (-0.52-0.11)	.19	-	-	-	-	-0.10 (-0.39-0.19)	.50	-0.10 (-0.38-0.22)	.59
Number of offline friends	0.00 (-0.00-0.01)	.34	-	-	-	-	-	-	0.00 (-0.00-0.01)	.68
Number of online friends	0.00 (0.00-0.00)	**<.01**	-	-	-	-	-	-	0.00 (-0.00-0.00)	.44

Assumption testing

Several measures were found to violate the assumption of normality using skewness and kurtosis tests and the Shapiro Wilk test (positive experience on SNS: positive mood, negative mood, social connectedness; negative experience on SNS: negative mood). However, evidence from Schmidt and Finan (2018) suggests that transformation to correct for non-normally distributed residuals may be unnecessary for large sample sizes, as linear regression is fairly robust to normality violations. Several measures also violated the assumption of homoscedasticity (positive experience on SNS: positive mood, negative mood; negative experience on SNS: negative mood). After the full multivariate models were re-run with weighted least squares to correct for this, all findings stayed the same, apart from negative mood (positive experience on SNS) where active use became non-significant (coefficient = -0.09, p=.095). The assumption of multicollinearity was met for all measures. See Appendix 13 for assumption tests and associated statistics.

Sensitivity analyses

Despite the instructions for the questionnaire specifying what the project considered to be a SNS ("*Note: we define social networking sites as any app or website on which you have a personal profile, and have connections to a network of other users whose profiles you can also access, e.g., Facebook, Twitter, Instagram, LinkedIn, though there are many others also. Please note, we do not qualify Snapchat as being a social networking site*"), some participants referenced sites / apps that did not qualify under this definition when defining the nature of their positive and negative online experiences. The analyses (described above) were therefore re-run after excluding any participants who referenced using apps / platforms in relation to their recalled positive or negative SNS experience that did *not* fall under the definition of SNS provided.

Participants' full responses were removed (i.e. for both positive and negative scenarios) if recalled positive *or* negative experiences were linked to a SNS app / platform that did not meet the provided definition (i.e. listwise deletion was applied). Where

participants reported *multiple* sites, for example "WhatsApp and Facebook messenger" when referencing an experience, the responses were retained as long as *one* of the referenced sites was a SNS.

Data were removed when the following sites were referenced: "Hinge" (dating site rather than SNS; N=2), "WhatsApp" (instant messenger rather than SNS; N=22), "Skype" (videoconferencing rather than SNS; N=1), "Soul" (dating site rather than SNS; N=1), "Snapchat" (social media rather than SNS; N=13), and "Microblog" (social media rather than SNS; N=1). Overall, 40 of the 352 responses were removed, leaving an analytic sample of 312 (88.6% of the original).

The full controlled multivariate models (Group 5 Models) were re-run with the non-SNSs removed across all conditions and outcome variables tested. See Appendix 14 for full results of the regression analyses. However, in brief, all findings relating to the predictors were unchanged with the exception that in the positive experience of SNS, active use no longer significantly predicted positive mood (p=.30).

Path analysis

Finally, in order to explore a proposed link between social approach motivations (relationship formation), active use, and positive wellbeing outcomes (increased positive mood and social connectedness) (Figure 2a), and a proposed link between escapist motivations, passive use, and negative wellbeing outcomes (increased negative mood and decreased social connectedness) (Figure 2b) a series of path analyses were run. Hypotheses 5 and 7 were tested using PROCESS model 4 (simple mediation), and hypotheses 6 and 8 were tested using model 7 (moderated mediation with moderation of the a-path but not the c'-path/direct effect; see Figure 2).

Figure 2

PROCESS model 7 path. The figures represent a general schematic summarising of the different models run. Where there are multiple dependent variables and moderators, these were run in separate analyses, resulting in a total of eight moderated mediation analyses run.

a)
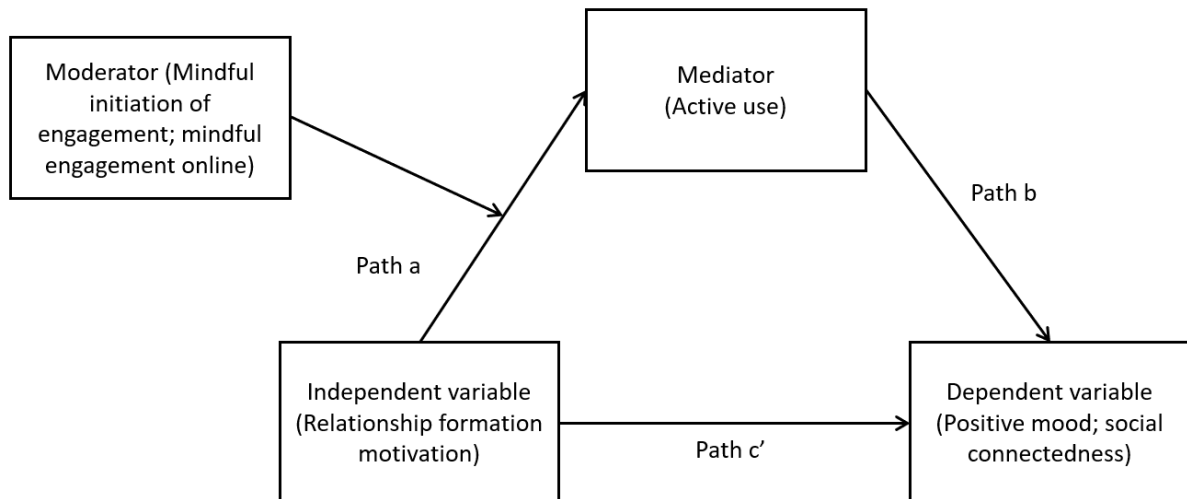
b)
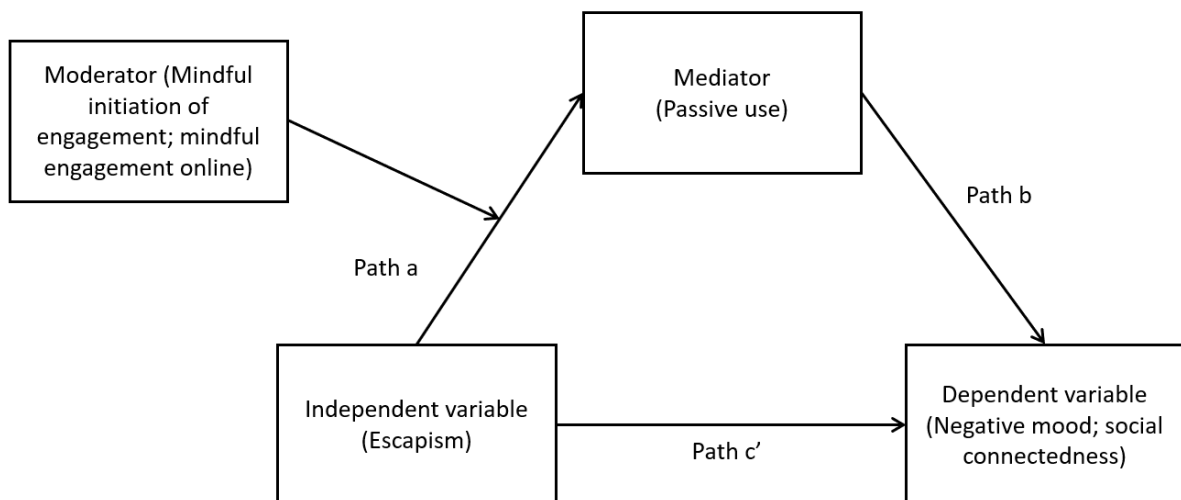
Mediation and moderated mediation analyses

All of the mediating pathways in all models were insignificant, with the exception of the mediation of relationship formation on positive mood through active use in the positive SNS experience ($b = 0.03$, Boot CI [0.00, 0.05]); all other ps>0.05; see Table 8). Therefore, only H5i was supported. All moderated mediation pathways were non-significant (see Table

8). (See Appendix 15a for path components for mediation and moderated mediation analyses).

After removing non-SNS data points, all mediating pathways and all moderated mediation pathways were non-significant (see Table 9). (See Appendix 15b for path components for mediation and moderated mediation analyses when non-SNS sites removed).

Table 8

Mediation and moderated mediation output. Due to the PROCESS macro output, p values are given for direct effects, whereas for indirect effects or otherwise, significance is inferred from confidence intervals (CIs). Where CIs enclose zero, effects are deemed non-significant (NS), and where they do not, they are deemed significant (SIG). Values in bold indicate significant pathways.

SNS experience	Outcome variable	Effect		*b*	95% CI	*p* value
Positive	Positive mood	Direct effect	Relationship formation -> positive mood	0.10	0.05, 0.14	**<.001**
		Indirect effect	Relationship formation -> active use -> positive mood	0.03	0.00, 0.05	**SIG**
		Moderated mediation	Relationship formation -> active use (moderated by mindful initiation of engagement)	-0.00	-0.01, 0.00	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful engagement online)	-0.00	-0.01, 0.00	NS
	Social connectedness	Direct effect	Relationship formation -> social connectedness	-0.06	-0.13, 0.02	0.127
		Indirect effect	Relationship formation -> active use -> social connectedness	0.02	-0.02, 0.06	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful initiation of engagement)	-0.00	-0.01, 0.00	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful engagement online)	-0.00	-0.01, 0.00	NS
Negative	Negative mood	Direct effect	Escapism -> negative mood	0.04	-0.00, 0.09	0.078
		Indirect effect	Escapism -> passive use -> negative mood	-0.01	-0.02, 0.00	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful initiation of engagement)	-0.00	-0.01, 0.01	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful engagement online)	0.00	-0.01, 0.01	NS
	Social connectedness	Direct effect	Escapism -> social connectedness	-0.24	-0.32, -0.17	**<.001**
		Indirect effect	Escapism -> passive use -> social connectedness	0.01	-0.00, 0.03	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful initiation of engagement)	0.00	-0.01, 0.01	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful engagement online)	-0.00	-0.01, 0.01	NS

Table 9

Mediation and moderated mediation output after removing non-SNS data points. Due to the PROCESS macro output, p values are given for direct effects, whereas for indirect effects or otherwise, significance is inferred from confidence intervals (CIs). Where CIs enclose zero, effects are deemed non-significant (NS), and where they do not, they are deemed significant (SIG). Values in bold indicate significant pathways.

SNS experience	Outcome variable	Effect		*b*	95% CI	*p* value
Positive	Positive mood	Direct effect	Relationship formation -> positive mood	0.09	0.05, 0.14	**<.001**
		Indirect effect	Relationship formation -> active use -> positive mood	0.01	-0.01, 0.04	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful initiation of engagement)	-0.00	-0.00, 0.00	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful engagement online)	-0.00	-0.00, 0.00	NS
	Social connectedness	Direct effect	Relationship formation -> social connectedness	-0.06	-0.14, 0.01	0.107
		Indirect effect	Relationship formation -> active use -> social connectedness	0.02	-0.03, 0.06	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful initiation of engagement)	-0.00	-0.01, 0.01	NS
		Moderated mediation	Relationship formation -> active use (moderated by mindful engagement online)	-0.00	-0.01, 0.00	NS
Negative	Negative mood	Direct effect	Escapism -> negative mood	0.04	-0.01, 0.09	0.151
		Indirect effect	Escapism -> passive use -> negative mood	-0.00	-0.01, 0.00	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful initiation of engagement)	-0.00	-0.01, 0.00	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful engagement online)	0.00	-0.01, 0.01	NS
	Social connectedness	Direct effect	Escapism -> social connectedness	-0.23	-0.32, -0.15	**<.001**
		Indirect effect	Escapism -> passive use -> social connectedness	0.00	-0.01, 0.02	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful initiation of engagement)	0.00	-0.01, 0.01	NS
		Moderated mediation	Escapism -> passive use (moderated by mindful engagement online)	-0.00	-0.01, 0.01	NS

Understanding the nature of positive and negative SNS experiences

Analyses were conducted on the qualitative responses from all 352 participants, including a quantitative comparison of which SNSs were referenced more commonly in relation to positive and negative SNS experiences, and a qualitative analysis of the nature of such experiences.

Comparing the frequency of platforms and apps reported in positive and negative SNS experiences

For both positive and negative experiences, Instagram was the most cited SNS that participants drew their experiences from (Pos=214 [57.5%], Neg=177 [47.3%])], followed by Facebook (Pos=36 [9.7%], Neg=57 [12.2%]), Twitter / X (Pos=26 [7.0%], Neg=39 [10.4%]), and then TikTok (Pos=21 [5.6%], Neg=28 [7.5%]; see Appendix 16 for all platform counts).

A chi-squared test was run to determine whether the frequency with which participants reported the use of particular platforms / apps differed across positive and negative SNS experiences. Platforms were only included if the expected count in each cell was ≥5 (Field, 2014, p.723). There was evidence for a significant non-random association between SNS experience type (positive and negative) and platform / app ($\chi^2_{(8,690)}$ = 16.96, *p*=.031). Participants reported significantly more *negative* experiences than expected on Facebook, TikTok, Twitter / X, Little Red Book / Xiaohongshu, and WhatsApp, and significantly more *positive* experiences than expected on Instagram, Snapchat, and WeChat. Observed counts of positive and negative experiences on YouTube did not deviate significantly from expected. See Appendix 17 for full chi squared scores.

The nature of positive and negative SNS experiences

A simple qualitative analysis was completed on participants' brief open text responses reporting on the nature of their positive and negative SNS experiences. Table 10 details the superordinate and subordinate themes captured in the data, with single supporting quotations. See Appendix 18 for full details and further supporting quotations.

Table 10

Data themes captured from participants' qualitative responses, reflecting on positive and negative SNS experiences

Type of experience	Superordinate themes	Subordinate themes	Supporting quotations
Positive	Feeling connected	Conversation with others	"Talking with friends about common interests we share."
		Relating to others' experiences	"Seeing a post on a mental health page that validated and resonated with my experience."
		Feeling thought of / held in mind by others	"A friend sending me a video of an experience she thinks I'd like."
	Making new friends	-	"Finding a new friend to talk about my favourite celebrity with."
	Sharing content	With known others, e.g., in a direct message	"I shared an event with my friend and we both decided to attend."
		With followers, e.g., onto a feed	"Posting something I was passionate about."
		Feeling validated by others after sharing content	"I posted some photos on my story and received positive interactions and messages from my friends."
	Passively viewing content on SNSs	Viewing content which I feature in	"View[ing] the photos that I took with my friends when we went out together."
		Viewing content from others about day-to-day life	"Seeing my friend's life updates when they're in another country, so I can see what they're up to and we can talk about it."
		Viewing content from others about life achievements	"Seeing positive photos of a friend's engagement."
	Use of SNSs for entertainment	-	"Watching funny and entertaining videos on TikTok."
	Use of SNSs for development and learning	-	"Learning about people's careers in statistics."
	Feeling inspired by online content	-	"Getting inspiration from videos of athletes or other people I admire."
Negative	Negative direct communication	-	"I was sharing a vulnerable experience with a stranger online and they dismissed my feelings as well as insulted me multiple times."
	Viewing negative comments	Generally online	"Reading negative and homophobic comments."
		About a friend	"Viewing racist comments on an Instagram reel that involved some of my friends (being the subject of racism)."
		Personal to them	"People commenting judgemental things on my posts / questioning my content."
	Scrolling through content	Passively and aimlessly	"Scrolling through absolute brain mushing content on Instagram reels."
		To escape from / avoid other things	"Personal bereavement where I turned to social media for escapism."
	Being left out / forgotten about	-	"Seeing some of my friends doing something fun together having not been invited."
	Viewing content / profiles which triggers negative emotions	General content	"Looking at videos that would trigger health anxiety."
		Violent content	"I watched a horrible video of boys fighting and stabbing each other."
	Social comparison	-	"Scrolling through an acquaintance's profile and feeling like they were so much more accomplished than I was."
	Being scammed online	-	"I have been scammed whilst using social media."

Discussion

This project aimed to test predictions to emerge from Tibber and Silver's (2022) trans-diagnostic cognitive behavioural model of the role of social media use in mental health and wellbeing in emerging adults. Specifically, it explored links between 1) motivations for going online (enhancement / escapist), 2) behaviour when online (active / passive), 3) mode of online use (mindful / habitual), and 4) consequences of use (mood and social connectedness) and self-reported *positive* and *negative* online SNS experiences. Overall, the results were broadly consistent with the model.

In line with H1, participants reported higher enhancement motivations (social connection motivation and relationship formation), active use, and mindful engagement (mindful initiation of engagement and mindful engagement online) when reflecting on a *positive* SNS experience than they did when reflecting on a *negative* SNS experience. Further, participants reported higher compensatory use (escapism) when reflecting on a *negative* SNS experience than they did when reflecting on a *positive* SNS experience. These findings were consistent with previous research, which showed that enhanced wellbeing outcomes were associated with enhancement motivations (Perugini & Solano, 2021), active use (Meier & Reinecke, 2021), and mindful engagement (Poon & Jiang, 2020), whereas poorer wellbeing outcomes were associated with escapist motivations (Perugini & Solano, 2021).

Counter to the prediction of H1, however, passive use was significantly higher in the positive SNS condition. A recent critical scoping review by Valkenburg et al. (2022) speaks to this finding, since it showed that most included studies did not support hypothesised associations between active use and increased wellbeing, and passive use and decreased wellbeing. The authors suggested, therefore, that the active / passive distinction is too general when considering associations between social media use and wellbeing, and that content, as well as the characteristics of the sender and the receiver, should be accounted

for (Valkenburg et al., 2022). Reflecting on this, it is of note that passive SNS use need not always be linked to escapist behaviours; for example, passive browsing of information that is related to an interest of the user could be values consistent, and thus a form of *approach* behaviour, which would be expected to be linked to positive wellbeing. In retrospect, therefore, passive use may have been a poor choice as a proxy for escapist use.

Digging into the results of the multiple regressions, there was considerable convergence between findings for both positive and negative SNS experiences. In other words, factors that predicted positive and negative outcomes were similar across both positive and negative SNS experiences. Consequently, findings from across both conditions are drawn together below, reporting where there are discrepancies between the two.

For both positive and negative SNS experiences, H2 was partially supported, as relationship formation (an enhancement motivation) was associated with increased positive mood, and escapism (a compensatory motivation) was associated with reduced social connection. This is consistent with previous research, which has typically found an association between *interpersonal* motivations for using social media and reduced levels of depression (Wright et al., 2013), as well as increased wellbeing (including emotional wellbeing) (Perugini & Solano, 2021). In contrast, when social media is motivated by avoidance of offline challenges, it is commonly associated with increased loneliness (Teppers et al., 2014).

Counter to the work of Yang et al. (2021), this project decided to explore both relationship formation and relationship maintenance (i.e. social connection motivation) as potential aspects of *enhancement* motivation. However, the variables were kept separate / entered into models separately, to allow for potential conceptual differences to be examined, and since, as noted, their combination into a single index of *enhancement* motivation resulted in a two-factor (rather than single-factor) solution. Interestingly, during the forward stepwise regression, relationship maintenance motivation was never retained as it did not significantly improve any of the models. This is potentially due to moderate shared variance

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with the relationship formation motivation as suggested by basic correlation analyses between the two (r = .40 and .43 for positive and negative SNS conditions, respectively). Of note, the relationship maintenance and relationship formation motivations behaved similarly in univariate analyses, suggesting a similar potential function.

H3 was partially supported for both positive and negative SNS experiences, as active use was associated with increased positive mood, and decreased negative mood. For the negative SNS condition only, active use was also associated with increased social connectedness. (N.B. When non-SNS sites were removed, active use was no longer associated with positive mood in the positive SNS condition). This is in line with findings from a meta-review which found associations between active use and positive wellbeing (Meier & Reinecke, 2021).

Lastly, for both positive and negative SNS experiences, H4 was partially supported, as mindful engagement was associated with enhanced wellbeing. Specifically, for the positive experience of SNS condition, mindful engagement online was associated with enhanced positive mood and social connectedness, and mindful *initiation* of engagement was associated with reduced negative mood. For the negative experience of SNS condition, mindful initiation of engagement was associated with enhanced positive mood, and reduced negative mood. This is consistent with previous research which suggests that mindfulness generally has associations with positive wellbeing (Tomlinson et al., 2018), as well as research relating to mindful online use more specifically, which supports a potentially beneficial / protective role of mindfulness between mental health and social media use (Li et al., 2022; Poon & Jiang, 2020) (see part one of this thesis also). The present study found that both mindful initiation of engagement and mindful engagement once online had significant associations with mood and social connectedness in multivariate analyses, suggesting that it may be beneficial to consider mindfulness at both stages, rather than just *whilst using* the SNS. This finding is in line with research by Hossain et al. (2024), which found that students using social media breaks to benefit recovery more often engaged in

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initiation *and* use which was conscious (i.e. mindful), compared to initiation and use which was automatic (i.e. habitual) and thus associated more with procrastination.

In terms of the path analysis only H5i was supported, whereby for positive SNS experiences, an association between relationship formation motivation and increased positive mood was partially mediated by active engagement. This is in line with the interpersonal-connection behaviours framework (Clark et al., 2018), as well as a body of research (e.g., Lomanowska & Guitton [2016]) , which suggests that active dimensions of engagement, such as self-disclosure and direct exchanges with others, facilitates connectedness and social capital, with consequences for wellbeing. Indeed, it is difficult to imagine an instance whereby an individual may be able to cultivate a (close) relationship without some level of active engagement. If so, this has practical implications for gaining the benefits of SNS use.

In retrospect, initial hypothesised pathways relating to escapist motivations may have been flawed. Thus, whilst it was hypothesised that associations between escapist motivations and reduced wellbeing (increased negative mood and decreased social connectedness) would be mediated by passive use, there are clear situations where individuals may actively engage with SNSs, in a way that is underpinned by an escapist function. For example, internet 'trolls', online bullies (often anonymous) who actively engage in causing offence and being derogatory towards others (Bishop, 2014), may be engaging in such behaviour to escape from aspects of their own lives, or to make others feel as bad as they do. In such contexts, one might expect negative wellbeing outcomes, despite active engagement. Again, as per Valkenburg et al. (2022), a crude active versus passive distinction may be too blunt a tool, at least with respect to predicting positive and negative outcomes.

With respect to the nature of participants' positive and negative SNS experiences, participants reported significantly more *negative* experiences than would be expected (relative to positive experiences) on Facebook, TikTok, Twitter / X, Little Red Book /

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Xiaohongshu, and WhatsApp, and significantly more *positive* experiences than expected on Instagram, Snapchat, and WeChat. In terms of platform features and affordances, there were no obvious differences / similarities between platforms which were associated with positive versus negative SNS experiences, e.g., as might be characterised using Nesi's transformation framework (Nesi et al., 2018a, 2018b) (asynchronicity, permanence, publicness, availability, cue absence, quantifiability, visualness).

Finally, in terms of the qualitative analysis, the findings are broadly consistent with Tibber and Silver's (2022) model. Thus, the most common positive experiences related to seeking out connection with others through conversation, or through sharing content. Contrary to the model, however, participants also commonly reported passive use in relation to positive SNS experiences. Nevertheless, when these responses were analysed further, it appeared that they often had a social connection element to them, such as viewing content from others about their day-to-day life and life achievements. In such instances, individuals commonly reported that they had passively viewed content made by friends. As per Valkenburg et al. (2022), these findings also suggest that the active / passive distinction may be too crude, and point to the importance of characterising what the individual is engaging with also. Thus, whether the content which they are passively scrolling is values consistent, and may even result in social approach behaviours, for example, passively browsing sites to find social events to attend, or passively viewing a friend's profile to feel closer to them. Whilst one of the putative risks of passive engagement is that social comparisons (commonly deemed detrimental to mental health) may be more common (Burnell et al., 2019), it is possible that individuals were *less* likely to make social comparisons, or detrimental social comparisons, when the potential comparator is a friend.

In terms of qualitative responses regarding the negative SNS condition, negative communication with others, often in the form of direct messaging, was the most common experience. In line with this, Tibber and Silver (2022) suggest how gratifications sought may not always be in line with gratifications obtained. For example, as per Tibber and Silver's

(2022) model, whilst social motivations may (in general) be more likely to engender social connection, this will not always be the case, i.e. there is an element of uncertainty derived from the respondents' / audiences' responses. Thus, in situations whereby the user attempts to connect socially with another (gratifications sought in line with social connection motivations), but satisfaction of these needs is not supported by their online engagement due to the responses of others not promoting connection, the user is likely to experience decreased satisfaction of core needs of belonging (i.e. disconnection), and thus reduced wellbeing. In line with this, Verduyn et al. (2022) extended the active / passive model by suggesting that active behaviour can be broken down into "*warm versus cold*" (p.65), and that as such, cold, quarrelsome behaviour is negatively related to wellbeing.

Another negative experience was related to individuals viewing content / profiles, some of which was violent, which triggered a negative emotion. A shared experience for many participants was viewing content / experiencing comments which were discriminatory, e.g., racist and homophobic. Whilst the model accounts for core beliefs in terms of the individual's cognitive behavioural cycle, it does not account for identity and the user's contextual factors, which, as seen here, may make it more likely that they will experience discriminatory behaviour, and thus be left with negative outcomes, regardless of their own motivation, behaviour, or mode of use. Again, this is in line with Tibber and Silver's (2022) model which suggests that greater disconnection as a consequence of use, as would be the case for discrimination, results in harm, whereby instead of the individual's sense of self being enhanced by feelings of acceptance and belonging, they instead become characterised as a member of an excluded outgroup.

Lastly, participants were able to self-identify instances where they engaged in social comparison and this resulted in a negative overall experience on the SNS. As social comparison was not included as a measure in this research, it is uncertain what, if any, the relationship between passive use, social comparison, and negative experiences of SNSs is.

However, research from Verduyn et al. (2015, 2017) demonstrates that the relationship between passive use and poor wellbeing is mediated by social comparison.

Implications

Overall, the findings are broadly consistent with Tibber and Silver's (2022) model, suggesting that if individuals use SNSs actively, mindfully, and to enhance their social network (i.e. relationship formation), then they will experience positive consequences for wellbeing. Thus, as the model was created to have clinical utility as a tool for formulation, interventions which promote such motivations, behaviours, and modes of use should be considered. Tibber and Silver (2022) include ideas for such interventions in their paper.

With regards to mindfulness, the findings acknowledge that mindful use is associated with enhanced wellbeing, both during initiation of engagement, as well as whilst engaging online. To this end, it is important for individuals to consider their motivations for online use in relation to how mindful / habitual their behaviour is, i.e. did they find themselves holding their phone with a SNS site open without having opened the app for a specific reason in the first place? Or did they go online with a specific motivation, only to find themselves habitually scrolling whilst not meeting that motivation? Tibber and Silver (2022) suggest behavioural changes which the user can implement, such as increasing knowledge of design features of social media sites through psychoeducation, and activity monitoring; however, perhaps technological changes should also be considered which could cue individuals to check in with themselves after they have been online for a certain time, or ask them to consider their motivation for using the app once they click on it.

Future research

Although this project did not include social comparison as a measure, qualitative responses showed that engaging in negative social comparison was associated with having a negative SNS experience. Research has found that the association between passive use and poor wellbeing is mediated by social comparison (Verduyn et al., 2015; Verduyn et al.,

2017), suggesting that both passive use and social comparison could be useful targets for intervention, to reduce the harms of social media use. However, despite being associated with social comparisons in the literature (Burnell et al., 2019), this project also found that passive use was associated with positive SNS experiences. One possible explanation for this was that the passive experiences participants described in the positive SNS condition often seemed to have a social aspect, such as checking in with friend's lives. Thus, perhaps social comparisons which are detrimental, are less likely when the potential comparator is a friend. Extending the active / passive model, Verduyn et al. (2022) suggest that social comparisons are more likely to occur when the content of the comparison is related to evaluation of the user's self-concept. For example, they suggest that "*a graduate student may feel a sting of envy when reading about a fellow student who published an important article, but not when discovering that the other student won a major swimming contest. In the latter case, the graduate student may actually feel happy by basking in the reflected glory of the fellow student*" (p.65) (Verduyn et al., 2022). In addition, upward social comparisons have been found to be associated more with negative self-evaluations and emotions, compared to downward social comparisons (McComb et al., 2023). Thus, future research should aim to contextualise the nature of both passive use and resulting social comparisons; as well as perhaps focussing on the more general conceptualisation of approach / avoidant behaviours rather than active / passive use, which provides more context for individuals' behaviours and whether they enhance or move away from their values (perhaps using qualitative research to facilitate a more contextualised understanding of such patterns).

Whilst there were no clear patterns in platform affordances related to positive and negative SNS experiences in the current research, future research might take a similar approach to Tibber et al. (2023), who coded identified platforms for core features of popular Chinese social media sites to examine associations with self-reported stress and academic attainment. This would enable understanding of any associations which may emerge between the type of platform (with respect to features and affordances) and relative

frequency of positive and negative SNS experiences for popular UK SNS platforms / apps. If patterns related to specific affordances were observed, this would enhance users' understanding of which sites may be more likely to have beneficial / harmful effects on their wellbeing, due to how the affordances may interact with their individual use and context.

Limitations of the project

There are a number of limitations of this project. Firstly, as previously mentioned, many of the survey items were made up of subscales from several existing, well-established questionnaires. This decision was made in order to reduce questionnaire length and time, and ensure maximum participation. Nonetheless, careful consideration was given to which items made up each measure, and analyses were undertaken to ensure internal reliability and factor structure. Another limitation with some of the existing questionnaires is that they are quite dated in terms of the scope of functionalities which social media currently allows for. For example, in characterising types of behaviours online, the Passive Active Use Measure (PAUM) (Gerson et al., 2017) captures "Looking through my friends' profiles", but does not have another option for looking through the profiles of people who are unknown offline and only followed online, or celebrities, a common functionality of many SNSs. Given this research found that passively viewing friends' profiles was associated with positive experiences online, and hypothesised this may have something to do with the lack of upward comparisons with friends, perhaps passively viewing the profiles of unknown others may result in different consequences for wellbeing. Therefore, in general, it would be beneficial for questionnaires measuring social media behaviours to be updated to accommodate the broad range of activities one can engage with online currently.

Another limitation was the self-report nature of the data, which may have affected its validity and accuracy (Verbeij et al., 2021). Validity may have also been impacted by the need to exclude potential bot responses, and the fact that current recommendations must be utilised with researcher discretion also. Furthermore, participants were asked to reflect on a recent time where they had a positive and negative experience on SNSs, i.e. imagine

themselves back in that situation. There is not much in the literature on modification of questionnaires to tap into *change* in mood rather than current mood state; however, research by Rice (2022) found no adverse effects on reliability and factor structure after altering scales to measure retrospective change in depression, social anxiety, and social connectedness. Furthermore, the current study also undertook measures of reliability and factor structure before commencing analysis.

In terms of the sample, age and gender were the only demographic variables collected and modelled as covariates. Therefore, whether these results are generalisable to the wider population of emerging adults is unclear, as it is likely that SNS use interacts with other elements of users' social and cultural identity. For example, the qualitative answers showed that for some users, negative experiences were characterised by experiences of racism and homophobia, suggesting an association between parts of one's identity being minoritised, and having a negative experience online, driven by discrimination. However, it is likely that for some individuals with minoritised identities, SNSs with particular affordances may promote opportunities for positive experiences also. For example, consider a young trans person who is bullied online by school peers (likely resulting in poorer wellbeing and feelings of social isolation), but accesses a supportive online community where their identity is accepted and shared (likely resulting in enhanced wellbeing and feelings of social connection). Thus, if using Tibber and Silver's (2022) model to formulate, it is important that clinicians should, as is beneficial in any therapeutic relationship, consider the person's identity, and how this may impact on the benefits and harms that SNSs may afford them. Further, although the research had no inclusion criteria based on mental health diagnoses and was instead interested in general wellbeing, the likelihood that some participants will have a clinical mental health diagnosis is acknowledged, given rates in the general population (NHS England, 2023). Thus, it is important that features of clinical diagnoses are also considered by clinicians, as they may have an impact on SNS engagement and outcomes; for example, a young adult with a diagnosis of anxiety and agoraphobia may be

more at risk of negative mood outcomes even when engaging actively online with friends, as it reminds them of the challenges relating to their offline life, and what they are missing out on at college with peers due to challenges with their mental health.

Another major limitation of the study is its cross-sectional design, which precludes inferences about directions of causality. Therefore, future studies should use longitudinal and experimental designs that can start to disentangle underlying mechanisms and directions of causality. In addition, the study was completed only referencing SNSs, therefore may not generalise to wider social media platforms, which may not have as much of a social connection element. Future research could therefore broaden out this research to encompass other social media sites.

Lastly, participants were not asked to rate how positive or negative their experience on the SNS was. Had this been included, it could have been built it as a covariate, to see whether the intensity of the positive / negative experience had any effect on the outcomes, i.e. extremely positive experiences may have been characterised by a certain pattern of use and related outcomes, compared to only moderately positive experiences. However, as participants were asked to reflect on a day-to-day experience of SNSs, it was considered that there may not be enough spread in the data. Furthermore, it was considered how the rating of the SNS experience may become conflated with mood, i.e. that individuals may rate an experience as being more positive, the more positive it made them feel emotionally. Thus, the decision was made to not include this in the questionnaire.

Conclusions

Overall, the findings of this project are broadly consistent with Tibber and Silver's (2022) model, suggesting that SNS use which is active, mindful, and motivated by enhancing the user's social network is associated with benefits to wellbeing. However, as per Valkenburg et al. (2022), the findings suggest that the passive / active distinction is too broad, and instead future research should consider the content, as well as qualities of the

sender and receiver, to allow for conceptualisation of findings such as in this project, whereby passive use was associated with positive outcomes. It is hoped that the findings from this project will help to promote the clinical utility of the model as a model of formulation which can be used by clinicians to support emerging adults' wellbeing by considering their online as well as offline worlds. Future research should aim to further test the model, by extending our understanding of the benefits and harms associated with affordances of UK platforms, as well as exploring the active / passive distinction further, to allow for a more contextualised understanding of SNS use and associated wellbeing outcomes.

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Part Three: Critical Appraisal

Introduction

This critical appraisal includes my reflections on undertaking the research project as part of the Clinical Psychology Doctorate. Starting with contextualising my previous clinical and research experience and how these influenced my project selection, followed by my broader reflections on both the process of the literature review and empirical paper. Throughout, I reflect on the difficulties I faced, what I have learnt from these, and the lessons I will take into my future career.

Background and reflections on project selection

Previous clinical experience

My clinical experience prior to starting the Doctorate was with adults, primarily in two settings. Initially, I worked in a Priory forensic psychiatric hospital; first as a Healthcare Assistant, then progressing to simultaneously volunteering as an Honorary Assistant Psychologist one day a week, until I secured a full-time Assistant Psychologist position. Secondly, I worked remotely during the pandemic as an Assistant Psychologist in an outpatient eating disorders team.

During both roles, I observed the positives and negatives of social media (SM) use. Working with young women in the acute ward at the psychiatric hospital, I saw how SM allowed them to connect with friends and family, often who were many miles away due to being placed out of area as a result of bed pressures (Nuffield Trust, 2023), and therefore would be unable to visit regularly. Research shows that social support during times of mental health crisis is extremely important and a positive predictor of recovery (Wang et al., 2018), therefore communication via phones and SM can provide a beneficial link with the outside world. Furthermore, conversations with a group of young women on the psychiatric intensive care unit (a secure ward which provides intensive treatment for mental illness) opened my eyes to how a younger generation of individuals felt comfortable to detail their time in inpatient psychiatric care, often on platforms supporting videos such as Instagram and

TikTok, where creators produced blog-like content documenting their mental health journeys. Whilst I agreed with them that providing information about mental health to a wider platform could reduce stigma, open people's eyes to what a psychiatric hospital is realistically like on the inside, versus the exaggerated adverse experiences often seen in popular media (see Anderson [2003] and Morris [2014]), and provide reassurance to those undergoing treatment that they are not the only one, I also had concerns. Firstly, individuals in psychiatric inpatient care are often very vulnerable, and may be experiencing mental health symptoms which make them disinhibited, as well as there being concerns about capacity, for example, to understand the risks with posting certain information online. Due to the potential permanence of online material (Nesi et al., 2018a, 2018b), there is always a risk of sharing something which may later be regretted, which could be enhanced by experiencing acute mental distress. Secondly, sharing images and videos of life inside a psychiatric ward could put both staff and other vulnerable patients at risk, and is a breach of confidentiality. Lastly, there is a darker side to social media where individuals can share information which can increase risk or be triggering, for example, sharing self-harm tips. Additionally, some of the patients on the ward spoke about having experienced cyberbullying whilst online. Overall, the young people's experiences were in line with research which details both risks and benefits of using SM generally (Uhls et al., 2017), as well as during times of psychological crisis (Weinstein et al., 2021).

When working in the eating disorders team, I had some similar concerns about the use of social media. Whilst running an Anorexia Nervosa treatment group consisting of young women, many of whom attended a top UK university, I again became aware of a darker side to social media. Often referred to as pro-ana content, there is a large body of information online dedicated to the promotion of behaviours related to anorexia including 'thinspiration', advice for weight loss, and individuals competing for weight loss (Bert et al., 2016). With the rise of social media (Kemp, 2024), it is easy for individuals to share and discuss content related to eating disorders, with content accessible via popular platforms

such as TikTok (Lookingbill et al., 2023), Twitter (Arseniev-Koehler et al., 2016), and Instagram (Ging & Garvey, 2018), despite efforts to restrict and ban it (Crawford, 2019; Marsh, 2020). Traits associated with anorexia, such as perfectionism (Cassin & von Ranson, 2005), mean that engaging with online content and comparing oneself with others is a slippery slope for trying to do weight loss 'well' and 'better' than other people, in order to be the best (i.e. thinnest); a hypothesis backed up by research which demonstrates associations between viewing pro-ana content, and worsening eating disorder symptoms (Bardone-Cone & Cass, 2007).

Influence of previous research and clinical experience on project choice

My research project during my Forensic Psychology Masters was a quantitative, online, experimental study into whether suspect stereotypes and offence severity biased individuals' decisions as to whether a pair of fingerprints was a match or not. Despite the hard work I put into both my Undergrad and Masters' dissertations, I was not supported to publish them. Therefore, I knew that for my Doctoral thesis, I wanted to find a topic I was interested in, that had a supportive supervisor who was interested in publication. I was unsure which clinical area I wanted to pursue after training, therefore had no drivers in terms of this. Compared to some of my colleagues on the course who had more research experience, I felt underprepared and had some anxiety about creating a project from scratch, and therefore looked for a project with research aims that were already quite fleshed out.

Initially, due to my interest and clinical experience in eating disorders, I considered a project examining whether the mechanisms of change during family therapy for Anorexia Nervosa were related to changes in parenting style during therapy. Despite my initial interest in this, I had concerns about how this would feel for parents of individuals with the diagnosis, and how they may feel blame, from others as well as towards themselves, for their child not getting better. Understandably, the finding would be very important in terms of supplementing research into other risk factors for anorexia, and I understood from my previous work that an important message embedded in family therapy for anorexia is that the

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family is not to blame, however it was a question I was left with. Additionally, the project required NHS ethical approval, which put me off due to my inexperience with research, and the challenges I had heard from other Trainee's about how it could massively impact upon the thesis timeline.

Deciding on my final project

After lots of consideration of the pros and cons of each project I was interested in, the project I selected was examining a cognitive behavioural model of SM use. From both my clinical experience (as described above) and personal experience, I was interested in exploring how social media can have both benefits and harms, and how we can use it in a way which is beneficial. I recall studying an internet and social communication module during my Undergraduate, and feeling confused as much of the research determined that SM has detrimental effects, especially on mental health, but then some research found benefits associated with SM use (Uhls et al., 2017). This negativity bias has often been reflected on in the literature (Orben, 2020), but it left me with questions about what was driving these opposing findings.

Therefore, I was excited by Tibber & Silver's (2022) paper on a trans-diagnostic cognitive behavioural conceptualisation of the positive and negative roles of social media use, as it brought nuance to the conversation. I was impressed with how comprehensive the model was and how it was grounded not only in theory, but with associated clinical examples. I therefore was eager at the possibility of testing the model, so that if it was found to be significant (or parts of it were), then it could potentially be used clinically by clinicians to help formulate with clients about how to continue to use SM in a way which benefits their wellbeing.

Alongside my previous clinical experience which got me thinking about social media benefits and harms, it was also something that I could relate to personally. There are times when I have been acutely aware of the negative influence that SM can have on my own life,

when I sit scrolling content on Instagram for over an hour each day; however, I have been able to recognize the negative effect on myself and set boundaries to reduce this. At times I have deleted the app, and despite this, over the first few days have found myself reaching for my phone to go on Instagram, only to remember that I had deleted it. This demonstrates just how automatic and mindless even the act of picking up our phones can become. However, despite noticing the benefits that it had on my mood and productivity, my enforced deletion of the app never lasted long, mainly because of the lack of connection I felt, worry about missing a message online, or fear of missing out (FOMO) on something new everyone else was seeing. In addition, as well as using SM for social connection and entertainment, there is a lot of educational content which I find helpful in relation to my interest in psychology, and my hobbies. Therefore, I decided to set myself a limit on certain social media apps, for example, after 15 minutes on Instagram, I would close the app for the day. What initially felt like a good compromise became unrealistic, and when the limit would appear, I would log off, but then find myself ignoring it later in the day and going back on the app. However, it is no wonder that we get stuck in these patterns, when social media is inherently designed to capture the attention of users' to maintain their engagement (Lupinacci, 2021). At the beginning of 2024, having found myself procrastinating precious thesis writing time away scrolling on SM, I set myself a goal of only using Instagram for 45 minutes per day. Perhaps due to my newfound knowledge on the benefits and risks (or perhaps due to my increased time needed for thesis writing!), it appears to have stuck, and now my continued streak of not breaking the habit, seems to be stronger than the pull I get to ignore the limit.

As SM use continues to rise, with the average user accessing it for 143 minutes per day (Kemp, 2024), I am passionate about finding a way for individuals to use it to their benefit, whilst having insight into the harms it can cause, and feeling empowered to manage these. As I have demonstrated myself, I do not believe it is realistic to expect people to come off all SM given how ubiquitous it is, and given that research into digital detox demonstrates

how it is not always beneficial (Radtke et al., 2022). It is interesting to reflect on conversations with friends about how we would want our future children to consume content on social media, and whether we would restrict this, and up until what age. With children as young as three accessing social media (Ofcom, 2023), despite sites saying that users should be 13 years old to create an account (Childnet, n.d.), it is clear that further regulation is required. However, restricting social media fully could leave young people at a social disadvantage, both at being left out from the experience of going online, as well as missing out socially on content discussed by peers, but also potentially at an educational disadvantage, given how social media has been demonstrated to be a useful educational tool (Faizi et al., 2013). With my thesis, I hoped to test Tibber and Silver's (2022) model, and contribute to the evidence base and understanding of how social media can be used to benefit wellbeing, as well as inform individuals which aspects of their use may be worsening their wellbeing, to allow them to make informed choices.

The research process

Systematic literature review

Picking the topic

The topic for the literature review came out of discussions with my supervisor, Marc Tibber, in relation to my empirical paper. Whilst putting together the cognitive behavioural conceptualization in Tibber and Silver (2022), Marc found a lack of research into links between mindfulness (a concept included in the cognitive behavioural model), mental health, and social media. Further research on my part found systematic reviews exploring each pairing of these three concepts separately, but not altogether.

Personal experiences of mindfulness

I was already interested in mindfulness as a concept, from my own personal experience of it. I currently use the app Headspace, and have done since during the pandemic, and aim to complete a daily meditation in the evening. I have found that it helps to

check in with myself, and have some awareness of how I am feeling, especially after busy days. After my literature review showed that mindfulness is associated with beneficial outcomes for mental health and healthier social media use, I am interested in considering how I can implement these findings personally. For example, how can I be more mindful when picking up my phone to consider what my motivation for using it is? When I open a SM app, can I be more mindful about not just scrolling, but engaging in content which makes me feel connected to others, or interests me. To take these findings to a larger scale, more experimental and longitudinal research is needed, but I can envisage how enhancing mindfulness could encourage individuals to be more aware of the benefits and harms of their SM use and consumption.

Reflecting on coding and analysis

Having never completed a systematic review before, I look back now at my naivety of what it entailed, and how time consuming each stage would be. I initially thought that once I had run my search that it would be plain sailing from there, and underestimated how much time data extraction would take with a very heterogeneous set of papers, let alone the analysis. At this point, I didn't even know what quality analysis was! I am especially grateful to my supervisor Marc for agreeing to be second-rater for my project, to reduce my anxiety at having missed any information during data extraction (especially regarding analyses which I found to be complex), but also as it was a hope of mine to be able to publish my project, and this increases its chances.

Empirical paper

Conceptualising the project

Initial discussions as a research team alongside a DClinPsy colleague who was testing the model qualitatively involved us deciding which parts of the model to test. This was an iterative process as we would both research different concepts, then bring our findings back to meetings to discuss. This process was challenging at the time, as a lot of the ideas

we researched ended up not being used, so I felt myself getting impatient as I felt like I was losing time. However, with hindsight, it was so important that we got the initial conceptualisation of the project right without rushing it, and it allowed me to become more familiar with many of the concepts outlined in Tibber and Silver's (2022) model. Despite picking this project as I was looking for something which was already fairly fleshed out, there was more scope than I initially thought to influence the direction of the project in terms of which variables to focus on, and how to conceptualise them. Although I felt out of my depth at the time, and was worried about getting things wrong, support and discussions from the research team built my confidence. Looking back, I am very grateful that I had the opportunity to shape the project to the extent that I did. In the end, we decided to stick quite closely to the model proposed in the paper (Tibber & Silver, 2022). One difficulty was that some of the concepts were challenging to measure quantitatively, for example whether behaviours were approach (i.e. towards values), or avoidance (i.e. away from values), as this could vary with context. Therefore, we had to choose parts of the model to test where measures already existed, to increase validity.

The next challenge was finding suitable measures for these concepts, balancing the length and validity of the questionnaire. As time to complete an online questionnaire goes up, it is more likely that individuals will drop out (Hoerger, 2010), which meant that the final questionnaire ended up using subscales of certain measures, in order to keep the overall questionnaire at around 100 questions and around 20 minutes. There were discussions about how to achieve this without losing validity, however it was decided that not putting participants off due to a long study was a priority. Therefore, the use of subscales was an inevitable limitation of the research, but also mitigated by examining the constructs using factor analysis and measuring internal consistency.

When conceptualising the study, it felt important to not focus specifically on mental health diagnoses or clinical samples, as much of the existing research bases focuses on how SM negatively impacts psychopathology e.g., SM addiction in individuals with

depression and anxiety (e.g., Seabrook et al., 2016; Şentürk et al., 2021). Therefore, instead

of using common mental health diagnoses, we decided to use outcomes of wellbeing which

everyone experiences, regardless of mental health diagnoses, and therefore settled on

mood and social connectedness. When it came to ethical approval, I thought the lack of

clinical sample would mean a less challenging process for ethics. However, the project still

required submission to the UCL research panel for consideration. Again, a learning curve for

myself as a new researcher, and a lesson in patience and management of workload, to

ensure I was using the time whilst the panel met to work on other aspects of the project.

Even at this early stage of conceptualising the project, I often felt overwhelmed

during discussions about the analysis and what statistical tests would be used. Maths had

always felt like a weakness of mine throughout education, and this left me lacking in

confidence about this aspect; especially as we had yet to receive any statistics teaching on

the course at this point. The results ended up being quite lengthy (at least to me) and more

complex than I had done previously. However, I was well supported by Marc, whose

confidence with statistics helped me massively, and encouraged to watch videos and read

online in order to learn the basics of STATA, a statistical package I was originally unfamiliar

with. Looking back, I am proud of my progress with statistical analysis, and now have

valuable knowledge of assumption testing, regression, and path analysis, as well as

completing some brief qualitative analysis based on the principles of thematic analysis.

Challenges during the project

In terms of data collection, one big challenge that I had was receiving many 'bot'

(automated software programmed to complete tasks such as online surveys [Storozuk et al.

[2020]]) responses on my Qualtrics survey, due to offering a prize draw for some vouchers.

Despite having run an online project four years previously during my Masters, and Marc

having supervised other more recent online projects, this appeared to be a relatively new

difficulty that my cohort were experiencing. It was disheartening to look at my results and

see so many duplicated responses, or responses that were not even related to my research

question. However, I was especially grateful that we had decided to include the qualitative questions at the end of the questionnaire, as otherwise I may not have even realized they were bot answers. This challenge brought my recruitment to a brief stop, as I took down the survey for a few days to give me time to research how to stop / reduce the bots. Thankfully, I was able to introduce security measures such as a reCAPTCHA, however they still managed to get through, just not at such a prolific rate as previously. I also read that bots were common on X (formerly Twitter) (Taylor, 2023; Wojcik et al., 2018), therefore decided to take my project down from X during the early stage of recruitment. This was discouraging as I was hoping that my study would have a bigger reach on X, as individuals are able to re-tweet and share it, potentially resulting in a broader participant reach outside of my social circle. I would hesitate before doing online research again in the near future, especially if offering a monetary reward, before security technology catches up. The presence of so many bot responses was very frustrating, and potentially may have altered the validity of the data, as I had to make fairly subjective decisions as to whether the data came from a human or a bot, using guidance from researchers as to potential indicators of bot responses (Lebrun et al., 2024).

As well as challenges with bots, I also underestimated how long data collection would take. During my Masters I also collected online survey data, and managed to recruit 360 participants relatively easily, so thought it would be the same this time where I needed to recruit 311. However, I realized I was naïve to reflect on my Masters, where the adult sample did not have an age requirement (therefore recruited individuals from age 18 to 77), whereas here I was only recruiting individuals aged 18 to 29. With many of my colleagues on the course outside of this age range, and myself approaching the top end of it, I realised that I did not have many people I could draw on to help recruit from the younger end of the age range. This therefore required lots of effort in terms of recruiting online through messages and online forums, alongside word of mouth, which naturally took longer than I anticipated.

Directions for future research

In this new sphere online where many are making money from using SM, either as influencers, creatives who use social media to build their following, or individuals who manage brand social media pages, it becomes more difficult to tease out certain aspects of use. Does the artist who loves painting but whose website gets no traction without followers on TikTok find that being on SM aligns with their values, or that it is just a way to help them make money? Does the influencer who posts content about their travels abroad love connecting with fellow travellers on SM who have the same values and are either traveling themselves, or thinking about doing so, or do they feel pressure to keep putting out content to get brand deals to support their lifestyle? SM use is more nuanced than the majority of the research base accounts for, especially where there is increasing crossover in the online sphere between personal use and business / career informed use (Clayton & Clayton, 2022). Therefore, I would be interested in seeing research with individuals who use social media in more varied ways such as these, to see whether there are any differences observed in their motivations, behaviours, mode of use, and associated outcomes.

Personal reflections

Prior to starting the course, I was worried about how I was going to manage the workload given my perfectionistic tendencies; a personality trait common amongst Trainee Clinical Psychologists, which has associations with burnout and low mood (Richardson et al., 2020). I felt another three years of my life focused solely on work and study with a cost to my personal life was unachievable, thus vowed to focus on maintaining a work-life balance. The way that course staff conceptualized good enough, and only needing to do enough to pass was hugely reassuring to me, and has allowed me to be more compassionate to myself throughout the course. During the research process, I often struggled with confidence in making decisions independently without running them by Marc, for fear of doing something wrong and wasting time, especially at the beginning. However, as the project has developed over the past 18 months, so has my confidence in my abilities. I have also recognized the

benefits of boundaries regarding work-life balance, managing my time to do things which fill my cup like seeing friends, reading, and going for a run, and when to push harder in order to meet deadlines. Running in particular has been a real source of stress-reduction for me, as demonstrated in the literature (Markotić et al., 2020), and despite having only taken it up mid-way through the course, it is something I will continue to invest time into for my mental wellbeing. I am also so grateful for the friendships I have gained on the course, and have found it invaluable to have their support and understanding of our shared experience and associated challenges; as reflected in research by Tompkins et al. (2016).

A related challenge, especially whilst working on my thesis, was managing the competing demands of clinical work on placement, other written assessments and exams, as well as life outside of the course. I found it difficult to switch between multiple tasks, for example, completing the literature review alongside the empirical paper, and often found myself wanting to finish one thing before moving on to another, so I could tick it off in my head. This became unfeasible due to timelines, but, as recommended by Marc, I found it helpful to keep a record of what I had been working on, so that I could familiarize myself with what I had done previously, and jump straight back in after a period of not working on it. I will definitely take this idea forward in my future clinical and research work.

Conclusions

Overall, I have found completing this thesis very rewarding and interesting, and feel inspired to continue to engage with research in a field which evolves at such a rapid pace, as per the technology within it. I am proud of myself and the project I have managed to achieve, and so grateful to Marc for all the support he has provided throughout completion of this project, both practical and in containing my anxieties. It is a testament to Marc's support that I have finished this project being interested in pursuing research in the future. I have been inspired by his passion for this area, which I now share, and hope to bring this interest into future clinical work.

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Appendices

Appendix 1 - Search strategies for PsycInfo, Medline, and Web of Science

PsycInfo (Ovid)

1   (Mindfulness or mindful or trait mindfulness or state mindfulness).ab,hw,id,ti.

22967

2   mindfulness/   12864

3   mindfulness-based interventions/   3384

4   1 or 2 or 3   22967

5   (Psychopathology or Psychopathologies or mental disorder* or mental illness* or

mental health or psychological disorder* or psychiatric disorder* or psychiatric illness* or

stress or distress or emotional problem* or mental ill health or psychological distress* or

schizophrenia or schizophrenic or psychosis or psychotic or mania or manic or schizotypal or

delusional or dissociat* or depersonalisation-derealisation or depersonalisation derealisation

or anxiet* or generalised anxiety disorder* or post-traumatic stress disorder* or post

traumatic stress disorder* or PTSD or social phobia* or social anxiet* or panic or phobia* or

obsessive-compulsive disorder* or obsessive compulsive disorder* or OCD or separation

anxiety or agoraphobi* or hypochondria* or bipolar or schizoaffective disorder* or manic

depressi* or affective disorder* or depressi* or mood disorder* or dysthymia or dysthymic or

cyclothymia or cyclothymic or catatoni* or eating disorder* or bulimia nervosa or binge eating

or binge eating disorder* or anorexia nervosa or body dysmorphi* or personality disorder* or

antisocial or anankastic or anxious or avoidant or borderline or dependent or histrionic or

narcissistic or paranoid or passive aggressive or schizotypal or schizoid or emotionally

unstable or obsessive-compulsive or obsessive compulsive or dissocial or addiction or

substance abuse or substance misuse or suicid* or self-harm or self harm or self-injurious

behaviour* or self injurious behaviour* or conduct disorder* or sleep* or psychological

wellbeing or wellbeing or well-being or well being or wellness or happiness or functioning or flourishing or quality of life or life satisfaction or satisfaction with life or positive affect or negative affect or self-concept or self concept or self-esteem or self esteem or self-worth or self worth or loneliness or emotional wellbeing).ab,hw,id,ti. 1832090

6   mental health/ or youth mental health/   91254

7   exp mental disorders/ 1077814

8   5 or 6 or 7   2139208

9   4 and 8   15854

10   (Social network* or social media* or Facebook or Facebook messenger or Instagram or TikTok or Twitter or LinkedIn or Snapchat or YouTube or WhatsApp or Pinterest or Reddit or LINE or BeReal or WeChat or Douyin or Telegram or Kuaishou or Sina Weibo or Tencent QQ or Xiaohongshu or Baidu Tieba or Qzone).ab,hw,id,ti.   145664

11   social media/ or online social networks/   23306

12   10 or 11   145664

13   9 and 12   425

14   limit 13 to ("0200 book" or "0240 authored book" or "0280 edited book" or "0300 encyclopedia" or "0400 dissertation abstract")   134

15   13 not 14   291

Medline (Ovid)

1   (Mindfulness or mindful or trait mindfulness or state mindfulness).ab,hw,id,ti.
         16660

2   Mindfulness/   6390

3   1 or 2   16660

4   (Psychopathology or Psychopathologies or mental disorder* or mental illness* or mental health or psychological disorder* or psychiatric disorder* or psychiatric illness* or stress or distress or emotional problem* or mental ill health or psychological distress* or schizophrenia or schizophrenic or psychosis or psychotic or mania or manic or schizotypal or delusional or dissociat* or depersonalisation-derealisation or depersonalisation derealisation or anxiet* or generalised anxiety disorder* or post-traumatic stress disorder* or post traumatic stress disorder* or PTSD or social phobia* or social anxiet* or panic or phobia* or obsessive-compulsive disorder* or obsessive compulsive disorder* or OCD or separation anxiety or agoraphobi* or hypochondria* or bipolar or schizoaffective disorder* or manic depressi* or affective disorder* or depressi* or mood disorder* or dysthymia or dysthymic or cyclothymia or cyclothymic or catatoni* or eating disorder* or bulimia nervosa or binge eating or binge eating disorder* or anorexia nervosa or body dysmorphi* or personality disorder* or antisocial or anankastic or anxious or avoidant or borderline or dependent or histrionic or narcissistic or paranoid or passive aggressive or schizotypal or schizoid or emotionally unstable or obsessive-compulsive or obsessive compulsive or dissocial or addiction or substance abuse or substance misuse or suicid* or self-harm or self harm or self-injurious behaviour* or self injurious behaviour* or conduct disorder* or sleep* or psychological wellbeing or wellbeing or well-being or well being or wellness or happiness or functioning or flourishing or quality of life or life satisfaction or satisfaction with life or positive affect or negative affect or self-concept or self concept or self-esteem or self esteem or self-worth or self worth or loneliness or emotional wellbeing).ab,hw,id,ti. 5054138

5   Mental Health/ 62786

6   exp Mental Disorders/ 1443781

7   4 or 5 or 6   5591530

8   3 and 7   11737

172

9   (Social network* or social media* or Facebook or Facebook messenger or Instagram or TikTok or Twitter or LinkedIn or Snapchat or YouTube or WhatsApp or Pinterest or Reddit or LINE or BeReal or WeChat or Douyin or Telegram or Kuaishou or Sina Weibo or Tencent QQ or Xiaohongshu or Baidu Tieba or Qzone).ab,hw,id,ti.   1482268

10   Social Media/ 16184

11   social networking/ or online social networking/   5764

12   9 or 10 or 11   1482268

13   8 and 12   335

Web of Science (Core Collection)

Search #1: Mindfulness OR mindful OR "trait mindfulness" OR "state mindfulness" (Topic)

Search #2: Psychopathology OR Psychopathologies OR "mental disorder*" OR "mental illness*" OR "mental health" OR "psychological disorder*" OR "psychiatric disorder*" OR "psychiatric illness*" OR stress OR distress OR "emotional problem*" OR "mental ill health" OR "psychological distress*" OR schizophrenia OR schizophrenic OR psychosis OR psychotic OR mania OR manic OR schizotypal OR delusional OR dissociat* OR "depersonalisation-derealisation" OR "depersonalisation derealisation" OR anxiet* OR "generalised anxiety disorder*" OR "post-traumatic stress disorder*" OR "post traumatic stress disorder*" OR PTSD OR "social phobia*" OR "social anxiet*" OR panic OR phobia* OR "obsessive-compulsive disorder*" OR "obsessive compulsive disorder*" OR OCD OR "separation anxiety" OR agoraphobi* OR hypochondria* OR bipolar OR "schizoaffective disorder*" OR "manic depressi*" OR "affective disorder*" OR depressi* OR "mood disorder*" OR dysthymia OR dysthymic OR cyclothymia OR cyclothymic OR catatoni* OR "eating disorder*" OR "bulimia nervosa" OR "binge eating" OR "binge eating disorder*" OR "anorexia nervosa" OR "body dysmorphi*" OR "personality disorder*" OR antisocial OR anankastic OR

anxious OR avoidant OR borderline OR dependent OR histrionic OR narcissistic OR paranoid OR "passive aggressive" OR schizotypal OR schizoid OR "emotionally unstable" OR "obsessive-compulsive" OR "obsessive compulsive" OR dissocial OR addiction OR "substance abuse" OR "substance misuse" OR suicid* OR "self-harm" OR "self harm" OR "self-injurious behaviour*" OR "self injurious behaviour*" OR "conduct disorder*" OR sleep* OR "psychological wellbeing" OR wellbeing OR "well-being" OR "well being" OR wellness OR happiness OR functioning OR flourishing OR "quality of life" OR "life satisfaction" OR "satisfaction with life" OR "positive affect" OR "negative affect" OR "self-concept" OR "self concept" OR "self-esteem" OR "self esteem" OR "self-worth" OR "self worth" OR loneliness OR "emotional wellbeing" (Topic)

Search #3: "Social network*" OR "social media*" OR Facebook OR "Facebook messenger" OR Instagram OR TikTok OR LinkedIn OR Snapchat OR YouTube OR WhatsApp OR Pinterest OR Reddit OR LINE OR BeReal OR WeChat OR Douyin OR Telegram OR Kuaishou OR "Sina Weibo" OR "Tencent QQ" OR Xiaohongshu OR "Baidu Tieba" OR Qzone (Topic)

Search: #1 AND #2 AND #3

Search: #1 AND #2 AND #3 and Book Chapters or Editorial Material (Exclude – Document Types)

Appendix 2 - Further detail about inclusion and exclusion criteria

(v) Included a measure of mental health

To be included, the mental health concept must have been included in the search terms.

Despite including 'addiction' as a broad term in the search, social media addiction was not included as a mental health measure. This is because it is a behaviour, and not a registered disorder as defined by the DSM-V (American Psychiatric Association, 2013) or ICD-11 (World Health Organisation, 2019).

In addition, problematic social media use was not included as mental health measure. Despite predicting wellbeing, it is not a construct of wellbeing, and has been shown to be a controversial label due to its circular nature (Caplan, 2003). Additionally, we chose not to include correlates of mental health problems such as disability.

(vi) Included a measure of social media

To be included, a measure of social media had to fit at least one of the following criteria:

- An explicit measure of social media use e.g., social media rumination

- A measure of engagement on social media e.g., time spent on social media

- A measure of social media motivation e.g., motivation to go on social media

- A social online process which infers use of social media e.g., fear of missing out

- Experimental comparison of social media users vs. non-users

NB. When pre-registering this literature review, it was outlined that participants only had to be social media users. However, once the systematic search was completed and screening and selection commenced, the criteria was made stricter (as above) in order to capture studies which fit with the research aims.

Appendix 3 - Further detail about quality assessment

Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004)

Each study was assessed for the degree to which it met criteria as per the manual (Yes = 2, Partial = 1, No = 0, Not applicable = N/A). Alongside using the manual, discussions between the researchers provided further clarity for some assessment questions. Where no further information is provided for headings below, the manual was fully adhered to.

(i) Research question sufficiently described

(ii) Appropriate study design

(iii) Method of subject selection

Further consideration was given to whether a student sample is biased based on whether the researchers made a claim about why they were interested in students specifically rather than for convenience. Additionally, research which recruited online was deemed as introducing bias.

2: no bias (as per the manual)

1: online recruitment; recruited students when there was no rationale for doing so

0: no information provided or obviously inappropriate selection (as per the manual)

(iv) Description of participant characteristics

(v) Random allocation of participants

(vi) Blinding of investigators

(vii) Blinding of participants

(viii) Well defined outcome and exposure measures

(ix) Appropriate sample size

(x) Analysis described and appropriate

(xi) Estimate of variance for main outcomes

(xii) Controlled for confounding variables

Despite the manual suggesting that cross-sectional surveys of a single group should be rated as 'N/A', age and gender often covary with social media use and mental health (Booker et al., 2018), therefore it was decided that the studies should be rated on whether they controlled for age and gender in the model of interest (either as a control / predictor / confounder variable or through sensitivity analyses). The following ratings were used:

2: age and gender controlled

1: either age *or* gender controlled

0: neither age nor gender controlled

(xiii) Results reported in sufficient detail

(xiv) Conclusions supported by results

Overall score.

A percentage summary score for each study was calculated as per the manual to indicate the overall quality. The tool does not provide cut off points to distinguish the quality of papers.

Extra quality measures

(xv) Measure of effect size for main outcomes (0 or 1; no or yes)

Measure of effect size was scored as 1 if effect sizes for all main outcomes were reported, and 0 if partial or no effect sizes were reported.

(xvi) Mindfulness measure valid and reliable; (xvii) Mental health measure valid and reliable; (xviii) Social media measure valid and reliable

Validity and reliability for all three outcomes (mindfulness, mental health, and social media) were scored in the same way. A score of 1 was given if at least one of the measures for an outcome accurately mapped onto the research question and had been validated in previous peer-reviewed research. This was so as not to penalise research where a primary measure which was valid and reliable was used alongside other exploratory measures. A score of 0 was given if none of the measures accurately mapped onto the research question or had been validated in previous peer-reviewed research.

(xix) Overall outcomes assessed using valid and reliable measures of mental health, mindfulness, and social media

The score for all three outcomes (xvi – xviii) was summed, to provide an overall score of validity and reliability of the measures.

Appendix 4 - Additional information on studies included in the review

Supplementary Table 1 Studies included in the review – additional information. The full list of studies included in this review is presented along with a number of additional variables not included in the main body of the thesis: date of data collection; country study was conducted in; sample population; any other participant demographics of importance; method of data collection; sampling strategy; type of social media site(s) examined; type of analysis; any sub-analyses/sensitivity analyses included; other variables included

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
Apaolaza, Hartmann, D'Souza & Gilsanz (2019)	November 2017	Spain	Undergraduate students	N/A	Field survey	Convenience sample	Participants had to be active WhatsApp users (not defined)	Correlation; path analysis; mediation analysis	N/A	N/A
Baker, Krieger & LeRoy (2016)	27/1/2015 to 28/4/2015	US	University students	Participants reported checking social media an average of 16.47 times per day (SD = 57.15).	Online survey	Volunteer sample	General social media use	Correlation; structural equation modelling	N/A	Fear of missing out (not included as a social media measure as the scale only had 1 social media relevant question); physical symptoms; age; gender; ethnicity
Bauer, Loy, Masur & Schneider (2017)	January 2015	Germany (*)	General population	Participants had a high level of education.	Online survey	Convenience snowball sampling	Instant messaging (IM)	Multilevel regression analyses	N/A	Age; gender
Brailovskaia & Margraf (2022)	October 2021	Germany	Current or former university students	78.1% students, 21.4% employees, 0.6% unemployed persons. 48.8% were singles, 42.0% were in a romantic relationship, 9.2% were married.	Online survey	Convenience sample	General social media use	Zero-order bivariate correlation; moderated mediation analysis	N/A	Psychological burden caused by COVID-19; age; gender

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
S. M. Coyne et al. (2023)	May to August 2021	US	Quota sample of young people	Average household income was between $60 000 and $75 000 per year (25.0% below $50 000 per year, 35.0% above $100 000 per year).	Online survey	Stratified sampling: using quotas for race and ethnicity based on US Census data	General social media use	Multivariate analysis of variance (MANOVA); Logistic regression	N/A	Age at first smartphone; school teaching of social media literacy; gender identity; body image; race; age; income; family structure
Du, Kerkhof & van Konigsbruggen (2021)	Time 1: February 2018, Time 2: March 2018, Time 3: November 2018	Netherlands (*)	General population	**Country of residence:** United Kingdom 86.5%, United States 7.7%, Canada 3.9%, Other 1.2%, Australia 0.7%. **Education:** Undergraduate degree (BA/BSc/other) 36.4%, College/A levels 29.3%, Secondary school/ GCSE 16.0%, Graduate degree (MA/MSc/MPhil/other) 13.5%, Doctorate degree (PhD/MD/other) 3.0%, No formal qualifications 1.2%, Other 0.7%. **Most selected daily used social media platforms:** Facebook 86.4%, WhatsApp 58.2%, Facebook messenger 53.9%, YouTube 53.4%, Instagram 46.5%,	Online survey	Volunteer sample	General social media use	Random intercept cross-lagged panel model (RI-CLPM)	Robustness after controlling for key variables run	Vitality; age; gender

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
				Twitter 31.8%, Snapchat 21.9%, Pinterest 14.8%, LinkedIn 8.4%, Google+ 7.1%, Skype 6.4%, Other (<5%).						
Eşkisu, Cam, Gelibolu & Rasmussen (2020)	Beginning of 2017	Turkey	University students from three universities	**Number of hours spent on Facebook daily:** 50% spent less than 1 hour a day on Facebook, 38% spent 1–2 hours on Facebook, 8% spent more than 2 hours on Facebook. **Number of times checked their status daily:** 57% checked their status less than 2 times a day, 22% checked their status 3–5 times a day, 21% checked their status more than 6 times a day.	Survey	Convenience sample	Facebook	SEM path analysis	N/A	N/A
Gu, Liu & Chen (2022)	Not reported	Not specified (*)	General population	**Educational background:** High School 14 4.4% Undergraduate 186 58.7% Master and Doctor 117 36.9% **Social media usage duration:** <1 h/ day 3.8%, 1–3 h/ day 36.6%, 3-5 h/ day 33.8%, 5 h/ day 25.9%.	Online survey	Volunteer sample	General social media use	Correlation; regression; moderated mediation analysis	N/A	Gender; highest degree attained; age

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
Hong, Liu, Ding, Fu, Zhen & Sheng (2021)	14/3/2020 to 18/3/2020	China	University students from two universities	N/A	Online survey	Convenience sample	General social media use (Asks specifically about the 6 most popular Chinese platforms)	Correlation; mediation analysis; moderated mediation analysis	N/A	Rumination; gender
Hu, Liu & Ma (2022)	Not reported	China	Students from two secondary schools	50.80% Middle school students, 49.20% High school students.	Survey	Cluster random sampling method to choose two classes in each grade from grade 7 to 12. Convenience sample.	General social media use	Correlation; moderated mediation analysis	N/A	Materialism; age; gender
Jones, Hook, Podduturi, McKeen, Beitzell & Liss (2022)	November 2020 and January to February 2021	US (*)	Psychology students and general population under 25	N/A	Online survey	Volunteer sample	General social media use	Correlation; mediation analysis	N/A	N/A
Kircaburun, Griffiths & Billieux (2018)	April 2018	Turkey	High school students	N/A	Paper survey in class	Convenience sample	General social media use	Correlation; saturated multiple mediation model	N/A	Internet Gaming Disorder; trait emotional intelligence; proneness to ruminate; gender; age
Li, Mu, Wang, Xie, Zhang & Liu (2022)	Time 1: February 2019 Time 2: May 2019	China	Seventh to ninth graders	N/A	Paper survey in class	Convenience sample	General social media use	Correlation; mediation model; moderated mediation model	N/A	Rumination; gender; age
Lutz (2023)	August 2020	Germany (*)	Daily users of	Highly educated	Online survey	Volunteer	General	Multilevel	Looking at	Fundamental

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
			mobile messenger services	(49% completed a university degree); most often in training/study (62%) or employed (33%).		sample	messenger use	regression models (mediation and moderation)	individual needs separately	needs (belonging; meaningful existence; control); vitality; desire to use messengers; relatedness frustration; daily working hours; age; gender; educational level
Majeed, Irshad, Fatima, Khan & Mubbashar Hassan (2020)	20/3/2020 to 23/4/2020	Pakistan	Employees of universities and IT field. Employed and currently working from home. No depressive symptoms or mental illness before COVID-19. Active social media account.	**Education:** Below Bachelor 7.5%, Bachelor 30.7%, Masters and above 61.8%. **Work experience:** Less than 1 year: 26.2%, 1–3 years: 37.5%, 3–5 years: 16.1%, 5–7 years: 12.7%, 7 and above: 7.5%.	Online survey	Non-probability convenience sample	General social media use	Correlation; moderated mediation model	N/A	Fear of COVID-19; gender; age; work experience; education
Moqbel, Alshare, Erskine & Bartelt (2023)	Late 2020	Qatar (*)	General population	Most respondents had a full-time job (87%) and a graduate degree (56%). Average years of work experience: 14 years.	Online survey	Random sample	WhatsApp	Partial least squares structural equation modelling	N/A	Gender; age; education; employment status; marital status; years of work experience; employment type
Passavanti et al. (2021)	17/4/2020 to 30/4/2020	Australia, China, Ecuador, Iran, Italy, Norway, and US	Adult students and workers	**Nationality:** Italy (26.1%), United States (9.8%), Ecuador (9.2%), Norway (6.6%), Iran (13.4%), Australia (8.1%), China	Online survey	Not reported	General social media use	ANCOVA, ANOVA, linear regression	N/A	Coping strategies; country; gender; declared income; education; employment; children; largest

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
				(26.8%). **Children:** 83.8% have no children, 16.2% have a child or more. **Income:** 11.8% low-income group, 22.2% in the medium-low, 50.1% in medium, 14.1% in medium-high, 1.7% in the high one. **Employment:** 7.3% unemployed, 90% students and workers, 2.7% did not declare their job status. **Education:** 80.9% High school to Master degree, 1.3% education below Middle school, 14.8% Ph.D. or to be attending Post graduate school.						open-air space in home; do you know anyone infected with COVID-19?; during lockdown do you usually go out for a walk or physical exercise?; during lockdown, do you usually go out for non-essential shopping?; what is your main source of information on health and infection?; how often do you look for information on the progress of the infection?
Poon & Jiang (2020)	June 2017	US	General population	N/A	Online survey	Convenience sample	Exposure to a fake social networking account	Correlation; hierarchical multiple regression models	N/A	Hostility; antisocial tendency
Throuvala, Griffiths, Rennoldson & Kuss (2020)	Not reported	UK (*)	General population but regular smartphone and social media use	59.3% were Undergraduate Psychology students in the UK; 92.3% had completed an Undergraduate	Online survey	Convenience and snowball sample	General social media use	Correlation; ANCOVA; mediation analyses	High vs. low smartphone distraction (but not relevant to variables of	Smartphone distraction; emotional self-awareness; habitual strength; self-efficacy;

Study	Date of data collection	Country study was conducted in	Sample population	Any other participant demographics of importance	Method of data collection	Sampling strategy	Type of social media site(s) examined	Type of analysis	Any sub-analyses/ sensitivity analyses included	Other variables included
				degree; 54.5% were not in a relationship.					interest)	online vigilance; impulsiveness; deficient self-regulation; nomophobia; age; gender; ethnicity; education; relationship status; smartphone hours per day
Weaver & Swank (2021)	Spring 2019	US	Undergraduate college students	**Class standing:** 23.0% freshmen, 12.9% sophomores, 17.3% juniors, 46.0% seniors. **GPA:** 69.8% GPA between 3.5 and 4.0. **Extracurriculars:** 50% reported involvement in one to two extracurricular activities.	Surveys (online [110] and in person [93]); recruited from undergraduate research pool (75)	Volunteer sample	General social media use	Correlation; mediation analysis	N/A	N/A
Yang, Holden & Carter (2017)	Late 2016	US	College freshmen using social media at least once per week	35% said Instagram was their most frequently used site followed by Facebook (27%) and Twitter (20%). Among the 18% who chose "Other", 77.5% nominated Snapchat as their most frequented social media channel.	Online survey	Convenience sample	General social media use	Correlation; regression analyses	N/A	Identity clarity; sex; ethnicity; age

* Countries marked with an asterisk indicate that participants were recruited online and it was not specified that participants only came from the target country, therefore participants from other countries may have also participated.

Appendix 5 - Additional information regarding study quality

Supplementary Table 2 Studies included in the review – additional information regarding study quality. The full list of studies included in this review is presented with full quality assessment scoring: (i) Research question = research question sufficiently described; (ii) Study design = study design appropriate; (iii) Subject selection = method of subject selection appropriate; (iv) Participant characteristics = sufficient description of participant characteristics; (v) Random allocation = random allocation of participants; (vi) Investigator blinding = blinding of investigators; (vii) Participant blinding = blinding of participants; (viii) Well defined measures = well defined outcome and exposure measures; (ix) Sample size = sample size appropriate; (x) Analysis = analysis described and appropriate; (xi) Variance = estimate of variance for main outcomes; (xii) Confounding = controlled for confounding variables; (xiii) Results = results reported in sufficient detail; (xiv) Conclusions = conclusions supported by results; MF = mindfulness measure valid and reliable; MH = mental health measure valid and reliable; SM = social media measure valid and reliable.

	Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004)														Extra quality measures		
Study	(i) Research question	(ii) Study design	(iii) Subject selection	(iv) Participant characteristics	(v) Random allocation	(vi) Investigator blinding	(vii) Participant blinding	(viii) Well defined measures	(ix) Sample size	(x) Analysis	(xi) Variance	(xii) Confounding	(xiii) Results	(xiv) Conclusions	MF	MH	SM
Apaolaza, Hartmann, D'Souza & Gilsanz (2019)	2	2	1	2	N/A	N/A	N/A	1	2	1	2	0	2	1	Yes	No	Yes
Baker, Krieger & LeRoy (2016)	2	2	1	2	N/A	N/A	N/A	2	2	1	2	0	1	2	Yes	Yes	No
Bauer, Loy, Masur & Schneider (2017)	2	2	0	2	N/A	N/A	N/A	2	2	1	2	2	2	2	No	No	No
Brailovskaia & Margraf (2022)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	Yes
S. M. Coyne et al. (2023)	2	2	2	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	Yes
Du, Kerkhof & van Konigsbruggen (2021)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	Yes
Eşkisu, Cam, Gelibolu & Rasmussen (2020)	2	2	2	2	N/A	N/A	N/A	2	2	2	2	1	1	2	Yes	Yes	Yes
Gu, Liu & Chen (2022)	2	2	1	1	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	No

	Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004)														Extra quality measures		
Study	(i) Research question	(ii) Study design	(iii) Subject selection	(iv) Participant characteristics	(v) Random allocation	(vi) Investigator blinding	(vii) Participant blinding	(viii) Well defined measures	(ix) Sample size	(x) Analysis	(xi) Variance	(xii) Confounding	(xiii) Results	(xiv) Conclusions	MF	MH	SM
Hong, Liu, Ding, Fu, Zhen & Sheng (2021)	2	2	1	2	N/A	N/A	N/A	1	2	2	0	1	2	2	Yes	Yes	No
Hu, Liu & Ma (2022)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	Yes
Jones, Hook, Podduturi, McKeen, Beitzell & Liss (2022)	2	2	1	2	N/A	N/A	N/A	2	1	2	2	0	2	2	Yes	Yes	Yes
Kircaburun, Griffiths & Billieux (2018)	2	2	1	2	N/A	N/A	N/A	1	2	2	2	2	2	2	Yes	Yes	Yes
Li, Mu, Wang, Xie, Zhang & Liu (2022)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	Yes	Yes
Lutz (2023)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	2	2	2	Yes	No	No
Majeed, Irshad, Fatima, Khan & Mubbashar Hassan (2020)	2	2	1	2	N/A	N/A	N/A	1	2	2	2	2	2	2	Yes	Yes	Yes
Moqbel, Alshare, Erskine & Bartelt (2023)	2	2	1	2	N/A	N/A	N/A	1	2	2	0	2	1	1	Yes	Yes	No
Passavanti et al. (2021)	0	2	0	2	N/A	N/A	N/A	2	2	2	2	1	2	1	Yes	Yes	No
Poon & Jiang (2020)	2	2	1	2	1	0	N/A	2	1	2	2	0	2	2	Yes	Yes	N/A
Throuvala, Griffiths, Rennoldson & Kuss (2020)	2	2	1	2	2	2	2	1	0	2	2	2	2	2	Yes	Yes	Yes
Weaver & Swank (2021)	1	2	1	2	N/A	N/A	N/A	2	2	1	1	0	2	2	Yes	Yes	Yes
Yang, Holden & Carter (2017)	2	2	1	2	N/A	N/A	N/A	2	2	2	1	2	2	2	No	Yes	No

Appendix 6 - UCL ethics approval letter

UCL RESEARCH ETHICS COMMITTEE
OFFICE OF THE VICE-PROVOST (RESEARCH, INNOVATION & GLOBAL ENGAGEMENT)

24th March 2023

Dr Marc Tibber
Division of Psychology and Language Sciences
UCL

Cc: Charlotte Jones

Dear Dr Tibber

Notification of Ethics Approval with Provisos
Project ID/Title: 24279/001: Exploration of a novel trans-diagnostic cognitive behavioural model of social media use in emerging adult populations

Further to your satisfactory responses to the Committee's feedback, 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 30th August 2024.

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/research-ethics/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.

Research Ethics Service
Office of the Vice-Provost (Research, Innovation & Global Engagement)
University College London
Email: ethics@ucl.ac.uk
www.ucl.ac.uk/research-ethics/

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 Michael Heinrich
Joint Chair, UCL Research Ethics Committee

Participant Information For Adults

UCL Research Ethics Committee Approval ID number: 24279/001

Title of study: Exploration of a Novel Trans-Diagnostic Cognitive Behavioural Model of

Social Media Use in Emerging Adult Populations

Department: Clinical, Educational & Health Psychology

Name and Contact Details of the Researcher: Charlotte Jones, ucjucj4@ucl.ac.uk

Name and Contact Details of the Principal Researcher: Marc Tibber, m.tibber@ucl.ac.uk

You are being invited to take part in a research project. Before you decide, it is important for

you to understand why the research is being done and what participation will involve. Please

take time to read the following information carefully and discuss it with others if you wish. If

there is anything that is not clear or if you would like more information, please email the

principal researcher on the details above. Take time to decide whether or not you wish to

take part. Thank you for reading this.

Project purpose:

The aim of this project is to understand more about social media, and the role it plays in

people's wellbeing. Specifically, we want to know what is going on when people have

positive and negative online experiences. It is hoped that the findings will eventually help us

to develop ways to support people to get the most out of social media, and use it in positive,

healthy ways.

Examples of questions you may be asked include:

- Why do you use social networking sites?

- What do you do when you are on social networking sites?

- How do you feel after going on social networking sites?

Why have I been chosen?

We are looking to recruit people to the study who are 18-29 years of age, fluent in English,

and a user of social network sites (e.g., using at least one social networking site once per

week).

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be
asked to give consent by ticking a box prior to starting the questionnaire. You can withdraw
at any time before finishing the survey without giving a reason.

What will happen to me if I take part?

After reading this information and ticking the consent box you will be directed to a survey,
which you can complete on a phone or computer, or whatever device you are reading this
on. The survey is comprised of around 100 questions, which should take around 20 minutes
to complete. You will only need to participate once, and then your involvement in the study is
complete.

What are the possible disadvantages and risks of taking part?

As well as being asked to recall a positive online experience, at some point during the study
you will be asked to recall a time when you had a (relatively typical) negative experience on
a social networking site. For some individuals this may bring up uncomfortable memories,
which could be distressing. At the end of the survey you will be provided with a list of support
services in case you would like further support. If you wish, you can also contact the
Principal Researcher Marc Tibber via email (m.tibber@ucl.ac.uk).

What are the possible benefits of taking part?

After your participation in the study, you can choose to enter a prize draw, with the
opportunity to win one of six vouchers (2x £50 and 4x £25). You will need to provide your
email address so the researchers can contact you if you win, however this will be stored
separately so that your survey responses are anonymous. The findings will contribute to our
understanding of the role of social network sites in wellbeing. Additionally, in the long run, it
should hopefully help us to develop ways to support people to get the most out of social
media, and use it in positive, healthy ways.

What if something goes wrong?

If you have any concerns about any aspect of this research, you can get in touch with the

Principal Researcher Marc Tibber via email (m.tibber@ucl.ac.uk). However, should you want to escalate your concern further, you can contact the Chair of the UCL Research Ethics Committee via email (ethics@ucl.ac.uk).

Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

What will happen to the results of the research project?

The data collected during the project will be disseminated as part of one of the researcher's Clinical Psychology doctoral thesis, as part of their postgraduate course. Once the DClinPsy thesis is completed, it is hoped that the research will be published in research article/s. Fully anonymised data will be kept indefinitely.

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.

For participants in health and care research studies, please click here for further information about UCL's General Privacy Notice.

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. As outlined by GDPR, no personal data will be collected during the questionnaire, and participants will only be asked to provide their age and gender. However, participants do have the opportunity to provide their email address should they wish to participate in the prize draw. The lawful basis that would be used to process your personal data will be public task.

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.

Contact for further information

Marc Tibber, m.tibber@ucl.ac.uk

If you would like a copy of this information sheet, please email ucjucj4@ucl.ac.uk. If you consent to participating in this study, please tick the consent box, where you will then be taken to the rest of the questionnaire. If you do not consent, please exit this webpage now.

Thank you for reading this information sheet and considering taking part in this research study.

Appendix 8 - **Full set of items measuring social networking site use and wellbeing outcomes**

Supplementary Table 3 All items included in the study measuring social networking site use and wellbeing outcomes, alongside response options

Scale	Domain	Items	Response options
Scale of Motives for Using Social Networking Sites (SMU-SNS) (Pertegal et al., 2019)	Social connectedness	(i) "I used the social networking site to not feel disengaged from the world". (ii) "I used the social networking site to feel connected with people". (iii) "I used the social networking site to feel socially integrated".	Seven-point Likert scale ranging from "completely untrue" to "completely true" 1: completely untrue; 2: mostly untrue; 3: slightly untrue; 4: neither true nor untrue; 5: slightly true; 6: mostly true; 7: completely true
	Relationship formation	(i) "I used the social networking site to make new friends." (ii) "I used the social networking site to extend my circle of friends." (iii) "I used the social networking site to meet new people"	
Escapism scale (Gao et al., 2017)	-	(i) "I used the social networking site to escape from the world of reality". (ii) "I used the social networking site to escape from problems and pressures". (iii) "I used the social networking site to escape from things that were unpleasant and worrisome". (iv) "I used the social networking site as it makes me feel as though I am in a different world of reality".	Seven-point Likert scale ranging from "strongly disagree" to "strongly agree" 1: strongly disagree; 2: disagree; 3: somewhat disagree; 4: neither agree nor disagree; 5: somewhat agree; 6: agree; 7: strongly agree
Additional item	-	(v) "I used the social networking site as it enabled me to avoid difficult offline relationships"	
Passive Active Use Measure (Gerson et al., 2017)	-	*I engaged in this behaviour when on the social networking site:* (i) "Posting status updates". (ii) "Commenting (on statuses, wall posts, pictures etc.)". (iii) "Chatting on a messenger tool". (iv) "Checking to see what someone is up to". (v) "Creating of RSVPing to events". (vi) "Posting photos". (vii) "Tagging photos". (viii) "Viewing photos". (ix) "Posting videos". (x) "Tagging videos". (xi) "Browsing the feed passively (without liking or commenting on anything". (xii) "Browsing the feed actively (liking and commenting on posts, pictures, and updates". (xiii) "Looking through my friends' profiles".	Five-point Likert scale ranging from "not at all" to "for the whole time" 1: not at all; 2: a little bit; 3: for some of the time; 4: for most of the time; 5: for the whole time
Five-Facet Mindfulness Questionnaire (FFMQ-15) (Baer et al., 2008)	-	(i) "I didn't pay attention when picking up my phone because I was daydreaming, worrying, or otherwise distracted". (ii) "I went on the social networking site automatically without being aware of what I was doing". (iii) "I found myself going on the social networking site without paying attention".	Five-point Likert scale ranging from "completely disagree" to "completely agree" 1: completely disagree; 2: somewhat disagree; 3: neither agree nor disagree; 4: somewhat agree; 6: completely agree
Comprehensive Assessment of Acceptance and Commitment Therapy	-	(i) "Whilst on the social networking site, I was "running on automatic" without much awareness of what I was doing". (ii) "Even when doing things that mattered to me on the social networking site, I found myself doing them without paying attention".	Seven-point Likert scale ranging from "strongly disagree" to "strongly agree" 1: strongly disagree; 2: disagree; 3: somewhat disagree; 4: neither agree nor disagree; 5: somewhat agree; 6: agree; 7: strongly agree

processes (COMPACT) (Francis et al., 2016)		(iii) "I rushed through meaningful activities on the social networking site without being really attentive to them". (iv) "I did jobs or tasks on the social networking site automatically, without being aware of what I was doing". (v) "I found it difficult to stay focused on what was happening in the present whilst using the social networking site".	
The International Positive and Negative Affect Schedule Short Form (Thompson, 2007)	-	*After going on the social networking site I felt that my mood had changed in the following way:* (i) "Upset". (ii) "Hostile". (iii) "Alert". (iv) "Ashamed". (v) "Inspired". (vi) "Nervous". (vii) "Determined". (viii) "Attentive". (ix) "Afraid". (x) "Active".	Five-point Likert scale ranging from "decreased a lot" to "increased a lot" 1: decreased a lot; 2: decreased a little; 3: no change; 4: increased a little; 5: increased a lot
Social connectedness scale (Lee & Robbins, 1995)	-	*By the end of the time on the social networking site I felt:* (i) "More disconnected from the world around me". (ii) "More like I didn't really belong". (iii) "More distant from people". (iv) "More like I had no sense of togetherness with my peers". (v) "More unrelated to anyone". (vi) "Even more as though I had lost all sense of connectedness with society". (vii) "More as though there is no sense of community, even among my friends". (viii) "More like I don't participate with anyone or any group".	Six-point Likert scale ranging from "strongly agree" to "strongly disagree" 1: strongly agree; 2: agree; 3: slightly agree; 4: slightly disagree; 5: disagree 6: strongly disagree

Appendix 9 - Reasons for exclusion

A hierarchy of exclusion criteria was used, as explained below:

1) **Didn't click option three**

    The questions included an attention check / bot check which asked participants to select 'option 3' in order to continue through the Qualtrics. Answers where option 3 was not selected were therefore excluded.

2) **Different ages**

    Participants were asked on two occasions to report how old they were, as an attention check / bot check. Answers where two different ages were reported were therefore excluded.

The following reasons relate to participants' free-text responses:

3) **Responses are unrelated to the question i.e. not related to social networking (including only digit or letter responses)**

    Some answers were made up of sequences of digits or letters. Other answers were unrelated to the research question, for example, participants reflected on their experience of answering the survey, or of another activity online and / or offline experience, not of their experience on social networking sites. Therefore these responses were excluded.

4) **Duplicated responses**

    Some responses were related to the research question, however had answers which had been submitted in quick succession that were duplicated. In such instances, the responses were excluded.

5) **Participant says that they have not had a positive or negative online experience**

    Some participants explicitly reported having never had a positive or negative online experience, despite having answered the survey, therefore their responses were excluded.

6) **Response does not sound like a human**

Some responses were related to the research question but were excessively long, used overly formal language, and often did not make grammatical sense. This exclusion reason was used sparingly due to its subjective nature, and where there was any uncertainty, responses were kept in to ensure potential human answers were not deleted.

Appendix 10 - Descriptive statistics for summary scores

Supplementary Table 4 Descriptive statistics for all demographic variables, social networking site use and wellbeing outcome summary scores

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Age	351	18	29	22.68	3.53
Gender	347	0	1	.80	0.40
Number of friends online	352	0	5000	54.64	378.12
Number of friends offline	352	0	400	12.93	24.31
Summary Score Positive Experience Social Connectedness Motivation	352	1	7	5.06	1.22
Summary Score Positive Experience Relationship formation	352	1	7	3.55	1.78
Summary Score Positive Experience Escapism	352	1	7	3.77	1.44
Summary Score Positive Experience Active Use	352	1	5	2.46	0.85
Summary Score Positive Experience Passive Use	352	1	5	3.34	0.80
Summary Score Positive Experience Mindful Initiation of Engagement	352	1	5	2.99	1.12
Summary Score Positive Experience Mindful Engagement Online	352	1	7	4.21	1.41
Summary Score Positive Experience Positive Mood	352	1	5	3.29	0.62
Summary Score Positive Experience Negative Mood	352	1	5	2.74	0.70
Summary Score Positive Experience Feeling of Social Connectedness	352	1	6	4.39	1.04
Summary Score Negative Experience Social Connectedness Motivation	352	1	7	4.57	1.37
Summary Score Negative Experience Relationship formation	352	1	7	3.19	1.76
Summary Score Negative Experience Escapism	352	1	7	4.04	1.53
Summary Score Negative Experience Active Use	352	1	5	2.16	0.87
Summary Score Negative Experience Passive Use	352	1	5	3.32	0.76
Summary Score Negative Experience Mindful Initiation of Engagement	352	1	5	2.74	1.16
Summary Score Negative Experience Mindful Engagement Online	352	1	7	3.82	1.47
Summary Score Negative Experience Positive Mood	352	1	5	2.96	0.70
Summary Score Negative Experience Negative Mood	352	1	5	3.31	0.71
Summary Score Negative Experience Feeling of Social Connectedness	352	1	6	3.59	1.19

Appendix 11 - Factor analysis output

Supplementary Table 5 Factor analysis output for all social networking site use and wellbeing variables

SNS experience condition	Construct	Item	Eigenvalue (of factors with eigenvalues >0)	Associated proportion of variance explained by each factor	Chi-squared value	*p* value
Positive	Social connectedness motivation	SCM1	2.12	0.71	358.34	.00
		SCM2	0.60	0.20		
		SCM3	0.28	0.09		
	Relationship formation	RF1	2.62	0.87	838.20	.00
		RF2	0.21	0.07		
		RF3	0.16	0.05		
	Escapism	E1	3.37	0.67	1048.64	.00
		E2	0.75	0.15		
		E3	0.42	0.08		
		E4	0.30	0.06		
		E5	0.15	0.03		
	Active	AP1	4.73	0.53	1575.86	.00
		AP2	0.92	0.10		
		AP3	0.83	0.09		
		AP5	0.68	0.08		
		AP6	0.56	0.06		
		AP7	0.47	0.05		
		AP9	0.37	0.04		
		AP10	0.28	0.03		
		AP12	0.16	0.02		
	Passive	AP4	1.98	0.49	241.74	.00
		AP8	1.00	0.25		
		AP11	0.61	0.15		
		AP13	0.42	0.10		
	Passive (item 11 removed)	AP4	1.95	0.65	227.08	.00
		AP8	0.62	0.21		
		AP13	0.44	0.15		
	Mindful initiation of engagement	MP1	2.33	0.78	545.14	.00
		MP2	0.48	0.16		
		MP3	0.19	0.06		
	Mindful engagement online	MOS1	3.41	0.68	968.54	.00
		MOS2	0.58	0.12		
		MOS3	0.45	0.09		

		MOS4	0.35	0.07		
		MOS5	0.20	0.04		
	Positive mood	M3	2.39	0.48	359.13	.00
		M5	0.92	0.18		
		M7	0.73	0.15		
		M8	0.56	0.11		
		M10	0.40	0.08		
	Positive mood (item 3 removed)	M5	2.21	0.55	295.88	.00
		M7	0.80	0.20		
		M8	0.56	0.14		
		M10	0.43	0.11		
	Negative mood	M1	3.07	0.61	681.18	.00
		M2	0.69	0.14		
		M4	0.48	0.10		
		M6	0.43	0.09		
		M9	0.33	0.07		
	Social connectedness	SC1	5.66	0.71	2279.92	.00
		SC2	0.66	0.08		
		SC3	0.39	0.05		
		SC4	0.34	0.04		
		SC5	0.29	0.04		
		SC6	0.25	0.03		
		SC7	0.21	0.03		
		SC8	0.19	0.02		
Negative	Social connectedness motivation	SCM1	2.16	0.72	407.63	.00
		SCM2	0.60	0.20		
		SCM3	0.24	0.08		
	Relationship formation	RF1	2.66	0.89	909.73	.00
		RF2	0.20	0.07		
		RF3	0.14	0.05		
	Escapism	E1	3.55	0.71	1214.58	.00
		E2	0.70	0.14		
		E3	0.34	0.07		
		E4	0.28	0.06		
		E5	0.13	0.03		
	Active	AP1	5.11	0.57	1848.32	.00
		AP2	0.84	0.93		
		AP3	0.77	0.09		
		AP5	0.62	0.07		
		AP6	0.55	0.06		
		AP7	0.37	0.04		
		AP9	0.34	004		
		AP10	0.27	0.03		

	AP12	0.13	0.01		
Passive	AP4	1.84	0.46	205.78	.00
	AP8	1.04	0.26		
	AP11	0.72	0.18		
	AP13	0.41	0.10		
Passive (item 11 removed)	AP4	1.82	0.61	196.62	.00
	AP8	0.77	0.26		
	AP13	0.41	0.14		
Mindful initiation of engagement	MP1	2.44	0.81	634.84	.00
	MP2	0.39	0.13		
	MP3	0.17	0.06		
Mindful engagement online	MOS1	3.57	0.71	1094.25	.00
	MOS2	0.54	0.11		
	MOS3	0.39	0.10		
	MOS4	0.31	0.06		
	MOS5	0.19	0.04		
Positive mood	M3	2.54	0.51	499.65	.00
	M5	1.08	0.22		
	M7	0.62	0.12		
	M8	0.43	0.09		
	M10	0.32	0.06		
Positive mood (item 3 removed)	M5	2.42	0.60	427.53	.00
	M7	0.79	0.20		
	M8	0.45	0.11		
	M10	0.34	0.09		
Negative mood	M1	2.88	0.58	586.75	.00
	M2	0.70	0.14		
	M4	0.67	0.14		
	M6	0.38	0.08		
	M9	0.36	0.07		
Social connectedness	SC1	5.71	0.71	2413.14	.00
	SC2	0.69	0.09		
	SC3	0.44	0.06		
	SC4	0.35	0.04		
	SC5	0.23	0.03		
	SC6	0.23	0.03		
	SC7	0.19	0.02		
	SC8	0.16	0.02		

Appendix 12 - Cronbach's alpha scores for all subscales

Supplementary Table 6 Cronbach's alpha scores for all social networking site use and wellbeing variables

	Subscale	Number of items	Cronbach's alpha (α)
Positive experience of SNS	Social connectedness motivation	3	.79
	Relationship formation	3	.93
	Escapism	5	.88
	Active use	9	.88
	Passive use	4	.62
	Passive use (item 11 removed)	3	.73
	Mindful initiation of engagement	3	.86
	Mindful engagement online	5	.88
	Positive mood	5	.72
	Positive mood (item 3 removed)	4	.73
	Negative mood	5	.84
	Social connectedness	8	.94
	Social connectedness motivation and relationship formation combined	6	.84
	Escapism and relationship formation combined	8	.82
Negative experience of SNS	Social connectedness motivation	3	.80
	Relationship formation	3	.94
	Escapism	5	.90
	Active use	9	.90
	Passive use	4	.55
	Passive use (item 11 removed)	3	.67
	Mindful initiation of engagement	3	.88
	Mindful engagement online	5	.90
	Positive mood	5	.75
	Positive mood (item 3 removed)	4	.78
	Negative mood	5	.81
	Social connectedness	8	.94
	Social connectedness motivation and relationship formation combined	6	.85
	Escapism and relationship formation combined	8	.80

Appendix 13 - Outcomes from assumption testing for regression analyses

Supplementary Table 7 Outcomes from assumption testing for regression analyses

Experience on SNS		Tests of normality				Test of homoscedasticity			Test of multicollinearity
		Skewness and kurtosis		Shapiro Wilk		Breusch-Pagan			Variance inflation factor
		Chi squared value	*p* value	W statistic	*p* value	Degrees of freedom	F statistic	*p* value	Mean VIF value
Positive	Positive mood	12.17	<.01	0.99	<.01	(3, 348)	6.14	<.001	1.25
	Negative mood	6.4	<.05	0.99	<.05	(3, 348)	2.70	<.05	1.25
	Social connectedness	39.36	<.001	0.96	<.001	(2, 349)	0.48	.23	1.24
Negative	Positive mood	1.10	.58	1.00	.96	(3, 348)	1.28	<.01	1.31
	Negative mood	7.55	<.05	3.05	<.01	(3, 348)	5.18	<.01	1.31
	Social connectedness	0.62	.73	1.00	.55	(4, 347)	2.02	.09	1.93

Appendix 14 - Regression analyses when model was re-run with non-SNS sites taken out

Supplementary Table 8 Regression analyses when the model was re-run with non-SNS sites taken out. Values in bold indicate significant predictors. Values in italics indicate a change in significance from the regression model with all participant data points in. The reference category for gender was male.

	Final Controlled Multivariate Model (with all demographic variables)											
	Positive experience of social media						Negative experience of social media					
	Positive mood		Negative mood		Social connectedness		Positive mood		Negative mood		Social connectedness	
Predictor	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value	Coefficient (95% CIs)	*p* value
SNS use variables												
Social connection motivation	-	**-**	-	-	-	-	-	-	-	-	-	-
Relationship formation	0.09 (0.05-0.14)	**<.001**	-0.03 (-0.08-0.02)	.22	-	-	0.11 (0.06-0.17)	**<.001**	0.03 (-0.02-0.08)	.31	-	-
Escapism	-	-	-	-	-0.15 (-0.24- -0.07)	**.001**	-	-	-	-	-0.12 (-0.21- -0.03)	**<.01**
Active use	0.05 (-0.04-0.14)	*.30*	-0.80 (-0.18-0.02)	.13	-	-	0.20 (0.10-0.31)	**<.001**	-0.23 (-0.33- -0.13)	**<.001**	0.33 (0.19-0.47)	**<.001**
Passive use	-	-	-	-	-	-	-	-	-	-	-	-
Mindful initiation of engagement	-	-	-0.17 (-0.23- -0.10)	**<.001**	-	-	0.09 (0.02-0.16)	**<.01**	-0.10 (-0.16- -0.03)	**<.01**	0.15 (-0.02-0.32)	.09
Mindful engagement online	0.10 (0.06-015)	**<.001**	-	-	-.17 (0.08-0.26)	**<.001**	-	-	-	-	0.10 (-0.04-0.24)	.14
Demographics												
Age	0.02 (-0.00-0.04)	.11	0.02 (-0.01-0.04)	.16	0.02 (-0.01-0.05)	.27	0.01 (-0.02-0.03)	.54	-0.02 (-0.04-0.00)	*.06*	0.03 (-0.00-0.07)	*.07*
Gender	-0.00 (-0.19-0.18)	.97	-0.03 (-0.23-0.17)	.78	0.22 (-0.07-0.52)	.14	-0.03 (-0.23-0.18)	.79	0.15 (-0.05-0.34)	.15	-0.02 (-0.35-0.31)	.91
Number of offline friends	-0.00 (-0.01-0.01)	.96	.001 (-0.00-0.01)	.67	0.01 (-0.00-0.02)	.06	0.00 (-0.00-0.01)	.20	-0.00 (-0.01-0.00)	.69	0.01 (0.00-0.02)	***.02***
Number of online friends	0.00 (-0.00-0.00)	.08	-0.00 (-0.00- -0.00)	**<.01**	0.00 (-0.00-0.00)	.30	0.00 (-0.00-0.00)	.12	-0.00 (-0.00-0.00)	**.001**	0.00 (-0.00-0.00)	.46

Appendix 15 - Path components for mediation and moderated mediation analyses a) with all data points, and b) with non-SNS sites removed

Supplementary Table 9 Path components for mediation and moderated mediation analyses a) with all data points, and b) with non-SNS sites removed. Values in bold indicate significant predictors.

a)

SNS experience	Outcome variable		*b*	*p* value
Positive	Positive mood	Relationship formation -> active use	0.25	**<.001**
		Active use -> positive mood	0.10	**<.05**
	Social connectedness	Relationship formation -> active use	0.25	**<.001**
		Active use -> social connectedness	0.07	.371
Negative	Negative mood	Escapism -> passive use	0.05	.102
		Passive use -> negative mood	-0.11	**<.05**
	Social connectedness	Escapism -> passive use	0.05	.102
		Passive use -> social connectedness	0.16	**<.05**

b)

SNS experience	Outcome variable		*b*	*p* value
Positive	Positive mood	Relationship formation -> active use	0.25	**<.001**
		Active use -> positive mood	0.06	*.244*
	Social connectedness	Relationship formation -> active use	0.24	**<.001**
		Active use -> social connectedness	0.08	.363
Negative	Negative mood	Escapism -> passive use	0.03	.287
		Passive use -> negative mood	-0.09	*.058*
	Social connectedness	Escapism -> passive use	0.03	.287
		Passive use -> social connectedness	0.13	*.074*

NB. Values in italics indicate a change in significance from the analyses with all participant data points in

Appendix 16 - Platforms which participants had negative and / or positive experiences on

Supplementary Table 10 Platforms which participants had negative and / or positive experiences on

Platform	Count	
	Positive experiences	Negative experiences
Discord	4	1
Facebook	36	57
Facebook messenger	6	2
Hinge	1	1
iMessage	1	0
Instagram	214	177
LINE	0	1
LinkedIn	4	5
Little Red Book / Xiaohongshu	4	6
Microblog	1	2
Reddit	5	4
Scratch	0	1
Skype	0	1
Snapchat	11	8
Soul	0	1
Telegram	2	2
TikTok	21	28
Tumblr	2	0
Twitter/X	26	39
WeChat	15	8
Weibo	3	6
WhatsApp	11	19
YouTube	5	5

NB. Total counts equal more than the number of participants, as some participants wrote down more than one social networking site in their answer.

Appendix 17 - Chi squared scores

Supplementary Table 11 Chi squared scores

Platform			Experience on SNS		
			Positive	Negative	Total
Platform	Facebook	Count	36	57	93
		Expected count	46.2	46.8	93
	Instagram	Count	214	177	391
		Expected count	194.4	196.6	391
	Snapchat	Count	11	8	19
		Expected count	9.4	9.6	19
	TikTok	Count	21	28	49
		Expected count	24.4	24.6	49
	Twitter / X	Count	26	39	65
		Expected count	32.3	32.7	65
	WeChat	Count	15	8	23
		Expected count	11.4	11.6	23
	WhatsApp	Count	11	19	30
		Expected count	14.9	15.1	30
	YouTube	Count	5	5	10
		Expected count	5	5	10
	Little Red Book	Count	4	6	10
		Expected count	5	5	10
Total		Count	343	347	690
		Expected count	343	347	690

Appendix 18 - Full details of qualitative analysis and further supporting quotes

(NB. The number of endorsements for each theme below does not equal the total amount of participants, as some answers were too vague to be included in the analysis.)

Positive SNS experience

The following themes came out of participants' reflections of a *positive* experience of SNS use.

Feeling connected

When reflecting on positive experiences on SNSs, participants often shared experiences where they were left feeling connected to others, whether that be through conversation, relating to the experiences of others that they saw online, or actively being thought of or held in mind by others.

Conversation with others (N=160). There were many instances where participants reflected on conversations with others, most often with friends, but also with romantic partners, and family members. Sometimes participants reflected that the conversation had a specific topic, e.g., about a hobby, but most often only general conversation was referenced.

"An enjoyable conversation with my best friend."

"Talking with friends about common interests we share."

Relating to others' experiences (N=4). Some participants shared situations where they had related to others' struggles, and how it left them feeling more understood.

"Seeing a post on a mental health page that validated and resonated with my experience."

"…came across a video that really resonated with me, and how I feel at the moment about life etc. […] it was nice to see people thinking the same way, it motivated me

more and made me feel like how I think is perhaps more normal, or even if not normal, valuable."

Feeling thought of / held in mind by others (N=13). Participants shared times where others, most often friends specifically, had showed that they were thinking of them or holding them in mind, for example, by posting a photo of them, or by sending them content which they think the individual would enjoy.

"I was posted by my friends online, made me feel loved."

"A friend sending me a video of an experience she thinks I'd like."

Making new friends (N=18)

Participants shared how they have made new friends online.

"Meeting new people and making connections to meet in real life."

"Finding a new friend to talk about my favourite celebrity with."

Sharing content

Participants reflected on experiences of sharing content with known others, for example, in a message, and also with their followers more generally, for example, posting onto their feed. Participants also reflected on feeling validated by others after they shared content to their feed.

With known others e.g., in a direct message (N=36). Participants often spoke about sharing funny posts or videos with friends, or events which they would like to attend.

"When I can find funny or relatable videos or photos to send to my friends and we can chat about it, it makes me feel closer towards them."

"I shared an event with my friend and we both decided to attend."

With followers e.g., onto a feed (N=16). Participants shared how they post photos and videos onto their accounts, to share with their wider followers. Often the content included being with close others, and sometimes about things they were interested in.

"Posting a nice picture of me and my partner."

"Posting something I was passionate about."

Feeling validated by others after sharing content (N=18). Some participants reflected further on their experience of sharing content, sharing that others often interacted positively with their post e.g., 'liking' it, which made them feel validated. Such validation came from both friends and unknown others.

"I posted some photos on my story and received positive interactions and messages from my friends."

"I posted my birthday celebration on one platform, and many strangers viewed and said happy birthday to me."

Passively viewing content on SNSs

Participants shared how they found themselves passively viewing content on SNSs. This ranged from content which they featured in themselves, to content that others had posted, both about their day-to-day life, as well as about life achievements and celebrations.

Viewing content which I feature in (N=3). Some participants reflected on viewing content where they had previously had a good experience with friends.

"Looking at pictures from the past when I shared an experience with a good friend."

"View[ing] the photos that I took with my friends when we went out together."

Viewing content from others about day-to-day life (N=29). Participants reflected on viewing content from friends, as well as unknown others e.g., influencers / celebrities, to keep up to date with their lives.

"Seeing my friend's life updates when they're in another country, so I can see what they're up to and we can talk about it."

"Following a celebrities family holiday."

Viewing content from others about life achievements (N=8). Participants shared examples of viewing content which friends had posted about life achievements / celebrations.

"Seeing positive photos of a friend's engagement."

"Being updated on a friend's achievement."

Use of SNSs for entertainment (N=25)

Participants shared how they use SNS apps / websites as a source of entertainment. The majority of such participants shared how the content they were engaging with as entertainment was often funny.

"Watching funny and entertaining videos on TikTok."

"Just watching contents I like."

Use of SNSs for development and learning (N=14)

Participants highlighted how SNSs are a good place for learning about new things, whether that be related to work or hobbies.

"Discovering a new hobby and investigating, exploring, and following people involved with that hobby."

"Learning about people's careers in statistics."

Feeling inspired by online content (N=11)

Some participants shared how they felt inspired after viewing people and content on SNSs.

"Getting inspiration from videos of athletes or other people I admire."

"Reading an inspiring poem."

Negative SNS experience

The following themes came out of participants' reflections of a *negative* experience of SNS use.

Direct negative communication (N=95)

Participants shared instances of where they had negative conversations with others, such as being in an argument, or being told something which was unpleasant, as well as content which was inappropriate such as mean, sexualised, or angry comments from others. Most often such communication was with friends, however it was sometimes with strangers.

"A disagreement with a friend concerning a friend of ours."

"I was sharing a vulnerable experience with a stranger online and they dismissed my feelings as well as insulted me multiple times."

Viewing negative comments

Participants reflected on viewing negative comments whilst being online. At times, these were just general comments seen online, however sometimes they were about a friend, or themselves personally.

Generally online (N=31). Participants shared experiences of viewing negative comments on their feed.

"Reading negative and homophobic comments."

"I had been scrolling and read through a disturbing thread of comments and information."

About a friend (N=4). Sometimes, participants reflected on how negative comments were directed at friends.

"Viewing racist comments on an Instagram reel that involved some of my friends (being the subject of racism)."

"Seeing one of my friends being harassed by a stalker."

Personal to me (N=11). Further, some participants reflected on times where they had received negative comments themselves from others.

"People commenting judgemental things on my posts / questioning my content."

"Someone commented hate on one of my tweets, they disagreed with me by swearing."

Scrolling through content

Participants reflected on times where they were scrolling through content on their feed. At times this was identified as being passive and aimless, but at times participants specifically highlighted that they were doing it to escape or avoid things that were difficult.

Passively and aimlessly (N=27). Participants identified that at times when they were scrolling online, it was aimless.

"Scrolling through absolute brain mushing content on Instagram reels."

"When I feel really stressed, I often mindlessly open Instagram and just start scrolling through posts but this can increase my stress because I become aware that I'm not really focusing on anything and that I'm wasting my time whilst not being able to put the phone away."

To escape from / avoid other things (N=7). At times, participants shared that SNSs were an escape / avoidance from difficult aspects of their offline life.

"Trying to switch off for a bit and forget about worries and things I need to do, whilst ignoring the present moment."

"Personal bereavement where I turned to social media for escapism."

Being left out / forgotten about (N=35)

Participants reflected on times where they had been left out by others, most often friends, or perceived that others had forgotten about them, for example, if they did not reply to their messages.

"Seeing some of my friends doing something fun together having not been invited."

"Someone read my message but did not respond."

Viewing content / profiles which trigger negative emotions

Participants experienced content which triggered negative emotions, alongside content which was specifically perceived as violent.

General content (N=54). Participants experienced SNSs as triggering negative emotions such as sadness, annoyance, terror, distress, disgust, and anxiety. At times, the negative content was about known others.

"Looking at videos that would trigger health anxiety."

"Seeing a negative and upsetting story update about a friend I cared about."

Violent content (N=13). Participants reflected specifically on content which they consumed, depicting violence.

"I watched a horrible video of boys fighting and stabbing each other."

"Video of poorly cat who had been harmed by humans."

Social comparison (N=44)

Many participants shared experiences of comparing themselves to others online which left them feeling doubtful, not good enough, and insecure. Often comparisons related to appearance, social life, relationships, and success.

"Scrolling through an acquaintance's profile and feeling like they were so much more accomplished than I was."

"Feeling insecure when comparing people's achievements or lives on social media."

Being scammed online (N=3)

A few participants reflected on experiences of being scammed whilst online.

"I have been scammed whilst using social media."

"Interaction with internet scammers."