Social Media Use, Loneliness and Psychological Distress in Emerging Adults

Zoe Taylor, Ala Yankouskaya and Constantina Panourgia

Department of Psychology, Bournemouth University, UK

Orcid Details:

Constantina Panourgia: https://orcid.org/0000-0002-5417-7210
Ala Yankouskaya https://orcid.org/0000-0003-0794-0989

Author Note

Correspondence concerning this article should be addressed to Constantina Panourgia, Department of Psychology, Bournemouth University, Fern Barrow, BH12 5BB, UK. Email: cpanourgia@bournemouth.ac.uk

The work was completed while Zoe Taylor was studying at Bournemouth University.

Abstract

Social media plays a dominant role in emerging adults' lives, with evidence showing that it can contribute to elevated levels of psychological distress. However, existing findings are contradictory, insofar as the connection between social media use (SMU) and psychological distress remains unclear. To gain a better insight into the above relationship, we focused on different styles of engagement with social media (active social, active non-social, and passive) and examined whether their impact on depression, anxiety and stress symptoms is mediated by loneliness. Data were collected via an online survey from 288 emerging adults in the UK. It was found that increased passive SMU was associated with higher anxiety, depression and stress symptoms; loneliness was associated with both SMU and psychological distress, while increased active non-social media use was associated with decreased stress. However, loneliness showed significant mediation effects only on the relation between passive SMU and psychological distress. Limitations, future research directions and suggestions for practice are discussed.

Keywords: social media use, anxiety, depression, stress, loneliness, emerging adults

Social Media Use, Loneliness and Psychological Distress in Emerging Adults

Social media use (SMU) is central to the lives of emerging adults, defined as young people aged between 18 and 29(Arnett, 2007; Vannucci et al., 2017). This group also experiences a high level of psychological distress (Matud et al., 2020; Vizard et al., 2020). Understanding the relationship between SMU and psychological distress in emerging adults has thus become a priority in social (Chancellor & De Choudhury, 2020), psychological (Naslund et al., 2020) and health (Ulvi et al., 2022) research. Despite such priority, however, research findings remain conflicting.

Social Media Use and Psychological Distress

Some research has reported a positive association between frequent SMU and increased chance of anxiety (Verduyn et al., 2015), depression (Lin et al., 2016; Primack et al., 2017; Shensa et al., 2017) and psychological distress (Chen & Lee, 2013) among emerging adults. Other research, however, proposes that SMU enables people to remain in touch with their social networks, and form and maintain social capital (Ellison et al., 2007). These findings suggest that SMU can facilitate positive subjective wellbeing (Kim & Kim, 2017) and reduce loneliness (Deters & Mehl, 2013) – although it should be noted that many such findings have small effect sizes (for a review, see O'Day & Heimberg, 2021). Furthermore, some evidence directly conflicts with extant findings linking frequent SMU with psychological distress, showing no such association (Berryman et al., 2018; Heffer et al., 2019; Jelenchick et al., 2013).

The Role of Loneliness

As noted above, there are many factors that influence psychological distress in the context of SMU. Yet, many studies testing the relationship between SMU and psychological distress foreground the importance of loneliness (Fardghassemi & Joffe, 2022; Hunt et al., 2018; Nowland et al., 2018; O'Day & Heimberg, 2021; Youssef et al., 2020). Loneliness is

considered a subjective feeling of distress, arising when social connections are perceived to be inadequate or unfulfilling (Hawkley & Cacioppo, 2010; Heinrich & Gullone, 2006). Loneliness is a growing public health issue due to its strong association with a high risk of morbidity and mortality (Cacioppo & Cacioppo, 2018; Holt-Lunstad et al., 2015); there is also substantial evidence that lonely people are more likely to suffer from impaired mental health (i.e., Wang et al., 2018b). In particular, extant research has established the detrimental effect of loneliness on anxiety and depression symptoms (Richardson et al., 2017), which can be explained by the evolutionary theory of loneliness (Cacioppo et al., 2006). According to this theory, short periods of loneliness can aid the individual in reconnecting with others. Still, if these efforts fail, the feeling of loneliness may endure, resulting in compounding psychological distress (Hawkley & Cacioppo, 2010).

Numerous studies have investigated the factors contributing to loneliness among young people, informing policies and prevention strategies. Some studies have also more directly indicated that burgeoning SMU may be tied to loneliness. For example, a recent systematic review suggested a bidirectional association between loneliness and SMU (Nowland et al., 2018). In other words, it is argued that SMU is linked to increased loneliness when online activities replace offline interactions (i.e., Youssef et al., 2020). Despite evidence supporting a link between SMU and increased loneliness, some research suggests that SMU may conversely be linked to decreased loneliness, whereby online activities promote the development of existing or new relationships (i.e., Thomas et al., 2020). This model underlines the dynamic nature of this relationship, denoting that loneliness shapes individuals' interactions with social media. For instance, lonely people are prone to negative biases and withdrawal behaviours that affect social interpretations and engagement (Nowland et al., 2018; Qualter et al., 2015). On the other hand, Satici (2019) found that shyness and loneliness mediate the positive relationship between Facebook addiction and impaired

subjective wellbeing. These findings signify that loneliness may have a mediating effect on the relationship between SMU and psychological distress, which is not well understood. However, although the plausibility of this assumption is supported by two previous studies showing reciprocal effects of loneliness on online social networking and life satisfaction (Dienlin et al., 2017; Tian et al., 2018), it remains to be tested.

Theoretical Background

The ambiguous relationship between SMU, psychological distress and loneliness is, in part, grounded in competing theoretical frameworks. On the one hand, the *displacement hypothesis* (Kraut et al., 1998; Nie, 2001) posits that replacing offline socialising with social media activities weakens ties with family and close friends, potentially decreasing psychological well-being (Ryan et al., 2017; Turkle, 2017). This hypothesis is supported by research showing that increased SMU reduces the amount of face-to-face social interactions (Ono et al., 2011), displaces the time spent on physical activities and sleep (Scott & Woods, 2019; Viner et al., 2019), and exacerbates the risk of social isolation (Kraut et al., 2002) resulting in adverse psychological outcomes (Christiansen et al., 2021). Recent evidence further supports the displacement hypothesis, albeit only at an individual level (Verduyn et al., 2021).

On the other hand, an opposing theory, the so-called s*timulation hypothesis,* argues that increased SMU is triggered by the need to enhance the quality of existing relationships or develop new ones. This purportedly leads to beneficial impacts on social connectedness and well-being. In other words, according to this hypothesis, SMU may enable individuals to improve their social capital which subsequently leads to reduced feelings of loneliness (Gross, 2004). The stimulation hypothesis is supported by evidence showing that social media enables young people to feel more connected with their friends (Deters & Mehl, 2013) and encourages communication and interactions with close and distant relationships,

therefore increasing social capital and psychological outcomes (Steinfield et al., 2008; Verduyn et al., 2017). Further indirect support can be found in research suggesting that direct or causal displacement effects of SMU are, in fact, modest (Hall & Liu, 2022).

Assessment of SMU

Conflicting findings on the relationship between SMU and psychological distress have been elucidated by existing theoretical work, but they may also be entangled with the variety of assessment methods used to capture SMU. For example, most studies examining the effect of SMU on psychological distress have investigated only one specific platform (for a review, see Frost & Rickwood, 2017). Most studies have also used only self-reported frequency of SMU (Lam et al., 2020), the number of social media accounts (Primack et al., 2017; Vannucci et al., 2017) or the number of friends on social media platforms (Kalpidou et al., 2011; Oh et al., 2014) as measurements of SMU. However, focusing solely on the frequency and duration of SMU may be overly simplistic (Thorisdottir et al., 2019). Therefore, it is advised that, in order for researchers to evaluate such a complex concept, they should also consider how users engage with social media (Gerson et al., 2017).

The *Activeness* of SMU

In human-computer interaction models, users are described as either "active process operators" or "passive process operators", reflecting different interactions between users and technology (Persson et al., 2001). For example, in a study investigating social networking activity and social well-being, Burke et al., (2010) reported that *direct* communication between Facebook users benefits social capital and diminishes feelings of loneliness, whereas *passive* consumption of content was linked to opposite outcomes. This differentiation of SMU was further categorised through three distinctive features of user activeness (Burke et al., 2011): directed communication with individual friends, passive consumption of social news, and broadcasting.

Directed communication, also known as active use, entails social interactions between users (Burke et al., 2011; Verduyn et al., 2017) whereas passive use refers to consumption of information without any creation of content or direct interaction with others (Burke et al., 2011; Metzger et al., 2018; Verduyn et al., 2015). Broadcasting, later labelled as active non-social usage (Gerson et al., 2017), involves the production of content on social media without being directed to specific individuals (Burke et al., 2011; Gerson et al., 2017). More recently, Gerson et al. (2017) claimed that there should be a distinction between active social and active non-social and that their main difference lies on the presence or lack of direct and private sharing of information. It is speculated that researchers have previously conceptualised active non-social SMU either as passive SMU due to its non-social nature, or as active SMU due to the creation of content (Gerson, 2017).

As a consequence of the categorisation problems highlighted above, emerging research exploring the effect of SMU on psychological distress has arguably merely focused on the differentiation between active and passive SMU. For instance, it has been demonstrated that active use of Facebook correlates positively with subjective well-being (i.e., Wang et al., 2018a) whereas passive use of Facebook is associated with deteriorated affective well-being over time (i.e., Verduyn et al., 2015) and increased social anxiety (Shaw et al., 2015). A more recent study signified that each one-point increase (on a scale of 1-16) in passive SMU was associated with a 33% increase in depressive symptoms and each one-point increase (on a scale of 1-16) in active SMU was associated with a 15% decline in depressive symptoms (Escobar-Viera et al., 2018). Although passive SMU has been criticised about its deleterious effects on psychological distress, it has also been positively linked to emotional well-being with evidence showing that browsing old posts and pictures can have a comforting effect (Good et al., 2013).

The Current Study

In general, active SMU has been linked to positive psychological outcomes, whereas passive SMU has mainly been correlated with negative psychological outcomes (Roberts & David, 2022). It is also asserted that different ways of engaging with social media affect feelings of loneliness accordingly. Moreover, previous studies have largely looked at either youth and adolescents (Ivie et al., 2020), or older people due to the growing number of older adults (Aarts et al., 2015) and the stereotype linking loneliness to ageing (Qualter et al., 2015). Despite recent research progress, there remains a dearth of studies on emerging adults (Hochberg & Konner, 2020). This research gap is unfortunate, considering that this is a transitional developmental period characterised by key learning and maturing processes and high rates of psychological distress (Matud et al., 2020; Vizard et al., 2020). Additionally, robust recent evidence from a national survey in the UK (Office for National Statistics, 2018) suggests that loneliness is highest among emerging adults (aged 18–34 years) compared with older age groups. Therefore, it is important to: i) obtain a more widespread understanding of the relationship between SMU and psychological distress; and ii) reveal the mechanisms through which loneliness can mediate this relationship in this specific population. Both of these aspects are crucial for the development of practices, policies and intervention strategies.

Given current research findings, it is expected that SMU will be linked to psychological distress and that loneliness will mediate this relationship. However, the distinguishing features of user activeness should also lead to differential effects. In this study we tested the above assumption by adopting Gerson et al.'s (2017) model to define and measure user engagement with social media, which is characterised as passive, active-social and active non-social. Due to a lack of research examining active non-social media usage, the relationship it has with psychological distress and loneliness remains uncertain. It can be assumed that active non-social media usage via public sharing, even though it is non-directive, can promote social connectedness and can facilitate satisfaction of social needs,

which are well-known protective factors against anxiety and depression (Li et al., 2021; Thorisdottir et al., 2019), loneliness (Zhang et al., 2021) and stress (Verrelli et al., 2019). Drawing on Gerson et al.'s (2017) definition of SMU, the above evidence, and the displacement and stimulation hypotheses, we expected that:

H1: Passive social media users will be at higher risk of anxiety, depression and stress because they will experience feelings of loneliness.

H2: Active-social and active-non social media users will be at lower risk of anxiety, depression and stress because it will be more possible for them to feel more connected with others and less lonely.

Method

Sample and Procedures

Data were collected from 383 young adults via an online survey which was advertised via social media to University students in the UK. Ninety-four responses were omitted from the final sample due to missing data resulting in an analytical sample of 288 participants. The final sample (N = 288) consisted of 37 males, 241 females whereas 10 participants chose not to reveal their gender; their average age was 20.75 (SD = 3.86). The majority of them were first year University students (43.06%, N = 124) and lived in university halls (41.32%, N = 119). Of the 288 participants, 233 (80.90%) reported they identified with a white ethnic background, 33 (11.46%) Asian background, 14 (4.86%) mixed ethic background, three (1.04%) black background; four (1.39%) reported 'Other ethnic background' and one participant (0.35%) did not provide information on this question.

Informed consent was obtained electronically for all participants, and ethics approval was provided by the Ethics Committee at Bournemouth University (ethics approval ID:

28006). The online survey was hosted through Qualtrics. Participants were recruited via social media (Facebook, Twitter and Instagram) and via a Research Participation System at Bournemouth University. Primarily, participants were provided with a participant information sheet and consent form. The online survey included some demographic questions and then three questionnaires. Participants were firstly presented with the UCLA Loneliness Scale (Russell, 1996), followed by the modified version of the Passive and Active Facebook Use Measure (PAUM, Gerson et al., 2017) and lastly, the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). Once the survey was completed, a debrief form was provided; it included further information about the study and details about organisations who offer support to individuals struggling with loneliness or other problems.

Measures

Social Media Use (SMU) was assessed with a modified version of Passive and Active Facebook Use Measure (PAUM, Gerson et al., 2017). The wording was adapted to reflect overall SMU rather than only Facebook use. For example, “Commenting on statuses, wall posts, pictures, etc.” was changed to “Commenting on other users’ profiles”. PAUM is a 13-item self-report 5-point Likert scale (1 = Never, 5 = Very Frequently), which uses the frequency of feature use to measure engagement style of social media users. PAUM consists of three subscales: (a) passive (Q4, Q8, Q11, Q13), (b) active social (Q1, Q2, Q3, Q6, Q12) and (c) active non-social media use (Q5, Q7, Q9, Q10). Items for each subscale are summed, with higher scores indicating higher passive, active social or active non-social media use. PAUM has demonstrated good psychometric properties (Gerson et al., 2017). In this study, Cronbach’s alpha was .74, .81, and .77 for passive, active social and active non-social scales, respectively.

Participants were also asked to report how many platforms they visited daily without reporting the names of the platforms.

The UCLA loneliness scale, version 3 (Russell, 1996), was utilised to assess *loneliness*. Participants were asked to rate 20 statements assessing subjective feelings of loneliness and social alienation. The scale includes 10 negative and 10 positive items; each of them is assessed on a 4-point Likert scale (1 = never, 4 = always), with higher scores signifying greater loneliness. The scale has shown strong psychometric properties (Russell, 1996). In our sample, Cronbach's alpha was .84.

Psychological distress was measured using the Depression Anxiety Stress Scale (DASS-21), the shortened version of the DASS (Lovibond & Lovibond, 1995), which evaluates emotional states of depression, anxiety and stress experienced over the past week. The scale consists of 21 items, and participants denote their agreement with the statements using a 4-point Likert scale (0= didn't apply to me at all, 3= applied to me very much or most of the time), with higher scores representing higher levels of depression, anxiety and stress. Previous studies report good psychometric properties for DASS-21 in clinical and non-clinical samples (i.e., Antony et al., 1998) and across different cultures (i.e., Norton, 2007). In this sample, Cronbach alpha was .72 for the depression subscale (DS), .75 for the anxiety subscale (AS) and .69 for the stress subscale (SS).

Data analysis

Data Exploration

Initial inspection of the 288 data points revealed no extreme values. The rate of missing data was low (ranging 0.3% to 1.54% across all questionnaires). We used full-information maximum likelihood (FIML) to handle missing observations (Enders & Bandalos, 2001).

Assumption Testing

We tested our hypothesis that the relationship between different types of SMU and psychological distress is mediated by loneliness. To do so, we examined a single-mediator model with types of media use (Active Social, Active non-Social and Passive) as predictors and three dimensions of psychological distress (Depression, Anxiety, Stress) as outcome variables. Before testing the mediation model, we assessed our variables to determine if mediation was appropriate. First, we tested whether the relationship between the variables is linear (Hayes, 2013) by plotting residuals against predicted values for four regressions: (i) type of SMU predicting psychological distress (direct effect, c); (ii) type of SMU predicting loneliness (path a); (iii) loneliness predicting type of SMU (path b); (iv) type of SMU and loneliness predicting psychological distress (combined collinearity of b and c'). Second, we evaluated whether estimation error is relatively equal across all predicted Y values. Large variability of the estimation error may result in heteroscedasticity, which may affect the standard error of the regression coefficients (Hayes, 2013). Third, we assessed the normality of estimation error using a Q-Q plot for multiple regression.

In order to assess the relationships between possible influences of different types of SMU on depressive, anxiety and stress-related symptoms we created structural equation models (SEM) using the Lavaan package in R (Rosseel, 2012). A mediation analysis was performed in JASP software implementing R-scripting and Lavaan syntaxis for structural equation modelling (SEM) of mediation effects with multiple predictors and outcome variables (Preacher & Hayes, 2008; Vanderweele & Vansteelandt, 2014; JASP Team, 2022). JASP (Version 0.16.3)[Computer software].

Results

Descriptive statistics

Descriptive statistics of all variables tested in our hypotheses are presented in Table 1.

(INSERT HERE TABLE 1)

Pairwise correlations between all study measures are displayed in Table 2.

(INSERT HERE TABLE 2)

Psychological Distress

It is worth underlining that in our sample, depression (M = 13.14, SD = 5.21) , anxiety (M = 12.52, D = 4.76), and stress levels (M = 14.89, SD = 4.73) measured by DASS-21, were much higher than in previous studies, using DASS-42 among student populations (Bayram & Bilgel, 2008: depression [M = 10.03, SD = 6.88], anxiety [M = 9.83, SD = 5.94], stress [M =14.92, SD = 6.71] ; Wong et al., (2006): depression [M = 8.66, SD = 7.54], anxiety [M = 9.36, SD = 6.42], stress [M = 13.97, SD = 8.15]).

Loneliness

A frequency analysis of Loneliness Scale scores indicated normal distribution with M = 43.90 (SD = 9.55). It has to be noted that the distribution and descriptive statistics of the Loneliness Scale in our sample were in line with previously reported descriptive statistics in the student population (Russell, 1996).

Mediation analysis

The Relationship Between Different Types of SMU and Psychological Distress

The results of multiple regression analyses with different types of SMU (AST – Active Social Total, ANST – Active Non-Social Total, PT – Passive Total) as predictors and psychological distress scores (AS – anxiety subscale, DS-depression subscale, SS-stress subscale) as outcome variables showed that increasing passive media use was associated with higher anxiety, depression and stress scores (Table 3). Whereas active-social media use did not show any relationship with anxiety, depression and stress, active non-social media use predicted stress scores but the relations between them showed an opposite direction, such as

increased active non-social media use was associated with a decreased level of stress (Table 3).

(INSERT HERE TABLE 3)

Inspection of *VIF*s indicated the lack of collinearity between independent variables in each regression model.

The Relationship Between Loneliness and Psychological Distress

The results of three separate regression analyses testing whether loneliness scores predicted anxiety, depression and stress scores are summarised in Table 4.

(INSERT HERE TABLE 4)

The results in Table 4 indicate that loneliness scores could significantly predict anxiety, depression and stress scores, explaining 20.0%, 41.0% and 28.1% of variance in these subscales respectively.

The Relationship Between Different Types of SMU and Loneliness

A multiple regression model with loneliness scores as a dependent variable and three types of media use (AST, ANST, PT) as predictors explained 8% of variance in loneliness scores ($F(3,270) = 8.79$, $p < .001$). The regression model indicated that both ANST and PT could significantly predict loneliness scores ($B = -0.17$, 95% CI [-1.0, -0.03], $t = -2.11$, $p = .03$; $B = 0.23$, 95% CI [0.31, 1.16], $t = 3.42$, $p < .001$). Active social media use could not predict loneliness scores ($B =- 0.16$, 95% CI [-0.85, 0.05], $t = -1.75$, $p =.08$).

The preliminary assessment of the relationship between loneliness, different types of SMU and psychological distress indicated that loneliness was associated with both types of media use and psychological distress scores and could potentially mediate the relationship between them. Next, we directly tested this assumption.

Mediation Models

Our initial mediation model included three types of SMU (AST, ANST, PT) as predictors, loneliness as a mediator and three variables of psychological distress (AS, DS, SS) as outcomes. The path diagram of the mediation model includes the standardised estimates for the causal paths for the indirect and direct effects (Table 5). The final model is displayed in Figure 1.

(INSERT HERE TABLE 5)

(INSERT HERE FIGURE 1)

The proportion of variance (R^2) explained for each of the outcome variables in the mediation model was 22%, 41%, 30% for anxiety, depression and stress scores, respectively. However, loneliness showed significant mediation effects between types of SMU and psychological distress only for passive media use (Table 5, Indirect effects).

We estimated the initial model's fit where residuals associated with multiple predictors and outcomes were permitted to covary. The model showed reasonably good model fit according to multiple SEM fit statistics and indices: Root Mean Square Error of Approximation (RMSEA) = .08, 95% CI [0.001, 0.10]; Comparative fit index (CFI) = .982; Tucker-Lewis index (TLI) = .95 (rule of thumb guidelines are that CFI $\geq$ .95, TLI $\geq$ .95 represent a good fitting model). It has to be noted that although previous research proposed a stringent cut-off value for RMSEA of 0.06 (Hu & Bentler, 1999) or the upper limit of less than 0.08 (McQuitty, 2004), recent studies argued for flexible cut-offs (Niemand & Mai, 2018). This is particularly relevant to SEM, which considers only the theoretically relevant paths. Therefore, the model fit metrics suggest that our theoretically motivated model of the covariance among variables provides a reasonably good approximation of the data obtained in this study (additional fit metrics are presented in Supplementary Material, Note 3).

Our alternative mediation model assumed that the number of social media platforms could confound the type of SMU acting as a background confounder of the mediation model. We tested this assumption by estimating a new mediation model that includes three types of SMU (AST, ANST, PT) as predictors, loneliness as a mediator, three variables of psychological distress (AS, DS, SS) as outcomes and the number of platforms used (NP) as a background confounder (see details in Supplementary Materials, Note 4). The results showed that the alternative model did not change dramatically from our initial mediation analysis results. However, the mediation model adjusted for confounding by the number of social media platforms showed a bad fit to the data (RMSEA) = .17, 95% CI [0.09, 0.46]; Comparative fit index (CFI) = .788; Tucker-Lewis index (TLI) = .78.

Discussion

This study responded to prior findings about the conflicting relationship between SMU, psychological distress and loneliness in a sample of emerging adults in the UK. In particular, this study looked at different ways of engaging with social media; namely, passive, active-social, and active non-social, and their impact on anxiety, depression and stress in emerging adults. We also tested the mediating effect of loneliness in this relationship. Some interesting findings emerged.

First, it was discovered that passive social media users were at higher risk of anxiety, depression and stress. It is well-documented that passive content consumption can trigger declines in social capital and social support (Burke et al., 2010; Roberts & David, 2022), evoke feelings of envy and jealously (Krasnova et al., 2015; Valkenburg et al., 2022), arouse social comparisons and fear of missing out (Pang, 2021). These factors contribute to increasing the odds of psychological distress. Nevertheless, it should be noted that the present

study did not explore the social media platforms or the amount of information to which our participants were exposed – future research could investigate this further.

Second, it was found that active non-social media use was associated with lower levels of stress. This aligns with previous findings demonstrating that active SMU can be beneficial, as it increases social connectedness and reduces psychological distress compared to passive SMU (Roberts & David, 2022). However, it should be acknowledged that the present study explored specific aspects of active SMU, active social vs active non-social. This makes our finding noteworthy, considering that previous research has overlooked this feature of active SMU. Such a finding could be justified by the nature of active non-social media use. In other words, active non-social use involves the public sharing of content by creating interactive content, tagging photos, posting videos, and tagging videos, none of which involves direct communication with other users, unlike active-social use, which entails more private sharing (Gerson et al., 2017; Trifiro & Gerson, 2019). It could be suggested the public non-directive communicative component of active non-social media use may help users gain the positive benefits of active SMU by experiencing positive feedback, without the demands of direct social media interactions. It is well-known that social media content alone can attract other users' positive feedback, which has been associated with reduced negative emotions, enhanced social self-esteem and better mental health (Valkenburg et al., 2017). At the same time, prior evidence shows that online requests from friends and the provision of social support on social media can be stressful, put a lot of pressure and cause exhaustion among users (Choi & Lim, 2016), suggesting that further research is necessary.

In the mediation model loneliness showed significant mediation effects only on the relationship between passive SMU and psychological distress. This finding is verified by evidence revealing that passive users of social media platforms may not gain social benefits such as social interaction and social support (Wang et al., 2018a; Park et al., 2009); in fact,

they may feel isolated or socially excluded leading to feelings of loneliness (Burke et al., 2010; Frison & Eggermont, 2020; Matook et al., 2015) which can adversely impact psychological state (Escobar-Viera et al., 2018). Another possible explanation of this finding derives from evidence demonstrating that passive SMU fosters weak-ties (Sander, 2012) which are linked to poor social connectedness and elevated psychological distress (Tibbetts et al., 2021). Furthermore, this finding is consistent with the displacement hypothesis (Kraut et al., 1998), suggesting that social media replaces stronger offline relationships with weaker online ones resulting in increased loneliness and psychological distress. Additionally, passive SMU allows for many activities that feel social but are not interactive (Clark et al., 2018), such as browsing profiles (Carpenter et al., 2011). These activities meet immediate social needs, such as a brief sense of belonging and short-term mood improvement, but fail to provide a deep understanding of interpersonal connection, which leads to loneliness (Green et al., 2005) and subsequently to higher chance of psychological distress.

Moreover, it can be argued that passive SMU increases loneliness because it does not offer opportunities for communication and self-disclosure (Frison & Eggermont, 2020). It has been shown that self-disclosure on social media can enhance feelings of connectedness or belongingness and thus reduce loneliness (Deters & Mehl, 2013). It has also been illustrated that self-disclosure on social media can endorse immediate feedback from others (i.e. “likes”) (Hayes et al., 2016), and this could be interpreted as a sign of high social support (Seo et al., 2016). As verified in prior studies, perceived social support in social media platforms can ameliorate feelings of loneliness (Frison & Eggermont, 2020; Seo et al., 2016). Therefore, due to their reluctance to self-disclose, passive users may experience a lack of support online, which can result in increased loneliness and psychological distress (Lin et al., 2020).

Strengths and Limitations

It is argued that the differentiation between social media usage is key to understanding its impact on psychological distress; however, the traditional dichotomization framework of active versus passive has been recently criticised. For instance, some researchers (Trifiro & Gerson, 2019) argue that individuals alter their behaviour online based on different contexts, moods or situations and they call for the development of a valid standardized universal measure. Other researchers propose the need for further distinctions within this dichotomization to account for the complexities of the relationship between social media and well-being as the outcomes of active and passive SMU may not be only positive or negative, respectively (Kross et al., 2021). Furthermore, it is advised that future studies exploring the effects of active versus passive SMU on psychological distress should also focus on another aspect of SMU, namely private versus public SMU, which can lead to diverse outcomes (Valkenburg et al., 2022). Private (active and passive) SMU is characterised by more intimacy, reciprocity, higher synchronicity and frequency than public (active and passive) SMU (Bazarova et al., 2015; van Driel et al., 2019; Waterloo et al., 2018) leading to diverse findings in studies examining the effect of active versus passive SMU on psychological outcomes (Valkenburg et al., 2022).

Although we modelled effects in line with theory and previous research evidence, we collected data at one specific point. Longitudinal data would enable researchers to make definitive claims about a causal path of associations. Besides, data collection exclusively relied on self-reported measures and thus, the possibility of social desirability must be acknowledged. Furthermore, our study did not explore the precise effect of different social media platforms; rather, assessed the overall and simultaneous use of different social media platforms. Even though this reflects the virtual reality of emerging adults who normally use a diverse array of social media platforms, it also neglects particular aspects and functions of different social media platforms. For example, it is reported that passive use of image-based

social media platforms is linked to negative beliefs about self and intensified feelings of dissatisfaction (Trifiro, 2018). Moreover, our study did not counterbalance for the effects of environmental context in the relation between SMU and psychological distress. For instance, future research should consider that social media can be used as an escape from pressure of offline life or as a coping strategy to reduce stress (Hou et al., 2017). Likewise, for future studies it will be a noteworthy endeavour to test the impact of users' socio-economic background, which has shown a strong link to problematic social media use (He et al., 2020).

Despite these limitations, the current study has several strengths. First, we investigated our hypothesis in a sample of emerging adults, whereas the majority of studies on SMU focus on adolescents. This is particularly important considering the high rates of psychological stress and loneliness in this age group population. Second, it extended limited research comparing passive, active social and active non-social media use (i.e., Gerson et al., 2017; Trifiro & Gerson, 2019).

Conclusion

Overall, findings from this study emphasise the need for social media users and researchers to consider the nature of SMU when trying to understand its effect on psychological distress. For instance, based on our findings we propose that social media users may reflect on the nature and motives behind their engagement with social media and also become more knowledgeable that passive use can arouse feelings of loneliness and consequently escalate anxiety, depression and stress symptoms. On the other hand, creating and sharing social media content without directly interacting with other users may be beneficial for stress levels. Therefore, intervention programs promoting psychological wellbeing among emerging adults would benefit by comprehending better the link between passive SMU, loneliness, and psychological distress. For example, rather than promoting the restriction of social media, helping young people to realise the risks of passive SMU use may

be more useful. This could be accomplished by aiding emerging adults to better understand their needs for SMU and how they can lead to feelings of loneliness and psychological distress. Intervention programs could also promote the development of personal strategies to control and process the passive consumption of information on social media platforms as a more practical way to alleviate feelings of loneliness and, subsequently better psychological outcomes.

Acknowledgements: Thanks to Dr Doug Hardman for proofreading the article. Also, we are grateful to Assoc Prof Evi Katsapi, Irina Filip, Qin Wang, Amber Brench, Sophia Redpath and Jasmiina Ryynanen for their help with data collection.

Declaration of interest statement: The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Data availability statement: Pending acceptance for publication, all of the anonymised data files will be automatically uploaded to Online Research Data repository of Bournemouth University.

Funding statement: No funding was received for this project.

Disclosure statement: The authors report there are no competing interests to declare.

References

Aarts, S., Peek, S. T., & Wouters, E. J. (2015). The relation between social network site usage and loneliness and mental health in community-dwelling older adults. *International Journal of Geriatric Psychiatry, 30*(9), 942-949. https://doi.org/10.1002/gps.4241

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P (1998). Psychometric properties of the 42-item and 21- item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment, 10,* 176-181. https://doi.org/10.1037/1040-3590.10.2.176

Arnett, J. J. (2007). Emerging adulthood: What is it, and what is it good for?. *Child Development Perspectives*, *1*(2), 68-73. https://doi.org/10.1111/j.1750-8606.2007.00016.x

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, *43*(8), 667-672. https://doi.org./10.1007/s00127-008-0345-x

Bazarova, N. N., Choi, Y. H., Sosik, V. S., Cosley, D., & Whitlock, J. (2015, February). *Social sharing of emotions on Facebook: Channel differences, satisfaction, and replies.* Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, p.154–164. https://doi.org/10.1145/2675133.2675297

Berryman, C., Ferguson, C. J., & Negy, C. (2018). Social media use and mental health among young adults. *The Psychiatric Quarterly*, *89*(2), 307–314. https://doi.org/10.1007/s11126-017-9535-6

Burke, M., Marlow, C., & Lento., T. (2010). Social network activity and social wellbeing. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. 10*, 1909 - 1912. https://doi.org/10.1145/1753326.1753613

Cacioppo, J. T., & Cacioppo, S. (2018). The growing problem of loneliness. *Lancet, 391*(10119), 426. https://doi.org/10.1016/S0140-6736(18)30142-9

Cacioppo, J. T., Hawkley, L. C., Ernst, J. M., Burleson, M., Berntson, G. G., Nouriani, B., & Spiegel, D. (2006). Loneliness within a nomological net: An evolutionary perspective. *Journal of Research in Personality, 40*(6), 1054-1085. https://doi.org/10.1016/j.jrp.2005.11.007

Carpenter, J. M., Green, M. C., & LaFlam, J. (2011). People or profiles: Individual differences in online social networking use. *Personality and Individual Differences, 50*(5), 538-541. https://doi.org/10.1016/j.paid.2010.11.006

Chancellor, S., & De Choudhury, M. (2020). Methods in predictive techniques for mental health status on social media: A critical review. *NPJ Digital Medicine,3*, 43. https://doi.org/10.1038/s41746-020-0233-7

Chen, W., & Lee, K. H. (2013). Sharing, liking, commenting, and distressed? The pathway between Facebook interaction and psychological distress. *Cyberpsychology, Behavior, and Social Networking, 16*(10), 728-734 . https://doi.org/10.1089/cyber.2012.0272

Choi, S. B., & Lim, M. S. (2016). Effects of social and technology overload on psychological well-being in youth South Korean adults: The mediatory role of social network service addiction. *Computers in Human Behavior, 61*, 245-254. https://doi.org/10.1016/j.chb.2016.03.032

Christiansen, J., Qualter, P., Friis, K., Pedersen, S. S., Lund, R., Andersen, C. M., Bekker-Jeppesen, M., & Lasgaard, M. (2021). Associations of loneliness and social isolation

with physical and mental health among adolescents and young adults. *Perspectives in Public Health*, *141*(4), 226–236. https://doi.org/10.1177/17579139211016077

Clark, J. L., Algoe, S. B., & Green, M. C. (2018). Social network sites and well-being: The role of social connection. *Current Directions in Psychological Science*, *27*(1), 32-37. https://doi.org/10.1177/0963721417730833

Deters, F. G., & Mehl, M. R. (2013). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science*, *4*(5), 579-586. https://doi.org/10.1177/1948550612469233

Dienlin, T., Masur, P. K., & Trepte, S. (2017). Reinforcement or displacement? The reciprocity of FtF, IM, and SNS communication and their effects on loneliness and life satisfaction. *Journal of Computer-Mediated Communication, 22*(2), 71–87. https://doi.org/10.1111/jcc4.12183

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication, 12*(4), 1143–1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*(3), 430–457. https://doi.org/10.1207/S15328007SEM0803_5

Escobar-Viera, C. G., Shensa, A., Bowman, N. D., Sidani, J. E., Knight, J., James, A. E., & Primack, B. A. (2018). Passive and active social media use and depressive symptoms among united states adults. *Cyberpsychology, Behavior and Social Networking*, *21*(7), 437–443. https://doi.org/10.1089/cyber.2017.0668

Fardghassemi, S., & Joffe, H. (2022). The causes of loneliness: The perspective of young adults in London's most deprived areas. *PloS One*, *17*(4), e0264638. https://doi.org/10.1371/journal.pone.0264638

Frison, E., & Eggermont, S. (2020). Toward an integrated and differential approach to the relationships between loneliness, different types of Facebook use, and adolescents' depressed mood. *Communication Research*, *47*(5), 701–728. https://doi.org/10.1177/0093650215617506

Frost, R. L., & Rickwood, D. J. (2017). A systematic review of the mental health outcomes associated with Facebook use. *Computers in Human Behavior*, *76*, 576-600. https://doi.org/10.1016/j.chb.2017.08.001

Gerson, J., Plagnol, A. C., & Corr, P. J. (2017). Passive and active Facebook use measure (PAUM): Validation and relationship to the reinforcement sensitivity theory. *Personality and Individual Differences*, *117*, 81-90. https://doi.org/10.1016/j.paid.2017.05.034

Good, A., Sambhantham, A., & Panjganj, V. (2013, July). Looking back at Facebook content and the positive impact upon wellbeing: exploring reminiscing as a tool for self-soothing. In *International Conference on Online Communities and Social Computing* (pp. 278-286). Springer, Berlin, Heidelberg.

Green, M. C., Hilken, J., Friedman, H., Grossman, K., Gasiewskj, J., Adler, R., & Sabini, J. (2005). Communication via instant messenger: Short and long-term effects. *Journal of Applied Social Psychology*, *35*, 445-462. https://doi.org/10.1111/j.1559-1816.2005.tb02130.x

Gross, E. F. (2004). Adolescent internet use: What we expect, what teens report. *Journal of Applied Developmental Psychology*, *25*(6), 633–649. https://doi.org/10.1016/j.appdev.2004.09.005

Hall, J. A., & Liu, D. (2022). Social media use, social displacement, and well-being. *Current Opinion in Psychology, 46,* 101339. https://doi.org/10.1016/j.copsyc.2022.101339

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters a theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *40*(2), 218–227. https://doi.org/10.1007/s12160-010-9210-8

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Guilford Press.

Hayes, R. A., Carr, C. T., & Wohn, D. Y. (2016). It's the audience: Differences in social support across social media. *Social Media + Society, 2*(4). https://doi.org/10.1177/2056305116678894

He, Z. H., Li, M. D., Ma, X. Y., & Liu, C. J. (2020). Family socioeconomic status and social media addiction in female college students: The mediating role of impulsiveness and inhibitory control. *The Journal of Genetic Psychology, 182*(1), 60-74. https://doi.org/10.1080/00221325.2020.1853027

Heffer, T., Good, M., Daly, O., MacDonell, E., & Willoughby, T. (2019). The longitudinal association between social-media use and depressive symptoms among adolescents and young adults: An empirical reply to Twenge et al. (2018). *Clinical Psychological Science, 7*(3), 462–470. https://doi.org/10.1177/2167702618812727

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: A literature review. *Clinical Psychology Review, 26*(6), 695–718. https://doi.org/10.1016/j.cpr.2006.04.002

Hochberg, Z. E., & Konner, M. (2020). Emerging adulthood, a pre-adult life-history stage. *Frontiers in Endocrinology, 10,* 918. https://doi.org/10.3389/fendo.2019.00918

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *10*(2), 227–237. https://doi.org/10.1177/1745691614568352

Hou, X. L., Wang, H. Z., Guo, C., Gaskin, J., Rost, D. H., & Wang, J. L. (2017). Psychological resilience can help combat the effect of stress on problematic social networking site usage. *Personality and Individual Differences*, *109*, 61–66. https://doi.org/10.1016/j.paid.2016.12.048

Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. *Journal of Social and Clinical Psychology, 37*(10), 751–768. https://doi.org/10.1521/jscp.2018.37.10.751

Ivie, E. J., Pettitt, A., Moses, L. J., & Allen, N. B. (2020). A meta-analysis of the association between adolescent social media use and depressive symptoms. *Journal of Affective Disorders, 275*, 165–174. https://doi.org/10.1016/j.jad.2020.06.014

JASP Team (2022). JASPS (version 0.16.3) [Computer Software].

Jelenchick, L. A., Eickhoff, J. C., & Moreno, M. A. (2013). "Facebook depression?" social networking site use and depression in older adolescents. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine, 52*(1), 128–130. https://doi.org/10.1016/j.jadohealth.2012.05.008

Kalpidou, M., Costin, D., & Morris, J. (2011). The relationship between Facebook and the well-being of undergraduate college students. *Cyber-Psychology, Behavior, and Social Networking*, *14*(4), 183-189. https://doi.org/10.1089/cyber.2010.0061

Kim, B., & Kim, Y. (2017). College students' social media use and communication network heterogeneity: Implications for social capital and subjective well-being. *Computers in Human Behavior, 73*, 620-628. https://doi.org/10.1016/j.chb.2017.03.033

Krasnova, H., Widjaja, T., Buxmann, P., Wenninger, H., & Benbasat, I. (2015). Why following friends can hurt you: An exploratory investigation of the effects of envy on social networking sites among college-age users college-age users. *Information Systems Research, 26*, 585–605. https://doi.org/10.1287/isre.2015.0588

Kraut, R., Kiesler, S., Boneva, B., Cummings, J. N., Helgeson, V., & Crawford, A. M. (2002). Internet paradox revisited. *Journal of Social Issues*, *58*(1), 49–74. https://doi.org/10.1111/1540-4560.00248

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox. A social technology that reduces social involvement and psychological well-being?. *The American Psychologist*, *53*(9), 1017–1031. https://doi.org/10.1037//0003-066x.53.9.1017

Kross, E., Verduyn, P., Sheppes, G., Costello, G. K., Jonides, J., & Ybarra, O. (2021). Social media and well-being: Pitfalls, progress, and next steps. *Trends in Cognitive Sciences 25*(1),55–66. https://doi.org/10.1016/j.tics.2020.10.005

Lam, S., Jivraj, S., & Scholes, S. (2020). Exploring the relationship between internet use and mental health among older adults in England: Longitudinal observational study. *Journal of Medical Internet Research*, *22*(7), e15683. https://doi.org/10.2196/15683

Li, Z., Yi, X., Zhong, M., Li, Z., Xiang, W., Wu, S., & Xiong, Z. (2021). Psychological distress, social support, coping style, and perceived stress among medical staff and

medical students in the early stages of the COVID-19 epidemic in China. *Frontiers in Psychiatry*, *12*, 664808. https://doi.org/10.3389/fpsyt.2021.664808

Lin, C. Y., Chou, E. Y., & Huang, H. C. (2020). They support, so we talk: The effects of other users on self-disclosure on social networking sites. *Information Technology & People*. *34* (3), 1039-1064(26). https://doi.org/10.1108/ITP-10-2018-0463

Lin, L. Y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., Hoffman, B. L., Giles, L. M., & Primack, B. A. (2016). Association between social media use and depression among US young adults. *Depression and Anxiety*, *33*(4), 323–331. https://doi.org/10.1002/da.22466

Lovibond, S .H., & Lovibond, P. F. (1995). *Manual for the depression anxiety & stress scales*. (2nd Ed.). Psychology Foundation.

Matook, S., Cummings, J.W., & Bala, H. (2015). Are you feeling lonely? The impact of relationship characteristics and online social network features on loneliness. *Journal of Management Information Systems, 31*, 278 - 310. https://doi.org/10.1080/07421222.2014.1001282

Matud, M. P., Díaz, A., Bethencourt, J. M., & Ibáñez, I. (2020). Stress and psychological distress in emerging adulthood: A gender analysis. *Journal of Clinical Medicine*, *9*(9), 2859. https://doi.org/10.3390/jcm9092859

McQuitty, S. (2004). Statistical power and structural equation models in business research. *Journal of Business Research*, *57*(2), 175–183. https://doi.org/10.1016/S0148-2963(01)00301-0

Metzger, M. J., Wilson, C., & Zhao, B. Y. (2018). Benefits of browsing? The prevalence, nature, and effects of profile consumption behavior in social network sites. *Journal of Computer-Mediated Communication*, *23*(2), 72-89.https://doi.org/10.1093/jcmc/zmx004

Naslund, J. A., Bondre, A., Torous, J., & Aschbrenner, K. A. (2020). Social media and mental health: Benefits, risks, and opportunities for research and practice. *Journal of Technology in Behavioral Science, 5*(3), 245–257. https://doi.org/10.1007/s41347-020-00134-x

Niemand, T., & Mai, R. (2018). Flexible cutoff values for fit indices in the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 46*(6), 1148–1172. https://doi.org/10.1007/s11747-018-0602-9.

Nie, N. H. (2001). Sociability, interpersonal relations, and the internet: Reconciling conflicting findings. *American Behavior Scientist, 45*, 420–435. https://doi.org/10.1177/00027640121957277

Nowland, R., Necka, E. A., & Cacioppo, J. T. (2018). Loneliness and social internet use: Pathways to reconnection in a digital world?. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science, 13*(1), 70–87. https://doi.org/10.1177/1745691617713052

Norton P. J. (2007). Depression Anxiety and Stress Scales (DASS-21): Psychometric analysis across four racial groups. *Anxiety, Stress, and Coping*, *20*(3), 253–265. https://doi.org/10.1080/10615800701309279

O'Day, E., & Heimberg, R. (2021). Social media use, social anxiety, and loneliness: A systematic review. *Computers in Human Behavior Reports, 3*, https://doi.org/10.1016/j.chbr.2021.100070

Office for National Statistics. (2018). *Loneliness - What characteristics and circumstances are associated with feeling lonely*? https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/lonelinesswhatcharacteristicsandcircumstancesareassociatedwithfeelinglonely/2018-04-10

Oh, H. J., Ozkaya, E., & LaRose, R. (2014). How does online social networking enhance life satisfaction? The relationships among supportive online interaction, affect, perceived social support, sense of community, and life satisfaction. *Computers in Human Behavior, 30*, 69–78. http://dx.doi.org/10.1016/j.chb.2013.07.053.

Ono, E., Nozawa, T., Ogata, T., Motohashi, M., Higo, N., Kobayashi, T., Ishikawa, K., Ara, K., Yano, K., & Miyake, Y. (2011, December). Relationship between social interaction and mental health. In *2011 IEEE/SICE International Symposium on System Integration (SII),* 2011, pp. 246-249. https://doi.org/10.1109/SII.2011.6147454

Pang, H. (2021). Unraveling the influence of passive and active WeChat interactions on upward social comparison and negative psychological consequences among university students. *Telematics and Informatics, 57,* 101510. https://doi.org/10.1016/j.tele.2020.101510

Park, N., Kee, K. F., & Valenzuela, S. (2009). Being immersed in social networking environment: Facebook groups, uses and gratifications, and social outcomes. *Cyberpsychology & Behavior, 12*, 729–733. https://doi.org/10.1089/cpb.2009.0003

Persson, A., Wanek, B., & Johansson, A. (2001). Passive versus active operator work in automated process control-a job design case study in a control centre. *Applied Ergonomics, 32*(5), 441–451. https://doi.org/10.1016/s0003-6870(01)00022-9

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

Primack, B., Shensa , A., Escobar-Viera, C., Barrett, E., Sidani, J., Colditz, J, & James, E. (2017). Use of multiple social media platforms and symptoms of depression and

anxiety: A nationally-representative study among US young adults. *Computers in Human Behavior, 69* (1-9). https://doi.org/10.1016/j.chb.2016.11.013

Qualter, P., Vanhalst, J., Harris, R., Van Roekel, E., Lodder, G., Bangee, M., Maes, M., & Verhagen, M. (2015). Loneliness across the life span. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *10*(2), 250–264. https://doi.org/10.1177/1745691615568999

Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health, 16* (2), 48-54. https://doi.org/10.1108/JPMH-03-2016-0013312

Roberts, J. A. & David, M. E. (2022). On the outside looking in: Social media intensity, social connection, and well-being: The moderating role of passive social media use. *Canadian Journal of Behavioural Science, 54*(4). https://doi.org/10.1037/cbs0000323

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *Journal of Personality Assessment, 66*(1), 20-40. https://doi.org/10.1207/s15327752jpa6601_2

Ryan, T., Allen, K. A., Gray, D. L., & McInerney, D. M. (2017). How social are social media? A review of online social behaviour and connectedness. *Journal of Relationships Research, 8,* Article e8. https://doi.org/10.1017/jrr.2017.13

Sander, T. (2012). Social media from the perspective of both strong and weak ties and the implications for recruiting. *International Journal of Arts & Sciences*, *5*(1), 121.

Satici, S. A. (2019). Facebook addiction and subjective well-being: A study of the mediating role of shyness and loneliness. *International Journal of Mental Health and Addiction*, *17*(1), 41–55. https://doi.org/10.1007/s11469-017-9862-8

Scott, H., & Woods, H. C. (2019). Understanding links between social media use, sleep and mental health: Recent progress and current challenges. *Current Sleep Medicine Reports, 5*(3),141–9. https://doi.org/10.1007/s40675-019-00148-9.

Seo, M., Kim, J., & Yang, H. (2016). Frequent interaction and fast feedback predict perceived social support: Using crawled and self-reported data of Facebook users. *Journal of Computer-Mediated Communication*, *21*(4), 282–297. https://doi.org/10.1111/jcc4.12160

Shaw, A. M., Timpano, K. R., Tran, T. B., & Joormann, J. (2015). Correlates of Facebook usage patterns: The relationship between passive Facebook use, social anxiety symptoms, and brooding. *Computers in Human Behavior, 48*, 575-580. https://doi.org/10.1016/j.chb.2015.02.003

Shensa, A., Escobar-Viera, C. G., Sidani, J. E., Bowman, N. D., Marshal, M. P., & Primack, B. A. (2017). Problematic social media use and depressive symptoms among US young adults: A nationally-representative study. *Social Science & Medicine (1982)*, *182*, 150–157. https://doi.org/10.1016/j.socscimed.2017.03.061

Steinfield, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology, 29(*6), 434-445. https://doi.org/10.1016/j.appdev.2008.07.002

Thomas, L., Orme, E., Kerrigan, F. (2020). Student loneliness: The role of social media through life transitions. *Computers & Education, 146*, 103754. https://doi.org/10.1016/j.compedu.2019.103754

Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and passive social media use and symptoms of anxiety and depressed mood among Icelandic adolescents. *Cyberpsychology, Behavior, and Social Networking*, *22*(8), 535-542. https://doi.org/10.1089/cyber.2019.0079

Tian, Y., Zhang, S., Wu, R., Wang, P., Gao, F., & Chen, Y. (2018). Association between specific internet activities and life satisfaction: The mediating effects of loneliness and depression. *Frontiers in Psychology*, *9*, 1181. https://doi.org/10.3389/fpsyg.2018.01181

Tibbetts, M., Epstein-Shuman, A., Leitao, M., & Kushlev, K. (2021). A week during COVID-19: Online social interactions are associated with greater connection and more stress. *Computers in Human Behavior Reports*, *4*, 100133. https://doi.org/10.1016/j.chbr.2021.100133

Trifiro, B. (2018). Instagram use and its effect on well-being and self-esteem. (Paper 4) [Master of Arts in Communication Graduate Thesis, Bryant University]. Bryant Digital Repository. https://digitalcommons.bryant.edu/macomm/4

Trifiro, B. M., & Gerson, J. (2019). Social media usage patterns: Research note regarding the lack of universal validated measures for active and passive use. *Social Media & Society*, 5(2). https://doi.org/10.1177/2056305119848743

Turkle, S. (2017). *Alone together: Why we expect more from technology and less from each other.* Hachette.

Ulvi, O., Karamehic-Muratovic, A., Baghbanzadeh, M., Bashir, A., Smith, J., & Haque. U. (2022). Social media use and mental health: A global analysis. *Epidemiologia, 3,* 11–25. https://doi.org/10.3390/epidemiologia3010002

Valkenburg, P. M., Beyens, I., Pouwels, J. L. van Driel, I. I., & Keijsers, L. (2022). Social media browsing and adolescent well-being: Challenging the "passive social media use hypothesis". *Journal of Computer-Mediated Communication*, *27*(1). https://doi.org/10.1093/jcmc/zmab015

Valkenburg, P. M., Koutamanis, M., & Vossen, H. G. (2017). The concurrent and longitudinal relationships between adolescents' use of social network sites and their

social self-esteem. *Computers in Human Behaviour*, *76*, 35-41. https://doi.org/10.1016/j.chb.2017.07.008

Vanderweele, T. J., & Vansteelandt, S. (2014). Mediation analysis with multiple mediators. *Epidemiologic Methods*, *2*(1), 95–115. https://doi.org/10.1515/em-2012-0010

van Driel, I. I., Pouwels, J. L.,Beyens, I., Keijsers, L., & Valkenburg, P. M. (2019). *Posting, scrolling, chatting, and snapping: Youth (14-15) and social media in 2019.* Center for Research on Children, Adolescents, and the Media (CcaM), Universiteit van Amsterdam.

Vannucci, A., Flannery, K. M., & Ohannessian, C. M. (2017). Social media use and anxiety in emerging adults. *Journal of Affective Disorders*, *207*, 163–166. https://doi.org/10.1016/j.jad.2016.08.040

Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., Ybarra, O., Jonides, J., & Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General*, *144*(2), 480. https://doi.org/10.1037/ xge0000057

Verduyn, P., Schulte- Strarhaus, J. C. C. , Kross, E., & Hulsheger, U. R. (2021). When do smartphones displace face-to-face interactions and what to do about it? *Computers in Human Bahavior*, *13*, 106550. https://doi.org/10.1016/j.chb.2020.106550

Verduyn, P., Ybarra, O., Resibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review, 11*(1), 274-302. https://doi.org/10.1111/sipr.12033

Verrelli, S., White, F. A., Harvey, L. J., & Pulciani, M. R. (2019). Minority stress, social support, and the mental health of lesbian, gay, and bisexual Australians during the

Australian Marriage Law Postal Survey. *Australian Psychologist, 54*(4), 336-346. https://doi.org/10.1111/ap.12380

Viner, R. M., Gireesh, A., Stiglic, N., Hudson, L. D., Goddings, A. L., Ward, J. L., & Nicholls, D. E. (2019). Roles of cyberbullying, sleep, and physical activity in mediating the effects of social media use on mental health and wellbeing among young people in England: A secondary analysis of longitudinal data. *The Lancet. Child & Adolescent Health, 3*(10), 685–696. https://doi.org/10.1016/S2352-4642(19)30186-5

Vizard, T., Sadler, K., Ford, T., Newlove-Delgado, T., McManus, S., Marcheselli, F., Davis, J., Williams, T., Leach, C., Mandalia, D., & Cartwright, C. (2020). Mental health of children and young people in England, 2020. *Change*, 12.

Wang, J., Gaskin, J., Rost, D. H., & Gentile, D. A. (2018a). The reciprocal relationship between passive social networking site (SNS) usage and users' subjective well-being. *Social Science Computer Review*, *36*(5), 511-522. https://doi.org/10.1177/0894439317721981

Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018b). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry*, *18*(1),156. https://doi.org/10.1186/s12888-018-1736-5

Waterloo, S. F., Baumgartner, S. E., Peter, J., & Valkenburg, P. M. (2018). Norms of online expressions of emotion: Comparing Facebook, Twitter, Instagram, and WhatsApp. *New Media & Society*, *20*(5), 1813–1831. https://doi.org/10.1177/1461444817707349

Wong, J. G., Cheung, E. P., Chan, K. K., Ma, K. K., & Tang, S. W. (2006). Web-based survey of depression, anxiety and stress in first-year tertiary education students in Hong

Kong. *Australian and New Zealand Journal of Psychiatry*, *40*, 777-782. https://doi.org/10.1080/j.1440-1614.2006.01883.x

Youssef, L., Hallit, R., Kheir, N., Obeid, S., & Hallit, S. (2020). Social media use disorder and loneliness: Any association between the two? Results of a cross-sectional study among Lebanese adults. *BMC Psychology*, *8*(1), 56. https://doi.org/10.1186/s40359-020-00421-5

Zhang, K., Kim, K., Silverstein, N. M., Song, Q., & Burr, J. A. (2021). Social media communication and loneliness among older adults: The mediating roles of social support and social contact. *The Gerontologist*, *61*(6), 888-896. https://doi.org/10.1093/geront/gnaa197

Table 1

Descriptive Statistics of All Study Variables

	Active Social SMU	Active Non-Social SMU	Passive SMU	Loneliness	Depression	Anxiety	Stress
Mean	15.52	8.39	14.49	43.92	13.14	12.52	14.89
SD	3.81	3.30	2.98	9.56	5.21	4.79	4.73
Missing	3	1	1	13	5	5	7

Table 2

Pearson's Correlations between All Study Variables

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. AST	-						
2. ANST	.70***	-					
3. PT	.48***	.29***	-				
4. LON	-.17**	.22***	.10	-			
5. AS	-.01	-.04	.14*	.45***	-		
6. DS	-.08	-.11	.09	.64***	.70***	-	
7. SS	-.01	-.10	.11	.54***	.77***	.75***	-

*$p < .05$, ** $p < .01$, *** $p < .001$

Note. AST – Active Social Total, ANST – Active Non-Social Total, PT – Passive Total, LON-loneliness, AS – anxiety subscale, DS-depression subscale, SS-stress subscale.

Table 3

The Results of Three Regression Models Examining the Relationship Between Different Styles of SMU and Psychological Distress

Outcome*	Predictors	Model (ANOVA)	Regression**
AS	AST	$F(3,278) = 3.07$, $p = .03$	B =-0.08, 95% CI [-0.33, 0.12], SE=0.11, t=-0.90, p =.37
	ANST		B =-0.04, 95% CI [-0.29, 0.18], SE=0.12, t=-0.48, p =.63
	PT		B =0.20, 95% CI [0.11, 0.54], SE= 0.11, t=2.94, p =.004
DS	AST	$F(3,278) = 3.12$, $p = .03$	B =-0.08, 95% CI [-0.36, 0.13], SE=0.12, t=-0.91, p =.37
	ANST		B =-0.10, 95% CI [-0.42, 0.09], SE=0.13, t=-1.25, p =.21
	PT		B =0.16, 95% CI [0.05, 0.52], SE=0.12, t=2.35, p =.02
SS	AST	$F(3,278)=3.21$, $p = .02$	B =0.05, 95% CI [-0.16, 0.29], SE = 0.12, t=0.55, p =.58
	ANST		B =-0.18, 95% CI [-0.49, 0.02], SE= 0.11, t=-2.14, p =.03
	PT		B =0.14, 95% CI [0.01, 0.44], SE=012, t=2.35, p =.01

Note. AST-Active Social Total, ANST – Active non-Social Total, PT – Passive Total, SS – Stress Subscale, DS – Depression Subscale, AS – Anxiety Subscale.

* Marginal effects plots are detailed in Supplementary Materials, Note 1

** *B* represents standardised coefficient with a bias-corrected percentile bootstrap confidence interval using 2000 bootstrapped samples

Table 4

The Results of Three Regression Models Examining the Relationship Between Loneliness and Psychological Distress

Outcome	Predictor	Model (ANOVA)	Regression*
AS	LON	$F(1,272)=69.19$, $p < .001$	B =0.22, 95% CI [0.17, 0.28], SE=0.03, t=8.32, $p <$ .001
DS		$F(1,272)=189.34$ $p < .001$	B =0.35, 95% CI [0.30, 0.40], SE = 0.03, t=13.76, p <.001
SS		$F(1,272)=106.98$ $p < .001$	B =0.26, 95% CI [0.21, 0.31], SE=0.03, t=10.34, p <.001

Note. SS – Stress Subscale, DS – Depression Subscale, AS – Anxiety Subscale, LON – Loneliness

**B* represents the standardised coefficient with a bias-corrected percentile bootstrap confidence interval using 2000 bootstrapped samples

Table 5

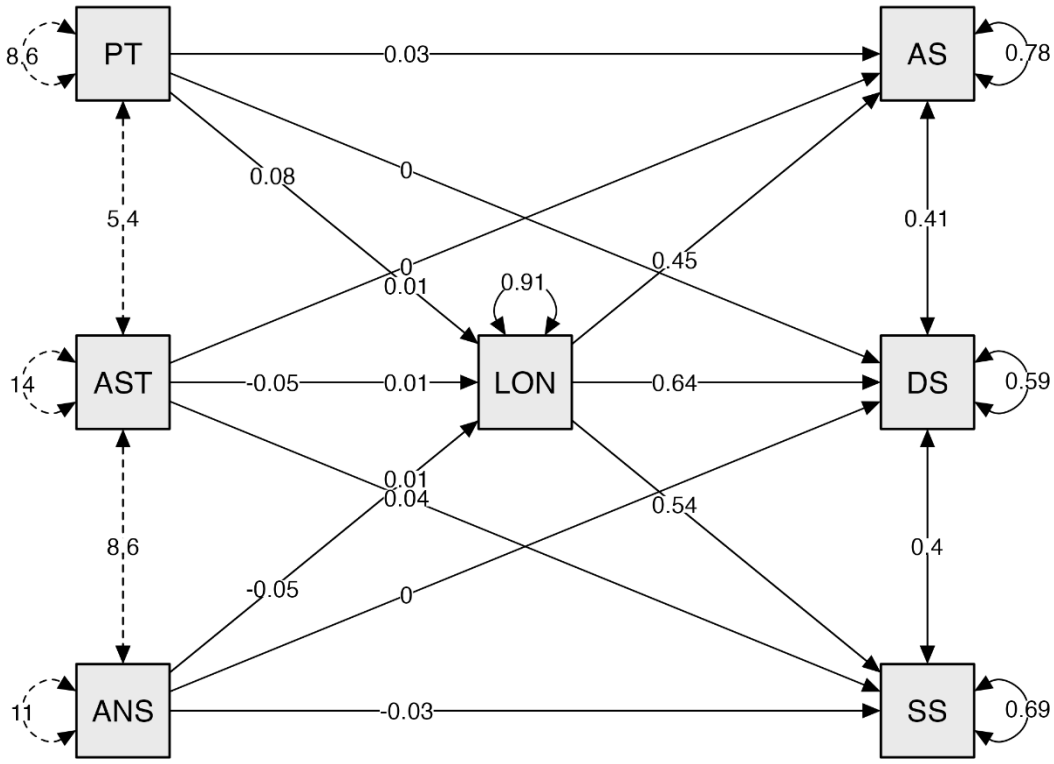
Summary of Mediation Analysis

	B	***SE***	***z***	***p***	**95% CI**
Direct effects					
AST->AS	-0.001	0.02	-0.01	.98	[-0.04, 0.04]
ANST->AS	0.008	0.02	0.36	.72	[-0.04, 0.05]
PT->AS	0.03	0.02	1.53	.13	[-0.01, 0.07]
AST-> DS	0.009	0.02	0.45	.65	[-0.03, 0.05]
ANST->DS	-0.003	0.02	-0.13	.90	[-0.04, 0.04]
PT->DS	0.004	0.02	0.22	.83	[-0.03, 0.04]
AST->SS	0.04	0.02	1.96	.05	[-0.003, 0.08]
ANST->SS	-0.03	0.02	-1.40	.16	[-0.07, 0.01]
PT->SS	0.006	0.02	0.29	.77	[-0.03, 0.05]
Indirect effects					
AST->LON->AS	-0.02	0.01	-1.93	.05	[-0.05, 0.002]
ANST->LON->AS	-0.02	0.01	-1.77	.08	[-0.05, 0.002]
PT->LON->AS	0.04	0.01	3.19	.001	[0.02, 0.06]
AST->LON->DS	-0.03	0.02	-1.96	.05	[-0.06, 0.03]
ANST->LON->DS	-0.03	0.02	-1.79	.08	[-0.07, 0.003]
PT->LON->DS	0.05	0.02	3.37	<.001	[0.02, 0.08]
AST->LON->SS	-0.03	0.01	-1.95	.05	[-0.05, 0.003]
ANST->LON->SS	-0.03	0.01	-1.78	.08	[-0.06, 0.002]
PT->LON->SS	0.04	0.01	3.29	<.001	[0.02, 0.07]
Total effects					
AST->AS	-0.02	0.02	-0.90	.37	[-0.07, 0.03]
ANST->AS	-0.01	0.02	-0.49	.63	[-0.07, 0.04]
PT->AS	0.07	0.02	2.95	.003	[0.02, 0.11]
AST->DS	-0.02	0.02	-0.90	.36	[-0.08, 0.03]
ANST->DS	-0.03	0.03	-1.26	.21	[-0.09, 0.02]
PT->DS	0.05	0.02	2.37	.02	[0.002, 0.10]
AST->SS	0.02	0.02	0.62	.53	[-0.03, 0.06]
ANST->SS	-0.06	0.03	-2.19	.03	[-0.10, -0.01]
PT->SS	0.05	0.02	2.11	.03	[0.004, 0.09]

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence interval using 2000 bootstrapped samples, Maximum Likelihood estimator. Lavaan syntax for this model is detailed in Supplementary Materials, Note 2.

Figure 1

Mediation Model



Note. The boxes with labels represent the variables of interest: PT (Passive Total), AST (Active Social Total), ANS (Active Non-Social) are predictors, LON- Loneliness score – mediator, AS (anxiety scores), DS (depression scores) and SS (stress scores) are outcomes. Circular curved arrows represent the residual variance of variables. The directional arrows imply one variable having a direct effect on another (i.e., one variable regressed on the other). Double-headed arrows between predictors or outcome variables represent covariance.