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Self-compassion moderates the predictive effects of social media use profiles on depression and anxiety

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ABSTRACT

This study identified patterns of social media use, examined their relationships with anxiety and depression, and investigated whether levels of self-compassion moderated these relationships. Three-hundred university students who used social media (M_{age} = 34.90, SD = 11.19, 77.3% female) completed an online survey. Variables that assessed time spent on social media, frequency of use, problematic social media use, fear of missing out, emotional responses to using social media, and perceptions of online interactions were subjected to a two-step cluster analysis. Four distinct *social media use profiles* emerged: *Problem Users*, *Disenchanted Dabblers*, *Moderate Users*, and *Contented Dabblers*. ANOVAs revealed that *Problem Users* reported higher mean levels of anxiety and depression than did the other three groups. However, subsequent moderation analyses found that self-compassion buffered these relationships, with highly self-compassionate *Problem Users* reporting similar levels of anxiety and depression to the other profile groups. These findings suggest that self-compassion may protect vulnerable social media users against anxiety and depression. Implications of the findings are discussed.

Introduction

Visiting social media platforms is a very popular global pastime (Kemp, 2020) that can have beneficial effects. For example, it can increase levels of social support, social capital, and communication with important others; and it can promote positive mental well-being, such as life satisfaction, self-esteem, and purpose in life (Erfani & Abedin, 2018; Manago et al., 2012; Ostic et al., 2021; Seabrook et al., 2016). However, systematic reviews and meta-analyses have indicated that social media use is also associated with greater depression and anxiety across various populations and platforms (Elhai et al., 2017; Frost & Rickwood, 2017; Huang, 2020; Ivie et al., 2020; Keles et al., 2020; Seabrook et al., 2016; Vahedi & Zannella, 2019; Yoon et al., 2019). Depression involves persistent feelings of hopelessness and sadness and a loss of interest in once enjoyed activities; while anxiety refers to ongoing feelings of tension and intrusive thoughts and worries (APA, 2013). Every year, more than 264 million people worldwide experience depression and over 284 million suffer from extreme anxiety (James et al., 2018), and the resulting load on the healthcare system and loss of productivity place a considerable economic burden on society (Vos et al., 2020). It is therefore imperative to understand the relationship between social media use and these two mental health outcomes, and to identify factors that may act as a buffer.

This study extended research knowledge by identifying patterns of social media use, evaluating their relationships with depression and anxiety, and examining whether self-compassion moderates these relationships. Self-compassion involves an ability to respond to negative experiences with self-kindness, mindful awareness, and a sense of connection with others (Neff, 2003b).

Social media use, depression, and anxiety

Research into the effects of social media use on depression and anxiety has often assessed individual indicators of social media use; most commonly time spent on social media platforms, frequency of checking-in (Yoon et al., 2019), or problematic social media use (Huang, 2020). Problematic use refers to excessive usage characterized by symptoms of addiction, such as dependency and compulsion, that interfere with normal daily functioning (Lee et al., 2017). According to the displacement hypothesis (Kraut et al., 1998), spending excessive time on social media may lower psychological wellbeing by displacing time that could be spent with family and close friends, thereby replacing substantive with superficial relationships. This hypothesis has gained some empirical support. For example, Helliwell and Huang (2013) found

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that subjective well-being was positively correlated with number of face-to-face friends but negatively correlated with number of online friends. Other researchers have suggested that time spent on social media also displaces time spent on other activities that benefit well-being, such as sport or relaxation (McDool et al., 2016). This perspective has also been supported. For instance, Sagioglou and Greitemeyer (2014) found that the causal relationship between social media activity and negative mood was mediated by users' interpretations of the activity as a meaningless waste of time.

In line with these hypotheses, recent meta-analyses have found small but significant positive mean predictive effects of time and frequency on symptoms of depression and anxiety across diverse samples (Frost & Rickwood, 2017; Ivie et al., 2020; Seabrook et al., 2016; Yoon et al., 2019) and small to medium mean effects of problematic use (Elhai et al., 2017; Huang, 2020). However, substantial heterogeneity is evident across studies. Such variation may partly reflect different social media activities. For example, a meta-analysis by Liu et al. (2019) found that using social media for entertainment or to interact with others was associated with greater psychological well-being, whereas browsing content was linked with lower well-being and updating one's status was unrelated to well-being. Of particular relevance to the current study, the heterogeneity may also be partly due to ambiguities associated with evaluating single indicators of social media use. For example, a measure of frequency may be misleading because one check-in may be followed by either a fleeting or prolonged visit; a measure of time cannot indicate a user's level of engagement with social media; and a measure of frequency, time, or problematic use cannot capture the valence of the social media experience. In this way, any single indicator of social media use can only convey part of a user's experience.

Accordingly, recent research has examined how multiple indicators of social media use combine to predict depression and anxiety (Hébert-Ratté & Poulin, 2019; Shensa et al., 2018). Shensa and colleagues used cluster analysis to classify participants according to their scores on five indicators of social media use: frequency, time, number of platforms, intensity (daily integration), and problematic social media use. They identified five groups of participants who exhibited distinct *social media use profiles*: *Unplugged* (low scores on all indicators), *Concentrated Dabblers* (moderate time and frequency, few platforms, and little problematic use), *Diffuse Dabblers* (low time and frequency, many platforms, and little problematic use), *Connected* (high scores on all indicators except problematic use), and *Wired* (high scores on all indicators). The *Wired* group reported the highest levels of depression and anxiety symptoms, even though *Connected* participants reported higher levels of time, frequency, intensity, and multiple platform use. This finding suggests that differences in depression and anxiety experienced by these two profile groups were largely determined by their coinciding levels of problematic use.

Although Shensa and colleagues' (2018) results are valuable, their methodology had two characteristics that could be improved — they dichotomised the clustering variables, and they did not include variables that assessed the valence of interactions with other users or emotions experienced while visiting social media platforms. These omissions are noteworthy because they may represent important components of an individual's social media use profile that may influence the likelihood and extent of their depressive or anxious responses. Social media provide fertile ground for social comparison, as posts apparently offer insights into the lives of others. However, individuals often present themselves unrealistically or overly positively on social media (Zheng et al., 2020), which may lead users to erroneously conclude that their own lives are unsuccessful in comparison (Vogel et al., 2014). A network analysis recently determined that such upward social comparisons play a bridging role between frequency of social media use and symptoms of anxiety, depression, and stress (Faelens et al., 2019).

Warrender and Milne (2020) recently applied Williams and Garland's (2002) five systems cognitive-behavioural therapy model to explain how mental health problems are initiated and maintained through interactions between looking at social media (comparing self with others) and thoughts (e.g., other people are better than me), feelings (e.g., envy), behaviours (e.g., spending time on social media, problematic use), and physical sensations (e.g., sleeplessness). From a psycho-behavioural perspective, the five systems model suggests that clustering variables should not only assess time, frequency, and problematic use, but also variables that assess the valence of emotional responses to social media and interactions with other users.

Emotional responses to social media

Individuals can experience a wide range of emotions when visiting social media platforms (Kafetsios et al., 2017) that may influence their mental health. Responses to social media are known to vary from positive emotions, such as happiness, calmness, and relaxation (Lin & Utz, 2015; Panger, 2018), to negative emotions, such as envy, sadness, and anger (Fahey et al., 2018; Lin & Utz, 2015). Some negative contrastive emotions (e.g., envy, contempt) or downward assimilative emotions (e.g., worry/fear) may arise in response to undesirable self-assessments that follow social comparisons with other users (Park & Baek, 2018).

Another powerful and specific negative emotional response to social media is the fear of missing out (FoMO), which refers to a preoccupation with maintaining connections with others to avoid missing out on rewarding social information (Przybylski et al., 2013). A recent meta-analysis found a moderate mean relationship between FoMO and social media use in a large pooled sample, and a strong relationship with problematic use (Fioravanti et al., 2021). People with high FoMO may develop excessive or compulsive patterns of social media use to satisfy their need to belong to a social community (Beyens et al., 2016) and/or to relate to others (Przybylski et al., 2013). Negative emotional responses to social media, including FoMO, are known predictors of depression and generalised anxiety (Baker et al., 2016; Liu & Ma, 2020; Settanni & Marengo, 2015; Tandoc et al., 2015).

Interactions with other users

The perceived valence of interactions with other social media users may also have a deleterious effect on a user's mental health. Several studies have highlighted beneficial effects of social media interactions on mental health. For example, the intensity of positive social feedback on Facebook has been associated with higher levels of happiness and self-esteem (Marengo et al., 2021); receiving Likes on self-photographs has been found to increase users' self-esteem (Burrow & Rainone, 2017); and feeling social connection on Facebook has been linked with greater life satisfaction (Grieve et al., 2013).

However, not all online interactions are positive. For example, so-called "trolls" deliberately post hateful and outrageous comments to disrupt discussions (Craker & March 2016), "cyberbullies" aim to inflict harm on another user (Runions et al., 2017), and generally non-malicious users may occasionally engage in online blaming (Whiting et al., 2019), mild forms of incivility or sarcasm (Anderson & Huntington, 2017), or share upsetting details of difficult life experiences (Naveed et al., 2011). Negative interactions with other users have been related to higher levels of depression and/or anxiety (Davila et al., 2012; Primack, Bisbey, et al., 2018, pp. 155–176; Vidushi et al., 2020; Worsley et al., 2017). Furthermore, due to the public nature of social media, users who merely witness an unpleasant exchange may also experience increased depression and anxiety (Doumas & Midgett; Wright et al., 2018).

Self-compassion as a potential moderator

Inconsistent relationships between single indicators of social media use and depression and anxiety may also be partly explained by moderator variables. To date, several moderators have been identified, including individual differences such as optimism (Liu et al., 2017),

empathy (Wright et al., 2018), and rumination (Davila et al., 2012). No previous study has investigated moderators of the effects of *social media use profiles* (i.e., combinations of social media use indicators) on mental health. However, self-compassion may provide such a buffer.

Self-compassion is a positive self-attitude that helps individuals navigate difficult life experiences (Neff, 2003b). According to Neff (2003a), it involves providing oneself with self-kindness and understanding rather than harsh self-criticism; recognizing that suffering connects us with other people rather than isolating us; and being mindfully aware of our suffering with balance rather than over-identification. Individuals with high levels of self-compassion consistently report relatively low levels of depression and anxiety (MacBeth & Gumley, 2012; Marsh et al., 2018), and self-compassion interventions have indicated that these effects may be causal (Wilson et al., 2019).

Self-compassion is known to perform a self-regulatory function, by facilitating emotion regulation (Krieger et al., 2013) and buffering the effects of stressful experiences, maladaptive beliefs, and negative self-related cognitions on adverse mental health outcomes, including depression and anxiety (Lathren et al., 2019; Phillips et al., 2018; Podina et al., 2015). In this way, self-compassion may increase self-acceptance in users who think their lives are dull or unsuccessful compared to the shiny lives that are often depicted in other users' posts, and it may relieve negative emotional responses to these comparisons or to other challenging or upsetting posts. It may also help to overcome social media addiction, as self-compassion interventions have successfully decreased symptoms of substance addiction (Held et al., 2018).

Very few studies have examined the relationship between social media use and self-compassion, and most have focused on body image. These studies have found that highly self-compassionate social media users are less likely to compare their appearance to other users (Modica, 2019) or to digitally manipulate selfies before posting them, and they put less effort into choosing which selfie to post (Lonergan et al., 2019). However, non-significant relationships have been found between self-compassion and intensity of use, photo-related activity (Modica, 2019), and talking about the body on social media (Wang et al., 2020). These researchers (i.e., Lonergan et al., 2019; Modica, 2019; Wang et al., 2020) found that self-compassion did not moderate most relationships between body-related online activity and body-related outcomes (e.g., body surveillance). However, Wang and colleagues found that the positive association between online body talk and body shame (a negative emotion) was not evident among participants with high self-compassion.

To date, self-compassion has not been examined as a potential moderator of relationships between social media use and depression and anxiety. However, the theorised function of self-compassion and relevant empirical evidence suggest that self-compassion may moderate the predictive effects of *social media use profiles* on these two outcomes.

Aims and hypotheses

Evaluating a single indicator of social media use in isolation may be misleading because the experience includes emotional, cognitive, and behavioural facets (Shensa et al., 2018; Warrender & Milne, 2020). Identifying how multiple indicators of social media use tend to combine within individuals may facilitate a more complete understanding of the associations between social media use and anxiety and depression. The current study extended research by Shensa et al. (2018) in two main ways. First, we identified social media use profiles based on a wider range of social mediator use indicators. Informed by the five systems model (Warrender & Milne, 2020), our profiling variables were frequency of social media use, time spent on social media, problematic social media use, perception of social media interactions, emotional responses to social media, and FoMO. Second, we conducted exploratory analyses to identify bivariate relationships between self-compassion and these six indicators of social media use. Finally, we determined whether self-compassion moderates relationships between social media profile membership and depression and anxiety. We hypothesised that:

1. A cluster analysis would identify groups of participants that share similar patterns of social media thoughts, feelings, and behaviours, thereby exhibiting distinct *social media user profiles.*
2. At least one *social media user profile* group would report significantly higher levels of anxiety and depression symptoms than other profile groups, and exhibit relatively frequent social media use, more time on social media, more problematic social media use, higher levels of FoMO, negative perceptions of social media interactions, and/or negative emotional responses to social media.
3. Self-compassion would moderate relationships between s*ocial media use profile* membership and anxiety and depression symptoms, where positive mean relationships exhibited by the most vulnerable social media group(s) would be evident at low but not high levels of self-compassion (relative to other groups).

Our overriding aim was to gather information that may guide recommendations for healthy social media usage and facilitate the design of effective intervention strategies for vulnerable users.

Method

Participants

Three hundred Australian undergraduate students (77.3% female) who used social media participated in the study. As the university has a large mature-aged cohort, participants' ages ranged from 18 to 71 years ($M = 34.7$, $SD = 10.8$). Students took part in order to receive course credits or points toward a university award for engaging in social and community activities. Previous clustering research suggested that up to six clusters would emerge from the cluster analysis (e.g., Shensa et al., 2018), so we conducted an a-priori power analysis based on six groups. The analysis indicated that 270 participants were needed to achieve 90% power to detect medium sized group differences at $\alpha = .05$. While there are no formal rules regarding sample size for cluster analysis, a post-hoc power analysis confirmed that our sample also exceeded the minimum sample size of $5*d^2$ suggested by (Qui & Joe, 2009), where d represents the number of clusters.

Procedures

Data collection took place between April and July of 2020 after gaining ethics approval. Participants responded to invitations posted on a first-year psychology teaching platform and a university Facebook page (accessible only to students) by clicking a survey link (Qualtrics, 2020). An information sheet described the study and advised students that participation was voluntary and anonymous. After giving their informed consent, they provided demographic information and answered questions about their social media usage. Participants then completed several measures that were presented in randomised order across participants. The survey took approximately 20-min to complete.

Measures

Frequency of social media use

Participants estimated how often they visit each of five platforms (Facebook, Instagram, Snapchat, Twitter, and Other). The Other item allowed participants to nominate another platform and indicate how often they check it. Response options were: *I don't use this platform, Less than once a week, 1–2 days a week, 3–4 days a week, About once a day, 2–4 times a day,* and *5 or more times a day.* Total scores were calculated by summing responses, using the midpoints of most response options (0, 0.5, 1.5, 3.5, 7, 21) and 49 for the highest option. Scores could range from 0 to 245.

Time spent on social media

Participants reported how much *time* (in minutes) per day they spent on each of five platforms (Facebook, Instagram, Snapchat, Twitter, and Other). The Other item allowed participants to indicate time spent on another nominated platform. Response options were: *less than 10 min, 10–30 min, 30–60 min, 61–120 min,* and *more than 120 min.* Total scores were calculated by summing all responses, using the midpoints of most response options (5, 20, 45, 90) and 120 for the highest option. Scores could range from 5 to 600.

Problematic Social Media Use

The six-item Bergen Social Media Addiction Scale (Andreassen et al., 2012) asked participants to rate the frequency of several symptoms of addiction (e.g., "… felt an urge to use social media more") when using social media on a five-point Likert scale from 1) *very rarely* to 5) *very often*. Item scores were averaged to create variable scores (α = .86).

Perceptions of social media interactions

Participants rated the average valence of their interactions with users on each of five platforms (Facebook, Instagram, Snapchat, Twitter, and Other). The Other item allowed participants to nominate and provide ratings for another platform. Response options ranged from 1) *extremely negative* to 5) *extremely positive*. Total scores were calculated by averaging item scores across platforms. The number of items in this scale varied from one to five depending on the number of platforms used by each participant. This variation prevented us from calculating internal consistency of this variable.

Fear of missing out

The Fear of Missing Out scale (FoMO; Przybylski et al., 2013) measured the frequency of participants' FoMO experiences while using social media. They rated four experiences (e.g., "I fear my friends have more rewarding experiences than me") on a five-point Likert Scale from 1) *less than once a week* to 5) *multiple times per day*. Item scores were averaged to create variable scores (α = .86).

Emotional responses to social media

A modified version of the Core Affect Scale (Västfjäll et al., 2002) presented 14 bipolar adjective pairs (e.g., sad-glad, tense-serene). We modified the original 12 item scale by applying it to social media and adding two adjective pairs (agitated-soothed and envious-grateful) in recognition of their known relationships with social media use. Participants were asked to indicate the degree to which each adjective pair described how they typically feel when using social media on all platforms on a scale from 1) *the negative adjective in the pair* to 10) *the positive adjective in the pair*. Item scores were averaged to create the final variable (α = .93).

Depression and anxiety

Two 7-item subscales of the Depression Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) measured symptoms of depression (DASS-D) and anxiety (DASS-A). Participants indicated how often they feel symptoms of anxiety (e.g., "I was worried about situations in which I might panic and make a fool of myself") and depression (e.g., "I couldn't seem to experience any positive feeling at all") on a scale ranging from 0) *never* to 3) *almost always*. Item scores were summed to created total scores with a possible range of zero to 21 (DASS-D, α = .93; DASS-A, α = .89).

Self-compassion

The short form of the Self-Compassion Scale (SCS-SF; Breines & Chen, 2012) assessed levels of *self-compassion*. Participants indicated how often they exhibit 12 self-compassionate behaviours (e.g., "When I am going through a very hard time, I give myself the caring and tenderness I need") on a scale ranging from 1) *never* to 5) *always*. Item scores were averaged to create total scores (α = .86).

Analysis strategy

Social media use profiles were identified by performing a two-step cluster analysis on six variables that represented indicators of social media use: time spent on social media, frequency of social media use, problematic social media use, perception of social media interactions, emotional responses to social media use, and FoMO. The variables were standardised for the cluster analysis. The categorical variable resulting from the cluster analysis was then used as the independent variable in subsequent analyses. ANOVAs and post hoc tests detected significant differences on key variables between the profile groups. Moderated multiple regression analyses then examined whether self-compassion moderated the relationships between *social media use profiles* and depression and anxiety.

Results

Data screening and assumption testing

A total of 326 respondents began the survey. Of these, 26 cases were excluded because they were incomplete (22) or represented multivariate outliers (4). This left a final sample of 300. The homogeneity of variance assumption was violated for the ANOVAs that assessed group differences in time spent, frequency of use, problematic use, perception of interactions, FoMO, anxiety, and depression, so we used the more robust Welch test for these analyses. There were no missing values and all other assumptions of cluster analysis, ANOVA, and multiple regression were met.

Descriptive information

Most participants used Facebook (94.0%) and Instagram (74.0%), with fewer using Snapchat (26.7%) and Twitter (22.3%). Many participants (86.6%) also used another social media platform (e.g., LinkedIn, Reddit, Whatsapp). Lovibond and Lovibond's (1995) DASS cut-offs indicate that a majority of participants (60.0%) reported normal levels of anxiety, and other participants reported mild (7.3%), moderate (19.7%), severe (3.3%), or extremely severe (9.7%) anxiety. Similarly, over half reported normal (56.0%) levels of depression, and fewer participants reported mild (16.3%), moderate (13.0%), severe (4.3%), or extremely severe (10.3%) depression.

Bivariate relationships

As shown in Table 1, all six indicators of social media use were significantly correlated with anxiety, depression, and self-compassion. Anxiety and depression were associated with more time on social media, more frequent visits to social media platforms, more problematic use, and more FoMO, and with more negative online interactions and emotional responses to social media. In contrast, self-compassion was associated with less time on social media, fewer visits to social media platforms, less problematic use, less FoMO, and with more positive online interactions and emotional responses.

Cluster analysis

A two-step log-likelihood cluster analysis was conducted in SPSS 26 (IBM Corp., 2019) to classify participants according to their scores on the six social media use variables. Schwarz's Bayesian Criterion (BIC) was used to examine two to 15 cluster solutions. The analysis identified four clusters in the sample that exhibited the largest ratio of distance measures (1.83), an acceptable Silhouette statistic (0.30), and an excellent ratio of largest to smallest cluster (1.71). The four-cluster solution was also highly interpretable. Participants were classified into four social media use clusters and a categorical variable was created that represented cluster membership.

Table 1
Correlations between key variables and anxiety, depression, and self-compassion.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Age		.09	-.34***	-.44***	-.22***	.02	.13*	-.30***	-.33***	-.17**	.22***
2. Gender			-.09	-.07	-.08	-.16**	.03	-.11	-.13*	-.04	.11
3. Time				.69***	.45***	.14*	-.01	.33***	.26***	.25***	-.22***
4. Frequency					.44***	.15*	-.04	.35***	.25***	.19**	-.21***
5. Problematic Use						.01	-.13*	.42***	.28***	.37***	-.40***
6. Interactions							.39***	-.08	-.12*	-.23***	.15**
7. Emotion								-.21***	-.35***	-.44***	.40***
8. FoMO									.43***	.44***	-.42***
9. Anxiety										.71***	-.51***
10. Depression											-.60***
11. Self-Compassion											

Note: $N = 300$. Pearson's correlations except for correlations with gender which are point-biserial. Gender, male = 1, female = 2.
* $p < .05$, ** $p < .01$, *** $p < .001$ (2-tailed).

The four groups of participants exhibited distinct patterns of social media use behaviours, emotions, and perception (see Fig. 1 and Table 2). *Problem Users* (52 participants) reported the highest mean levels of time, frequency, problematic use, and FoMO, along with relatively negative emotional responses to using social media. On average, members of this group were younger than the other groups and comprised more females than statistically expected. *Disenchanted Dabblers* (86 participants) exhibited relatively low levels of time, frequency, and problematic use, relatively negative emotional responses and negative perceptions of interactions. This group also comprised significantly more females than expected. *Moderate Users* (89 participants) tended to use social media in moderation (although more often than the sample average) and demonstrated positive emotional responses and perceptions of interactions. *Contented Dabblers* (73 participants) reported low levels of time, frequency, problematic use, and FoMO, but reported relatively positive emotional responses and perceptions of interactions. Members of this group were, on average, older than the other groups.

Group differences on Depression, Anxiety, and self-compassion

One-way ANOVAs found that the four profile groups differed in anxiety, depression and self-compassion (see Table 2). Tukey HSD post-hoc comparisons revealed that *Problem Users* reported significantly higher mean levels of anxiety and depression than the other three groups. *Disenchanted Dabblers* reported less depression and anxiety than *Problem Users*, but more than *Contented Dabblers. Moderate Users* reported less depression and anxiety than *Problem Users* but did not differ from the other two groups. Finally, *Contented Dabblers* exhibited the lowest levels of anxiety and depression that differed from *Problem Users* and *Disenchanted Dabblers*. Effect sizes of these two ANOVAs were significantly larger than the combined bivariate correlations between the six single indicators of social media use and anxiety and depression, Fisher's Z*r* (300) = .47 > .33, $p = .04$; depression, Fisher's Z*r* (300) = .44 > .29, $p = .03$.

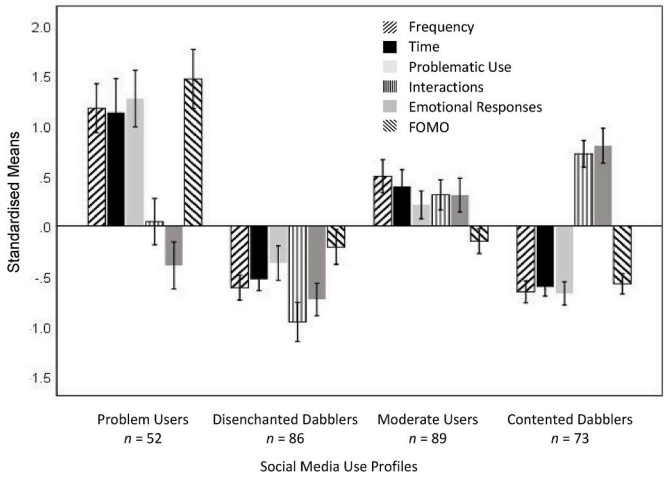

Fig. 1. Social media use indicators across the social media profile groups.
Note: Error bars: 95% CI.

The self-compassion ANOVA indicated that *Problem Users* reported lower levels of self-compassion than the other three profiles, and *Contented Dabblers* displayed higher levels of self-compassion than the other three profiles. *Disenchanted Dabblers* and *Moderate Users* reported similar mean levels of self-compassion.

Moderated multiple regressions

Two moderated multiple regression analyses were conducted using PROCESS (Hayes, 2017) to investigate whether self-compassion moderates the relationship between *social media use profiles* and anxiety and depression. To evaluate the predictive effects of the social media groups, we instructed PROCESS to create dummy variables using indicator coding. The dummy variables compared the *Problem Users* group (coded 0) with the *Disenchanted Dabblers* (D1), *Moderate Users* (D2) and *Contented Dabblers* (D3) groups (all coded 1). The *Problem Users* group was set as the focus group for comparison, because the ANOVA indicated that this group reported the highest levels of anxiety and depression symptoms. We instructed PROCESS to create interaction terms by calculating the product of each dummy variable and the SCS-SF variable (centred).

Anxiety

The regression model explained a significant 32% of the variance in anxiety symptoms, F (7,292) = 19.43, $p < .001$ (see Table 3). A significant negative main effect of SCS-SF indicated that lower levels of self-compassion were associated with higher levels of anxiety. Significant main effects of the D1, D2 and D3 variables confirmed that *Problem Users* tended to report higher levels of anxiety than *Discontented Dabblers*, *Moderate Users* and *Contented Dabblers*, even after controlling for the SCS-SF and the interaction terms. The interaction between D2 and SCS-SF was significant, indicating that the relationship between D2 and anxiety varied as a function of self-compassion.

Inspection of the simple slopes revealed that D2 was associated with anxiety at low levels of self-compassion ($B = -2.65$, $p < .001$, 95% CI [-3.80, −1.50]) but not at high levels of self-compassion ($B = -0.35$, $p = .73$, 95% CI [–2.34, 1.63]). As hypothesised, this interaction indicated that *Problem Users* were more likely to report higher levels of anxiety than *Moderate Users* if they possessed low levels of self-compassion but not if they were high in self-compassion (see Fig. 2).

Depression

The moderated regression model explained 41% of the variance in depression, F (7, 292) = 28.95, $p < .001$ (see Table 3). A significant negative main effect of SCS-SF indicated that lower levels of self-

Table 2
Means and group differences.

Variables	Whole Sample (N = 300)		Problem Users (n = 52)		Disenchanted Dabblers (n = 86)		Moderate Users (n = 89)		Contented Dabblers (n = 73)		Group Differences	
	n		n	Resid	n	Resid	n	Resid	n	Resid	χ^2	
Males	68		6^{b}	−2.1	26^{a}	2.0	21^{ab}	0.20	15^{ab}	0.50	6.71	
Females	232		46^{b}	2.1	60^{a}	−2.0	68^{ab}	−0.20	58^{ab}	−0.50		
	M	SD	M	SD	M	SD	M	SD	M	SD	F	η^2
Age	34.90	11.19	27.45^{c}	7.65	36.57^{b}	11.65	33.15^{b}	10.14	40.36^{a}	10.71	17.27	.53
Time FB	86.33	69.06	163.94^{a}	83.80	48.55^{c}	36.60	112.75^{b}	55.07	43.36^{c}	27.42	65.04	.44
Frequency FB	53.36	38.02	97.72^{a}	33.56	29.27^{c}	22.16	71.75^{b}	30.08	27.73^{c}	17.90	100.80	.53
Problematic use	2.12	0.86	3.21^{a}	0.88	1.79^{c}	0.70	2.29^{b}	0.57	1.53^{c}	0.43	70.54	.45
Perception	5.65	1.09	5.69^{b}	0.90	4.60^{c}	0.99	5.98^{b}	0.78	6.43^{a}	0.62	67.39	.42
Emotional response	5.71	1.50	5.10^{c}	1.28	4.58^{c}	1.16	6.17^{b}	1.22	6.92^{a}	1.13	59.45	.38
FoMO	1.72	0.80	2.89^{a}	0.85	1.54^{b}	0.65	1.59^{b}	0.47	1.25^{c}	0.35	59.20	.47
Anxiety	8.07	3.16	10.67^{a}	3.82	8.05^{b}	3.05	7.64^{bc}	2.34	6.75^{c}	2.55	14.08	.17
Depression	9.03	3.92	12.27^{a}	4.75	9.41^{b}	4.09	8.27^{bc}	2.80	7.17^{c}	2.57	18.70	.19
Self-Compassion	3.04	0.71	2.47^{c}	0.56	2.93^{b}	0.68	3.09^{b}	0.62	3.52^{a}	0.60	30.05	.23

Notes: N = 300. All F tests are significant at p < .001. ^ Welch statistic is reported. Group means with different superscripts (in rows) are significantly different at p < .05. Resid = Adjusted Standardised Residual where < or > 1.98 indicates that gender distributions differ from expectation at p < .05.

Table 3
Moderated regression analyses predicting anxiety and depression symptoms.

	Anxiety					Depression				
Predictor	B	SE	p	LLCI	ULCI	B	SE	p	LLCI	ULCI
D1	−1.41	0.60	.02	−2.59	−0.22	−0.67	0.70	.34	−2.03	0.70
D2	−1.49	0.60	.01	−2.67	−0.31	−1.34	0.69	.05	−2.69	0.02
D3	−1.55	0.66	.019	−2.85	−0.26	−1.44	0.76	.06	−2.94	0.06
SCS	−2.57	0.66	<.001	−3.86	−1.28	−4.44	0.76	<.001	−5.93	−2.95
D1 x SCS	0.19	0.78	.81	−1.34	1.72	1.18	0.90	.19	−0.59	2.95
D2 x SCS	1.60	0.80	.04	0.04	3.18	2.39	0.92	.01	0.57	4.20
D3 x SCS	0.72	0.83	.39	−0.92	2.36	2.13	0.96	.03	0.23	4.03
Model	F (7, 292) = 19.43, R^2 = .32, p < .001					F (7, 292) = 28.95, R^2 = .41, p < .001				

Notes: N = 300. D1 = differences between Problem Users (coded 0) and Discontented Dabblers (coded 1); D2 = differences between Problem Users (0) and Moderate Users (1); D3 = differences between Problem Users (0) and Contented Dabblers (1); 95% CI.

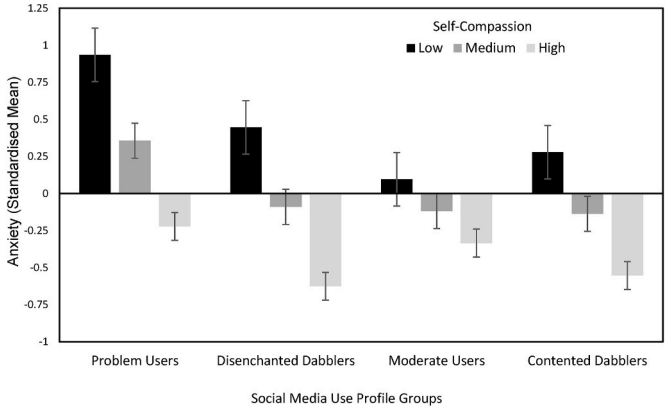

Fig. 2. Standardised effects of social media use profiles on anxiety at levels of self-compassion.
Note: Error bars: Standard Errors.

compassion were associated with higher levels of depression. Non-significant main effects of D1, D2, and D3 indicated that the relationship between *Problem Users* and DASS-D did not differ from relationships exhibited by *Discontented Dabblers, Moderate Users*, and *Contented Dabblers* after controlling for SCS-SF and the three interaction terms. However, significant interactions between SCS-SF and both D2 and D3 indicated that the relationships between these dummy variables and depression varied as a function of levels of self-compassion.

Inspection of the simple slopes revealed that D2 and D3 were associated with depression at low levels of self-compassion (D2: $B = -3.04$, $p < .001$, [95% CI -4.36, −1.71]; D3: $B = -2.96$, $p = .001$, 95% CI [-4.36, −1.71]) but not at high levels of self-compassion (D2: $B = 0.36$, $p = .76$, 95% CI [-1.93, 2.65]; D3: $B = 0.07$, $p = .95$, 95% CI [-2.15, 2.30]). As hypothesised, *Problem Users* were more likely to report higher levels of depression than *Moderate Users* and *Contented Dabblers* if they reported low levels of self-compassion but not if they were highly self-compassionate (see Fig. 3).

Discussion

This study identified four *social media use profiles* that comprised

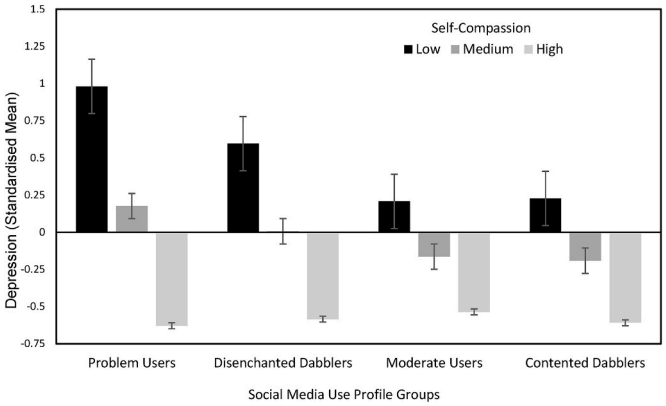

Fig. 3. Standardised Effects of Social Media Use Profiles on Depression at Levels of Self-Compassion.
Note: Error bars: Standard Errors.

distinct patterns of social media related thoughts, feelings, and behaviours in a sample of social media users. *Problem Users* spent the most time on social media, used it most often, and exhibited the highest levels of problematic use and FoMO. *Disenchanted Dabblers* tended to avoid social media, experienced negative emotions when using it, and tended to have negative interactions with other users, but exhibited relatively little problematic use. *Moderate Users* visited social media in moderation and tended to have positive online interactions and emotional responses to it, but had slightly elevated levels of problematic use. Finally, *Contented Dabblers* seldom used social media but experienced very positive online interactions and emotional responses, and very low levels of FoMO. Also as hypothesised, one group (*Problem Users*) reported significantly higher mean levels of anxiety and depression than the other three groups, and the relationships between membership of the *Problem Users* profile and anxiety and depression were buffered by self-compassion.

The current study extended previous work by Shensa et al. (2018), who identified five social media use clusters. Both studies included time, frequency, and problematic social media use as clustering variables, but the other clustering variables differed. Shensa and colleagues also included intensity (daily integration) and multiple platforms, whereas the current study added indicators that were informed by Warrender and Milne's (2020) application of the Five Systems Model (Williams & Garland, 2002). This model posits that comparing oneself to others on social media interacts with behaviours, thoughts, and feelings to predict mental health problems. We therefore included emotional responses to social media, fear of missing out (FoMO), and perceptions of interactions with other users as additional clustering variables. Accordingly, the two studies identified different profiles and associations with depression and anxiety. Two profiles found in the current study are similar to profiles found by Shensa et al.: our *Problem Users* and their *Wired* group endorsed high levels of time, frequency, problematic use, depression, and anxiety; and our *Contented Dabblers* and their *Unplugged* group reported low levels of these five variables.

Unlike Shensa et al. (2018), we found two profile groups that reported similarly low levels of time, frequency, and problematic use - *Disenchanted Dabblers* and *Contented Dabblers*. Although they shared these three attributes, they experienced significantly different levels of depression and anxiety. These divergent mental health outcomes may be attributed to their differing emotional responses to social media, online interactions, and levels of FoMO. Specifically, occasional social media users in this sample tended to report higher levels of anxiety and depression if they experienced relatively negative emotional responses, negative interactions, and higher levels of FoMO (*Disenchanted Dabblers*), but they reported lower levels of these mental health outcomes if they experienced less FoMO and more positive emotions and online interactions (*Contented Dabblers*). This finding suggests that occasional social media use interacts with emotional responses to social media and perceptions of online interactions to predict anxiety and depression. Such an interaction is consistent with the previous finding that levels of FoMO moderated direct and indirect associations (via social overload) between social media use and subjective wellbeing in a sample of Chinese adolescents, where the negative effects were more potent for participants with higher FoMO (Chai et al., 2019).

The identification of a *Problem Users* profile that exhibited extreme scores on all social media use indicators and experienced relative high levels of depression and anxiety is consistent with previous research that has examined single indicators of social media use. This body of research has indicated that anxiety and depression are associated with frequent or prolonged social media visits (Frost & Rickwood, 2017; Ivie et al., 2020; Seabrook et al., 2016; Yoon et al., 2019), high levels of problematic use (Elhai et al., 2017; Huang, 2020), negative emotional responses and FoMO (Baker et al., 2016; Liu & Ma, 2020; Settanni & Marengo, 2015; Tandoc et al., 2015), and negative perceptions of interactions with others users (Davila et al., 2012; Primack, Bisbey, et al., 2018; Vidushi et al., 2020; Worsley et al., 2017). The current results extend research knowledge by revealing that these six indicators can coincide and interact within individuals to strongly predict depression and anxiety.

Self-compassion and social media use

Little research to date has examined the relationship between social media use and self-compassion (i.e., Lonergan et al., 2019; Modica, 2019; Wang et al., 2020). It is therefore noteworthy that self-compassion was significantly correlated with all six indicators of social media use examined in this study. Compared to participants with low self-compassion, highly self-compassionate participants spent less time on social media, visited platforms less frequency, reported less problematic use and FoMO, and had more positive perceptions of online interactions and emotional responses to social media.

Importantly, subsequent moderated multiple regression analyses indicated that levels of self-compassion possessed by social media users buffered the predictive effects of membership of the *Problem Users* group on depression and anxiety. *Problem Users* reported higher levels of anxiety than *Moderate Users* and higher levels of depression than *Moderate Users* and *Contented Dabblers* if they possessed low levels of self-compassion but not if they were highly self-compassionate. Self-compassion therefore provided a protective buffer for these vulnerable users. This finding is consistent with its conceptualisation as a positive self-attitude that performs a self-regulatory function when facing difficult life experiences (Neff, 2003b). For example, when confronted with personal weaknesses, failures, and challenges, highly self-compassionate individuals typically respond with greater acceptance, perspective-taking, emotional regulation and coping skills, ability to pursue new and attainable goals, and capacity to make required life changes (Krieger et al., 2013; Leary et al., 2007; Neely et al., 2009; Neff et al., 2007). They are therefore better able to modulate their physiological and subjective responses to social threat (Arch et al., 2014), and to recover quickly from social stressors (Arch et al., 2018).

Implications

Regarding recommendations for healthy patterns of social media use, our results generally support the REAL communication model of social media use (Primack, Shensa, et al., 2018), which advocates avoidance of negative online social interactions, engaging with social media in a balanced manner, focusing attention on real-life contacts, and limiting social media time, frequency, and number of platforms. However, we found that negative online interactions and emotional responses to social media (including FoMO) may place occasional social media users at increased risk of anxiety and depression. This finding suggests that recommendations for healthy social media use should place greater emphasis on social media interactions and emotions than on time and frequency.

Our finding that self-compassion moderated the predictive effects of patterns of problem use on depression and anxiety suggests that the adverse outcomes experienced by *Problem Users* may be ameliorated by training programs that increase levels of self-compassion. Arguably, the most prominent self-compassion training programs are Compassion-Focused Therapy (Gilbert, 2009) and Mindful Self-Compassion (Neff & Germer, 2013), which use exercises drawn from real-life difficult situations to teach participants how to give themselves encouragement, support, self-acceptance and warmth; rather than harsh self-criticism and punishment.

Limitations and future directions

Limitations of this study should be considered when interpreting its results. First, the cross-sectional and correlational nature of this study does not provide evidence to support causation. Confirmatory experimental studies are required to allow the drawing of causal inferences, which would then support the use of self-compassion training as a

remediation strategy. Second, use of a student sample precludes generalisation of the results to other populations. Therefore, the current investigations should be conducted in other population samples to confirm the applicability of the findings; including samples of clinically anxious and depressed individuals. Future research could also explore whether the observed moderating influence of self-compassion on the mental health effects of *Problem Users* differs between genders, given the greater representation of women in that profile group.

Third, while estimates of social media use obtained from self-report measures are, on average, moderately associated with logged measures of social media use, it is probable that our use of self-report measures resulted in under- or over-estimates of time and frequency of social media use (Ernala et al., 2020; Parry et al., 2021), that in turn influenced reported levels of depression and anxiety (Sewall et al., 2020). Future researchers could improve the accuracy of their social media use variables by using a methodology that accommodates electronic collection of usage data. Using a continuous variable to assess time spent on social media may also return more accurate results. Fourth, it may be worthwhile to include *physical sensations* as an additional social media use indicator, as suggested by the Five Systems Model (Warrender & Milne, 2020; Williams & Garland, 2002). Finally, this study did not control for the possible contributions of the COVID-19 pandemic to social media behaviours and levels of anxiety and depression symptoms.

Conclusion

Most research into social media use, anxiety, and depression has been limited by the use of single measures of social media use, such as time spent, frequency, and problematic use. This study broadened the scope of social media use to include *co-occurring* levels of six behavioural, emotional, and perception-based variables. It identified four *social media use profiles* (*Problem Users, Disenchanted Dabblers, Moderate Users,* and *Contented Dabblers*) who shared similar patterns of scores across the six indicators. *Problem Users* reported the highest levels of depression and anxiety. However, the extent of depression and anxiety experienced by occasional social media users depended on the valence of co-occurring emotional responses, FoMO, and perceptions of interactions with other users. Thus, these results may inform the development of recommendations for healthy use. Self-compassion was found to buffer levels of depression and anxiety experienced by *problem users*. Thus, self-compassion training may ameliorate these two adverse consequences of this problematic pattern of use.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Anderson, A. A., & Huntington, H. E. (2017). Social media, science, and attack discourse: How Twitter discussions of climate change use sarcasm and incivility. *Science Communication, 39*, 598–620. https://doi.org/10.1177/1075547017735113.

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports, 110*, 501–517. https://doi.org/10.2466/02.09.18.Pr0.110.2.501-517.

Arch, J. J., Brown, K. W., Dean, D. J., Landy, L. N., Brown, K. D., & Laudenslager, M. L. (2014). Self-compassion training modulates alpha-amylase, heart rate variability, and subjective responses to social evaluative threat in women. *Psychoneuroendocrinology, 42*, 49–58. https://doi.org/10.1016/j.psyneuen.2013.12.018.

Arch, J. J., Landy, L. N., Schneider, R. L., Koban, L., & Andrews-Hanna, J. R. (2018). Self-compassion induction enhances recovery from social stressors: Comparing adults with social anxiety disorder and healthy controls. *Anxiety, Stress & Coping, 31*, 594–609. https://doi.org/10.1080/10615806.2018.1504033.

Baker, Z. G., Krieger, H., & LeRoy, A. S. (2016). Fear of missing out: Relationships with depression, mindfulness, and physical symptoms. *Translational Issues in Psychological Science, 2*, 275–282. https://doi.org/10.1037/tps0000075.

Beyens, I., Frison, E., & Eggermont, S. (2016). "I don't want to miss a thing": Adolescents' fear of missing out and its relationship to adolescents' social needs, Facebook use, and Facebook related stress. *Computers in Human Behavior, 64*, 1–8. https://doi.org/10.1016/j.chb.2016.05.083.

Breines, J. G., & Chen, S. (2012). Self-compassion increases self-improvement motivation. *Personality and Social Psychology Bulletin, 38*, 1133–1143. https://doi.org/10.1177/0146167212445599.

Burrow, A. L., & Rainone, N. (2017). How many likes did I get?: Purpose moderates links between positive social media feedback and self-esteem. *Journal of Experimental Social Psychology, 69*, 232–236. https://doi.org/10.1016/j.jesp.2016.09.005.

Chai, H.-Y., Niu, G.-F., Lian, S.-L., Chu, X.-W., Liu, S., & Sun, X.-J. (2019). Why social network site use fails to promote well-being? The roles of social overload and fear of missing out. *Computers in Human Behavior, 100*, 85–92. https://doi.org/10.1016/j.chb.2019.05.005.

Craker, N., & March, E. (2016). The dark side of Facebook®: The Dark Tetrad, negative social potency, and trolling behaviours. *Personality and Individual Differences, 102*, 79–84. https://doi.org/10.1016/j.paid.2016.06.043.

Davila, J., Hershenberg, R., Feinstein, B. A., Gorman, K., Bhatia, V., & Starr, L. R. (2012). Frequency and quality of social networking among young adults: Associations with depressive symptoms, rumination, and corumination. *Psychology of Popular Media Culture, 1*, 72–86. https://doi.org/10.1037/a0027512.

Doumas, D. M., & Midgett, A. The association between witnessing cyberbullying and depressive symptoms and social anxiety among elementary school students. Psychology in the Schools, n/a. https://doi.org/10.1002/pits.22467.

Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders, 207*, 251–259. https://doi.org/10.1016/j.jad.2016.08.030.

Erfani, S. S., & Abedin, B. (2018). Impacts of the use of social network sites on users' psychological well-being: A systematic review. *Journal of the Association for Information Science and Technology, 69*, 900–912. https://doi.org/10.1002/asi.24015.

Ernala, S. K., Burke, M., Leavitt, A., & Ellison, N. B. (2020). How well do people report time spent on Facebook? An evaluation of established survey questions with recommendations. In *Proceedings of the 2020 CHI conference on human factors in computing systems* (pp. 1–14). https://doi.org/10.1145/3313831.3376435. Association for Computing Machinery.

Faelens, L., Hoorelbeke, K., Fried, E., Raedt, R., & Koster, E. (2019). Negative influences of Facebook use through the lens of network analysis. *Computers inHuman Behavior, 96*, 13–22. https://doi.org/10.1016/J.CHB.2019.02.002.

Fahey, R. A., Matsubayashi, T., & Ueda, M. (2018). Tracking the Werther Effect on social media: Emotional responses to prominent suicide deaths on twitter and subsequent increases in suicide. *Social Science & Medicine, 219*, 19–29. https://doi.org/10.1016/j.socscimed.2018.10.004.

Fioravanti, G., Casale, S., Benucci, S. B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. *Computers in Human Behavior, 122*, Article 106839. https://doi.org/10.1016/j.chb.2021.106839.

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.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15*, 199–208. https://doi.org/10.1192/apt.bp.107.005264.

Grieve, R., Indian, M., Witteveen, K., Anne Tolan, G., & Marrington, J. (2013). Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behavior, 29*, 604–609. https://doi.org/10.1016/j.chb.2012.11.017.

Hayes, A. F. (2017). PROCESS (Version 3.0). https://www.processmacro.org.

Hébert-Ratté, R., & Poulin, F. (2019). Facebook user profiles, personality and well-being in early adulthood. *European Review of Applied Psychology, 69*, Article 100478. https://doi.org/10.1016/j.erap.2019.100478.

Held, P., Owens, G. P., Thomas, E. A., White, B. A., & Anderson, S. E. (2018). A pilot study of brief self-compassion training with individuals in substance use disorder treatment. *Traumatology, 24*, 219–227. https://doi.org/10.1037/trm0000146.

Helliwell, J. F., & Huang, H. (2013). Comparing the happiness effects of real and on-line friends. *PloS One, 8*. https://doi.org/10.1371/journal.pone.0072754. e72754-e72754.

Huang, C. (2020). A meta-analysis of the problematic social media use and mental health. *International Journal of Social Psychiatry*. https://doi.org/10.1177/0020764020978434, 0.

IBM Corp. (2019). *IBM SPSS statistics for windows, version 26.0*. Armonk, NY: IBM Corp.

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.

James, S. L., Abate, D., Abate, K. H., Abay, S. M., Abbafati, C., Abbasi, N., & Murray, C. J. L. (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: A systematic analysis for the global burden of disease study 2017. *The Lancet, 392*, 1789–1858. https://doi.org/10.1016/S0140-6736(18)32279-7.

Kafetsios, K., Chatzakou, D., Tsigilis, N., & Vakali, A. (2017). Experience of emotion in face to face and computer-mediated social interactions: An event sampling study. *Computers in Human Behavior, 76*, 287–293. https://doi.org/10.1016/j.chb.2017.07.033.

Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth, 25*, 79–93. https://doi.org/10.1080/02673843.2019.1590851.

Kemp, S. (2020). *Social media insights: Using social media data to make sense of broader ICT trends. Digital 2020: October Global Statshot Report*. Retrieved 17 December 2020, from https://datareportal.com/reports/digital-2020-october-global-statshot.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). *Internet paradox: A social technology that reduces social involvement and psychological well-being?*. https://doi.org/10.1037/0003-066X.53.9.1017.

Krieger, T., Altenstein, D., Baettig, I., Doerig, N., & Holtforth, M. G. (2013). Self-compassion in depression: Associations with depressive symptoms, rumination, and avoidance in depressed outpatients. *Behavior Therapy, 44*, 501–513. https://doi.org/10.1016/j.beth.2013.04.004.

Lathren, C., Bluth, K., & Park, J. (2019). Adolescent self-compassion moderates the relationship between perceived stress and internalizing symptoms. *Personality and Individual Differences, 143*, 36–41. https://doi.org/10.1016/j.paid.2019.02.008.

Leary, M. R., Tate, E. B., Adams, C. E., Allen, A. B., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: The implications of treating oneself kindly. *Journal of Personality and Social Psychology, 92*, 887–904. https://doi.org/10.1037/0022-3514.92.5.887.

Lee, E. W. J., Ho, S. S., & Lwin, M. O. (2017). Explicating problematic social network sites use: A review of concepts, theoretical frameworks, and future directions for communication theorizing. *New Media & Society, 19*, 308–326. https://doi.org/10.1177/1461444816671891.

Lin, R., & Utz, S. (2015). The emotional responses of browsing Facebook: Happiness, envy, and the role of tie strength. *Computers in Human Behavior, 52*, 29–38. https://doi.org/10.1016/j.chb.2015.04.064.

Liu, D., Baumeister, R. F., Yang, C.-c., & Hu, B. (2019). Digital communication media use and psychological well-being: A meta-analysis. *Journal of Computer-Mediated Communication, 24*, 259–273. https://doi.org/10.1093/jcmc/zmz013.

Liu, C., & Ma, J. (2020). Social media addiction and burnout: The mediating roles of envy and social media use anxiety. *Current Psychology, 39*, 1883–1891. https://doi.org/10.1007/s12144-018-9998-0.

Liu, Q.-Q., Zhou, Z.-K., Yang, X.-J., Niu, G.-F., Tian, Y., & Fan, C.-Y. (2017). Upward social comparison on social network sites and depressive symptoms: A moderated mediation model of self-esteem and optimism. *Personality and Individual Differences, 113*, 223–228. https://doi.org/10.1016/j.paid.2017.03.037.

Lonergan, A. R., Bussey, K., Mond, J., Brown, O., Griffiths, S., Murray, S. B., & Mitchison, D. (2019). Me, my selfie, and I: The relationship between editing and posting selfies and body dissatisfaction in men and women. *Body Image, 28*, 39–43. https://doi.org/10.1016/j.bodyim.2018.12.001.

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

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review, 32*, 545–552. https://doi.org/10.1016/j.cpr.2012.06.003.

Manago, A. M., Taylor, T., & Greenfield, P. M. (2012). Me and my 400 friends: The anatomy of college students' Facebook networks, their communication patterns, and well-being. *Developmental Psychology, 48*, 369–380. https://doi.org/10.1037/a0026338.

Marengo, D., Montag, C., Sindermann, C., Elhai, J. D., & Settanni, M. (2021). Examining the links between active Facebook use, received likes, self-esteem and happiness: A study using objective social media data. *Telematics and Informatics, 58*, Article 101523. https://doi.org/10.1016/j.tele.2020.101523.

Marsh, I. C., Chan, S. W. Y., & MacBeth, A. (2018). Self-compassion and psychological distress in adolescents—a meta-analysis. *Mindfulness, 9*, 1011–1027. https://doi.org/10.1007/s12671-017-0850-7.

McDool, E., Powell, P., Roberts, J., & Taylor, K. B. (2016). *Social media use and children's wellbeing*. IZA Discussion Paper No. 10412 https://ssrn.com/abstract=2886783.

Modica, C. (2019). Facebook, body esteem, and body surveillance in adult women: The moderating role of self-compassion and appearance-contingent self-worth. *Body Image, 29*, 17–30. https://doi.org/10.1016/j.bodyim.2019.02.002.

Naveed, N., Gottron, T., Kunegis, J., & Alhadi, A. C. (2011). *Bad news travel fast: A content-based analysis of interestingness on twitter proceedings of the 3rd international web science conference*. https://doi.org/10.1145/2527031.2527052. Koblenz, Germany.

Neely, M. E., Schallert, D. L., Mohammed, S. S., Roberts, R. M., & Chen, Y. (2009). Self-kindness when facing stress: The role of self-compassion, goal regulation, and support in college students' well-being. *Motivation and Emotion, 33*, 88–97. https://doi.org/10.1007/s11031-008-9119-8.

Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223–250. https://doi.org/10.1080/15298860309027.

Neff, K. D. (2003b). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*, 85–101. https://doi.org/10.1080/15298860309032.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the Mindful Self-Compassion Program. *Journal of Clinical Psychology, 69*, 28–44. https://doi.org/10.1002/jclp.21923.

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*, 139–154. https://doi.org/10.1016/j.jrp.2006.03.004.

Ostic, D., Qalati, S. A., Barbosa, B., Shah, S. M. M., Galvan Vela, E., Herzallah, A. M., & Liu, F. (2021). Effects of social media use onpsychological well-being: A mediated model. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.678766, 678766-678766.

Panger, G. (2018). People tend to wind down, not up, when they browse social media. In *, Vol. 2. Proceedings of the ACM on human-computer interaction*. ACM, Article 133. https://doi.org/10.1145/3274402, 29.

Park, S. Y., & Baek, Y. M. (2018). Two faces of social comparison on Facebook: The interplay between social comparison orientation, emotions, and psychological well-being. *Computers in Human Behavior, 79*, 83–93. https://doi.org/10.1016/j.chb.2017.10.028.

Parry, D. A., Davidson, B. I., Sewall, C. J. R., Fisher, J. T., Mieczkowski, H., & Quintana, D. S. (2021). A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use. *Nature Human Behaviour*. https://doi.org/10.1038/s41562-021-01117-5.

Phillips, W. J., Hine, D. W., & Marks, A. D. G. (2018). Self-compassion moderates the predictive effects of implicit cognitions on subjective well-being. *Stress and Health, 34*, 143–151. https://doi.org/10.1002/smi.2773.

Podina, I., Jucan, A., & David, D. (2015). Self-compassion: A buffer in the pathway from maladaptive beliefs to depression. A exploratory study. *Journal of Evidence-Based Psychotherapies, 15*, 97–109. https://psycnet.apa.org/record/2015-15699-008.

Primack, B. A., Bisbey, M. A., Shensa, A., Bowman, N. D., Karim, S. A., Knight, J. M., & Sidani, J. E. (2018). The association between valence of social media experiences and depressive symptoms. *Depression and Anxiety, 35*, 784–794. https://doi.org/10.1002/da.22779.

Primack, B. A., Shensa, A., Sidani, J. E., Bowman, N., Knight, J., Karim, S. A., & Viera, C. G. E. (2018). Reducing risk for mental health conditions associated with social media use: Encouraging "real" communication. In J. Van Hook, S. M. McHale, & V. King (Eds.), *Families and technology*. Cham: Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-319-95540-7_9.

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior, 29*, 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014.

Qualtrics. (2020). *Qualtrics software*. Provo, Utah, USA https://www.qualtrics.com.

Qui, W., & Joe, H. (2009). Generation of random clusters with specified degree of separation. *Journal of Classification, 23*, 315–334. https://doi.org/10.1007/s00357-006-0018-y.

Runions, K. C., Bak, M., & Shaw, T. (2017). Disentangling functions of online aggression: The cyber-aggression typology questionnaire (CATQ). *Aggressive Behavior, 43*, 74–84. https://doi.org/10.1002/ab.21663.

Sagioglou, C., & Greitemeyer, T. (2014). Facebook's emotional consequences: Why Facebook causes a decrease in mood and why people still use it. *Computers in Human Behavior, 35*, 359–363. https://doi.org/10.1016/j.chb.2014.03.003.

Seabrook, E. M., Kern, M. L., & Rickard, N. S. (2016). Social networking sites, depression, and anxiety: A systematic review. *JMIR Mental Health, 3*, e50. https://doi.org/10.2196/mental.5842.

Settanni, M., & Marengo, D. (2015). Sharing feelings online: Studying emotional well-being via automated text analysis of Facebook posts. *Frontiers in Psychology, 6*. https://doi.org/10.3389/fpsyg.2015.01045.

Sewall, C. J. R., Bear, T. M., Merranko, J., & Rosen, D. (2020). How psychosocial well-being and usage amount predict inaccuracies in retrospective estimates of digital technology use. *Mobile Media & Communication, 8*, 379–399. https://doi.org/10.1177/2050157920902830.

Shensa, A., Sidani, J. E., Dew, M. A., Escobar-Viera, C. G., & Primack, B. A. (2018). Social media use and depression and anxiety symptoms: A cluster analysis. *American Journal of Health Behavior, 42*, 116–128. https://doi.org/10.5993/AJHB.42.2.11.

Tandoc, E. C., Ferrucci, P., & Duffy, M. (2015). Facebook use, envy, and depression among college students: Is facebooking depressing? *Computers in Human Behavior, 43*, 139–146. https://doi.org/10.1016/j.chb.2014.10.053.

Vahedi, Z., & Zannella, L. (2019). The association between self-reported depressive symptoms and the use of social networking sites (SNS): A meta-analysis. *Current Psychology*. https://doi.org/10.1007/s12144-019-0150-6.

Västfjäll, D., Friman, M., Gärling, T., & Kleiner, M. (2002). The measurement of core affect: A Swedish self-report measure derived from the affect circumplex. *Scandinavian Journal of Psychology, 43*, 19–31. https://doi.org/10.1111/1467-9450.00265.

Vidushi, V., G, G., & Snetageri, V. (2020). Trolling on social media sites and its correlation with teenage depression. *Journal of Evidence Based Medicine and Healthcare, 7*, 497–502. https://doi.org/10.18410/jebmh/2020/108.

Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-esteem. *Psychology of Popular Media Culture, 3*, 206–222. https://doi.org/10.1037/ppm0000047.

Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., & Murray, C. J. L. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: A systematic analysis for the global burden of disease study 2019. *The Lancet, 396*, 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9.

Wang, Y., Wang, X., Yang, J., Zeng, P., & Lei, L. (2020). Body talk on social networking sites, body surveillance, and body shame among young adults: The roles of self-compassion and gender. *Sex Roles, 82*, 731–742. https://doi.org/10.1007/s11199-019-01084-2.

Warrender, D., & Milne, R. (2020). Social media, social comparison and mental health. *Nursing Times, 116*, 58–61. https://www.nursingtimes.net/digital-edition/nursing-times-march-2020/.

Whiting, J. B. P., Olufuwote, R. D. P., Cravens-Pickens, J. D. P., & Witting, A. B. P. (2019). Online blaming and intimate partner violence: A content analysis of social media comments. *Qualitative Report, 24*, 78–94.

Williams, C., & Garland, A. (2002). A cognitive–behavioural therapy assessment model for use in everyday clinical practice. *Advances in Psychiatric Treatment, 8*, 172–179. https://doi.org/10.1192/apt.8.3.172.

Wilson, A. C., Mackintosh, K., Power, K., & Chan, S. W. Y. (2019). Effectiveness of self-compassion related therapies: A systematic review and meta-analysis. *Mindfulness, 10*, 979–995. https://doi.org/10.1007/s12671-018-1037-6.

Worsley, J. D., Wheatcroft, J. M., Short, E., & Corcoran, R. (2017). Victims' voices: Understanding the emotional impact of cyberstalking and individuals' coping responses. *SAGE Open, 7*, 1–13. https://doi.org/10.1177/2158244017710292.

Wright, M. F., Wachs, S., & Harper, B. D. (2018). The moderation of empathy in the longitudinal association between witnessing cyberbullying, depression, and anxiety. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 12*. https://doi.org/10.5817/CP2018-4-6.

Yoon, S., Kleinman, M., Mertz, J., & Brannick, M. (2019). Is social network site usage related to depression? A meta-analysis of facebook–depression relations. *Journal of Affective Disorders, 248*, 65–72. https://doi.org/10.1016/j.jad.2019.01.026.

Zheng, A., Duff, B. R. L., Vargas, P., & Yao, M. Z. (2020). Self-presentation on social media: When self-enhancement confronts self-verification. *Journal of Interactive Advertising, 20*, 289–302. https://doi.org/10.1080/15252019.2020.1841048.