**ORIGINAL ARTICLE**

# The Role of Self-Esteem, Depressive Symptoms, Extraversion, Neuroticism and FOMO in Problematic Social Media Use: Exploring User Profiles

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**Abstract**

Problematic social media use (PSMU) is known to be associated with self-esteem, depressivesymptomology, extraversion, neuroticism and the fear of missing out (FOMO).However, few studies have sought to understand how these psychological factorsmay converge and differentially relate to PSMU severity. Thus, the current studyexamined how these factors may present as different 'user profiles'. A total of574 participants completed an online survey, and hierarchical cluster analysisand K-means clustering techniques were used to form profiles. A five-clustersolution was identified. The clusters differed in PSMU scores and in order ofPSMU severity were identified as FOMO, Emotionally Vulnerable, Low-risk, LowExtraversion and Protective profiles. These findings indicate a more nuancedunderstanding of PSMU severity may be gained by considering how specificpsychological correlates converge as opposed to considering them as uniquepredictors of PSMU. Future research may benefit from conceptualising PSMU froma combined risk lens that prioritises the relationship between PSMU correlates.

**Keywords** Personality · Extraversion · Neuroticism · Self-esteem · Depression · FOMO · User · Profiles · Social networking use

It is estimated that over 4 billion people worldwide use social media (Pennington & Shaw, 2023). Of increasing concern is the occurrence of problematic social media use (PSMU) (Coyne et al. 2020; Shensa et al., 2018). PSMU is characterised by a preoccupation with social media use. This preoccupation includes experiencing withdrawal and difficulty in reducing social media use, using social media to escape negative emotional states and continued use despite negative life consequences (Paakkari et al., 2021). Research indicates that a range of individual differences are associated with social media use, including self-esteem, depressive symptoms, extraversion and neuroticism and the fear of missing out (FOMO) (Bányai et al., 2017; Franchina et al., 2018; Kircaburun et al., 2020; Raudsepp & Kais, 2019). However, there is a lack of research into how these correlates may

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interrelate and contribute to PSMU (Marino et al., 2020; Weaver & Swank, 2021). This study intends to improve understanding of PSMU by examining how self-esteem, depressive symptoms, extraversion, neuroticism and FOMO converge and differentially relate to PSMU using cluster analysis.

Cluster, profile and subgrouping analytic techniques provide an approach to explore how individual differences may combine and contribute to the risk of problematic behaviours. Essentially, these approaches classify individuals into subgroups based on shared similarity across a range of relevant variables (Milosevic & Ledgerwood, 2010; Yim & Ramdeen, 2015). In relation to addictive behaviours, profile analytic techniques have provided insights into the individual and motivational risk factors that precipitate and perpetuate behaviour (Castro-Calvo et al., 2020; Shensa et al., 2017; Tiego et al., 2019). Although there are a range of individual differences-associated PSMU, their combined influences are often not examined. In the following section, we outline identified individual differences that have shown to correlate with social media use and the processes that help explain how these factors may converge to maintain PSMU.

## Correlates of PSMU

Depression and self-esteem are associations with PSMU. Specifically, people with depressive symptomology and low self-esteem have been found to be more likely to engage in social media use to mitigate distress, emotionally regulate and avoid in-person interactions (Andreassen et al., 2017; Shensa et al., 2017; Wartberg et al., 2020). In addition, low self-esteem has been shown to be associated with higher social media use, problematic social media use and difficulties with quitting or reducing social media use (Blachnio et al., 2016). Longitudinal research has also indicated a temporal relationship depression and increased the risk of PSMU severity (Raudsepp & Kais, 2019).

In relation to dispositional characteristics, meta-analytic research has shown neuroticism and extraversion share robust associations with online addictive behaviour (Kayis et al., 2016). In terms of social media use specifically, higher extraversion has been found to be positively associated with Facebook, WhatsApp and Instagram use disorder scores (Sindermann et al., 2020). Similarly, individuals with higher levels of neuroticism have been found to be more likely to use social media problematically (Kircaburun et al., 2020). One proposition is those with higher extraversion tend to use social media to engage with others and seek social gratification, which may in turn lead to addictive social media use (Atroszko et al., 2018), whereas elevated levels of neuroticism are more likely to lead to use social media to escape daily life and regulate negative affectivity (Kircaburun et al., 2020; Sindermann et al., 2020).

A growing body of research indicates that the fear of missing out (FOMO) plays a dominant role in PSMU (Fioravanti et al., 2021). Przybylski et al. (2013, pp. 1841) defined FOMO as the 'pervasive apprehension that others might be having rewarding experiences from which one is absent'. Furthermore, it is proposed that FOMO may lead to a proclivity to connect with others that in turn drives the excessive and harmful use of social media (Boustead & Flack, 2021; Fuster et al., 2017; Tandon et al., 2021). Support for the centrality of FOMO as an explanatory factor is reflected in recent meta-analytic research that indicates FOMO has a consistent association with both social media use and PSMU (Fioravanti et al.,

2021). In addition, FOMO has been found to directly and independently associated with PSMU (Fioravanti et al., 2021; Franchina et al., 2018). FOMO is also positively associated with a range of consequences, including negative physical symptoms, depressive symptoms and decreased mindful attention (Baker et al., 2016; Franchina et al., 2018).

## Profile Analysis

It is likely relationships described do not exist in singularity. In fact, there is emerging research to indicate these individual differences may converge to contribute to an increased risk of PSMU. For example, it has been suggested that depressive symptoms and low self-esteem may increase the use of social media due to the need for emotional regulation and social avoidance (Shensa et al., 2017; Wartberg et al., 2020). In addition, people with elevated levels of neuroticism have been found to be more vulnerable to low self-esteem and depressive symptoms (Marino et al., 2016; Mu et al., 2019). It also appears that concomitant elevations of FOMO may exacerbate this vulnerability (Buglass et al., 2017). Not only is FOMO considered a primarily relevant variable in social media research, but FOMO has also been shown to share a robust association with depression, extraversion and neuroticism (Fioravanti et al., 2021). Therefore, it could be expected that the social media users experiencing PSMU would display profiles associated with combinations of elevated negative affect, lower self-esteem and relatively high scores on neuroticism and FOMO.

## Current Study

There is conceptual support for the notion that individual difference may converge in a way that contribute to the maintenance of problematic social media use. However, research to date has typically used a more restrictive set of PSMU correlates in determining user profiles. Also, to the authors' knowledge, FOMO has not been included in the other profile analytic studies exploring individual difference. Thus, this study aims to identify 'user profiles' of social media use by examining how the PSMU correlates of self-esteem, depression, neuroticism, extraversion and FOMO may converge using an exploratory cluster analysis. Despite user profiles not being developed with the variables included in this study, some tentative propositions can be made.

1. Several distinct profiles will be identified.
2. The identified profiles will differ on PSMU severity.
3. FoMO will likely be elevated in the profile with the highest PSMU scores and associated with higher levels of neuroticism, depressive symptomology and low self-esteem.

# Method

## Participants and Procedure

A total of 574 adult active users of social media (61% female) completed an anonymous online survey. The participants were recruited via paid advertisements posted on Facebook, TikTok and Instagram advertising. Most of the participants were under 45 years of age; 21.8% (18–24), 29.8% (25–34), 15.5% (35–44), 27.6% (45–64) and 11.2% (65 years or

older). Almost two thirds of the participants (64.9%) reported Facebook as their most used social media, 21.8% Instagram, 5.1% TikTok, 1.6% Snapchat, 3.9% Twitter, 0.8% LinkedIn and 1.9% other (e.g. Reddit). The average number of platforms used was 2.7. Approximately one fifth (20.1%) of the sample used social media hourly, 59.6% several times a day, 17.7% at least daily and 1.9% at least weekly. The majority of participants are reported living in Australia (48%), followed by the USA (20.1%), New Zealand (9.0%), the UK (8.8%) and other (14.1%).

## Ethics

Prior to conducting the current study, ethics approval was obtained from the researchers' Human Research Ethics Committee (H21019; 8 April 2021). Participants were recruited using social media advertising with no identifying information recorded from participants. Participants could opt-in to enter a draw for one of 10 USD $25.00 e-gift cards upon completion of the survey. Respondents were required to be at least 18 years of age and use social media to participate and complete the survey in English. No other exclusion criteria were applied.

## Measures

**Problematic Social Media Use** The Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2017) is a 6-item self-report measure of problematic social media use. BSMAS has an optimal cut-off point of 24, indicating experiences of withdrawal and mood modification associated with social media use (Luo et al., 2021). The BSMAS has a 5-point response options ranging from 'very rarely' to 'very often'. The scale requires individuals to respond to statements such as 'How often during the last year have you tried to cut down on the use of social media without success?'. Recent research has evidenced adequate levels of internal consistency ($\alpha = 0.83$) for the BSMAS (Schivinski et al., 2020). Using a PSMU cut-off score of 24 (Luo et al., 2021), 11.3% of the sample were likely experiencing significant withdrawal, distress and negative life consequences associated with social media use.

**Neuroticism and Extraversion** The Big Five Inventory (BFI; John and Srivastava, 1999) is a 44-item measure of dimensions of personality. Neuroticism and extraversion facets of the BFI each have 8 items, respectively, rated on a 5-point Likert scale. Items such as 'I see myself as someone who is talkative' (extraversion) and 'I see myself as someone who worries a lot' (neuroticism) require individuals to rate from 'disagree strongly' to 'agree strongly'. Research has identified adequate internal consistency $\alpha = .82$ for extraversion facet and $\alpha = .83$ for neuroticism facet of the BFI (Alansari, 2016).

**Self-Esteem** The Rosenberg Self-esteem scale (RSES; Rosenberg, 1965) is a 10-item self-report measure of both positive and negative feelings about self. Self-esteem is measured using a 4-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. Example items include 'I take a positive attitude towards myself". Psychometric research has identified the RSES to have good internal consistency ($\alpha = .90$), item convergence and discriminant validity (Sinclair et al., 2010).

**FOMO** The Fear of Missing Out scale (FoMOs; Przybylski et al., 2013) is a 10-item self-report measure of FOMO, anxiety related to the feeling of being absent from pleasurable experiences that others are having. The FOMOs utilise a 5-point scale ranging from 'not at all true of me' to 'extremely true of me' on items such as 'I fear others are having more rewarding experiences than me'. Development of the scale showed support for a single-factor solution with good internal consistency ($\alpha = 0.90$).

**Psychological Distress** The Depression Anxiety Stress Scales–21 (DASS-21; Lovibond and Lovibond, 1995) is a 21-item measure that involves participants rating statement responses on a 4-point Likert scale. This ranges from 0 = 'did not apply to me at all' to 3 = 'applied to me most of the time'. This study utilises depression subscale of 7 items and a reliable internal consistency rating of $\alpha = 0.91$ (Sinclair et al., 2012).

### Data Analysis Plan

Data were screened for multivariate outliers and multicollinearity, as these can influence the development of distinct clusters (Hair et al., 2014; Kaushik & Mathur, 2014). Mahalanobis and Cook's distance statistics were below critical cut-offs, indicating no influential multivariate outliers. In addition, the tolerance statistic fell within acceptable range, indicating no concerns with multicollinearity. The variables utilised in the current study (extraversion, neuroticism, depression, self-esteem and FOMO) were standardised to $z$-scores prior to the progression of the cluster analysis. There were no missing data due to the forced response option employed. All predictor variables were included in the cluster analysis. The independence of observations was maintained by participants only being assigned to one cluster.

Social media user profiles were identified using both hierarchical and non-hierarchical clustering techniques with IBM SPSS statistics version 28. Hierarchical cluster analysis (HCA) was used to identify an optimal number of clusters for an initial 'seed point'. The identification of clusters was based on the interpretation of the agglomeration schedule, scree plot and dendrogram (Yim & Ramdeen, 2015). The HCA used a squared Euclidean distance as the distance measure and Ward's method as the linkage measure. Ward's method has previously been identified to perform the best overall in comparison to alternative HCA linkage measures (Ferreira & Hitchcock, 2009). Squared Euclidean distance was selected as it is the most used distance measure in HCA research and is recommended to be used in conjunction with Ward's method (Hair et al., 2014; Majerova & Nevima, 2017).

The results of the HCA were subsequently utilised in a K-means clustering analysis. K-means clustering is a non-hierarchical procedure that organises cases according to the centroid of each cluster. It groups data points based on distance from each centroid (Hair et al., 2014). This method requires a predetermined number of clusters before the analysis; therefore, it is the best practice to complete hierarchical methods first. That is, the HCA and K-means clustering analysis are complementary techniques. The HCA's ability to split clusters supports the K-means need to have a specified and non-random cluster number (Hair et al., 2014). Kaushik and Mathur (2014) highlight that the strengths of a K-means analysis include its ease of understanding and the stability of clusters.

Differences across the clusters on PSMU severity were examined using one-way ANOVAs. Although the data violated the assumptions of normality, one-way ANOVAs are considered robust to violations of normality (Blanca et al., 2017; Schmider et al., 2010). As the

homogeneity of variance was not violated, Tukey's HSD post hoc testing was used and interpreted (Hair et al., 2014). As an extra measure to reaffirm the ANOVA results, a non-parametric Kruskal-Wallis analysis was conducted. Furthermore, additional post hoc tests were performed using the Games-Howell and Sidak analyses to confirm the stability of the findings. As the pattern of results did not differ between the test type used, only the ANOVA and Tukey's HSD results are shown.

## Results

The HCA allowed for the inspection of the agglomeration schedule, scree plot and dendrogram. The agglomeration schedule was examined for significant increases in coefficients, the dendrogram was inspected for similarity between clusters, and the scree plot was used to identify a 'break point' to determine optimal number of clusters for further analysis (Yim & Ramdeen, 2015). A 5-cluster solution is presented as the most optimal option. The 5-cluster solution was entered into a non-hierarchical K-means cluster analysis to determine profile presentation based on the entered predictor variables.

### Hierarchical Cluster Analysis and K-Means Clustering

Figure 1 represents the user profiles identified with the cluster analyses. The profiles were characterised based on variations in presentation across extraversion, neuroticism, self-esteem, depression and FOMO. Profile 1 is characterised by high level of FOMO, elevated depression and extraversion and low self-esteem. This was termed the 'FOMO Profile'. Profile 2 does not have significantly elevated scores on any of the variables, which can be thought of as a 'Low-risk Profile'. Profile 3 is primarily defined by low self-esteem, high depression and high neuroticism, with some elevation in FOMO. Due to this combination, profile 3 can be termed our 'Emotionally Vulnerable Profile'. Profile 4 has the lowest score on extraversion and low scores across all variables except neuroticism. Thus, this profile
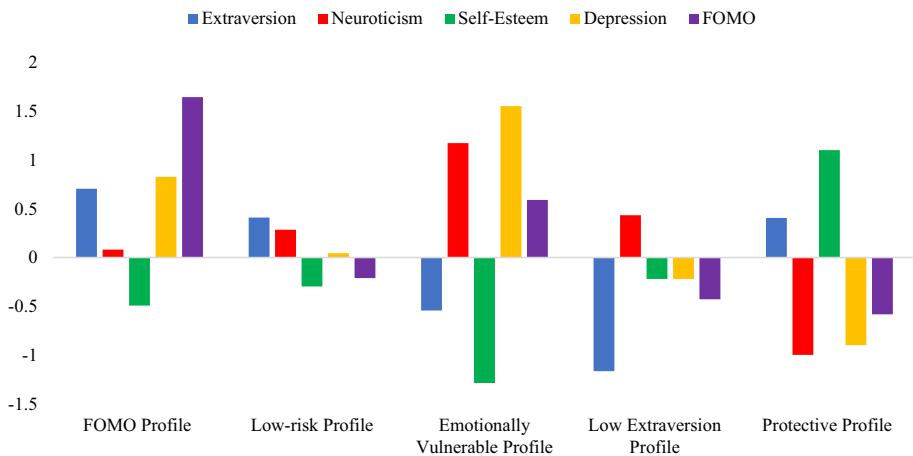


**Fig. 1** User profiles (cluster formation). Note. The vertical axis represents *z*-scores of extraversion, neuroticism, self-esteem, depression and FOMO

can be defined as our 'Low Extraversion Profile'. Profile 5 has high self-esteem and elevated extraversion, combined with low FOMO, low depression and low neuroticism. Profile 5 can be termed a 'Protective Profile' cluster due to its low scores across correlates that research has suggested increase PSMU risk, supporting the literature findings (Ahmed et al., 2021; Fioravanti et al., 2021; Kircaburun et al., 2020).

## Profile Differences

One-way between groups ANOVAs were used to test for PSMU score differences across the identified profiles. Levene's statistic indicated the assumption for homogeneity of variance was not violated, $F(4, 481.02) = 0.16$, $p = .958$. The ANOVA was statistically significant with a result of $F(4, 569) = 60.90$, $p = .001$, indicating the PSMU scores are associated with the cluster membership. Eta-squared results indicate a large effect size of $\eta^2 = 0.30$ (Hair et al., 2014). With the exceptions of Low Extraversion (P4) and Protective Profiles (P5), post hoc analyses revealed the remaining cluster differed from each other on PSMU scores ($p < .05$). Of the 10 pairwise comparisons, 30% of effect size were large ($d > 0.8$), 40% medium ($d > 0.5$) and 30% small ($d < 0.3$). The results are presented in Table 1.

To further validate the presentation of the profiles, the clusters were compared on the predictor variables using one-way ANOVAs. The results indicated that the profile means differ significantly on extraversion $F(4, 469) = 132.70$, $p = <0.001$, $\eta^2 = 0.48$; neuroticism $F(4, 469) = 166.80$, $p = <0.001$, $\eta^2 = 0.54$; self-esteem $F(4, 469) = 263.22$, $p = <0.001$, $\eta^2 = 0.65$; depression $F(4, 469) = 281.38$ $p = <0.001$, $\eta^2 = 0.66$; and FOMO $F(4, 469) = 207.93$, $p = <0.001$, $\eta^2 = 0.59$. Taken together, these findings support the cluster analysis groupings.

## Discussion

This study examined how self-esteem, depression, neuroticism, extraversion and FOMO may form distinct 'user profiles' of PSMU risk. Specifically, it was predicted that distinguishable profiles of social media users would emerge and that the profiles differ on levels of PSMU. Additionally, it was predicted that elevated at-risk PSMU profiles have a cumulative presentation of elevated FOMO, neuroticism, depressive symptomology and low self-esteem. A total of five profiles were identified and were classified based on the presentation of the identified predictor variables and further examined in relation to PSMU severity (see Fig. 1; Table 1). The FOMO, Low-risk and Emotionally Vulnerable profiles differed significantly in their PSMU severity, highlighting how combinations of individual differences may contribute to PSMU. These results indicate that PSMU can be understood through a combined psychological risk lens.

### Profile Comparisons

The dominant feature of the 'FOMO' profile was the elevated FOMO scores, although extraversion was also somewhat elevated. These results indicate that personality may play a role in the severity of PSMU and profile formation. Previous research has identified a positive relationship between Facebook addiction and extraversion, after controlling for other personality characteristics (Atroszko et al., 2018). Sindermann et al. (2020) posit

**Table 1** User profile for PSMU scores (mean and standard deviation)

| | P1 ($N = 84$), FOMO Profile | P2 ($N = 119$), Low-risk Profile | P3 ($N = 72$), Emotionally vulnerable Profile | P4 ($N = 121$), Low Extraversion Profile | P5 ($N = 178$), Protective Profile | Total sample ($N = 574$) |
|---|---|---|---|---|---|---|
| **PSMU scores** | | | | | | |
| Mean | $22.26^{2-5*}$ | $15.24^{1*3-5*}$ | $17.42^{1-2*4-5*}$ | $13.36^{1-3*}$ | $12.48^{1-3*}$ | 15.29 |
| Standard deviation | 4.94 | 4.91 | 5.28 | 5.01 | 5.18 | 6.04 |
| PSMU score above 24 (%) | 52.4 | 3.4 | 16.7 | 1.7 | 1.7 | 11.3 |

Means with superscripts indicate statistically significant profile differences at $*p < .05$

that extraversion increases the need to be socially engaged and thus increases the risk of PSMU. However, Kircaburun et al. (2020) found that whilst extraversion increases the degree of social media use, it does not increase problematic use. It is plausible that the different results may be due to combined effects between extraversion and additional effects of FOMO. For example, studies have yet to utilise FOMO in assessing the relationship between personality and PSMU. This is despite evidence that indicates a positive correlation between extraversion and FOMO (Fioravanti et al., 2021).

The Emotionally Vulnerable profile suggests that a combined presentation of elevated depression and neuroticism contributes to severity of PSMU. Previous research has established that higher negative affect and lower self-esteem are more common in those with neuroticism (Abbasi & Drouin, 2019; Mu et al., 2019; Vittengl, 2017). In turn, high depression, lower self-esteem and higher anxiety have been shown to influence the degree of PSMU severity (Cunningham et al. 2021; Huang, 2022; Shannon et al., 2022; Zhang et al. 2021). As reflected in the Emotionally Vulnerable profile, it is plausible that elevated levels of neuroticism exacerbate negative affect and low self-esteem. For example, people with higher neuroticism may be more likely to engage in excessive social media use and be overly concerned with how they present themselves to others (Bowden-Green et al., 2021).

Compared to the Emotionally Vulnerable profile, the Protective Profile has high self-esteem, low neuroticism, low depressive symptomology, low FOMO and lowest PSMU severity. This indicates that PSMU may be understood from the viewpoint of maladaptive coping. For example, those with depressive symptoms may use social media to regulate emotionally and avoid in-person interaction (Shensa et al., 2018; Wartberg et al., 2020). Similarly, people with low self-esteem are more likely to engage in online communication and use social media to mitigate distress (Ahmed et al., 2021). Low self-esteem is predictive of higher social media use, issues with quitting or reducing social media use and addictive use of social media (Andreassen et al., 2017; Blachnio et al., 2016). For the Protective Profile, the high self-esteem may serve as a protective mechanism against engaging in social comparison, which has been identified to increase negative affectivity (Liu et al., 2017). Therefore, those in the Protective Profile may be less reliant on use social media to regulate emotions, resulting in a lower risk for PSMU.

The FOMO Profile and Emotionally Vulnerable Profile have the highest PSMU severity, as well as the highest levels of FOMO. This suggests that FOMO may play a central role in the development and maintenance of PSMU. Possible reasons for the significance of FOMO on PSMU include increased ability for social surveillance via social networking sites, feelings of social inadequacy from consistent exposure to others' lives and social comparison (Buglass et al., 2017). In continuance of these findings, Casale et al. (2018) found that those who experience higher levels of FOMO possessed erroneous beliefs that social media use would regulate negative emotions associated with missing out. Thus, a cyclical relationship begins to form between PSMU and FOMO. In the case of the FOMO and Emotionally Vulnerable profiles, engagement in social media use likely further engenders FOMO. This may encourage the continued use of social media use and increase the awareness of others' lives, subsequently increasing the need to engage in social media use to cope with the negative feelings of missing out—culminating in a higher risk of PSMU.

## Combination of Risk

The profiles identified provide support for the notion of combined risk. For instance, the Low Extraversion Profile comprises somewhat elevated levels of neuroticism yet the equal

lowest level of PSMU scores. This result indicates that the presence of one PSMU risk factor may not be sufficient to increase PSMU risk. Similarly, despite the Protective Profile having a higher degree of extraversion, there was not an associated increase the risk of PSMU. When extroverted people possess higher self-esteem, there is likely to be a positive association with PSMU severity (Smith, 2022). A potential explanation is that people with heightened levels of self-esteem and extraversion are more likely to engage in positive online interactions, partake in enjoyable activities and possess satisfaction with how they are perceived by others (Smith, 2022).

As mentioned, FOMO appears to play a dominant role in PSMU. Elevated levels of FOMO have been suggested to reflect state of limbo that arises when psychological needs are not being met (Tandon et al., 2021), which is more likely to occur in those with pre-existing vulnerability (Boustead & Flack, 2021). Additionally, FOMO is found to be associated with low self-esteem and higher levels of depressive symptoms and neuroticism (Cunningham et al. 2021; Huang, 2022; Shannon et al., 2022; Zhang et al. 2021). A contrasting pattern is observed in the Low-risk Profile, where slight elevations in extraversion and neuroticism are apparent with low deviations across the other variables. The Low-risk Profile has a more moderate level of PSMU severity compared to the FOMO and Emotionally Vulnerable profiles.

A possible method of understanding the combined risk perspective is social comparison theory. Social comparison theory postulates that people have an innate drive to compare themselves to others to ascertain an idea of self (Tandon et al., 2021). Considering the proliferation of social media use, people may engage in upward social comparison (thinking others are better off), leading to negative affect, lower self-esteem, depression and FOMO. Furthermore, research has identified that social comparison mediates the relationship between personality traits, such as neuroticism, and passive use of social media, contributing to PSMU (Rozgonjuk et al., 2019).

## Implications

This study successfully identified distinct profiles of PSMU. Of particular importance was demonstrating the contributions of FOMO and emotional vulnerability to PSMU severity. People with multiple domains of psychological vulnerability are more likely to be at-risk for PSMU and may need more intensive interventions. Practical implications relating to interventions include treatment development that targets combined risk. Research has supported the design of interventions that focus on mindfulness-based techniques to re-orientating users to the present, decrease upward social comparison and reduce symptoms of FOMO and associated psychological distress (Weaver & Swank, 2019, 2021).

This research also supports the conceptualisation of PSMU from a perspective of combined risk. Previous literature has identified distinct profiles of problematic social media users. For instance, Blachnio et al. (2016) and Bányai et al. (2017) identified that low self-esteem primarily defined at-risk profiles for PSMU. Additionally, Fuster et al. (2017) found that user profiles differed mainly by levels of FOMO, with the most at-risk subgroup having the highest levels of FOMO. The novelty of the current research is that it builds upon these findings, considering FOMO, personality, depressive symptomology and self-esteem as interacting risk variables. Ultimately, what was identified is that the culmination of these variables may lead to an emotional and psychological vulnerability that contributes to the development and maintenance of PSMU severity. Taken together, it appears profile analysis possesses utility in helping to understanding the maintaining factors PSMU.

## Limitations and Future Directions

Future research could incorporate 'use motives' to further understand the role of personality and emotional distress on profile presentation. Studies have found that personality often influences or interacts with motives that contribute to the severity of addictive behaviours (Flack & Buckby, 2020; Kircaburun et al., 2020; Schivinski et al., 2020). For example, extraversion is linked to using social media to maintain relationships, whilst neuroticism is associated with using social media to pass the time (Kircaburun et al., 2020). The desire to pass time use has been identified in multiple studies as a motive that is positively associated with PSMU severity (Kircaburun et al., 2020; Schivinski et al., 2020; Süral et al., 2019). In addition, Schivinski et al. (2020) identified that problematic social media users have elevations in negative affect and the increased motivation to use social media for surveillance of others, network expansion and maintaining relationships when compared to those not at-risk for PSMU. Thus, the personalities-oriented profiles may be further explored in the context of salient PSMU motives. Further exploration may build upon the foundation provided in this study and provide an additional nuanced understanding of these profiles.

A potential limitation of the current research is the cross-sectional design does not allow for understanding the direction and progression of the profiles over time. Previous longitudinal findings indicate that increased levels of PSMU and FOMO are likely to be maintained over time (Lo Coco et al., 2020). While this stability is attributed to the interplay between FOMO and PSMU maintaining psychological distress, the temporal interactions between these factors are largely unknown. Thus, future longitudinal research is required to examine the stability of individual characteristics identified in the current study to assess how they interact or change over time. This would also improve the evidence base for interventions by increasing the understanding of the risk profiles identified and the processes involved.

## Conclusion

In this study, it was found that there were distinct subtypes of social media users. The profiles differed significantly on the severity of PSMU, with at-risk profiles having a cumulative presentation of high neuroticism, elevated FoMO, high depressive symptomology and low self-esteem. The findings underscore the importance of understanding maladaptive social media behaviour through a lens of combined risk. For example, consider the relationship between personality and self-esteem and the exacerbating impacts of FOMO on self-esteem and depressive symptomology. Thus, the strength of this research is its ability to emphasise the importance of how personality and individual differences may interact and lead to cyclical relationships that exist outside of simple causality. This has implications for treatment design and matching and how we approach PSMU conceptualisation moving forward. Future research could focus on investigating PSMU from a perspective of combined risk.

**Data Availability** The data that support the findings of the present study are available from the corresponding author upon reasonable request.

## Declarations

**Ethics Approval and Consent to Participate** All procedures performed in this study involvinghuman participants were in accordance with the ethical standards of theresearch team's organisational Ethics Board and with the 1975 HelsinkiDeclaration, as revised in 2000. Informed consent was obtained from allparticipants.

**Conflict of Interest** The authors declare no competing interests.

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