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Young adults' risk profiles and predictive factors of Problematic Social Media Use (PSMU): a cross-sectional study

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Abstract
Problematic social media use (PSMU) is a current public health concern. The current study aimed to identify the risk profiles and predictive factors of PSMU among young Finnish adults using a cross-sectional design. Survey data were analysed with K-means clustering and logistic regression, revealing three profiles: high-risk (HRG), moderate-risk (MRG), and low-risk (LRG) groups. The HRG was characterized by low conscientiousness and self-esteem, high neuroticism, and ADHD symptoms. No significant differences were noted in social support and other personality traits across profiles. Significant associations were found between profiles and sociodemographic factors, social media use duration, and motivations for use. These findings underscore the need to consider sociodemographic, psychosocial, and motivational factors in identifying individuals at risk for PSMU. The study's outcomes can help develop effective policies and interventions for preventing and identifying PSMU.

Keywords Social media · Problematic social media use · Young adults · Risk profiles

Introduction

From a global perspective, there are over 5 billion social media users (Kemp, 2024); therefore, it is not surprising that interest in the impacts of social media use, especially problematic social media use (PSMU), has been increasing (Moretta et al., 2022). Young adults, defined as 18–35 years old in this study (American Psychological Association, 2023), have been early adopters of digital technologies (Odgers & Jensen, 2020) and have grown during this new digital era (Haddad et al., 2021). In Finland, young adults spend more than 20 hours a week on social media (Hylkilä

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et al., 2023). They use social media to connect with others and to maintain relationships, which are beneficial to users when the purpose is to make meaningful social connections (Clark et al., 2018; Hylkilä et al., 2024). On the other hand, constant connectivity has raised concerns about what kind of possible positive and negative impacts social media use might have on young adults' psychosocial well-being, ranging from the ability to interact with others offline and increased loneliness levels to mental health problems (e.g., depression) (Odgers & Jensen, 2020; Hylkilä et al., 2023; Wu et al., 2024; Ahmed et al., 2024). The World Health Organization [WHO] (2015) stated that PSMU is a public health concern requiring more research (Moretta et al., 2022). According to Meng et al.'s (2022) study the global pooled prevalence of PSMU was 17.42%. In Finland, approximately 10% of young adults use social media problematically, and almost 70% report having had some problems with their social media use (Hylkilä et al., 2023).

Problematic social media use as a disorder and its relation to psychosocial well-being

Although there has been increasing interest in and a growing number of studies considering PSMU, there is not yet agreement on the conceptualization of PSMU and whether it should be considered a behavioural addiction (Moretta et al., 2022). PSMU is one type of internet addiction and includes diminished control over the use of social media, excessive concerns about its use, and spending so much time on social media that it negatively affects life functioning and well-being. The use also continues despite its negative consequences. (Andreassen, 2015; Moretta et al., 2022.) It has been suggested that PSMU shares similar features to behavioural addictions (e.g., salience, mood modification, conflict, tolerance, withdrawal, relapse) and impulse control disorders (ICDs) (Griffiths, 2005; Andreassen, 2015). On the other hand, clinical studies suggest that behavioural addictions differ from ICDs and that PSMU shares more characteristics with addictive behaviours (Moretta et al., 2022). However, gaming disorder have been classified as 'disorders due to addictive behaviours' in the 11th edition of the International Classification of Diseases (ICD-11) (WHO, 2025). To date, considering the available evidence highlighting the commonalities in addictive behavioural patterns, researchers are considering other internet-related activities for inclusion in the ICD diagnostic manual; thus, PSMU may be considered 'other specified disorders due to addictive behaviours' (Brand et al., 2020; Moretta et al., 2022). Despite the debate on the PSMU conceptualization, several studies have indicated different effects of social media use on well-being, and even more research is needed to deepen the understanding.

The recently developed Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2019) proposes that individuals' internet-based problematic behaviour (e.g., PSMU) could be elucidated through a process resulting from interactions between individuals' core characteristics, various predisposing factors, mediators and moderators (Brand et al., 2019; Dempsey et al., 2019). Personal factors include for example factors concerning an individual's background and it is suggested that personality traits play an important role in PSMU (Brand et al., 2019; Akbari et al., 2023c). Different personality traits and personal factors affect the motivation to use social media, which might affect the influence of use on well-being. For example, it has been suggested that neuroticism and extraversion might increase PSMU (Akbari et al., 2023c). Regarding personality traits, the most consistent associations have been found between high impulsivity, low self-esteem and perceived social support is one of the key concepts to consider in this context (Pontes et al., 2015; Brand et al., 2016; Andreassen et al., 2017).

Responses to different personality traits and personal factors include mechanisms (e.g., coping, attention bias) that might be protective or risk factors for PSMU (Kircaburun & Griffiths, 2018; Dempsey et al., 2019; Masaeli & Farhadi, 2021; Akbari et al., 2023c). Motivational factors for social media use, such as escapism and relationship maintenance, may serve as predictors of PSMU (Alzougool, 2018; Wadsley et al., 2021; Hylkilä et al., 2024). Additionally, attention-deficit/hyperactivity disorder (ADHD) is one of the recognised factors influencing the likelihood of developing behavioural addictions (APA, 2013; Chen et al., 2024). ADHD is a neurodevelopmental disorder characterised by inattention and hyperactivity (APA, 2013), including symptoms such as high reward sensitivity, high sensation seeking and impaired cognitive control. Similar symptoms may also be involved in other problematic behaviours (e.g., PSMU) (El Archi et al., 2022) and links between PSMU and ADHD are mainly studied in adolescent populations (e.g., Akbari et al., 2023a; Thorell et al., 2024). PSMU may exacerbate symptoms of ADHD, potentially by impeding cognitive development, disturbing sleep patterns and exposing individuals to fast-paced use. Evidence has also shown that emotion regulation strategies, a tendency towards psychological problems and impulsivity may play a mediating role in the co-occurrence of PSMU and ADHD. (El Archi et al., 2022).

Previous studies have indicated that various sociodemographic factors (e.g., female gender, young age), psychological factors (e.g., ADHD, self-esteem) and social factors (e.g., social support) are associated with PSMU (Andreassen et al., 2017; Zsido et al., 2020; Castrén et al., 2022; Vainio et al., 2023; Hylkilä et al., 2023, 2024; Akbari et al.,

2023a; Wu et al., 2024; Thorell et al., 2024), thus posing a risk for behavioural addictions (Dailey et al., 2020). For example, positive interactions and social support on social media might lower levels of anxiety but negative interaction effects in the opposite way (Seabrook et al., 2016). According to earlier findings PSMU is known to be associated with personality traits, self-esteem, ADHD symptoms and social support, but only a few studies have focused on how these factors relate to the severity of PSMU. For these reasons and mirroring to I-PACE model, previously implicated background factors (gender, age), psychosocial well-being factors (personality traits, self-esteem, ADHD, social support) and factors related to individuals' social media use (frequency and volume of use, motivation to use social media, PSMU) are included in the current study to understand the risk profiles and predictive factors of PSMU.

Profiles of problematic social media use

A quick literature search revealed some previous studies focusing on internet-related problems and profiling. Hawi and Samaha (2019) examined the commonalities and differences in personality traits associated with problematic internet and social media use. Additionally, two studies were found that focused on PSMU: one explored risk and protective factors among adolescents (Akbari et al., 2023a), and another did not have an age limit (Packer & Flack, 2023). Both studies identified five groups varying in PSMU severity and highlighted multiple predictive factors such as loneliness, ADHD, low self-esteem, and low perceived social support. In a study by Akbari et al. (2023b), psychological predictors of the co-occurrence of PSMU, problematic gaming, and gambling were identified, revealing four latent classes: 'nonproblematic behavior', 'problematic gambling,' 'problematic social media use with gaming disorder,' and 'disordered gambling with problematic social media use.' Cerniglia et al. (2019) identified distinct profiles of adolescents with unique patterns of psychopathological risk and similar levels of impulsivity, internet gaming disorder, and PSMU. Bányai et al. (2017) also focused on adolescents, categorizing them into three profiles: no risk, low risk, and at risk of PSMU.

Two studies focused on problematic internet use and psychosocial profiles among adolescents (Ahmadi & Saghafi, 2013; Pontes & Macur, 2021). Ahmadi and Saghafi (2013) studied only associations between problematic internet use and psychosocial factors, but Pontes and Macur (2021) identified low-risk and high-risk profiles in their study. Additionally, one study considered smartphone application-based addictions, and the results indicated three profiles (low-risk, middle-risk and high-risk) for problematic smartphone use (Peng et al., 2023). A few earlier studies included internet use profiles and parenting practices and involvement (Geurts et al., 2023; Gómez et al., 2017). One systematic review studied problematic internet use and predictive factors among university students (Sánchez-Fernández et al., 2023).

According to the literature search, no previous studies concerning the risk profiles of PSMU and how different predictive factors related to it among young adults have been identified. The current study answers this research gap and aims to identify risk profiles with this focus group to gain a better understanding of the phenomena. Earlier studies have focused mainly on adolescents, and it is crucial to gain information from young adults' perspective to understand if the risk and protective factors differ in different populations and to recognize this special period in life which includes often major changes and unique challenges. To the authors' knowledge, ADHD and motivation to use social media have not been included in the other profile analytics among this population. From the perspective of behavioural addictions, profile analyses have provided insights into individual and motivational risk factors that may cause and maintain behaviour (Akbari et al., 2023a, b; Packer & Flack, 2023; Pontes & Macur, 2021) and build an understanding about individual differences which may contribute to problematic behaviours (Packer & Flack, 2023). Information about PSMU from a Finnish perspective is lacking, and there is a crucial role in studying PSMU in different contexts (Ghai et al., 2022; Akbari et al., 2023a) to gain a deeper understanding of PSMU. Studying the influencing factors is important for developing prevention measures and interventions. The analysis of contributing factors plays a key role in developing treatment interventions and preventive strategies (Akbari et al., 2023a).

Aim of the study

The current study aimed to identify the risk profiles and predictive factors of PSMU among young Finnish adults. The objective was to identify the risk profiles and predictive factors of PSMU among Finnish young adults to gain a better understanding of the phenomenon, enabling improved identification and prevention of PSMU in the future.

The research questions were as follows:

1. What are young adults' risk profiles for problematic social media use at the age of 18–35 years?
2. Which factors (e.g., demographics, motivations) are associated with the risk profiles of problematic social media use among Finnish young adults?

Materials and methods

Study design and participants

A web-based cross-sectional study was conducted, and data were collected using an online survey with convenience sampling. The study is part of a larger research project, and the results of previous research can be found here: https://doi.org/10.1016/j.tele.2023.101996. The research protocol was approved by the University of Oulu and the Regional Ethics Committee of the Northern Ostrobothnia Hospital District (60/2020). Potential participants received information about the study and principles of voluntary participation via social media and through an open recruitment announcement in Finnish national online journals. The data privacy notice for the scientific study was published on the home page of the survey. Participants provided their informed consent to participate in the study at the beginning of the survey.

A power analysis using G*Power was conducted to calculate the required sample size, based on the gender comparison of BSMAS scores reported in the study by Andreassen et al. (2017). The sample size was calculated using an independent samples t-test (effect size = 0.393; α = 0.05; power = 0.8) and the results indicated a required total sample size of 206. (Faul et al., 2009). The present study involved 383 Finnish young adults, primarily females (80.6%) and the mean age was 26.01 years. Two participants did not want to participate in the study and were excluded from the final analysis (n = 381). The inclusion criteria for participants were being 18–35 years old, experience of using the internet and social media and having the opportunity to answer the survey in Finnish.

Data collection and instruments

Data collection was conducted from September to November 2020. The data collection happened during the COVID-19 pandemic, which was noted in the data collection and the limitations section of the study. The survey included three main areas: (i) background factors (gender, age); (ii) the use of social media (frequency and volume of use of social media, motivation to use social media, PSMU); and (iii) psychosocial well-being (personality traits, self-esteem, ADHD, social support). The questions were based on validated instruments, and permission to use the instruments was obtained. The instruments were translated from English into Finnish using the translation-back-translation method.

Sociodemographic and social media use factors

As sociodemographic factors, gender and age were included. Other sociodemographic factors (e.g., educational level, marital status, living arrangement, educational or employment status) were not included in the study because they were not significantly correlated with the PSMU in this data (Hylkilä et al., 2023).

To measure social media use, we used different measurements and scales concerning overall social media use and PSMU. The questionnaire included one question concerning daily time spent on social media (hours per day) on weekdays and weekends. The daily time spent on social media was transformed into one variable, here considering the time spent on social media during the whole week. Motivation to use social media was measured with a 5-point Likert scale, which was created for this study based on previous research (e.g., Andreassen, 2015; Tanner et al., 2020) and consisted of nine questions concerning how the participants use social media and what is important to them while using it. The questions were, for example, 'On social media, it is important for me to express myself' and 'On social media, it is important for me to maintain social relationships'. The scale was transformed into three sum variables using factor analysis. Three factors were formed, and all nine items were included in the factors. The first factor (relationship maintenance; α = 0.72) included four questions concerning social relationships and relationship maintenance. The questions were as follows: (1) express myself, (2) produce and share content, (3) meet new people and (4) maintain relationships. The second factor (relaxation and escapism; α = 0.63) included three questions: (1) relax, (2) escape from unpleasant thoughts and (3) spend time and entertain myself. The third factor (Entertainment; α = 0.56) included two items: (1) follow content, produced by othersand (2) follow public figures.

The Bergen Social Media Addiction Scale (BSMAS) was used to measure PSMU (Andreassen et al., 2016). The scale includes six statements based on the core characteristics of basic addiction symptoms (salience, mood modification, tolerance, withdrawal, conflict and relapse) (Griffiths, 2005). All questions concerned experiences occurring over the past year, and the questions were, for example, 'How often during the last 12 months have you become restless or troubled if you have been prohibited from using social media?' The questions were rated on a 5-point Likert scale (1 = 'rarely' to 5 = 'very often'). The BSMAS was transformed into a sum variable (α = 0.83), with higher scores indicating the likelihood of PSMU. The possible range of scores was between 6 and 30, and the cut-off point was 19, which indicated PSMU (Bányai et al., 2017).

Psychosocial factors

For measuring personality traits, a 10-item short version of the Big Five Inventory (BFI-10) was used (Rammstedt

& John, 2007). The BFI-10 is a validated, shorter version of John et al.'s (1991) Big Five Inventory (BFI-44). The BFI-10 scale consists of two BFI items for each Big Five dimension: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience (e.g., 'I see myself as someone who is reserved') (Rammstedt & John, 2007). The scale was rated on a 5-point Likert scale from 1 = 'disagree strongly' to 5 = 'agree strongly'. Every dimension's two items were transformed into a sum variable, and higher scores indicated higher levels of a given personality trait. The Cronbach's alphas were on acceptable level (extraversion $\alpha=0.73$; agreeableness $\alpha=0.75$; conscientiousness $\alpha=0.42$; neuroticism $\alpha=0.48$; openness $\alpha=0.45$) because BFI-10 is a two-item scale, three of the alphas are over 0.45 (minimum) and alpha values are in line with previously reported studies (e.g., Credé et al., 2012; Balgiu, 2018).

Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965). The scale included 10 items with a 4-point Likert scale: 0 = strongly disagree, 1 = partly disagree, 2 = partly agree and 3 = strongly agree. The scale includes five positively phrased statements (e.g., "Overall, I am satisfied with myself") and five negatively phrased statements. The negative statements were reverse-coded. The variables were transformed into sum variables, with higher scores indicating higher self-esteem. The scores ranged from 1 to 30. The Cronbach's alpha was 0.90.

The six-item Adult ADHD self-report scale (ASRS) was used to measure ADHD and participants' ability to concentrate (Kessler et al., 2005). The scale asks respondents to rate on a 5-point Likert-type scale (never to very often) the extent to which they exhibited ADHD symptoms in the previous 12 months (e.g., 'How often do you have trouble wrapping up the final details of a project once the challenging parts have been done?'). The variables were transformed into a sum variable ($\alpha=0.75$), and the scoring approach was recommended by the ASRS v1.1 Screener manual. Respondents who endorsed at least four out of six items were considered to be at 'elevated' risk for ADHD. (Adler et al., 2003).

Social support was measured with one question: 'How happy have you been about the support received from your friends during the past 12 months?'. The item was measured on a 5-point Likert scale ranging from 1 = Very dissatisfied to 5 = Very satisfied.

Data analyses

The data were analysed using IBS SPSS Statistics version 29. Descriptive statistics (means, frequencies, standard deviations and percentages) were calculated. The data were checked for missing values but all the given answers were included in the final analyses (the cut-off for listwise deletion set at ≥5% missing values).

K-means clustering was used to identify different PSMU risk profiles using the BSMAS. In clustering, data with similarities are grouped into similar kinds of clusters, and in K-means clustering, clusters are formed with the help of centroids (Rauf et al., 2012). Two-, three- and four-cluster solutions were tested to identify the most reliable cluster solution, and the three-cluster model was determined to be the best because the size of clusters needed to be greater than 5% of the sample (Bejarano et al., 2011).

Principal component analysis with a varimax rotation method was performed to obtain a factor structure for the motivation to use social media. A measure of sampling adequacy > 0.6 was confirmed with the Kaiser-Meyer-Olkin (KMO) test (0.641) to ensure the adequacy of the sample size, and to determine the applicability of the factor analysis, Bartlett's test of sphericity (695,786, $p<.001$) was used. In the final EFA structure, the item loading cut-off was set at 0.3, and items with loading values > 0.3 were retained (Williams et al., 2010). Factor loading is presented in Appendix 1.

The associations between the profiles and demographic factors were analysed using a one-way analysis of variance (ANOVA) and the chi-square test. A non-parametric Kruskal-Wallis analysis was conducted to confirm the ANOVA results. Differences between different profiles were found using Tukey's test. $P<.05$ indicated statistical significance (p-value). The effect size was interpreted according to Cohen's d equivalence (small d ≤ 0.2), medium d ≤ 0.5) and large d ≤ 0.8) (Cohen, 1992).

Logistic regression analyses were performed to compare different profiles and their relationships. Comparisons were made between the LRG and the HRG, with the LRG serving as the reference category and between the MRG and the HRG, with the MRG serving as the reference category. Independent variables were first regressed separately, and then, all significant variables were added to the final regression model. The goodness of fit was analysed with Omnibus and the Hosmer-Lemeshow tests and the results are presented as odd ratios (OR) with confidence intervals of 95%.

Results

Three significantly different profiles were identified: the high-risk group (HRG) ($M=20.96$), moderate-risk group (MRG) ($M=13.09$) and low-risk group (LRG) ($M=7.83$). Figure 1 shows that the HRG had higher scores for every BSMAS item than did the other profiles. In comparison, the LRG had the lowest scores for all items. However, the MRG obtained higher scores for 'You use social

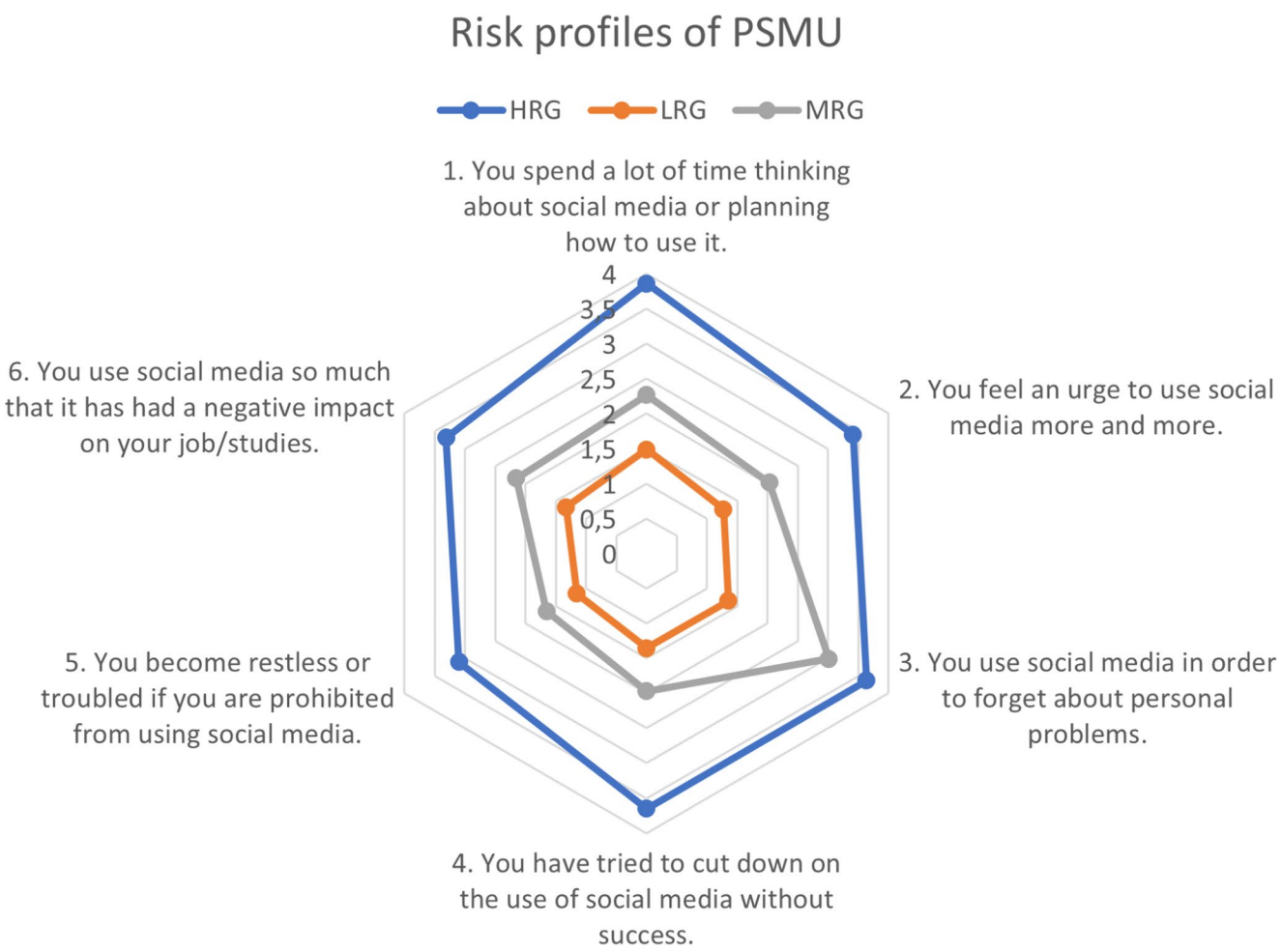

Fig. 1 Risk profiles of PSMU (with respect to BSMAS)

media to forget about personal problems' than for the other items. In the HRG profile, the participants had significantly greater BSMAS (*M = 20.96; SD = 3.62*) scores than in the other profiles. The MRG had intermediate levels of PSMU (*M = 13.09; SD = 1.99*), and the LRG had low levels (*M = 7.83; SD = 1.66*). A significant difference in the BSMAS score was found between the profiles (*F(2, 373 = 758.83); p = <.001*).

The HRGs included 51 participants (13.6%), most of whom were female. (Table 1). The average age in the HRG was 26.08 years (*SD = 4.55*). The MRG included 162 participants (43.1%), 138 of whom were female. The average **age** in this group was 25.43 years (*SD = 4.55*), which was lower than that in the other two profiles. The LRG included 163 participants (43.4%), 122 of whom were female. The mean age in the LRG was 26.70 years (*SD = 4.49*). Gender (*p = .010*) and age (*F(2, 275) = 3.22; p = .041*) were significantly different between the profiles, but age was significantly different only between the MRG and the LRG. Most of the female (45.5%) and other (60.0%) participants belonged to the MRG. However, the LRG included more men (63.8%) than the other profiles.

The amount of **time spent using social media** during the day differed significantly between the profiles (*F(2, 372) = 12.49; p = < 0.001*), except between the MRG and LRG (Fig. 2). In the HRG profile, participants spent significantly more time using social media, which was more than 4 h during the day (*M = 4.41; SD = 4.08*). MRG participants spent slightly more time using social media (*M = 2.75; SD = 1.90*) than LRG participants (*M = 2.39; SD = 2.42*).

Additionally, the **motivation to use social media** was significantly different between the profiles. Relationship maintenance as a motivation to use social media was the most common in the HRG, and significant differences were found among the profiles (*F = (2, 373) = 14.96; p = < 0.001*). Relaxation and escapisms (*F = (2, 373 = 40.03); p = < 0.001*) and entertainment (*F = (2, 373) = 5.84; p = .003*) motives were also highest in the HRG, and significant differences were found between the HRG and LRG (relaxing and escapism, *p = < 0.001*; entertainment, *p = .015)* and between the

Table 1 Characteristics of the risk profiles

Characteristics of the risk profiles *n* (%)	Total sample *n* = 376[a]	HRG Profile *n* = 51 (13.6%)	MRG Profile *n* = 162 (43.1%)	LRG Profile *n* = 163 (43.4%)	*p*-value, Cohen's d min-max)[h]	Comparison between the profiles, *p*-value
Gender n (%)					**0.010**	
Female (1)	303 (80.6%)	43 (14.2%)	138 (45.5%)	122 (40.3%)		
Male (2)	58 (15.4%)	6 (10.3%)	15 (25.9%)	37 (63.8%)		
Other or I don't want to tell (3)	15 (4.0%)	2 (13.3%)	9 (60.0%)	4 (26.7%)		
Age, years, mean (SD)[b]	26.07 (4.55)	26.08 (4.55)	25.43 (4.55)	26.70 (4.49)	**0.041** 0.14–0.28	HRG–MRG 0.642 HRG–LRG 0.669 MRG–LRG **0.031**
Time spent using SM, mean (SD)[b], min–max	2.81 (2.58) 0–21.71	4.41 (4.08)	2.75 (1.90)	2.39 (2.42)	**< 0.001**[c] 0.17–0.70	HRG–MRG **< 0.001** HRG–LRG **< 0.001** MRG–LRG 0.404
Motivation to use social media, mean (SD)[b]						
Relationship maintenance	3.02 (0.92)	3.54 (0.90)	3.10 (0.85)	2.79 (0.92)	**< 0.001** 0.35–0.82	HRG–MRG **0.006** HRG–LRG **< 0.001** MRG–LRG **0.005**
Relaxation and escapism	3.84 (0.76)	4.23 (0.58)	4.09 (0.55)	3.48 (0.84)	**< 0.001** 0.25–0.95	HRG–MRG 0.407 HRG–LRG **< 0.001** MRG–LRG **< 0.001**
Entertainment	3.48 (0.93)	3.72 (0.81)	3.59 (0.87)	3.30 (0.99)	**0.003** 0.87–0.99	HRG–MRG 0.668 HRG–LRG **0.015** MRG–LRG **0.015**
BSMAS[d], mean (SD)[b] min–max	11.88 (4.86) 0–30	20.96 (3.62) 16–30	13.09 (1.99) 9–18	7.83 (1.66) 5–12	**< 0.001**[c] 2.87–5.74	HRG–MRG **< 0.001** HRG–LRG **< 0.001** MRG–LRG **< 0.001**
BFI-10[e], mean (SD)[b]						
Extraversion	2.70 (1.16)	2.69 (1.01)	2.64 (1.10)	2.76 (1.27)	.620[c]	
Agreeableness	3.58 (0.80)	3.46 (0.79)	3.55 (0.74)	3.64 (0.87)	.322[c]	
Conscientiousness	3.12 (0.86)	2.86 (0.87)	3.05 (0.79)	3.26 (0.91)	**0.007**[c] 0.23–0.44	HRG–MRG **0.036** HRG–LRG **0.010** MRG–LRG 0.063
Neuroticism	3.09 (1.01)	3.77 (0.71)	3.16 (0.90)	2.79 (1.07)	**< 0.001**[c] 0.37–0.98	HRG–MRG **< 0.001** HRG–LRG **< 0.001** MRG–LRG **0.002**
Openness	3.56 (0.99)	3.69 (0.92)	3.45 (1.03)	3.63 (0.98)	0.171	
Self-esteem[f], mean (SD)[b], min–max	17.57 (6.11), 1–30	15.29 (5.60), 1–26	16.76 (5.93), 1–30	19.12 (5.60) 4–30	**< 0.001** 0.25–3.37	HRG–MRG 0.028 HRG–LRG **< 0.001** MRG–LRG **0.001**
ADHD[g], mean (SD)[b]	2.56 (1.67)	3.78 (1.39)	2.60 (1.65)	2.13 (1.59)	**< 0.001** 0.29–1.07	HRG–MRG **< 0.001** HRG–LRG **< 0.001** MRG–LRG **0.021**
Social Support, mean (SD)[b]	3.70 (1.09)	3.51 (1.26)	3.79 (1.02)	3.67 (1.09)	.286[c]	

a. Sample size varied from the total sample (*n* = 381) because of cases with missing values

b. SD = Standard deviation

c. The Brown–Forsythe test

d. The Bergen Social Media Addiction Scale (BSMAS)

e. The Big Five Inventory (BFI-10)

f. The Rosenberg Self-Esteem Scale (RSES)

g. The six-item Adult ADHD self-report scale v1.1 (ASRS)

h. Effect size

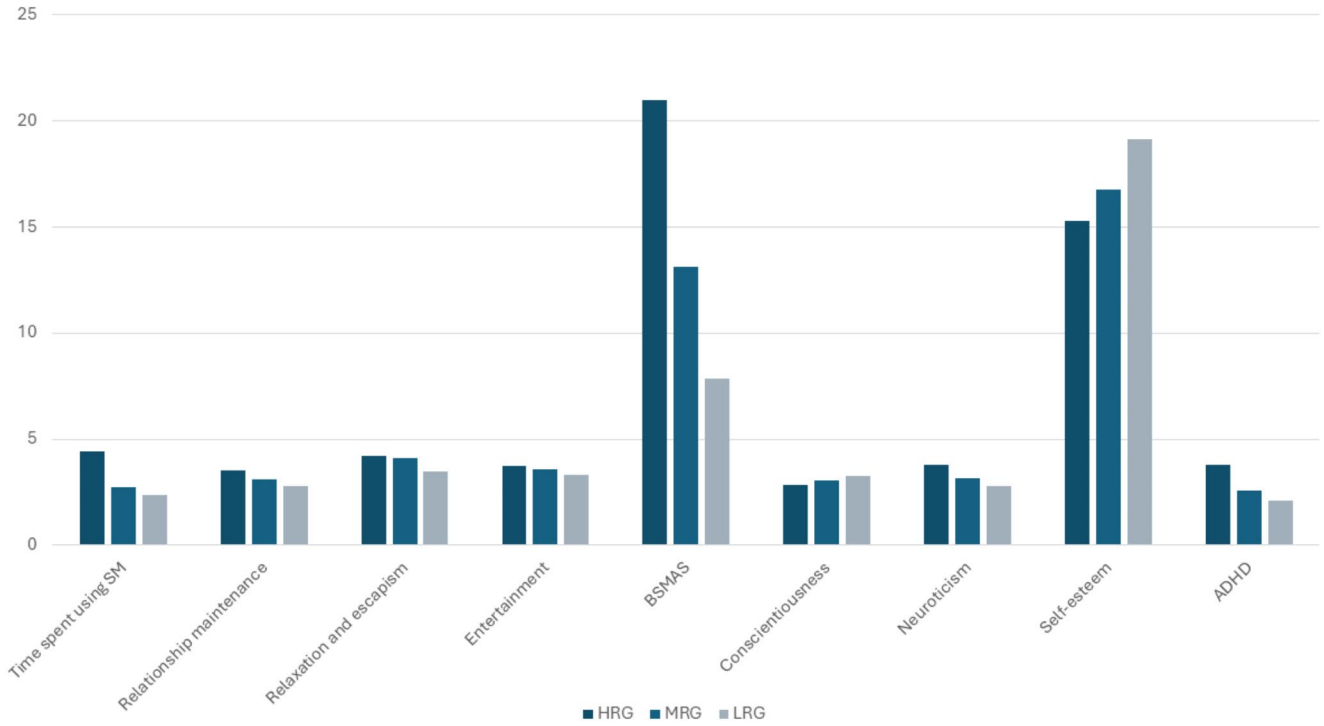

Fig. 2 Significantly differing social media use and psychosocial factors in the profiles

MRG and LRG (relaxation and escapism, $p = < 0.001$; entertainment, $p = .015$) but not between the HRG and MRG.

The personality traits (BFI-10) that exhibited significant differences between the profiles were conscientiousness ($F(2, 373) = 5.17$; $p = .007$) and neuroticism ($F(2,372) = 21.39$; $p = < 0.001$). Conscientiousness scores were lowest in the HRG ($M = 2.86$; $SD = 0.87$) and highest in the LRG ($M = 3.26$; $SD = 0.91$). In turn, neuroticism scores were highest in the HRG ($M = 3.77$; $SD = 0.71$) and lowest in the LRG ($M = 2.79$; $SD = 1.07$). Conscientiousness differed significantly between the HRG and MRG ($p = .036$), but also between the HRG and LRG ($p = .010$). Neuroticism was significantly different between the HRG and MRG ($p = < 0.001$), between the HRG and LRG ($p = < 0.001$) and between the MRG and LRG ($p = .002$).

Self-esteem ($F(2, 366) = 10.55$; $p = < 0.001$) and **ADHD** ($F(2, 372 = 21.15)$; $p = < 0.001$) were significantly different between the profiles; self-esteem was lowest in the HRG ($M = 15.29$; $SD = 5.60$), moderate in the MRG ($M = 16.76.27$; $SD = 5.93$) and highest in the LRG ($M = 19.12$; $SD = 6.12$), and ADHD symptoms were highest in the HRG ($M = 3.78$; $SD = 1.39$) and the lowest in the LRG ($M = 2.13$; $SD = 1.59$). Interestingly, self-esteem significantly differed between the HRG and LRG ($p = < 0.001$) and between the MRG and LRG ($p = .001$) but not between the HRG and MRG ($p = .279$). However, a statistically significant difference was found between every profile when comparing ADHD symptoms. **Social support** did not differ significantly between the profiles but was lowest in the HRG ($M = 3.61$; $SD = 1.26$).

The results of the logistic regression analysis, in which the HRG was compared with the LRG and MRG, are presented in Table 2. When comparing the HRG to the LRG, weekly time spent using social media ($OR = 1.23$; 95% $CI = 1.05–1.45$), relationship maintenance ($OR = 2.95$; 95% $CI = 1.61–5.40$), relaxation and escapism ($OR = 5.85$; 95% $CI = 2.62–13.11$) and neuroticism ($OR = 2.59$; 95% $CI = 1.35–4.94$) significantly predicted a greater likelihood of belonging to the HRG.

A comparison of the HRG and MRG time spent using social media ($OR = 1.20$; 95% $CI = 1.03–1.41$), relationship maintenance ($OR = 1.95$; 95% $CI = 1.22–3.11$), neuroticism ($OR = 2.42$; 95% $CI = 1.49–3.92$) and ADHD ($OR = 1.50$; 95% $CI = 1.16–1.94$) predicted belonging to the HRG.

Discussion

The current study aimed to identify the risk profiles and predictive factors of PSMU use among young Finnish adults. Three distinct profiles were identified: (1) HRG, (2) MRG and (3) LRG. This kind of profile structure is similar to earlier studies published with different populations (e.g., Bányai et al., 2017). The profiles reported different scores for different aspects of psychosocial well-being factors. Additionally, the results indicated that gender, age, time

Table 2 Comparison between the profiles' relationships with psychosocial factors via logistic regression analysis

	LRG vs. HRG			MRG vs. HRG		
	B	Exp (β)	95% Cl	B	Exp (β)	95% Cl
Time spent using SM	0.208	1.23*	1.05–1.45	0.186	1.20*	1.03–1.41
Relationship maintenance	1.08	2.95**	1.61–5.40	0.669	1.95*	1.22–3.11
Relaxation and escapism	1.77	5.85**	2.62–13.11	0.360	1.43	0.70–2.92
Entertainment	0.224	1.25	0.72–2.18	0.159	1.17	0.73–1.89
Conscientiousness	−0.195	0.823	0.44–1.54	−0.023	0.978	0.60–1.58
Neuroticism	0.950	2.59*	1.35–4.94	0.882	2.42**	1.49–3.92
Self-esteem	−0.057	0.944	0.86–1.03	0.002	1.00	0.93–1.08
ADHD	0.192	1.21	0.88–1.67	0.407	1.50*	1.16–1.94

LRG vs. HRG = low-risk group was the reference category, *MRG vs. HRG* = moderate-risk group as a reference category, *B* = regression coefficient, Exp (β) = odds ratio (OR), 95% Cl = 95% confidence interval; * = $p < .05$; ** = $p < .001$

spent using social media during a week and motivation to use social media for different purposes were significantly associated with different profiles.

Risk profiles of PSMU

The profiles were formed using the BSMAS item scores. When comparing the item loadings in different profiles, the MRG clearly received higher scores for the item 'You use social media to forget about personal problems' than for the other items. These results may indicate that social media is used as a coping method that may predispose users to PSMU. Earlier studies have obtained similar results and suggested that social media might be used to cope with negative emotions, release stress and escape from reality (Masaeli & Farhadi, 2021). Ahmed et al. (2024) suggested that social media use could amplify existing mental health problems, low self-esteem and maladaptive coping strategies. Interventions that incorporate support mechanisms and promote healthier coping strategies for individuals with negative emotions or life adversities could be advantageous in the prevention or treatment of PSMU. Noteworthy is that the survey was conducted in 2020 when the COVID-19 pandemic became a global pandemic which might have caused stress and mental health challenges to people and social media might be used as a coping method (Alimoradi et al., 2022; Hylkilä et al., 2023). In order to see if there is a variance between the results due to COVID-19 further comparative studies around the effects of COVID-19 should be conducted.

The participants who belonged to the HRG had significantly greater PSMU scores than those in the MRG and LRG. Most of the scores for those in the HRG were greater than the cut-off point (19), which indicated PSMU. As a result, the LRG exhibited minimal scores. The participants in the MGR demonstrated intermediate levels of PSMU scores, notably remaining below the established threshold for PSMU. These findings present promising implications, suggesting the importance of considering individuals within the MGR who may exhibit potential issues with PSMU but have not yet met the criteria for PSMU. According to Hylkilä et al. (2023), only 10% of the participants met with the BSMAS for PSMU, but almost 70% felt that they had problems with their social media use. This may indicate a lack of sensitivity of the used measurements (Ahmed et al., 2024) but compared with gaming, which has been included in the 11th Revision of the International Classification of Diseases (ICD-11), there is also a criterion for hazardous gaming that might develop into a gaming disorder if not addressed in time (WHO, 2020). Early identification of these problems is important. The focus should be on preventing PSMU and guiding its use in ways that promote well-being rather than complete abstinence (Kuss & Griffiths, 2017; Haddad et al., 2021). Feasible and effective regulation policies and health services are needed (WHO, 2015), highlighting the need to develop more effective programmes for identification, prevention and interventions (Moretta et al., 2023).

Variations in sociodemographic and social media use factors between the profiles

Among the sociodemographic factors, gender and age were significant predictors of being a member of different profiles. The individuals who belonged to the HRG were mainly females, and the highest proportion of men belonged instead to the LRG. Those who answered the gender question 'other or I don't want to tell' belonged mostly to the MRG, although only a few belonged to this group. Age significantly differed only between the MRG and LRG profiles, and the mean age of the MRG profile was younger than that of the other two profiles. Previous studies have reported mixed findings regarding the associations between sociodemographic factors and PSMU and associations may not be uniform in different populations (Ahmed et al., 2024). Some studies have shown associations between gender (Castrén et al., 2022), age (Hylkilä et al., 2023) and PSMU, and other studies have indicated that gender (Akbari et al., 2023a) and age are not predictive factors of PSMU. Pontes et al. (2018)

suggested that other predictive factors (e.g., psychosocial) might be more effective for PSMU, and it would be beneficial to highlight those factors in the future.

The amount of time spent using social media during a week predicted belonging to the HRG when comparing the HRG to the LRG or MRG. The amount of time spent on social media during the day was significantly greater in the HRG profiles than in the other profiles, consistent with recent systematic review findings (Sánchez-Fernández et al., 2023). Individuals who belonged to the HRG used social media for more than four hours, while in the MRG and LRG, the usage time was less than 3 h a day. This result indicates that social media usage time might predispose individuals to more severe problems with social media and that increased usage time increases the risk of PSMU. It has been suggested that spending more than 4 h online in a day may increase the likelihood of PSMU (Sánchez-Fernández et al., 2023). Also, recent meta-analysis indicated that social media use, in addition to PSMU, is associated to depression and anxiety (Ahmed et al., 2024). Because social media use is an integral part of people's lives and has many positive aspects, complete abstinence from social media could be difficult and cause challenges for people to maintain. In the future, it would be beneficial to study which kind of social media use enhances well-being and guides individuals towards healthier social media use (Kuss & Griffiths, 2017; Haddad et al., 2021). Conversely, it is crucial to include usage time in forthcoming interventions and prevention initiatives.

Earlier studies have suggested that motivation to use social media might be related to increased levels of PSMU (Wadsley et al., 2021; Hylkilä et al., 2024), and the results of the present study support this finding. Relationship maintenance, relaxation and escapism and neuroticism predicted belonging to the HRG compared with the LRG, but when comparing the HRG to the MRG, only relationship maintenance was a significant predictor. The different motivational factors that significantly affected the profiles of the individuals were categorised. A greater tendency towards relationship maintenance, the use of social media for relaxation and escapism and entertainment purposes were all more common in the HRG. Wadsley et al. (2021) suggested that the amount of time spent on social media and the frequency of checking social media were associated with different motives. More prolonged social media use was associated with self-expression, and frequency was instead associated with gaining social approval. It is important to pay attention to individuals' reasons for using social media (Hylkilä et al., 2023), and for healthier use, it would be beneficial to reduce the motivation to gain approval and make comparisons with others (Wadsley et al., 2021).

Psychosocial factors in the profiles

The results indicated that consciousness and neuroticism were the only personality traits that were significantly different between the profiles. Individuals who scored lower in conscientiousness or had higher scores in neuroticism more commonly belonged to the HRG and MRG profiles. Earlier studies on the associations between profiles and PSMU have yielded mixed results, and the direction of the association is controversial (Akbari et al., 2023c). For example, according to Kayiş et al.'s (2016) meta-analysis, all personality traits had a significant effect on PSMU. Much like the present study, conscientiousness seems to be a protective factor against PSMU, and in turn, neuroticism might predict it. Individuals characterised by conscientiousness exhibit self-discipline, which may aid in regulating their social media use. Conversely, those with elevated levels of neuroticism tend to gravitate towards online communication, potentially fostering PSMU because of feelings of insecurity and challenges related to emotion regulation (Kayiş et al., 2016; Akbari et al., 2023c). Additionally, it has been suggested that different personality traits might be associated with different forms of social media use (Kircaburun & Griffiths, 2018); for example, those with the traits of extroversion and neuroticism have more PSMU (Wang et al., 2015) and instead, being less open to experience is associated especially with problematic Facebook use (Błachnio et al., 2017). As suggested in the I-PACE model, PSMU is a wide and complex phenomenon that includes not only motivational and personality traits, but also executive functions (Akbari et al., 2023c). Although other personality traits did not significantly differ between the profiles in this study, extroversion, agreeableness and openness were lowest in the HRG or MRG, which might support earlier results indicating that these factors could be protective factors against PSMU (Kayiş et al., 2016).

Lower self-esteem (how individuals feel about themselves) is linked to profiles with higher PSMU, which is consistent with prior findings (Andreassen et al., 2017; Servidio et al., 2024). This result indicates that lower self-esteem might be a risk factor and can be exposed to PSMU. The difference was significant between the HRG and LRG but also between the MRG and LRG, hence indicating that the lower the self-esteem scores are, the more severe the problems with PSMU are. It has been suggested that individuals use social media to obtain higher self-esteem, for example, by collecting likes. Although social media could be used in safe environments to try more desirable identities, the use of social media might be a maladaptive coping strategy and be used to escape feelings of low self-esteem. People with lower self-esteem may also prefer to communicate online. (Andreassen et al., 2017; Akbari et al., 2023a.;

Servidio et al., 2024) Additionally, individuals who have PSMU and lower levels of self-esteem might have adverse effects on psychological well-being (Wang et al., 2018), and greater severity of PSMU might decrease self-esteem and social support and increase ADHD symptoms (Akbari et al., 2023a). PSMU is also associated with body image problems, and comparison on social media may mediate the relationship between PSMU and body image (Holland & Tiggemann, 2016), which also affects individuals' self-esteem. The presence of better self-esteem could mitigate susceptibility to PSMU, which is a factor worthy of consideration in future research endeavours and the formulation of intervention strategies.

ADHD symptoms were clearly more common in the HRG than in the other profiles, which indicates that more ADHD symptoms predicted belonging to the HRG. Additionally, a significant difference was found between the MRG and the LRG. ADHD symptom levels also increased between the LRG and the MRG. These findings are in line with those of previous studies (e.g., Akbari et al., 2023a; Chen et al., 2024). It has been suggested that individuals with ADHD symptoms often experience emotional dysregulation and are at risk of employing inappropriate coping strategies for life's challenges. Engaging in online activities (e.g., using social media) may serve as a coping mechanism for difficulties associated with ADHD symptoms (El Archi et al., 2022). PSMU, as well as ADHD, is associated with lifestyle factors (e.g., sleep, physical activity) and PSMU may contribute to more severe ADHD symptoms and greater problems in daily life. Characters in social media might be more attractive for person with ADHD and that is why ADHD may be a risk factor for PSMU (Thorell et al., 2024).

Social support was not associated with the profiles, even though some earlier findings have indicated that good social support might act as a protective factor against PSMU (Akbari et al., 2023a) and especially online social support might act as a risk factor (Ma et al., 2025). On the other hand, social support was measured with only one question, which might have affected the results. Although social support did not differ significantly between the profiles, it is important to consider the social aspect of social media use. In the present study, one important motive for using social media was relationship maintenance, and lower satisfaction with social relationships was associated with PSMU (Hylkilä et al., 2023). Communication through social media might weaken people's communication skills and offline social support, resulting in social anxiety (Wu et al., 2024).

Findings concerning psychological factors concerning profiles among young adults are in line with previous findings considering the adolescent population (Akbari et al., 2023a). Unhealthy behaviours which are adopted at a younger age might occur as a habit in later adulthood (Demetriou et al., 2019) and early-stage prevention programs are needed.

Limitations

The current study has several limitations that should be considered. First, because of the cross-sectional design, causal relationships cannot be found, and longitudinal studies are needed in the future. Second, even though the inclusion criteria included all of the Finnish young adults aged 18–35 years and a convenience sampling method was used, only a small part of the target group participated in the study. Finland is an individualistic culture which needs to be taken into consideration while comparing the results with other cultures. Also, most of the participants were women which needs to be considered. This may limit the generalizability of the findings. Third, the data were collected with self-reported measures, which may have biased the results. Fourth, the data were collected during the COVID-19 pandemic and during the lockdowns in Finland, which might have affected the study results. For example, the COVID-19 pandemic increased social media usage (Hylkilä et al., 2023) and might have caused stress and other psychological problems. COVID-19 might have also affected to individuals' psychosocial well-being which could reflect to the results. Fifth, social support was measured only with one question which did not separate online and offline social connections and perceived support, which might affect the results. It also might explain the non-significant findings related to social support. Sixth, the developed scale to measure motivation to use social media had quite low Cronbach's alpha scores which needs to be noted.

Societal impact and future directions

Regarding the study's limitations, the present study has identified three different risk profiles and possible predictive factors that should be considered. One particularly important point of the study is that the profiles among young adults are in line with other age groups which could highlight the importance of preventive actions. In addition, findings demonstrate the contributions of ADHD symptoms and motivational factors to the severity of PSMU. Also, the study builds an understanding of PSMU among the Finnish population and the findings could be mirrored in other developed countries. The study results can be used for the prevention of PSMU and the identification of risk groups who might develop PSMU at an early stage by social and healthcare professionals. These different risk factors and profiles should be noted in social and healthcare professionals' education so that they can gain good competence in digital well-being to meet, recognise and treat individuals who

Table 3 Motivation to use social media factor loading

Items	Factor loading		
	1	2	3
Factor 1: Relationship maintenance			
On social media, it is important for me to express myself	0.909		
On social media, it is important for me to produce or share content (e.g., update status, share videos or pictures)	0.702		
On social media, it is important for me to meet new people	0.475		
On social media, it is important for me to maintain relationships	0.411		
Factor 2: Relaxation and escapism			
On social media, it is important for me to relax		0.748	
On social media, it is important for me to escape unpleasant thoughts		0.610	
On social media, it is important for me to spend time and entertain myself		0.466	
Factor 3: Entertainment			
On social media, it is important for me to follow content produced by others			0.736
On social media, it is important for me to follow public figures			0.544
Cronbach's alpha	0.72	0.63	0.56
Cronbach's alpha on total scale	0.654		

have problems with PSMU. Additionally, these results could be used in prevention programmes and intervention development to develop effective, evidence-based programmes to address PSMU and guide individuals to use social media in healthier ways. In addition, the study results provide information for individuals. Individuals should pay attention to how much they are using social media, why they are using it (e.g., relaxing, escaping negative feelings) and whether they are relying on social media to communicate with others and replace face-to-face communication, which are all risk factors for PSMU. An individual can influence the previously mentioned actions and reduce the risk of developing PSMU.

Future studies are needed to determine the causal relationships between different factors and PSMU. Interventions to address and prevent PSMU are needed in the future. In addition, professionals (e.g., social and health care professionals) need education about PSMU, tools to recognise PSMU, and how to guide individuals to engage in healthier social media use.

Conclusion

Taken together, the present study has provided novel evidence of potential risk profiles and predictive factors for PSMU and strengthens the evidence of different levels of risk groups. The findings highlight three significantly different profiles: HRG, MRG and LRG. In particular, it is important to consider that the use of social media as a coping strategy may increase the probability of individuals belonging to MRGs or even HRGs. The results have shown different personal and psychosocial features mediate the severity of PSMU and might dispose of it. The results of the present study, along with what has previously been reported, highlight the importance of considering different sociodemographic and psychosocial factors when identifying individuals who might be at risk of developing PSMU. In addition, it is important to identify individuals who are at moderate risk at as early a stage as possible to prevent more severe problems from occurring. The results can be used to develop feasible and effective regulation policies and programmes to identify and prevent PSMU.

Appendix 1

Author contributions **Krista Hylkilä**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Visualization **Niko Männikkö**: Conceptualization, Supervision, Writing - Review & Editing. **Maria Kääriäinen**: Conceptualization, Supervision, Writing - Review & Editing. **Aino Peltonen**: Writing - Review & Editing. **Sari Castrén**: Conceptualization, Writing - Reviewing and Editing. **Terhi Mustonen**: Conceptualization, Writing - Review & Editing. **Jenni Konttila**: Writing - Review & Editing.

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Data availability The data generated during and/or analysed during the current study are not publicly available nor are they available on request due to its sensitivity and lack of relevant approvals of the participants.

Declarations

Ethics approval The research protocol was approved by the University of Oulu and the Regional Ethics Committee of the Northern Ostrobothnia Hospital District (60/2020).

Informed consent The participants provided informed consent to be included in the study by clicking the approval button before filling out the main survey.

Competing of 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.

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