



# The associations between attachment, self-esteem, fear of missing out, daily time expenditure, and problematic social media use: A path analysis model

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## ABSTRACT

The present study investigated the factors that may be associated with a dysfunctional use of social media use, by exploring the association between adult attachment patterns and problematic social media use and analyzing the sequential mediation of self-esteem, fear of missing out (FoMO), and time spent on social media. A sample of 470 social media users ( $M_{age} = 33.76$  years;  $SD = 14.267$ ; 70 % women) completed the Bergen Social Media Addiction Scale, Fear of Missing Out Scale, Rosenberg Self-Esteem Scale, and Relationship Questionnaire. Results showed a path analysis model providing an excellent fit to the data ( $\chi^2 = 2.939$ ,  $p = 0.230$ ;  $GFI = 0.998$ ,  $TLI = 0.987$ ,  $CFI = 0.998$ ,  $RMSEA = 0.032$ ,  $SRMR = 0.016$ ). A significant and positive total effect in the associations between preoccupied and fearful attachment patterns and problematic social media use emerged. Both preoccupied and fearful attachment patterns were also related to self-esteem, FoMO, and time spent on social media, which were sequentially associated and were, in turn, significantly related to problematic social media use. Finally, when self-esteem, FoMO, and time spent on social media were added into the model, they totally mediated the relationships between preoccupied and fearful attachment patterns and problematic social media use, suggesting a full multiple mediation model ( $R^2 = 0.33$ ). Such data may provide useful information for clinical practice to develop tailored interventions and prevention programs to address the compensatory and problematic use of social media.

## 1. Introduction

Problematic social media use refers to excessive and uncontrollable use of social media to the extent that symptoms akin to behavioral addiction occur, clinically impairing other aspects of daily life and causing a deterioration in personal, social, and professional functioning (Andreassen & Pallesen, 2014; Kuss & Griffiths, 2017; Sun & Zhang, 2021). Although social media can be useful in the dissemination of information (Carlson et al., 2016), as well as for the creation and maintenance of relational networks in the absence of space–time constraints (Savci et al., 2020), problematic (and in extreme cases pathological) use can be the source of numerous problems for the psychophysical health of individuals (Kuss & Griffiths, 2017). Previous research has shown that problematic social media use is associated with dissatisfaction and difficulties in interpersonal relationships (Müller et al., 2016), work problems (Zivnuska et al., 2019), sleep disorders (Szczygiel &

Podwalski, 2020), depression (Keles et al., 2020), anxiety (Liu & Ma, 2020), and poor life satisfaction (Błachnio et al., 2016). Because of this, the exploration of the psychosocial variables underlying this phenomenon has acquired growing research interest (see Sun & Zhang, 2021 for a review) and can have important implications for clinical practice. Within this framework, the present study examined the factors that may be associated with problematic social media use, by investigating the role of attachment styles, self-esteem, fear of missing out (FoMO), and time spent on social media.

For this purpose, Compensatory Internet Use Theory (Kardefelt-Winther, 2014) was adopted as the theoretical reference model for the present study. This theory states that individuals may use the internet to compensate for real-life social lacks and/or fulfill specific psychological needs, favouring the development of addiction in individuals at risk (Kardefelt-Winther, 2014). According to perspectives considering internet addiction as an umbrella construct (Baggio et al., 2018), the

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specific application of the Compensatory Internet Use Theory to problematic social media use has found increasing acceptance in the scientific literature (Casale, 2020). In line with this position, an insecure attachment may trigger maladaptive and compensatory reactions leading to a search for attachment objects through the internet (e.g., Ding et al., 2022), and may therefore be an important risk factor in the development of problematic social media use (see D'Arienzo et al., 2019) for a review).

Indeed, Flores (2004) viewed addiction as an attachment disorder. Attachment theory is an evolutionary perspective on psychological functioning that highlights how the bond between a child and their primary caregiver plays a vital role not only in childhood but also in adulthood by providing the script for future close relationships and influencing an individual's way of being in a relational environment (Bartholomew & Horowitz, 1991; Bowlby, 1988). The quality of attachment in the adult may influence well-being levels (Stevenson et al., 2019) and can play a key role in both addiction vulnerability (Gori, Topino, Craparo, et al., 2022) and severity (Gori, Topino, Cacioppo, et al., 2022). While previous research has shown that a secure adult attachment pattern is associated with an increase in satisfaction with life and unrelated to problematic social media use (Stöven & Herzberg, 2021), in their systematic literature review, D'Arienzo et al. (2019) highlighted the predictive role of anxious and avoidant insecure attachment in the development of problematic social media use. However, they also reported that avoidant attachment was associated with problematic social media use only among individuals who also had a high level of attachment anxiety. In this regard, Bartholomew (1990; Bartholomew & Horowitz, 1991) conceptualized anxiety and avoidance attachment as dimensional (rather than categorical), whose interaction can determine four adult attachment styles: secure attachment (low anxiety and low avoidance), fearful attachment (high anxiety and high avoidance), preoccupied attachment (high anxiety and low avoidance), and dismissing attachment (low anxiety and high avoidance). Consistent with the findings of D'Arienzo et al. (2019), studies including the description of adult attachment styles by Bartholomew (1990; Bartholomew & Horowitz, 1991) have shown that (i) university students with high levels of fearful and preoccupied attachment styles have higher levels of problematic social media use (Demircioğlu & Köse, 2020), and (ii) there are no differences between more or less active social media users in relation to a dismissing attachment style (Andangsari et al., 2013).

In parallel, previous research has also shown the predictive role of fearful and preoccupied attachment styles, and more generally, an anxious attachment style not only in the development of problematic social media use, but also for other variables that could influence this relationship such as self-esteem (Khoshkam et al., 2012; Stănculescu & Griffiths, 2021) and FoMO (Liu & Ma, 2019). Indeed, individuals with attachments characterized by high levels of anxiety tend to report a negative self-conception, attention-seeking and/or reassurance-seeking as strategies to cope with their insecurities. Moreover, such individuals have a high activation of attachment needs, and fear of abandonment (Bartholomew & Horowitz, 1991; Brennan et al., 1998) which can result in problematic compensatory use of social media (Kardefelt-Winther, 2014).

The concept of self-esteem indicates the global value that individuals place on themselves (Rosenberg, 1979). Empirical studies have highlighted the association between self-esteem and subjective well-being (Pandey et al., 2021), life satisfaction (Błachnio et al., 2016), happiness (Du et al., 2017), and mental health (Sowislo & Orth, 2013). Moreover, previous research has consistently shown that lower self-esteem may be a risk factor for different forms of addiction (Gori et al., 2021a, 2021b), including that due to problematic use of social media (Kircaburun et al., 2019; Weaver & Swank, 2021). Similarly, self-esteem has been found to be negatively associated with FoMO (Weaver & Swank, 2021), which could be a mediating element in this relationship, as supported by longitudinal research highlighting that decreased

self-esteem might lead to a potentially detrimental cycle of FoMO-inspired online SNS use (Buglass et al., 2017). Indeed, individuals with low self-esteem experience feelings of helplessness, greater social anxiety, isolation, and fear of being excluded (De Jong et al., 2012; Goswick & Jones, 1981; Kim, 2022) and, in line with the Compensatory Internet Use Theory (Kardefelt-Winther, 2014), individuals may use social media to search for a compensation in perceived lack of social connection needs satisfaction (Fang et al., 2020; Forest & Wood, 2012).

FoMO is a pervasive fear of being excluded from and/or losing rewarding experiences lived by others (Przybylski et al., 2013). FoMO has been associated with a range of negative life experiences and feelings (Gupta & Sharma, 2021) and has been found to be inversely proportional to life satisfaction (Błachnio & Przepiórka, 2018; Przybylski et al., 2013). Moreover, given its characteristics, the construct of FoMO has received a lot of recent empirical attention in the field of social media use, since this can be an effective way to stay in contact with others and get information on the experiences they live (see Fioravanti et al., 2021 for a review). FoMO has consistently been shown to be a significant predictor of problematic social media use (Blackwell et al., 2017).

Finally, previous evidence has shown that time expenditure is another key predictor of problematic social media use (Liu & Ma, 2018). Indeed, individuals with problematic social media use report significantly greater use of social media than non-problematic users (Luo et al., 2021). Furthermore, the time spent on social media has been predicted by both self-esteem and FoMO (Andreassen et al., 2017; Blackwell et al., 2017), supporting the possibility of time expenditure being a significant mediator in the relationship between these variables and problematic social media use.

Based on this theoretical and empirical framework, the present study investigated the relationships between factors that may influence the levels of problematic social media use among social media users. More specifically, the present study adds a further contribution to knowledge in this field by using the articulated conception of adult attachment of Bartholomew (1990; Bartholomew & Horowitz, 1991) to assess the associations between attachment styles and problematic social media use, as well as considering the role of self-esteem, FoMO, and time spent on social media in these associations. A path analysis was performed which hypothesized that self-esteem, FoMO, and time spent on social media would be significant mediators in the relationships between the fearful and preoccupied adult attachment patterns and problematic social media use (see Fig. 1). More specifically, it was hypothesized that: (i) preoccupied and fearful attachment patterns will show a significant and positive relationship with problematic social media use ( $H_1$ ); (ii) preoccupied and fearful attachment will be significantly and positively associated with self-esteem and FoMO ( $H_2$ ); (iii) self-esteem will be significantly and negatively associated with FoMO ( $H_3$ ); (iv) both self-esteem and FoMO will be significantly associated with time spent on social media ( $H_4$ ); (v) self-esteem, FoMO, and time spent on social media will be associated with problematic social media use ( $H_5$ ); and (vi) self-esteem, FoMO, and time spent on social will mediate the relationship between preoccupied and fearful attachment patterns and problematic social media use ( $H_6$ ).

## 2. Method

### 2.1. Participants, procedure, and ethics

The sample comprised 470 participants who were daily social media users. Their age ranged from 18 to 81 years ( $M_{age} = 33.76$ ;  $SD = 14.267$ ). As described in Table 1, most participants were female (70 %), single (59 %), employed (35 %), and had a high school diploma (37 %). All the participants were recruited online, by posting a link to the online survey hosted on the *Google Forms* platform on the authors' social media accounts. Before collecting the data, each participant was informed about the general objective of the study and all of them provided electronic

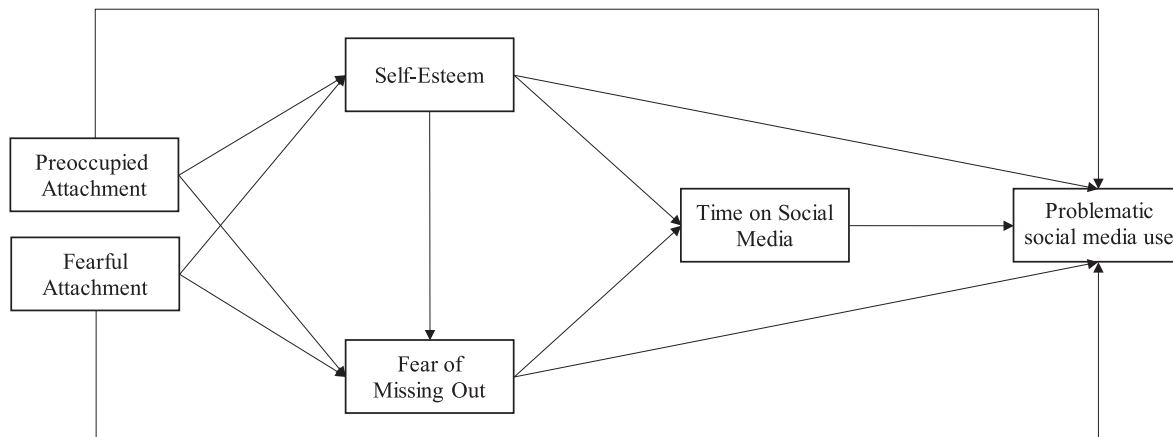


Fig. 1. The hypothesized multiple mediation model.

Table 1  
Demographic characteristics of the sample (N = 470).

Characteristics	M ± SD	N (%)
Age	33.76 ± 14.267	
Sex		
	<i>Males</i>	140 (29.8 %)
	<i>Females</i>	330 (70.2 %)
Marital Status		
	<i>Single</i>	277 (58.9 %)
	<i>Married</i>	80 (17.0 %)
	<i>Cohabiting</i>	91 (19.4 %)
	<i>Separated</i>	5 (1.1 %)
	<i>Divorced</i>	13 (2.8 %)
	<i>Widowed</i>	4 (0.9 %)
Education		
	<i>Middle School diploma</i>	19 (9.6 %)
	<i>High School diploma</i>	172 (36.6 %)
	<i>University degree</i>	127 (27.0 %)
	<i>Master's degree</i>	107 (22.8 %)
	<i>Post-lauream specialization</i>	45 (9.6 %)
Occupation		
	<i>Student</i>	108 (23.0 %)
	<i>Working student</i>	68 (14.5 %)
	<i>Artisan</i>	4 (0.9 %)
	<i>Employee</i>	163 (34.7 %)
	<i>Entrepreneur</i>	11 (2.3 %)
	<i>Freelance</i>	43 (9.1 %)
	<i>Retired</i>	35 (7.4 %)
	<i>Trader</i>	2 (0.4 %)
	<i>Homemaker</i>	9 (1.9 %)
	<i>Manager</i>	5 (1.1 %)
	<i>Unemployed</i>	22 (4.7 %)
Time spent on social media (daily)		
	<i>Less than one hour</i>	63 (13.4 %)
	<i>From 1 up to 2 h</i>	200 (42.6 %)
	<i>More than 2 up to 5 h</i>	173 (36.8 %)
	<i>More than 5 up to 10 h</i>	29 (6.2 %)
	<i>More than 10 h</i>	5 (1.1 %)

informed consent. Data were collected anonymously, and privacy was guaranteed. The study was approved by the first author's institutional Ethical Committee.

2.2. Measures

2.2.1. Bergen Social Media Addiction Scale (BSMAS)

The BSMAS (Andreassen et al., 2016; Italian version: Monacis et al., 2017b) is a six-item self-report scale used to assess problematic social media use, by evaluating core addiction elements (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse; Griffiths, 2005). Items are rated on a five-point Likert scale from 1 ("very rarely") to 5 ("very often"). The total score of the Italian version was used in the

present study and showed good internal consistency ( $\alpha = 0.79$ ;  $\omega = 0.79$ ).

2.2.2. Fear of Missing Out Scale (FoMOS)

The FoMOS (Przybylski et al., 2013; Italian version: Casale & Fioravanti, 2020) is a 10-item self-report scale used to assess fear of missing out. Items are rated on a five-point Likert scale from 1 ("Not at all true of me") to 5 ("Extremely true of me"). The total score of the Italian version was used in the present study and showed very good internal consistency ( $\alpha = 0.87$ ;  $\omega = 0.88$ ).

2.2.3. Rosenberg Self-Esteem Scale (RSES)

The RSES (Rosenberg, 1979; Italian version: Prezza et al., 1997) is a

10-item self-report scale used to assess global self-esteem. Items are rated on a four-point Likert scale, from 0 (“strongly agree”) to 3 (“strongly disagree”). The total score of the Italian version was used in the present study and showed good internal consistency ( $\alpha = 0.90$ ;  $\omega = 0.89$ ).

2.2.4. Relationship Questionnaire (RQ)

The RQ (Bartholomew & Horowitz, 1991; Italian version: Carli, 1995) is a four-item self-report scale used to assess adult attachment patterns (i.e., secure, dismissing, preoccupied, and fearful attachment). Items are rated on a seven-point Likert, from 1 (“It does not describe me at all”) to 7 (“It very much describes me”). The Italian version was used in the present study and since the four attachment styles are assessed with a single item, the alpha and omega coefficient cannot be calculated.

2.3. Data analysis

The collected data were analyzed using SPSS (v. 21.0; IBM, New York, USA), JAMOVI (The Jamovi Project, 2022), and AMOS (v. 24.0; IBM, New York, USA) for Windows. Descriptive statistics, Pearson correlation, and multiple linear regression were performed. Using only the attachment patterns that showed a significant relationship with problematic social media use, the path modeling approach (Bollen & Long, 1993) was used to investigate the hypothesized model. The statistical fit of the model was evaluated based on a range of goodness-of-fit indicators: the model Chi-square ( $\chi^2$ ), with  $p > 0.05$  indicative of good fit; Hu & Bentler, 1999); the Goodness of Fit (GFI), Tucker Lewis index (TLI), and the Comparative Fit Index (CFI), with a reasonable fit for values above 0.90 (Hu & Bentler, 1999; Kline, 2015); the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR), with 0.08 or below indicative of reasonable fit (Hooper et al., 2008; Marsh & Hocevar, 1985). The  $R^2$  index was also calculated ( $R^2 < 0.02 =$  very weak effect;  $0.02-0.12 =$  weak effect;  $0.13-0.26 =$  moderate effect;  $R^2 > 0.26 =$  substantial effect; Cohen, 1988). Finally, the bias-corrected bootstrap procedure (5000 bootstrapped samples) was used to test the statistical stability of the model, supporting the significance of the effects if the 95 % bias-corrected bootstrap confidence intervals (from Lower Limit Confidence Interval [Boot LLCI] to Upper Limit Confidence Interval [Boot ULICI]) did not contain zero.

3. Results

3.1. Descriptive statistics and correlations

Descriptive statistics for the sample and the measures are shown in Table 1 and Table 2, respectively. Most participants reported spending on average from 1 to 2 h (43 %) or more than 2 h up to 5 h (37 %) on social media each day. Table 2 also shows the correlation between the variables. Problematic social media use was significantly and positively associated with fearful attachment, preoccupied attachment, and FoMO. Furthermore, problematic social media use was significantly and

negatively correlated with self-esteem.

3.2. Regression analysis

The multiple linear regression analysis ( $R^2 = 0.122$ ,  $F_{4,465} = 16.160$ ,  $p < 0.001$ ) showed that only preoccupied and fearful attachment styles were significant predictors of problematic social media use ( $\beta = 0.24$ ,  $p < 0.001$  and  $\beta = 0.18$ ,  $p < 0.001$ , respectively), whereas secure and dismissing attachment were not ( $p = 0.992$  and  $p = 0.340$ , respectively).

3.3. Path analysis

Based on the regression analysis, preoccupied and fearful attachment styles were the only patterns included in the path analysis. The emerging multiple mediation model showed an excellent fit to the data:  $\chi^2 (2) = 2.939$  ( $p = 0.230$ ), GFI = 0.998, TLI = 0.987, CFI = 0.998, RMSEA = 0.032, SRMR = 0.016 (see Fig. 2).

More specifically, preoccupied and fearful attachment patterns were significantly related with self-esteem and FoMO. Furthermore, self-esteem was significantly negatively associated with problematic social media use, and both showed a significant relationship with the time spent on social media. Moreover, a significant influence on problematic social media use was found from self-esteem, and time spent on social media. When included in the model, these variables totally mediated the effect of preoccupied and fearful attachment patterns on problematic social media use, determining non-significant direct effects (see Fig. 2 and Table 3). The total model explained 33 % of the total variance ( $R^2 > 0.26 =$  substantial effect). Finally, the bias-corrected bootstrap procedure (5000 bootstrapped samples) confirmed the statistical stability of the full multiple mediation model (see Table 3).

4. Discussion

Information and communication technologies in the internet age favor the emergence and growth of opportunities and resources, but at the same time, they also determine important challenges relating to the relationship between well-being and the digital world (Lin et al., 2011; Machimbarrena et al., 2018). In this regard, improper and problematic use of social media can be the source of an impairment of the users’ psychosocial functioning and health (Hussain & Griffiths, 2021; Rasmussen et al., 2020), and, given the rapid evolution of social media and its presence in daily life, this behavior has led to increasing attention from researchers and mental health professionals. Therefore, to enhance the current knowledge base and to provide information for intervention programs, the present study investigated a number of key psychosocial factors underlying problematic social media use, by specifically focusing on attachment styles, self-esteem, FoMO, and daily time spent on social media.

In relation to adult attachment patterns, the fearful and preoccupied styles showed significant effects in the relationship with problematic social media use. These data are part of the growing empirical evidence

Table 2  
Pearson correlations and descriptive statistics of the variables.

	1	2	3	4	5	6	7
1. Problematic social media use	1						
2. Secure attachment	-0.071	1					
3. Preoccupied attachment	<b>0.264**</b>	<b>-0.199**</b>	1				
4. Fearful attachment	<b>0.299**</b>	<b>-0.119**</b>	<b>0.328**</b>	1			
5. Dismissing attachment	0.035	<b>-0.142**</b>	0.044	-0.063	1		
6. Self-esteem	<b>-0.359**</b>	<b>0.267**</b>	<b>-0.386**</b>	<b>-0.369**</b>	0.028	1	
7. Fear of missing out	<b>0.451**</b>	-0.078	<b>0.378**</b>	<b>0.383**</b>	<b>-0.102*</b>	<b>-0.476**</b>	1
8. Time spent on social media	<b>0.431**</b>	-0.010	<b>0.154**</b>	<b>0.190**</b>	-0.054	<b>-0.245**</b>	<b>0.244**</b>
M	12.764	3.328	2.998	2.438	3.174	20.662	21.851
SD	4.575	1.828	1.73	1.676	1.757	5.983	8.105

Note: Bold values indicate significant p-values. \*\*Correlation is significant at the  $p < 0.01$  level (2-tailed). \*Correlation is significant at the  $p < 0.05$  level (2-tailed).

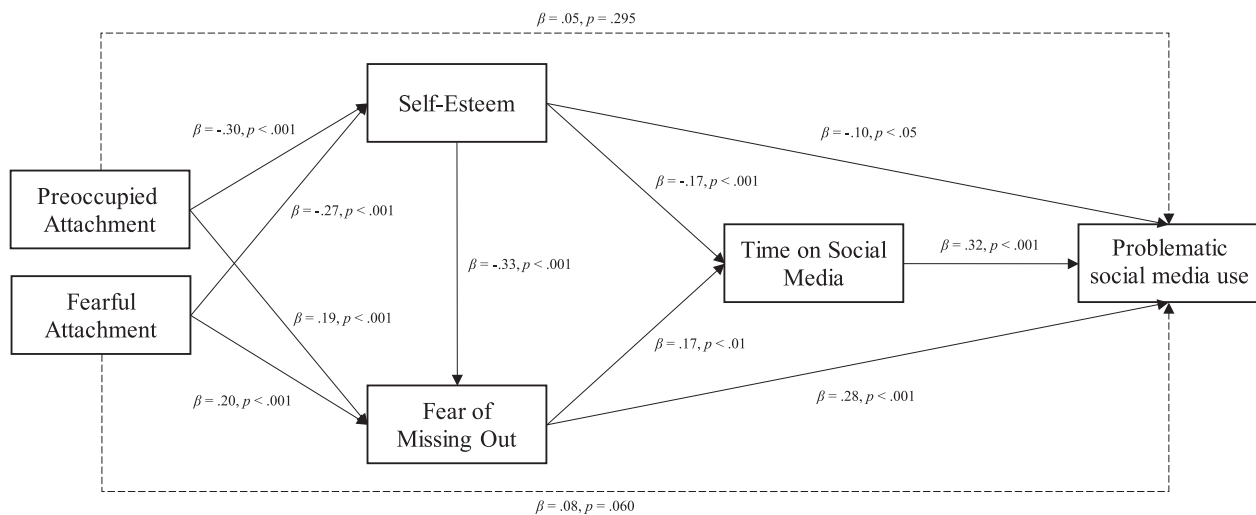


Fig. 2. Path analysis depicting direct and indirect effects of preoccupied and fearful attachment on problematic social media use, exploring the role of self-esteem, fear of missing out, and time spent on social media: A full multiple mediation model.

Table 3  
Coefficients of the full multiple mediation model.

	Estimate	SE	p	BootLLCI	BootULCI
<i>Total effects</i>					
Preoccupied → Problematic social media use	0.487	0.112	<0.001	0.265	0.856
Fearful → Problematic social media use	0.594	0.132	<0.001	0.345	0.704
<i>Direct effects</i>					
Preoccupied → Problematic social media use	0.118	0.113	0.295	-0.105	0.344
Fearful → Problematic social media use	0.218	0.116	0.060	-0.029	0.472
<i>Partial indirect effects</i>					
Preoccupied → Self-esteem → Problematic social media use	0.081	0.038	0.020	0.012	0.163
Preoccupied → Fear of missing out → Problematic social media use	0.136	0.040	<0.001	0.067	0.223
Preoccupied → Self-esteem → Time → Problematic social media use	0.072	0.021	<0.001	0.039	0.122
Preoccupied → Fear of missing out → Time → Problematic social media use	0.026	0.011	<0.001	0.009	0.053
Preoccupied → Self-esteem → Fear of missing out → Problematic social media use	0.041	0.016	<0.001	0.017	0.079
Preoccupied → Self-esteem → Fear of missing out → Time → Problematic social media use	0.014	0.005	<0.001	0.006	0.028
Fearful → Self-esteem → Problematic social media use	0.076	0.036	0.016	0.014	0.155
Fearful → Fear of missing out → Problematic social media use	0.151	0.047	<0.001	0.071	0.257
Fearful → Self-esteem → Time → Problematic social media use	0.068	0.020	<0.001	0.036	0.117
Fearful → Fear of Missing Out → Time → Problematic social media use	0.028	0.011	<0.001	0.011	0.056
Fearful → Self-esteem → Fear of missing out → Problematic social media use	0.039	0.016	<0.001	0.015	0.078
Fearful → Self-esteem → Fear of missing out → Time → Problematic social media use	0.013	0.005	<0.001	0.006	0.026
<i>Total indirect effects</i>					
Preoccupied → Problematic social media use	0.369	0.064	<0.001	0.252	0.502
Fearful → Problematic social media use	0.376	0.072	<0.001	0.245	0.529

regarding the association between insecure attachment styles and online behavioral addictions (Schimmenti et al., 2014; Topino et al., 2022), and supports a broader theoretical framework that highlights the role of attachment as a common risk factor for addictions more generally (Alvarez-Monjaras et al., 2019; Flores, 2004; Strathearn et al., 2019), by showing different interactions with other specific aspects based on the behavior central to the disorder (Monacis et al., 2017a). Furthermore, such results enrich the findings of previous research which has highlighted a predictive association between anxious attachment and problematic social media use (Worsley et al., 2018). Indeed, both preoccupied and fearful attachment styles are characterized by high levels of anxiety (Bartholomew & Horowitz, 1991; Sun & Zhang, 2021). Therefore, individuals with anxious patterns show a hyperactivated attachment system, with fear of rejection and the need for closeness, and it appears plausible that this could foster problematic use of social media as a way of seeking belonging and reassurance online (Worsley et al., 2018).

On the other hand, no associations were found between dismissing and secure attachment and problematic social media use, in line with previous research (Demircioğlu & Göncü Köse, 2021; Stöven &

Herzberg, 2021). Indeed, contrary to other insecure patterns, the dismissing style (low anxiety and high avoidance) is characterized by a hypoactivation of the attachment system (Bartholomew & Horowitz, 1991), which could lead to a much greater disinterest in the use of social media as a means for interaction (Lin, 2016). Furthermore, securely attached individuals tend to report more satisfying social relationships and functional stress coping strategies (Welch & Houser, 2010; Winterheld, 2016), and may therefore not have a need for a compensatory (and problematic) use of social media (Kardefelt-Winther, 2014).

The results of the present study also highlighted that the associations between fearful and preoccupied attachment patterns and problematic social media use mainly occur indirectly, involving the consequential effects of self-esteem, FoMO, and daily time spent on social media, fully confirming all six hypotheses (H<sub>1</sub> to H<sub>6</sub>). More specifically, both fearful and preoccupied attachment showed a significant total effect in their relationship with problematic social media use (H<sub>1</sub>). Furthermore, fearful and preoccupied attachment styles were also negatively associated with self-esteem (H<sub>2</sub>), and lower levels of self-esteem were associated with higher levels of problematic social media use (H<sub>5</sub>). These data can be understood in the light of the negative conception of the self of

both fearful attachment (negative conception of oneself and the other) and preoccupied attachment (negative conception of oneself and positive of the other; Bartholomew & Horowitz, 1991), which can be a source of low self-esteem. In line with the Compensatory Internet Use Theory (Kardefelt-Winther, 2014), problematic use of social media can therefore represent a dysfunctional strategy to seek external resources that compensate for the lack of self-acceptance and that allow escaping from feelings of low self-esteem (Andreassen, Pallesen, & Griffiths, 2017; Stănculescu & Griffiths, 2021).

Furthermore, fearful and preoccupied attachment patterns ( $H_2$ ) and self-esteem were significantly associated with FoMO ( $H_3$ ), which in turn was associated with problematic social media use ( $H_5$ ). These results echo those of Stănculescu and Griffiths (2021) who identified the chained predictive role of anxious attachment, low self-esteem, and need to belong in relation to Facebook addiction. This can be understood by considering the fear of rejection among individuals with anxious attachment styles (fearful and preoccupied), which manifests itself in a greater need for social approval and higher fear of exclusion, resulting in problematic social media use as an attempt to mitigate emotional frustration (Lai et al., 2016; Stănculescu & Griffiths, 2021).

Finally, in this indirect path, both self-esteem and FoMO showed a significant influence on the final mediating variable (i.e., time spent on social media;  $H_4$ ), which was in turn significantly and positively associated with problematic social media use ( $H_5$ ). This is in line with previous evidence showing that time spent using social media is inversely proportional to self-esteem (Mann & Blumberg, 2022) and directly proportional to FoMO (Blackwell et al., 2017). Individuals with these characteristics could use social media sites to seek confirmation and engagement with others, and this appears to be associated with greater absorption (Weaver & Swank, 2021) and therefore more time spent on these platforms, which in turn is one of the major predictors of their problematic use (Giota & Kleftras, 2013). In other words, these findings support the significant full mediation of self-esteem, FoMO, and time spent on social in the relationship between preoccupied and fearful attachment patterns and problematic social media use ( $H_6$ ).

The present study has some limitations that need to be considered. First, the use of a non-clinical convenience sample comprising Italians only may affect the generalizability of the study's findings. Future studies should replicate the findings among both clinical and non-clinical samples recruited with different sampling methods with cohorts from different countries and cultures. Furthermore, the cross-sectional design means there is a need to be cautious in interpreting causal relationships between the variables. Therefore, the implementation of longitudinal research studies could delineate the causal relationships more rigorously. Moreover, the data were self-report and, therefore, exposed to the risk of biases (e.g., social desirability). A multi-method approach (e.g., by integrating observational and/or experimental methods) may overcome this issue in future research. Finally, the specificity of the explored effects for problematic social media use was not investigated in the present study. The analysis of the differences and similarities in the role of the studied variables based on the type of addiction (e.g., Monacis et al., 2017a) should also be investigated in future research. Finally, future research may also extend the present study by considering other relevant evidence on the antecedents of problematic social media use (e.g., personality, emotional intelligence, perceived stress, to name a few; Sheldon et al., 2021; Süral et al., 2019; Arrivillaga et al., 2022) and elaborating a broader model that integrates different theoretical perspectives (see Sun & Zhang, 2021 for a review).

## 5. Conclusions

The growth of society's digitization and internet access has led to numerous changes in daily work and leisure habits. Indeed, numerous activities, such as social interaction (Kuss & Griffiths, 2017), shopping (Gori, Topino, Casale, 2022), information-seeking (Baerg & Bruchmann, 2022), gambling (Topino, Gori, & Cacioppo, 2021), or gaming (Kuss &

Griffiths, 2012), can now be carried out online but some online features (e.g., speed, 24/7 access and availability, affordability, convenience, perceived anonymity, online disinhibition, etc.; Griffiths, 2003; Rogier et al., 2021) combined with individuals' particular vulnerabilities may facilitate addictive behaviors. The present study focused on the factors that can influence the development of problematic social media use, by considering the effect of adult attachment patterns, self-esteem, FoMO, and time spent on social media, using the Compensatory Internet Use Theory (Kardefelt-Winther, 2014) as its theoretical framework. The results obtained offer novel insights to enrich clinical practice, highlighting the significant role of the analyzed variables and, therefore, the possibility of incorporating them in therapeutic interventions and prevention programs.

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## Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Ethical Committee of the Integrated Psychodynamic Psychotherapy Institute (IPPI) (IPPI; ethical approval number 002/2022) and with Declaration of Helsinki of 1975, revised in 2013. Informed consent was obtained from all patients for being included in the study.

## CRedit authorship contribution statement

**Alessio Gori:** Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Writing – review & editing, Supervision. **Eleonora Topino:** Methodology, Formal analysis, Data curation, Writing – original draft, Writing – review & editing. **Mark D. Griffiths:** Writing – original draft, Writing – review & editing, Supervision.

## 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.

## Data availability

The data presented in this study are available on request from the corresponding author.

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