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Problematic social networking sites use and online social anxiety: The role of attachment, emotion dysregulation and motives

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## Problematic social networking and attachment

# Problematic social networking sites use and online social anxiety: The role of attachment, emotion dysregulation and motives

**Keywords:** Attachment; emotion dysregulation; motives; problematic social networking sites use; social anxiety.

### Abstract

Problematic Social Networking Sites Use (PSNSU) and social anxiety are associated. SNSs users may develop online social anxiety that may become a standalone problem. The present study aims to test the mediating role of emotion dysregulation and motives (coping, conformity, social, and enhancement) between attachment (anxiety and avoidance) and two outcomes (PSNSU and online social anxiety) in an integrated theory-driven model. Self-report questionnaires were completed by 756 SNSs users (50.4% females; mean age = 28.74 years,  $SD = 8.00$ ). Results of the path analysis supported the **partial** mediating role of emotion dysregulation in the association between attachment anxiety and both the outcomes and the serial mediating role via four and three motives in the association with PSNSU and online social anxiety, respectively. This study highlighted the role of several relational, emotional, and motivational factors that should be taken into account to tackle PSNSU and online social anxiety through clinical and prevention interventions.

### 1. Introduction

Some of the most widely used Social Networking Sites (SNSs) in western countries include Facebook, Twitter, Instagram, and TikTok, with almost four billion total users in 2022 (Clement, 2022). Although recent systematic reviews and longitudinal studies have shown that most users use SNSs in a functional way (e.g., Coyne et al., 2020; Orben, 2020; Shankleman et al., 2021), a minority

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(about 5%; Cheng et al., 2021) of users manifests an excessive and uncontrolled use, that can lead to multiple negative consequences (Huang, 2022). Thus, people with "problematic social networking sites use" (PSNSU; Svicher et al., 2021) are characterized by a preference for online social interactions over face-to-face ones, excessive preoccupation with SNSs, sense of urgency to use SNSs, emotional imbalance, and impairment in users' psychosocial functioning, such as interpersonal conflicts, work-related issues, and sleep difficulties (Andreassen, 2015; Marino et al., 2017). However, PSNSU has not been recognized as a clinical disorder by diagnostic manuals including the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). Among the several correlates of PSNUS, social anxiety is one of the most investigated, given that people with social vulnerability are at risk of exponential growth in the use of the Internet for social interaction purposes (e.g., email and SNSs). As emerged from numerous studies (e.g., Y. Chen et al., 2020; Markowitz et al., 2016; Yıldız Durak, 2020; Zsido et al., 2021), individuals with high levels of social anxiety are more prone to use technologically mediated communication since online social communication may be perceived as less threatening. Face-to-face communication skills may decline over time, while the overdependence on the Internet may intensify in a vicious cycle that perpetuates PSNSU (Huan et al., 2014). Beyond the view of social anxiety as a risk factor for PSNSU, it could also be the case that SNSs users might develop specific online social anxiety-like fears deriving from their SNSs use, such as online self-evaluation anxiety due to the view of their selves based on online others' evaluations (Alkis et al., 2017). Online social anxiety might arise from concerns about others' reactions to shared content on SNSs, or it can manifest through fear to share content by individuals themselves or anxiety derived from contents pertaining to them but shared by others (Alkis et al., 2017). Moreover, especially new SNSs users might experience difficulties in online social interactions and communication, and be concerned about the privacy of their private information (Alkis et al., 2017). From this perspective, taking all these possible symptoms together, online social anxiety may be considered a specific maladaptive form of SNSs use and may become

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problematic on its own, especially for people with vulnerability towards offline social anxiety but also for SNSs users who experience symptoms of social anxiety arising from their SNSs use as proposed by Alkis and colleagues (2017). Indeed, given the social nature of SNSs and the similarities with other addictive behaviors, maladaptive use of SNSs might cover both addiction-like symptoms such as cognitive preoccupation, compulsive use, and negative consequences (as in the case of PSNSU) and social anxiety-like symptoms, as in the case of online social anxiety. For this reason, in the present study, online social anxiety is included as an outcome along with PSNSU. Previous studies investigated many possible antecedents of PSNSU such as insecure attachment, emotion dysregulation, and motives to use SNSs (e.g., D'Arienzo et al., 2019; Marino et al., 2019; Marino, Mazzieri et al., 2018). However, to date and to the authors' knowledge, no study has investigated the association of these constructs with PSNSU and online social anxiety in a sole theory-driven model. Thus, the present study focuses on several relational, emotional, and motivational factors that may lead to PSNSU and online social anxiety in an integrated model depicted in Figure 1.

Insert Figure 1 about here

### *1.1 Attachment patterns as plausible antecedents of PSNSU and online social anxiety*

Attachment patterns have received increasing attention in the field of SNSs in recent years (D'Arienzo et al., 2019; Imperato & Mancini, 2019). Briefly, attachment theory postulates the existence of a dispositional behavioral repertoire aimed at seeking and maintaining the proximity of significant others (i.e., attachment figures) who provide a sense of security and comfort (Bowlby, 1969). Such relational schemas develop during infancy and persist in a relatively stable manner during adulthood (Fraley, 2002). The quality of the interactions with such significant others defines the individual differences in the attachment patterns, which were commonly indicated as a combination of the two attachment dimensions of anxiety (i.e., the anxious need for other's acceptance and fear of rejection) and avoidance (i.e., the avoidance of intimacy in relationships and compulsive self-reliance; Bartholomew & Horowitz, 1991).

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A positive association between attachment anxiety and PSNSU was reported in systematic reviews (D'Arienzo et al., 2019; Musetti et al., 2022; Stöven & Herzberg, 2021), suggesting a compensatory attempt to reduce separation anxiety, fear of rejection, and need for company. Furthermore, as emerging from several studies (see D'Arienzo et al., 2019), users with high attachment avoidance appear to feel connected while browsing other people's profiles without feeling threatened by unintended intimacy. Moreover, individuals with low state attachment anxiety (i.e., attachment anxiety temporarily activated by contextual and relational factors) were found to report higher PSNSU scores when they presented high levels of social anxiety (Y. Chen et al., 2020; Remondi et al., 2022). This may be due to socially anxious users tending to interpret social situations as more threatening and uncomfortable, due to biased cognitive beliefs (Nitzburg & Farber, 2013). Moreover, users with high levels of attachment anxiety appear to tend to satisfy their social needs through SNSs thus avoiding distressing face-to-face interactions (Y. Chen et al., 2020).

### *1.2. Emotion dysregulation and motives as mediators*

Beyond attachment patterns, several psychological factors have been found to be associated with PSNSU, such as psychological distress, deficiencies in reflective functioning, maladaptive cognitions as well as difficulties in emotion regulation, and motives to use SNSs (e.g., Casale & Banchi, 2020; Imperato et al., 2022; Marino, Gini, et al., 2018b; Musetti et al., 2021). The current study focuses on the latter two as potential mechanisms involved in PSNSU and online social anxiety because emotion dysregulation and motives to use SNSs are both based on well-established theoretical models, that is the model of emotion regulation proposed by Gratz and Roemer (2004) and the motivational model proposed by Bischof-Kastner et al. (2014). Moreover, these constructs are likely to be associated to each other but, to the authors' knowledge, an explicit exploration of such association in the context of the two proposed outcomes is currently missing. An in-depth understanding of the interplay between these variables might be useful to highlight the potential

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psychological factors to be taken into account when planning prevention programs and interventions related to online behaviors.

Notably, because of its integrating and transdiagnostic role, emotion dysregulation has been extensively investigated, including its associations with dysregulated Internet usage, and specific motives such as emotion suppression and escapism (Gioia et al., 2021). Specifically, the construct of emotion regulation refers to the awareness, understanding, and acceptance of emotions, and the ability to manage appropriate emotional responses to achieve personal goals and situational demands (Marino et al., 2019). Several cross-sectional and longitudinal studies have shown that emotion dysregulation is positively associated with problematic Internet use (Gioia et al., 2021; Pettorruso et al., 2020; Spada & Marino, 2017; Wartberg & Lindenberg, 2020), PSNSU (Hussain et al., 2021; Marino et al., 2019), and social anxiety related disorders, such as social phobia (Golombek et al., 2020). Specifically, it has been suggested (e.g., Marino et al., 2019) that SNSs users who have difficulty regulating emotions (including emotional avoidance, lack of awareness, and poor impulse control) may tend to use SNSs to regulate their emotions incurring and maintaining the problematic online behaviors via negative reinforcement, such as PSNSU and, eventually, online social anxiety. However, to date, despite the evidence of the relationship between emotion dysregulation and social anxiety (e.g., Azad-Marzabadi & Amiri, 2017), there is a lack of studies exploring such association with online social anxiety.

People use SNSs for a variety of purposes, which can be summarized as social connection (e.g., self-presentation, self-enhancement, or joining an online community), instrumental purposes (e.g., searching for information), or entertaining purposes (e.g., playing video games, watching video clips, listening to music; Kircaburun et al., 2020; Stöven & Herzberg, 2021; Zheng et al., 2020). According to the traditional motivational model of addictions (Cooper, 1994) applied to online behaviors, individuals' problematic online behaviors are motivated by expectancies that represent the valence (positive or negative) and the source (internal or external) of expected outcomes. It follows that four

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classes of motives can be generated: social (positive valence and external source; that is, expecting to gain social incentives and improve relationships with friends), conformity (negative valence and external source; using SNSs because of friends' pressure and avoid social rejection), enhancement (positive valence and internal source; that is, expecting to improve positive affect using SNSs), and coping (negative valence and internal source; that is, expecting to diminish bad feelings using SNS; Marino, Gini, et al., 2018a). This model considers motives as proximal antecedents of problematic behaviors and they lead to engagement in the target behavior (Cooper, 1994). In line with this view, a recent longitudinal study (Q. Liu et al., 2022) confirmed the direction of the association between psychological needs and PSNSU, revealing that need for autonomy, competence and relatedness predicted social networking addiction at one year.

### *1.3. Hypothesized theoretical model developed for testing in the study*

The present study aimed at testing a model designed to assess the contribution of attachment patterns, emotion dysregulation, motives to use SNSs on PSNSU, and online social anxiety simultaneously among Italian adults. The conceptual model is depicted in Figure 1. As previously mentioned, a number of studies have shown that attachment patterns, emotion regulation, and motives for SNSs use are associated with PSNSU. However, to date, no attempt has been made to examine the association of such psychological aspects with online social anxiety on SNSs along with PSNSU.

First, two attachment dimensions (attachment anxiety and attachment avoidance) were included as independent variables in the current study, as they are plausible distal antecedents of problematic patterns of SNSs use (e.g., Musetti et al., 2022). The quality of attachment relationships, both with parents and romantic partners, is considered as relatively stable over time because it reflects a systematic pattern of emotions and expectations towards close people (Schimmenti et al., 2021). Indeed, attachment is related to how individuals adjust their own emotional responses, and in turn to how they behave on the Internet and SNSs (Schimmenti et al., 2021; Wang et al., 2018; Yu et al., 2013).

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Secondly, emotion dysregulation was included as the first hypothesized mediator between attachment and problematic patterns of SNSs use. Empirical studies (e.g., Liese et al., 2020) have shown that emotion dysregulation is negatively associated with secure attachment patterns and positively associated with insecure attachment patterns. For example, a study reported a partial mediation effect of emotion dysregulation between attachment anxiety and PSNSU (Liu & Ma, 2019), thus suggesting a defective coping mechanism related to mood regulation. Attachment anxiety and attachment avoidance were found to have a positive association with emotion dysregulation and anxiety disorder symptoms (Marganska et al., 2013), accordingly attachment insecurity may support inadequate emotion regulation, increasing the likelihood of these disorders.

Thirdly, motives to use SNSs were included as mediators between attachment and the two outcomes. Individual characteristics including attachment patterns (Baek et al., 2014), affective self-regulating abilities (Marino et al., 2019), and social anxiety tendency (Shensa et al., 2018) have an impact on functional and dysfunctional SNSs uses and motivations. Several motives for utilizing SNSs have been associated with attachment anxiety and attachment avoidance. In particular, anxiously attached users exhibit stronger needs to belong and be well-liked, which in turn lead to feelings of fear of being excluded (Chang, 2019). Such users show an accentuated sensitivity to social feedback and an inclination for social comparison (Flynn et al., 2018; Oldmeadow et al., 2013). Moreover, maladaptive coping mechanisms involved in stressful life events and emotional difficulties may lead to the development of PSNSU (Pettorruso et al., 2020). As further examples, it has been found that attachment is indirectly associated with problematic use of specific SNSs (i.e., Grindr, Facebook) via motivations related to companionship, escapism, and likes-seeking behaviors (Jayawardena et al., 2021; Vaillancourt-Morel et al., 2020). Another study (Chen, 2019) suggested that motives related to the satisfaction of the need for relatedness and self-presentation mediated the association between attachment anxiety and SNS addiction, further sustaining the hypothesized mechanism linking attachment to problematic patterns of SNSs use via psychological motives.



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Furthermore, motives to use SNSs were included as serial mediators between emotion dysregulation and the two outcomes. To the authors' knowledge, no study specifically tested such association in a single model. However, a previous study on a different problematic online behavior (i.e., problematic gaming) showed that escapism motives partially mediated the relationship between difficulties in emotion regulation and problematic gaming (Blasi et al., 2019). Therefore, it is hypothesized that emotion dysregulation, as influenced by attachment, might strengthen certain motives to use SNSs, which in turn are associated with PSNSU and online social anxiety. However, due to the lack of previous longitudinal studies on this specific series of mediators in the context of SNSs and online social anxiety, an alternative model was tested (see Appendix A), where motives mediate the relationship between attachment and emotion dysregulation, which in turn is associated with the two outcomes. **Indeed, it should be noted that the cross-sectional design of the present study hampers the possibility to draw conclusions about the direction of the hypothesized associations. Therefore, results will be taken cautiously as other models might be plausible.**

Overall, the present study sought to test a single model in which it is hypothesized that attachment anxiety and avoidance are both directly and indirectly associated with PSNSU and online social anxiety, via emotion dysregulation (Mikulincer & Shaver, 2019) and different motives for SNSs use (Stöven & Herzberg, 2021). Emotion dysregulation and motives, in turn, would be associated with levels of both PSNSU (Süral et al., 2019; Wartberg et al., 2021) and online social anxiety. Additionally, age, gender and time spent on SNSs were included as control variables of the two outcomes because it has been repeatedly showed that being young (e.g., Livingstone, 2008), female (e.g., Hou et al., 2017; Kuss & Griffiths, 2017), and frequently using SNSs (e.g., Zimmer, 2022) are risk factors for problematic patterns of SNSs use (e.g., Marino, Gini, et al., 2018a).

## **2. Methods**

### *2.1. Participants and procedure*

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An online questionnaire batch was used to collect data between December 2020 and January 2021 by means of advertisements shared in social network groups. Before starting the survey, all participants received information about the study and gave their online consent. Anonymity of the participants was guaranteed as no personal data or Internet Protocol address was collected. No compensation was given for participating in the study. Inclusion criteria were as follows: (i) being over 18 years; (ii) being able to complete questionnaires in Italian; and (iii) using at least one SNS. A total of 1017 individuals participated in the study, however incomplete questionnaires ( $n = 186$ ), questionnaires including more than 20% of missing data in the variables of interest ( $n = 19$ ), and non-binary identity ( $n = 2$ ) were excluded. Moreover, for the purpose of the current study, those reporting not using any SNS ( $n = 43$ ) were also excluded. Using the Mahalanobis distance scores, 13 multivariate outliers were identified and removed. Therefore, the analyses were run on a final sample of 756 SNS users (50.4% females; mean age = 28.74 years,  $SD = 8.00$  years; age range = 19-69 years). Participants reported using SNS for about 2 hours and a half per day on average. Preferred SNSs were WhatsApp, Facebook, Instagram, Telegram, TikTok, and YouTube. Twenty eight percent of respondents were university students and 66% workers, whereas the remaining were unemployed, housewives, or retired; 54.8% of the sample reported being single, 44.8% being in a stable relationship, and the remain was divorced or widowed.

This study was part of a larger research project on social media during the COVID-19 pandemic, and other data not related to the current study will be presented elsewhere. The study procedures were carried out in accordance with the Declaration of Helsinki. The Ethical Committee of the Center for Research and Psychological Intervention (CERIP) of the University of Messina approved the study (protocol number: 119094). All participants were informed about the study and all provided informed consent prior to the online survey, which took approximately 30 minutes to complete. This study did not involve human and/or animal experimentation.

### *2.2. Measures*

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*2.2.1. Problematic Social Networking Sites Use.* We used an adaptation of the Italian version of the Problematic Facebook Use Scale (Marino et al., 2017) to assess PSNSU in the last 12 months. Specifically, in each item the word “Facebook” was replaced with “social networking sites”. The scale includes 15 items (e.g., “I prefer online social interaction over face-to-face communication”; “I would feel lost if I was unable to access social networking sites”). Participants were asked to rate the extent to which they agreed with each item on an 8-point scale from 1 (definitely disagree) to 8 (definitely agree). Items were averaged to obtain continuous variables for a total score of PSNSU with higher scores indicating higher levels of PSNSU. The Cronbach’s alpha for the scale was .91 (95% CI .90-.92).

*2.2.2. Online Social Anxiety.* We used the Italian version (Ruggieri et al., 2020) of the Social Anxiety Scale for Social Media Users (SAS-SMU; Alkis et al., 2017) to assess online social anxiety in the last 12 months. The scale includes 21 items (e.g., “I am concerned about being ridiculed by others for the content I have shared”) about shared content anxiety, privacy concern anxiety, interaction anxiety, and self-evaluation anxiety. Participants were asked to rate how often they feel anxious or preoccupied on social media on a 5-point scale from 1 (never) to 5 (always). Items were averaged to obtain continuous variables for a total score of social anxiety concerning SM with higher scores indicating higher levels of online social anxiety. The Cronbach’s alpha for the scale was .95 (95% CI .94-.95).

*2.2.3. Attachment.* Adult attachment was assessed with the Italian adaptation (Carli, 1995) of the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991). The RQ includes four sentences each of which describes four prototypical attachment attitudes: (a) Secure (“It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depending on me. I don’t worry about being alone or having others non accept me”); (b) Dismissing (“I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me”);

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(c) Preoccupied (“I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don’t value me as much as I value them”); (d) Fearful (“I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others”). Participants were required to indicate how well each paragraph described them on a 7-point Likert scale from 1 (It does not describe me at all) to 7 (It very much describes me). Following previous research (Brennan et al., 1998), we used the scores on the four attitudes to calculate the two underlying dimensions of attachment anxiety [(fearful + preoccupied) – (secure + dismissing)] and avoidance [(fearful + dismissing) – (secure + preoccupied)]. The anxiety dimension refers to anxiety about abandonment, rejection, and unlovability, whereas the avoidance dimension refers to avoidance of dependency and intimacy.

*2.2.4. Emotion dysregulation.* Emotion dysregulation was assessed using the Italian version of the Difficulties in Emotion Regulation Strategies (DERS; Sighinolfi et al., 2010). The scale includes 36 items rated on a 5-point scale from 1 (almost never) to 5 (almost always) and covers six dimensions, labeled: lack of emotional awareness, lack of emotional clarity, difficulties controlling impulsive behaviors when distressed, difficulties engaging in goal-directed behavior when distressed, non-acceptance of negative emotional responses, and limited access to effective emotional regulation strategies. Items were averaged to obtain a continuous score for emotion dysregulation with higher scores indicating more difficulties in emotion regulation. The Cronbach’s alpha for the scale was .93 (95% CI .92-.94).

*2.2.5. Motives to use SNSs.* Motives for using SNSs were assessed with an adapted version of the Facebook Motives Questionnaire (Marino, Gini, et al., 2018a; original version by Bischof-Kastner et al., 2014) to SNSs in general. This adapted scale has already been used among Italian adults and showed good validity properties (Marino et al., 2016). Participants were asked how often **in the last**

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12 months they logged on SNSs for different motivations, thinking of all the times they have been on SNSs during the last 12 months. The scale includes four motives: coping (e.g., “To forget your worries?”), conformity (e.g., “To be liked by others?”), enhancement (e.g., “Because it is exciting?”), and social motive (e.g., “To come into contact with others?”). The questionnaire contains 16 items rated on a 5-point scale from 1 (never or almost never) to 5 (always or almost always) so that higher scores indicate higher levels on each motive. The Cronbach’s alphas for the subscales were as follows: .87 (95% CI .88-.89) for coping; .77 (95% CI .74-.80) for conformity; .70 (95% CI .67-.74) for enhancement; and .84 (95% CI .82-.86) for social motive.

### 2.3. Statistical analysis

First, in order to test the associations between the variables of interest, correlation analyses were conducted. Second, the pattern of relationships specified by our hypothesized model (Figure 1) was examined through a path analysis, using the package Lavaan (Rosseel, 2012) of the software R (R Development Core Team, 2017) and utilizing a single observed score for each construct included in the model. The covariance matrix of the observed variable was analyzed with Robust Maximum Likelihood method estimator as some variables were non-normally distributed (see Table 1). The Sobel test (Baron & Kenny, 1986; Hayes, 2009) was used to test for mediation. To evaluate the goodness of fit of the model we considered the  $R^2$  of each endogenous variable and the total coefficient of determination (Bollen, 1989; Jöreskog & Sörbom, 1996). In the tested model, PSNSU and online social anxiety were the dependent variables, emotion dysregulation, and the four motives were the mediators, and attachment anxiety and avoidance were the independent variables, whereas age, gender, and time spent on SNSs were included as control variables on the two outcomes (Figure 1).

## 3. Results

Table 1 shows the means, standard deviations, range, skewness, kurtosis, and bivariate correlations between the variables included in the study. Most of the study variables were correlated

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with each other, with the exception of attachment avoidance which appears to be weakly and positively associated with online social anxiety and DERS, and negatively with social motive only. Of note is that a large positive correlation was found between PSNSU and online social anxiety, as well as between DERS and the two outcomes. The strongest correlations were observed between coping motive and the two outcomes. Overall, time spent on SNSs was positively associated with all the other variables with the exception of avoidance and with the strongest association observed with PSNSU. With regards to demographic characteristics, age was negatively, though weakly, associated with all variables of interest, whereas gender was positively and very weakly associated with the two outcomes, the two attachment dimensions, and two motives (coping and enhancement).

Insert Table 1 about here

The theoretical model was tested including all the variables of interest. Several coefficients did not reach statistical significance: the links between attachment avoidance and four mediators (i.e., DERS, coping, conformity, enhancement), and PSNSU; the associations between attachment anxiety and three mediators (i.e., conformity, enhancement, social), and PSNSU; the association between enhancement and online social anxiety; the associations between age and gender with PSNSU and between age, gender, time spent on SNSs with online social anxiety. As shown in Figure 2 and reported in Table 2, the two attachment dimensions were directly but weakly associated with one outcome (online social anxiety). Overall, positive and medium associations were found especially between attachment anxiety and DERS, and between DERS, two motives (i.e., coping and conformity) and the two outcomes. Smaller associations were observed between DERS and the other two motives (i.e., enhancement and social) that, in turn, were weakly associated with PSNSU. As shown in Table 3, several indirect associations were found to be significant. Results of the Sobel test supported the mediating role of DERS in the association between attachment anxiety and both the outcomes. Coping motive mediated the association between attachment anxiety and PSNSU only. Moreover, the serial mediating role of DERS and two motives (i.e., coping and conformity) in the

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associations between attachment anxiety and the two outcomes were observed, as well as the association between attachment anxiety and PSNSU via DERS and social motive, and the association between attachment anxiety and online social anxiety via DERS and enhancement. Attachment avoidance was only associated with social motive which, in turn, was weakly associated with both outcomes.

Insert Figure 2 and Table 2 about here

The squared multiple correlations for the endogenous variables indicate that the model accounts for 50% of the variance of PSNSU and 37% of online social anxiety. Less variance is explained for mediators: 15% for DERS, 21% for coping, 17% for conformity, 8% for enhancement, and 3% for social motive. Finally, the total amount variance explained by the model (Total Coefficient of Determination, TCD = .29) indicated an acceptable fit to the observed data. In terms of effect size, TCD = .29 corresponds to a correlation of  $r = .54$ . According to the Cohen's (1988) traditional criteria, this is a medium effect size.

Insert Table 3 about here

## 4. Discussion

The goal of the present study was to examine the contribution of theory-driven factors to PSNSU and online social anxiety. Bivariate correlations showed that the two outcomes were associated with each other sustaining the idea that socially anxious individuals may perceive online interactions as safer but engage in maladaptive safety behaviors that may lead to a long-term preference for online communications rather than face-to-face interactions (Carruthers et al., 2019).

With regards to attachment, bivariate correlations indicated a positive association between attachment anxiety and the two outcome variables and between attachment avoidance and online social anxiety. Overall, results are in line with a recent systematic review (Musetti et al., 2022), indicating a clear association between attachment anxiety and PSNSU, while findings on attachment avoidance appeared to be more controversial. However, when emotion dysregulation and motives

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were included in the path analysis, the results of this study provided additional evidence on the weak associations between attachment anxiety, attachment avoidance and online social anxiety. That is, interestingly, results from the path analysis suggested that individuals with attachment insecurities are more likely to **display** PSNSU because they have more difficulties in satisfying their social and emotional needs.

With regards to attachment anxiety, it was positively associated with emotion dysregulation, which, in turn, was positively associated with PSNSU (Faghani et al., 2020). Attachment anxiety implies an overinvolvement in SNSs as an attempt to deal with fear of abandonment and rejection (Young et al., 2020). As such, people high in attachment anxiety may tend to have more difficulties in emotion regulation resulting both in PSNSU, for example using of SNSs for mood regulation and cognitive preoccupation about what happens on SNS (e.g., Marino et al., 2017), and in online social anxiety, for example developing specific fears about shared contents, and self-evaluation anxiety (Alkis et al., 2017). Further, difficulties in regulating emotions were associated with stronger motives to use SNSs to satisfy psycho-social needs. Specifically, the strongest associations were observed between emotional dysregulation and the two motives with negative valence (i.e., coping and conformity). This is not surprising because people experiencing difficulties in emotion regulation are likely to attempt to manage engaging in dysfunctional strategies, such as using SNSs to decrease unwanted negative internal states (i.e., coping) and to decrease the feeling of being excluded from others (i.e., conformity). Coherently, these two motives are also the ones showing the strongest associations with the two outcomes. Indeed, coping and conformity are often considered more problematic as compared to enhancement and social motives (Marino, Mazzieri, et al., 2018) because they are driven by the expectancy to decrease a negative state, which is, on the contrary, often frustrated rather than satisfied on SNSs (Brand et al., 2016; O'Day & Heimberg, 2021). **Overall, enhancement and social motives are weakly associated with both PSNSU and online social anxiety. Results also indicated that the serial mediation of DERS and enhancement was significant in the**



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**association between attachment anxiety and online social anxiety.** This could indicate that socially anxious individuals compensate for poor relational skills with coping mechanisms, with the intent of presenting themselves as more socially competent (Kardefelt-Winther, 2014).

With regard to attachment avoidance, results from the path analysis showed that it had an overall marginal role in explaining the two outcomes. Specifically, attachment avoidance was only directly and weakly related to online social anxiety. This suggests that SNSs users with high levels of avoidance attachment may employ SNSs not to interact and create close contacts, a situation in which they expose themselves to possible judgment, but to create relationships at a distance so as not to confront others and keep the relation under control (Young et al., 2020). Moreover, attachment avoidance was negatively associated with the social motive, which, in turn, was positively but weakly associated with both PSNSU and online social anxiety. It could be argued that individuals with high levels of attachment avoidance and withdrawing attitudes (Mikulincer & Shaver, 2007) may not use SNSs interactively, due to preoccupations with reciprocal relationships with others. Instead, they would fulfill their social needs and motivations by establishing a safe distance from other individuals (Vaillancourt-Morel et al., 2020). Consequently, it could be noted that people suffering from online social anxiety are afraid of others because of cognitive biases and negative implicit evaluations of others, showing continuity between offline relational impairment and online socializations (Weidman & Levinson, 2015). This is in line with recent studies (Ali et al., 2021), that suggested a close relation between avoidance of direct social contacts, implicit negative evaluations and fear of rejection, and compulsive social networking sites usage. Social interaction may thus be mediated by a compensatory use of online social platforms (Xie & Karan, 2019).

Regarding the control variables, results from the present study indicated that time spent on SNSs is directly associated with PSNSU and online social anxiety, suggesting that a longer time spent on SNSs is related to more PSNSU and online social anxiety. However, some authors (e.g., Laconi et al., 2015; Marino, Gini, et al., 2018a) showed that prolonged use alone does not necessarily imply

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problematic or addictive behaviors but may increase the likelihood of loss of control over SNSs use. Regarding gender differences, in the present study females reported higher levels of PSNSU and online social anxiety in line with several previous research (Marino, Mazzieri, et al., 2018).

Our findings have implications that need to be acknowledged. The creation of digital social environments (Musetti & Corsano, 2018) is leading more individuals to use SNSs as extensions and alternatives to face-to-face interactions. This could result in unsuccessful or maladaptive cognitive and behavioral schemata that could have clinical implications. Psychological and preventive interventions should address the specific intrapersonal and interpersonal mediating factors between different attachment dimensions, PSNSU, and the individual's propensity to online social anxiety (Ruggieri et al., 2020; Zsido et al., 2021).

### 4.1. Limitations

The present study has a number of limitations. PSNSU is a concept that is still being debated (see Starcevic et al., 2020; Svicher et al., 2021). As such, PSNSU was evaluated as a whole phenomenon and in the present study no specific social media was separately explored. Moreover, given the cross-sectional design of the study, **the direction of the associations is only suggestive, and no definitive conclusions can be drawn about the stability of the identified mediated effects**. In order to partially overcome this issue, an alternative model (with motives and emotion dysregulation as serial mediators) was explored. This model has a comparable fit to the original model (see APPENDIX A). However, the alternative model accounts for less variance of the two outcomes and mediators (45% for PSMU; 34% for online social anxiety; 6% for coping; 3% for conformity; 7% for enhancement; 1% for social; 32% for emotion dysregulation). Thus, longitudinal studies are still needed to inspect causality relationships among the variables and further examine the proposed serial mediations. Furthermore, we used a snowball convenience sampling, not necessarily representing the general population, and the obtained data were collected through self-report measures, thus being

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susceptible to response bias. Additionally, we did not include a measure of offline social anxiety, therefore we could not draw any conclusions about the risk of developing online social anxiety in absence of pre-existing vulnerabilities to social anxiety. Finally, even though attachment tend to be relatively stable across time, data were collected during the COVID-19 pandemic that influenced people's social media use and increased worries, likely impacting on emotion regulation strategies used to tackle the emergency of the pandemic and motives to use SNSs (e.g., Boursier et al., 2020). For this reason, our results may have been affected by the context during the administration of the questionnaires. Therefore, further studies are needed to test whether our findings may vary during non-pandemic times.

### 4.2. Conclusions

Despite these limitations, the presented model revealed a complex intertwined phenomenon related to emotional, social, and cognitive factors that at least partially elucidated the mechanism underlying the relationship between attachment patterns, PSNSU, and online social anxiety. Emotion dysregulation and specific psycho-social motives are strictly associated with two different sides of maladaptive SNS use (i.e., PSNSU and online social anxiety) and, as such, could be tackled through clinical and prevention interventions.

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### Reviewer #3:

Comment 1: This study tested the mediating role of motives for SNSs and emotion dysregulation on the relationship between anxiety/avoidance attachment and two outcomes (online social anxiety and PSNSU). This is a well-written manuscript addressing a relevant research question. However, I have some concerns, listed below.

Reply: We thank the reviewer for the positive feedback.

Comment 2: My main concern was that the study used a cross-sectional design to assess the supposed causal associations between constructs. A longitudinal design is required to answer such complex questions with time-varying and interacting constructs. I realized that the authors improved a previous version of the manuscript to tackle this issue, but I am still unconvinced. I do not think that conclusions on causal directions could be derived from this study.

Reply: We totally agree with the Reviewer. As highlighted in several paragraphs across the manuscript (pp. 8, 17, 18), we did not suppose causal associations nor intended to draw conclusions about the direction of the associations. Unfortunately, we could not adopt the optimal design for the study at the time of data collection. However, the hypothesized model was based on established theoretical models described in the introduction section, which suggest that the tested associations are plausible even though not exclusive. In addition, we also tested an alternative model with motives and emotion dysregulation as serial mediators, and such model accounts for less variance of the two outcomes and mediators, suggesting the same. The potential causal language has been further smoothed across the manuscript.

Comment 3: In addition, the time frame for each scale is not given. Is it the same for all scales? Four weeks, twelve months, whole life? This is an important information (especially if they are different).

Reply: We are sorry for this oversight, we added a time frame for each scale in the measures (pp. 10-12), specifying that both Problematic SNS Use, Online social anxiety, and motives to use SNS considered the last 12 months, whereas both Emotion regulation and Attachment did not consider a specific time frame. This is in line with the literature, in fact it is well known that emotion (dys)regulation is a relatively stable construct (e.g., Shadur et al., 2015) and is attachment as a trait-like construct (e.g., Fraley, 2002)

Fraley, R. C. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review*, 6(2), 123–151. [https://doi.org/10.1207/s15327957pspr0602\\_03](https://doi.org/10.1207/s15327957pspr0602_03)

Shadur, J. M., & Lejuez, C. W. (2015). Adolescent substance use and comorbid psychopathology: Emotion regulation deficits as a transdiagnostic risk factor. *Current addiction reports*, 2(4), 354–363. <https://doi.org/10.1007/s40429-015-0070-y>

Comment 4: Another issue is that the manuscript has a confirmatory approach to test its model. The authors added an alternative model, but there was not enough information on it to understand what was done. I could not see the detail of Appendix A.



Reply: We are very sorry for the lack of materials of the previous round of revisions. Some technical problem has occurred. We have now enclosed all the tables and figures. We hope that the alternative model provided in Appendix A would help in clarifying that we are aware that the hypothesized associations are only suggestive, as stated in the manuscript, and that other possible directions are plausible.

Comment 5: The reason why the study specifically focused on emotion regulation and motives to use SNSs rather than other relevant constructs should be given (Introduction section 1.2).

Reply: We thank the reviewer for this suggestion. This has been done (pp. 4-5).

Comment 6: Removing non-significant variables is not a good practice, it increases the risk of overfit. If the authors wish to select variables, they need to use a more advanced method (e.g., lasso) and to explain it in the objectives and methods.

Reply: We understand the Reviewer's doubt and we have now presented the full model (both for the main and the alternative models).

It can be noticed that results do not substantially change as the procedure of step-by-step removal of non-significant links in the context of path analysis does not over estimate the fit index considered useful in path analysis, that is the total coefficient of determination (TCD). The TCD (Bollen, 1989; Jöreskog & Sörbom, 1996) was used to evaluate the goodness of fit of the model as it is commonly considered a reliable fit index of models run as path analysis (that is SEM for observed variables). The TCD represents the joined effect of all predictor variables on all dependent variables, so that higher TCD indicate more variance explained. Thus, the standard fit indices usually reported for SEM models with latent variables have not been included here because it has been shown that they are not particularly useful in models without latent variables like path analyses due to the poor sensitivity to errors in model equations (e.g., Lenzi et al., 2015; Rosario et al. 2005). For this reason and in line with several previous studies using this procedure (see for example, Lenzi et al., 2015, Marci et al., 2021), the previous "clean" version of the model was preferred in order to show the most plausible model fitting the data and clearly highlight the significant paths. However, we understand that information about the non-significant links might be important and we have now added all the results. Please note that Figure 2 still shows the significant paths only for seek of clarity but complete results are provided in Table 2.

Comment 7: Tables and Figures were not included in the revised version of the paper. I used tables from the original submission, but Table 2 was truncated and I could not see it entirely. It is therefore very difficult to understand what was done (also because the Results section cannot be read as a standalone piece of work). I miss the description of the direct and indirect effects for the mediation model. I guess that direct effects are in Figure 2 and indirect effects in Table 2? Exact p-values should be reported in Figure 2, otherwise it is a form of incomplete reporting.

Reply: We are sorry for the lack of materials. All the tables and figures have now been uploaded. Exact p-values are reported in Table 2 and not in Figure 2 for seek of clarity, given the complexity of the model. We have now added a more detailed description of indirect effects in the text. However, please note that results (of both direct and indirect effects – see Tables 2 and 3) are not reported also in the text for legibility and word count reasons. If requested, we are willing to report all the exact results also in the text.

Comment 8: The study was conducted during the pandemic, a period in which all variables might be differently associated compared to "normal" times. This was not discussed in the manuscript and I wonder whether results still apply.

Reply: We thank the reviewer for this comment. This has been added in the limitations section.

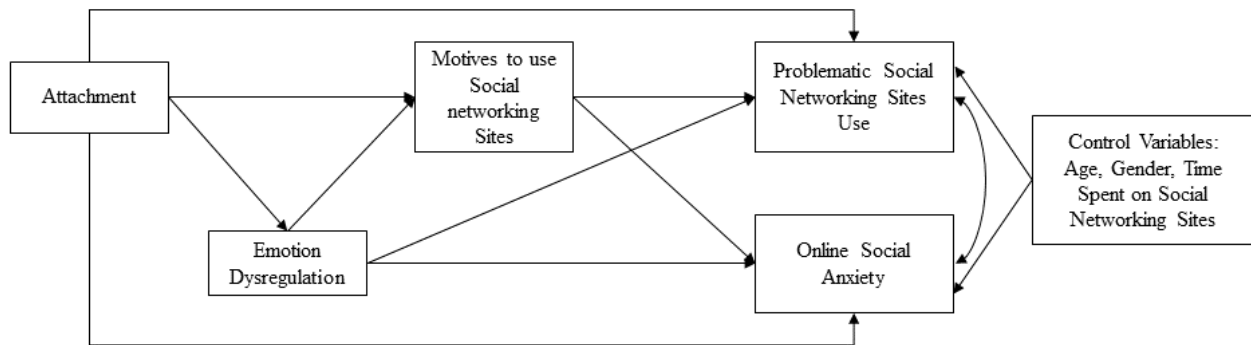
## **Highlights**

- Problematic SNS use (PSNSU) and online social anxiety are associated
- Attachment anxiety is associated with PSNSU and social anxiety
- Emotion dysregulation could be a therapeutic target to reduce problematic behaviors
- Coping and conformity are important antecedents of PSNSU and online social anxiety

## Problematic social networking and attachment

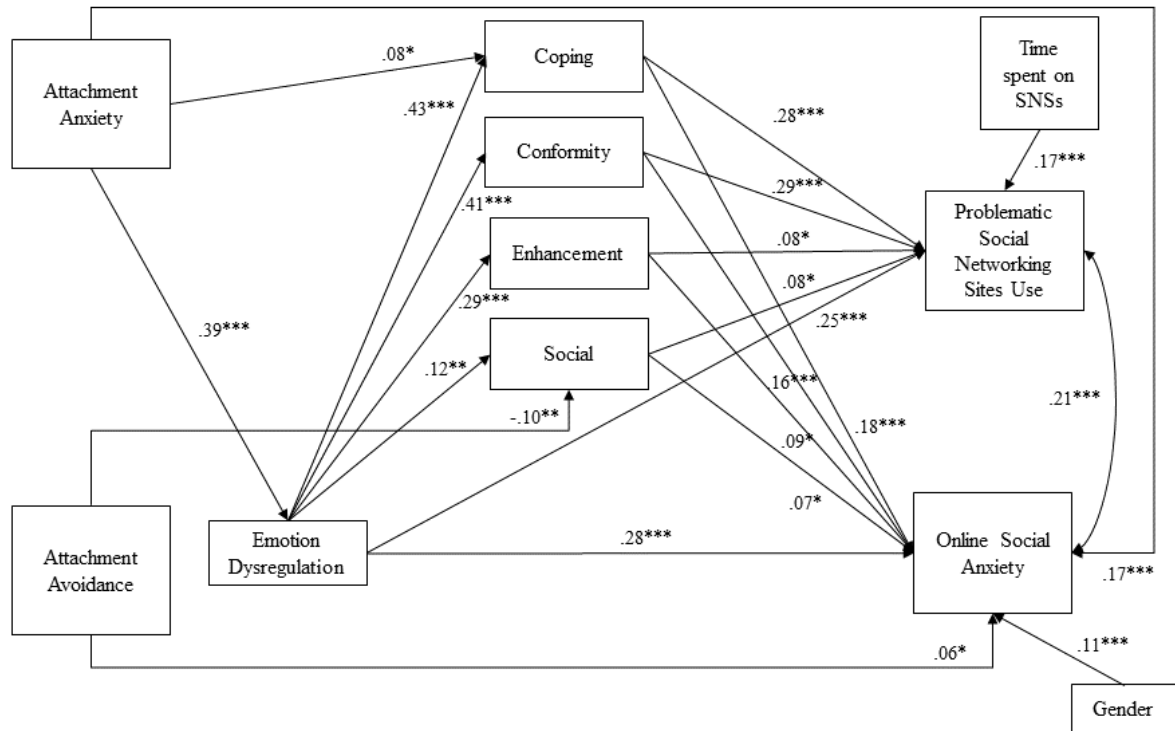
**Figure 1**

*Proposed theoretical model.*



## **Problematic social networking and attachment**

**Figure 2.** Tested model of the inter-relationships between the study variables.



Notes. \* $p < 0.05$ , \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ;  $n = 756$ ; Gender: 1 = M, 2 = F. For seek of clarity, only significant associations are reported in the figure. See Table 2 for all the direct associations among variables.

**Table 1***Correlation matrix for the study variables.*

	<i>M</i>	<i>SD</i>	Range	Skewn ess (.089)	Kurto sis (.176)	1	2	3	4	5	6	7	8	9	10	11
1. PSNSU	2.20	1.11	1-6.07	1.06	.50	-										
2. Online social anxiety	2.07	.77	1-4.62	.51	-.42	.54***	-									
3. Anxiety	-.96	4.40	-12-11	.18	-.67	.25***	.36***	-								
4. Avoidance	.49	4.42	-12-11	.16	-.56	.01	.13***	.23***	-							
5. DERS	2.33	.60	1.11-4.44	.53	-.01	.53***	.49***	.39***	.08*	-						
6. Coping	1.88	.90	1-5	1.19	.95	.63***	.49***	.24***	.04	.46***	-					
7. Conformity	1.44	.60	1-4	1.60	2.26	.58***	.43***	.16***	.006	.41***	.48***	-				
8. Enhancement	1.97	.72	1-5	.74	.34	.52***	.38***	.08*	.01	.28***	.63***	.46***	-			
9. Social	2.51	.98	1-5	.45	-.45	.37***	.23***	-.04	-.11**	.09**	.35***	.33***	.51***	-		
10. SNSs time	2.45	1.70	0-12	1.45	3.56	.37***	.15***	.09**	.002	.17***	.29***	.16***	.29***	.29***	-	
11. Age	28.73	8.00	19-69	-	-	-.27***	-.17***	-.15***	-.12**	-.22***	-.26***	-.13**	-.29***	-.24***	-.26***	-
12. Gender	-	-	-	-	-	.09*	.20***	.14***	.08*	.03	.21***	.05	.09**	.04	.06	-.05

*Notes.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ;  $N = 756$ ; males (1) - females (2); PSNSU = Problematic Social Networking Sites Use; Anxiety = Attachment Anxiety; Avoidance = Attachment Avoidance; DERS = Difficulties in Emotion Regulation Strategies; SNSs time = hours spent daily on social networking sites.

**Table 2.** Standardized direct effects.

Path from	to	Beta	<i>p</i>
Anxiety →	DERS	.390	<.001
	Coping	.082	.017
	Conformity	.005	.897
	Enhancement	-.028	.441
	Social	-.061	.123
	PSNSU	.042	.141
Avoidance →	Online social anxiety	.172	<.001
	DERS	-.013	.727
	Coping	-.009	.797
	Conformity	-.027	.374
	Enhancement	-.010	.773
	Social	-.103	.005
DERS →	PSNSU	-.036	.172
	Online social anxiety	.060	.044
	Coping	.425	<.001
	Conformity	.411	<.001
	Enhancement	.289	<.001
	Social	.124	.002
Coping →	PSNSU	.252	<.001
	Online social anxiety	.265	<.001
Conformity →	PSNSU	.282	<.001
	Online social anxiety	.178	<.001
Enhancement →	PSNSU	.293	<.001
	Online social anxiety	.156	<.001
Social →	PSNSU	.083	.052
	Online social anxiety	.088	.050
Time spent on SNSs →	PSNSU	.083	.012
	Online social anxiety	.071	.041
Gender →	PSNSU	.175	<.001
	Online social anxiety	-.026	.412
Age →	PSNSU	-.008	.748
	Online social anxiety	.110	<.001
	PSNSU	-.039	.147
	Online social anxiety	.027	.374

**Notes:** PSNSU = Problematic Social Networking Sites Use; Anxiety = Attachment Anxiety; Avoidance = Attachment Avoidance; DERS = Difficulties in Emotion Regulation Strategies.



**Table 3.** Standardized direct, indirect, and total effects of the independent variables (attachment anxiety and attachment avoidance) on the two outcomes (PSNSU and online social anxiety) via the mediators (emotion dysregulation and motives to use SNSs).

Independent	Mediators	Outcome							
		PSNSU				Online social anxiety			
		Beta	SE	<i>z</i>	<i>p</i>	Beta	SE	<i>z</i>	<i>p</i>
Anxiety	DERS	.098	.015	5.844	<.001	.103	.017	5.696	<.001
	Total effect via DERS	.141	.026	4.774	<.001	.275	.031	8.457	<.001
	Coping	.023	.009	2.217	.027	-.002	.006	-.257	.797
	DERS→Coping	.047	.009	4.664	<.001	.029	.008	3.578	<.001
	Total effect via DERS and Coping	.089	.026	3.006	.003	.202	.032	6.124	<.001
	Conformity	.001	.010	.129	.897	-.004	.005	-.868	.385
	DERS→Conformity	.047	.008	5.461	<.001	.025	.007	3.564	<.001
	Total effect via DERS and Conformity	.089	.026	3.055	.002	.197	.033	5.810	<.001
	Enhancement	-.002	.003	-.716	.474	-.001	.003	-.291	.771
	DERS→Enhancement	.009	.005	1.847	.065	.010	.005	1.930	.054
	Total effect via DERS and Enhancement	.052	.026	1.765	.078	.182	.032	5.504	<.001
	Social	-.005	.003	-1.297	.195	-.007	.004	-1.654	.098
	DERS → Social	.004	.002	1.950	.051	.003	.002	1.668	.095
	Total effect via DERS and Social	.046	.026	1.600	.110	.176	.031	5.391	<.001
Avoidance	DERS	-.003	.008	-.349	.727	-.003	.009	-.348	.728
	Total effect via DERS	-.039	.024	-1.426	.154	.056	.030	1.830	.067
	Coping	-.002	.008	-.256	.798	-.002	.006	-.257	.797
	DERS→Coping	-.002	.004	-.347	.728	-.001	.003	-.348	.728
	Total effect via DERS and Coping	-.037	.024	-1.416	.157	.059	.029	1.978	.048
	Conformity	-.008	.008	-.878	.380	-.004	.005	-.868	.385
	DERS→Conformity	-.002	.004	-.349	.727	-.001	.002	-.347	.728
	Total effect via DERS and Conformity	-.037	.023	-1.420	.156	.059	.029	1.983	.047
	Enhancement	-.001	.003	-.284	.777	-.001	.003	-.291	.771

DERS→Enhancement	-.000	.001	-.348	.728	-.000	.001	-.345	.730
Total effect via DERS and Enhancement	-.036	.023	-1.382	.167	.059	.029	2.001	.045
Social	-.009	.004	-1.881	.060	-.007	.004	-1.654	.098
DERS → Social	-.000	.000	-.340	.734	-.000	.000	-.338	.735
Total effect via DERS and Social	-.036	.023	-1.373	.170	.060	.029	2.007	.045

**Notes:** PSNSU = Problematic Social Networking Sites Use; Anxiety = Attachment Anxiety; Avoidance = Attachment Avoidance; DERS = Difficulties in Emotion Regulation Strategies.

**Declaration of Competing Interest**

The authors declare no conflict of interest.

Author Agreement Statement

We the undersigned declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process. He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs

Signed by all authors as follows:

Claudia Marino



Tommaso Manari



Alessio Vieno




Marcantonio M. Spada



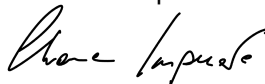
Christian Franceschini



Alessandro Musetti

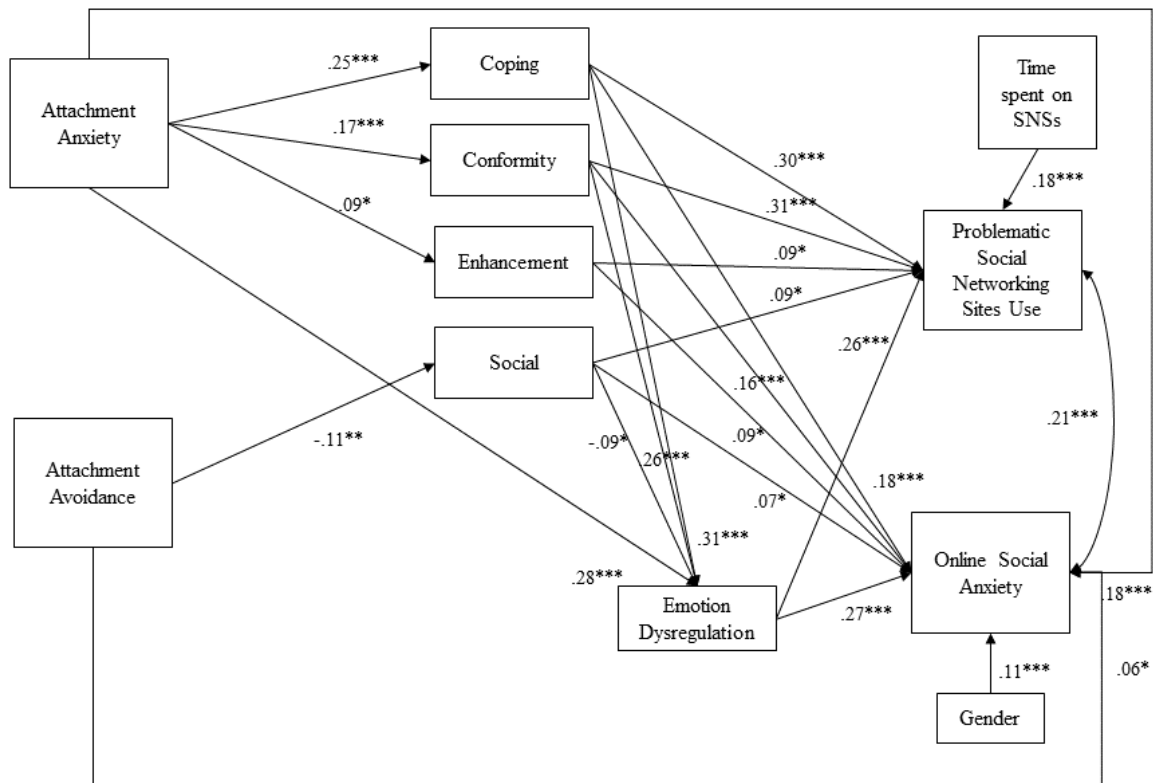


Chiara Imperato



## APPENDIX A

### Alternative Model of the Inter-Relationships between the Study Variables



Note.  $N = 756$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\*  $p < .001$ ; Gender: 1 = M, 2 = F;  $R^2$  (Problematic Social Networking Sites Use) = .44;  $R^2$  (Online Social Anxiety) = .33;  $R^2$  (Coping) = .06;  $R^2$  (Conformity) = .02;  $R^2$  (Enhancement) = .07;  $R^2$  (Social) = .01;  $R^2$  (Emotion dysregulation) = .29. Total Coefficient of Determination = .30. For seek of clarity, only significant associations are reported in the figure. See the subsequent tables for all the direct and indirect associations among variables.

Table 1. Standardized direct effects of the alternative model.

Path from	to	Beta	<i>p</i>
Anxiety →	DERS	.276	<.001
	Coping	.248	<.001
	Conformity	.165	<.001
	Enhancement	.085	.019
	Social	-.012	.742
	PSNSU	.044	.141
	Online social anxiety	.177	<.001
Avoidance →	DERS	-.010	.776
	Coping	-.014	.695
	Conformity	-.033	.326
	Enhancement	-.014	.704
	Social	-.105	.005
	PSNSU	-.037	.172
	Online social anxiety	.061	.044
Coping →	DERS	.309	<.001
	PSNSU	.295	<.001
	Online social anxiety	.183	<.001
Conformity →	DERS	.260	<.001
	PSNSU	.307	<.001
	Online social anxiety	.160	<.001
Enhancement →	DERS	-.009	.847
	PSNSU	.087	.052
	Online social anxiety	.090	.050
Social →	DERS	-.087	.019
	PSNSU	.087	.012
	Online social anxiety	.073	.041
DERS →	PSNSU	.260	<.001
	Online social anxiety	.268	<.001
Time spent on SNSs →	PSNSU	.183	<.001
	Online social anxiety	-.027	.412
Gender →	PSNSU	-.009	.748
	Online social anxiety	.113	<.001
Age →	PSNSU	-.041	.147
	Online social anxiety	.027	.374

**Notes:** PSNSU = Problematic Social Networking Sites Use; Anxiety = Attachment Anxiety; Avoidance = Attachment Avoidance; DERS = Difficulties in Emotion Regulation Strategies.

Table 2. Standardized direct, indirect, and total effects of the independent variables (attachment anxiety and attachment avoidance) on the two outcomes (PSNSU and online social anxiety) via the mediators (motives to use SNSs and emotion dysregulation).

Independent	Mediators	PSNSU				Outcome			
		Beta	SE	<i>z</i>	<i>p</i>	Beta	SE	<i>z</i>	<i>p</i>
Anxiety	DERS	.072	.011	5.343	<.001	.074	.013	5.379	<.001
	Total effect via DERS	.116	.025	3.933	<.001	.251	.031	7.652	<.001
	Coping	.073	.014	4.425	<.001	-.003	.006	-.391	.696
	Coping→DERS	.020	.004	3.759	<.001	.021	.005	3.599	<.001
	Total effect via Coping and DERS	.064	.025	2.137	.033	.197	.031	6.038	<.001
	Conformity	.051	.010	4.127	<.001	-.005	.005	-.955	.339
	Conformity → DERS	.011	.003	3.571	<.001	.012	.003	3.459	.011
	Total effect via Conformity and DERS	.055	.025	1.848	.065	.188	.031	5.709	<.001
	Enhancement	.007	.004	1.488	.137	-.001	.003	-.381	.703
	Enhancement → DERS	-.000	.001	-.192	.848	-.000	.001	-.192	.848
	Total effect via Enhancement and DERS	.044	.026	1.465	.143	.177	.031	5.300	<.001
	Social	-.001	.003	-.325	.745	-.008	.004	-1.652	.099
	Social → DERS	.000	.001	.322	.747	.000	.001	.322	.747
	Total effect via Social and DERS	.045	.025	1.482	.138	.177	.031	5.322	<.001
Avoidance	DERS	-.002	.007	-.284	.777	-.003	.008	-.283	.777
	Total effect via DERS	-.040	.024	-1.416	.157	.059	.029	1.881	.060
	Coping	-.004	.009	-.388	.698	-.003	.006	-.391	.696
	Coping→DERS	-.001	.002	-.393	.695	-.001	.003	-.393	.695
	Total effect via Coping and DERS	-.039	.024	-1.391	.164	.060	.029	1.966	.049
	Conformity	-.010	.009	-.973	.331	-.005	.005	-.955	.339
	Conformity → DERS	-.002	.002	-.961	.337	-.002	.002	-.952	.341
	Total effect via Conformity and DERS	-.040	.023	-1.441	.150	.059	.029	1.927	.054
	Enhancement	-.001	.003	-.371	.711	-.001	.003	-.381	.703

Enhancement → DERS	.000	.000	.184	.854	.000	.000	.184	.854
Total effect via Enhancement and DERS	-.037	.023	-1.366	.172	.062	.029	2.011	.044
Social	-.009	.004	-1.877	.060	-.008	.004	-1.652	.099
Social → DERS	.002	.001	1.757	.079	.002	.001	1.723	.085
Total effect via Social and DERS	-.035	.023	-1.281	.200	.064	.029	2.084	.037

**Notes:** PSNSU = Problematic Social Networking Sites Use; Anxiety = Attachment Anxiety; Avoidance = Attachment Avoidance; DERS = Difficulties in Emotion Regulation Strategies.



## Problematic social networking and attachment

# Problematic social networking sites use and online social anxiety: The role of attachment, emotion dysregulation and motives

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## **Problematic social networking and attachment**

### **Declaration of Competing Interest**

The authors declare no conflict of interest.

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## Problematic social networking and attachment

# Problematic social networking sites use and online social anxiety: The role of attachment, emotion dysregulation and motives

**Keywords:** Attachment; emotion dysregulation; motives; problematic social networking sites use; social anxiety.

### Abstract

Problematic Social Networking Sites Use (PSNSU) and social anxiety are associated. SNSs users may develop online social anxiety that may become a standalone problem. The present study aims to test the mediating role of emotion dysregulation and motives (coping, conformity, social, and enhancement) between attachment (anxiety and avoidance) and two outcomes (PSNSU and online social anxiety) in an integrated theory-driven model. Self-report questionnaires were completed by 756 SNSs users (50.4% females; mean age = 28.74 years,  $SD = 8.00$ ). Results of the path analysis supported the partial mediating role of emotion dysregulation in the association between attachment anxiety and both the outcomes and the serial mediating role via four and three motives in the association with PSNSU and online social anxiety, respectively. This study highlighted the role of several relational, emotional, and motivational factors that should be taken into account to tackle PSNSU and online social anxiety through clinical and prevention interventions.

### 1. Introduction

Some of the most widely used Social Networking Sites (SNSs) in western countries include Facebook, Twitter, Instagram, and TikTok, with almost four billion total users in 2022 (Clement, 2022). Although recent systematic reviews and longitudinal studies have shown that most users use SNSs in a functional way (e.g., Coyne et al., 2020; Orben, 2020; Shankleman et al., 2021), a minority

## **Problematic social networking and attachment**

(about 5%; Cheng et al., 2021) of users manifests an excessive and uncontrolled use, that can lead to multiple negative consequences (Huang, 2022). Thus, people with "problematic social networking sites use" (PSNSU; Svicher et al., 2021) are characterized by a preference for online social interactions over face-to-face ones, excessive preoccupation with SNSs, sense of urgency to use SNSs, emotional imbalance, and impairment in users' psychosocial functioning, such as interpersonal conflicts, work-related issues, and sleep difficulties (Andreassen, 2015; Marino et al., 2017). However, PSNSU has not been recognized as a clinical disorder by diagnostic manuals including the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). Among the several correlates of PSNUS, social anxiety is one of the most investigated, given that people with social vulnerability are at risk of exponential growth in the use of the Internet for social interaction purposes (e.g., email and SNSs). As emerged from numerous studies (e.g., Y. Chen et al., 2020; Markowitz et al., 2016; Yıldız Durak, 2020; Zsido et al., 2021), individuals with high levels of social anxiety are more prone to use technologically mediated communication since online social communication may be perceived as less threatening. Face-to-face communication skills may decline over time, while the overdependence on the Internet may intensify in a vicious cycle that perpetuates PSNSU (Huan et al., 2014). Beyond the view of social anxiety as a risk factor for PSNSU, it could also be the case that SNSs users might develop specific online social anxiety-like fears deriving from their SNSs use, such as online self-evaluation anxiety due to the view of their selves based on online others' evaluations (Alkis et al., 2017). Online social anxiety might arise from concerns about others' reactions to shared content on SNSs, or it can manifest through fear to share content by individuals themselves or anxiety derived from contents pertaining to them but shared by others (Alkis et al., 2017). Moreover, especially new SNSs users might experience difficulties in online social interactions and communication, and be concerned about the privacy of their private information (Alkis et al., 2017). From this perspective, taking all these possible symptoms together, online social anxiety may be considered a specific maladaptive form of SNSs use and may become

## **Problematic social networking and attachment**

problematic on its own, especially for people with vulnerability towards offline social anxiety but also for SNSs users who experience symptoms of social anxiety arising from their SNSs use as proposed by Alkis and colleagues (2017). Indeed, given the social nature of SNSs and the similarities with other addictive behaviors, maladaptive use of SNSs might cover both addiction-like symptoms such as cognitive preoccupation, compulsive use, and negative consequences (as in the case of PSNSU) and social anxiety-like symptoms, as in the case of online social anxiety. For this reason, in the present study, online social anxiety is included as an outcome along with PSNSU. Previous studies investigated many possible antecedents of PSNSU such as insecure attachment, emotion dysregulation, and motives to use SNSs (e.g., D'Arienzo et al., 2019; Marino et al., 2019; Marino, Mazzieri et al., 2018). However, to date and to the authors' knowledge, no study has investigated the association of these constructs with PSNSU and online social anxiety in a sole theory-driven model. Thus, the present study focuses on several relational, emotional, and motivational factors that may lead to PSNSU and online social anxiety in an integrated model depicted in Figure 1.

Insert Figure 1 about here

### *1.1 Attachment patterns as plausible antecedents of PSNSU and online social anxiety*

Attachment patterns have received increasing attention in the field of SNSs in recent years (D'Arienzo et al., 2019; Imperato & Mancini, 2019). Briefly, attachment theory postulates the existence of a dispositional behavioral repertoire aimed at seeking and maintaining the proximity of significant others (i.e., attachment figures) who provide a sense of security and comfort (Bowlby, 1969). Such relational schemas develop during infancy and persist in a relatively stable manner during adulthood (Fraley, 2002). The quality of the interactions with such significant others defines the individual differences in the attachment patterns, which were commonly indicated as a combination of the two attachment dimensions of anxiety (i.e., the anxious need for other's acceptance and fear of rejection) and avoidance (i.e., the avoidance of intimacy in relationships and compulsive self-reliance; Bartholomew & Horowitz, 1991).

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A positive association between attachment anxiety and PSNSU was reported in systematic reviews (D'Arienzo et al., 2019; Musetti et al., 2022; Stöven & Herzberg, 2021), suggesting a compensatory attempt to reduce separation anxiety, fear of rejection, and need for company. Furthermore, as emerging from several studies (see D'Arienzo et al., 2019), users with high attachment avoidance appear to feel connected while browsing other people's profiles without feeling threatened by unintended intimacy. Moreover, individuals with low state attachment anxiety (i.e., attachment anxiety temporarily activated by contextual and relational factors) were found to report higher PSNSU scores when they presented high levels of social anxiety (Y. Chen et al., 2020; Remondi et al., 2022). This may be due to socially anxious users tending to interpret social situations as more threatening and uncomfortable, due to biased cognitive beliefs (Nitzburg & Farber, 2013). Moreover, users with high levels of attachment anxiety appear to tend to satisfy their social needs through SNSs thus avoiding distressing face-to-face interactions (Y. Chen et al., 2020).

### *1.2. Emotion dysregulation and motives as mediators*

Beyond attachment patterns, several psychological factors have been found to be associated with PSNSU, such as psychological distress, deficiencies in reflective functioning, maladaptive cognitions as well as difficulties in emotion regulation, and motives to use SNSs (e.g., Casale & Banchi, 2020; Imperato et al., 2022; Marino, Gini, et al., 2018b; Musetti et al., 2021). The current study focuses on the latter two as potential mechanisms involved in PSNSU and online social anxiety because emotion dysregulation and motives to use SNSs are both based on well-established theoretical models, that is the model of emotion regulation proposed by Gratz and Roemer (2004) and the motivational model proposed by Bischof-Kastner et al. (2014). Moreover, these constructs are likely to be associated to each other but, to the authors' knowledge, an explicit exploration of such association in the context of the two proposed outcomes is currently missing. An in-depth understanding of the interplay between these variables might be useful to highlight the potential

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psychological factors to be taken into account when planning prevention programs and interventions related to online behaviors.

Notably, because of its integrating and transdiagnostic role, emotion dysregulation has been extensively investigated, including its associations with dysregulated Internet usage, and specific motives such as emotion suppression and escapism (Gioia et al., 2021). Specifically, the construct of emotion regulation refers to the awareness, understanding, and acceptance of emotions, and the ability to manage appropriate emotional responses to achieve personal goals and situational demands (Marino et al., 2019). Several cross-sectional and longitudinal studies have shown that emotion dysregulation is positively associated with problematic Internet use (Gioia et al., 2021; Pettorruso et al., 2020; Spada & Marino, 2017; Wartberg & Lindenberg, 2020), PSNSU (Hussain et al., 2021; Marino et al., 2019), and social anxiety related disorders, such as social phobia (Golombek et al., 2020). Specifically, it has been suggested (e.g., Marino et al., 2019) that SNSs users who have difficulty regulating emotions (including emotional avoidance, lack of awareness, and poor impulse control) may tend to use SNSs to regulate their emotions incurring and maintaining the problematic online behaviors via negative reinforcement, such as PSNSU and, eventually, online social anxiety. However, to date, despite the evidence of the relationship between emotion dysregulation and social anxiety (e.g., Azad-Marzabadi & Amiri, 2017), there is a lack of studies exploring such association with online social anxiety.

People use SNSs for a variety of purposes, which can be summarized as social connection (e.g., self-presentation, self-enhancement, or joining an online community), instrumental purposes (e.g., searching for information), or entertaining purposes (e.g., playing video games, watching video clips, listening to music; Kircaburun et al., 2020; Stöven & Herzberg, 2021; Zheng et al., 2020). According to the traditional motivational model of addictions (Cooper, 1994) applied to online behaviors, individuals' problematic online behaviors are motivated by expectancies that represent the valence (positive or negative) and the source (internal or external) of expected outcomes. It follows that four

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classes of motives can be generated: social (positive valence and external source; that is, expecting to gain social incentives and improve relationships with friends), conformity (negative valence and external source; using SNSs because of friends' pressure and avoid social rejection), enhancement (positive valence and internal source; that is, expecting to improve positive affect using SNSs), and coping (negative valence and internal source; that is, expecting to diminish bad feelings using SNS; Marino, Gini, et al., 2018a). This model considers motives as proximal antecedents of problematic behaviors and they lead to engagement in the target behavior (Cooper, 1994). In line with this view, a recent longitudinal study (Q. Liu et al., 2022) confirmed the direction of the association between psychological needs and PSNSU, revealing that need for autonomy, competence and relatedness predicted social networking addiction at one year.

### *1.3. Hypothesized theoretical model developed for testing in the study*

The present study aimed at testing a model designed to assess the contribution of attachment patterns, emotion dysregulation, motives to use SNSs on PSNSU, and online social anxiety simultaneously among Italian adults. The conceptual model is depicted in Figure 1. As previously mentioned, a number of studies have shown that attachment patterns, emotion regulation, and motives for SNSs use are associated with PSNSU. However, to date, no attempt has been made to examine the association of such psychological aspects with online social anxiety on SNSs along with PSNSU.

First, two attachment dimensions (attachment anxiety and attachment avoidance) were included as independent variables in the current study, as they are plausible distal antecedents of problematic patterns of SNSs use (e.g., Musetti et al., 2022). The quality of attachment relationships, both with parents and romantic partners, is considered as relatively stable over time because it reflects a systematic pattern of emotions and expectations towards close people (Schimmenti et al., 2021). Indeed, attachment is related to how individuals adjust their own emotional responses, and in turn to how they behave on the Internet and SNSs (Schimmenti et al., 2021; Wang et al., 2018; Yu et al., 2013).



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Secondly, emotion dysregulation was included as the first hypothesized mediator between attachment and problematic patterns of SNSs use. Empirical studies (e.g., Liese et al., 2020) have shown that emotion dysregulation is negatively associated with secure attachment patterns and positively associated with insecure attachment patterns. For example, a study reported a partial mediation effect of emotion dysregulation between attachment anxiety and PSNSU (Liu & Ma, 2019), thus suggesting a defective coping mechanism related to mood regulation. Attachment anxiety and attachment avoidance were found to have a positive association with emotion dysregulation and anxiety disorder symptoms (Marganska et al., 2013), accordingly attachment insecurity may support inadequate emotion regulation, increasing the likelihood of these disorders.

Thirdly, motives to use SNSs were included as mediators between attachment and the two outcomes. Individual characteristics including attachment patterns (Baek et al., 2014), affective self-regulating abilities (Marino et al., 2019), and social anxiety tendency (Shensa et al., 2018) have an impact on functional and dysfunctional SNSs uses and motivations. Several motives for utilizing SNSs have been associated with attachment anxiety and attachment avoidance. In particular, anxiously attached users exhibit stronger needs to belong and be well-liked, which in turn lead to feelings of fear of being excluded (Chang, 2019). Such users show an accentuated sensitivity to social feedback and an inclination for social comparison (Flynn et al., 2018; Oldmeadow et al., 2013). Moreover, maladaptive coping mechanisms involved in stressful life events and emotional difficulties may lead to the development of PSNSU (Pettorruso et al., 2020). As further examples, it has been found that attachment is indirectly associated with problematic use of specific SNSs (i.e., Grindr, Facebook) via motivations related to companionship, escapism, and likes-seeking behaviors (Jayawardena et al., 2021; Vaillancourt-Morel et al., 2020). Another study (Chen, 2019) suggested that motives related to the satisfaction of the need for relatedness and self-presentation mediated the association between attachment anxiety and SNS addiction, further sustaining the hypothesized mechanism linking attachment to problematic patterns of SNSs use via psychological motives.

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Furthermore, motives to use SNSs were included as serial mediators between emotion dysregulation and the two outcomes. To the authors' knowledge, no study specifically tested such association in a single model. However, a previous study on a different problematic online behavior (i.e., problematic gaming) showed that escapism motives partially mediated the relationship between difficulties in emotion regulation and problematic gaming (Blasi et al., 2019). Therefore, it is hypothesized that emotion dysregulation, as influenced by attachment, might strengthen certain motives to use SNSs, which in turn are associated with PSNSU and online social anxiety. However, due to the lack of previous longitudinal studies on this specific series of mediators in the context of SNSs and online social anxiety, an alternative model was tested (see Appendix A), where motives mediate the relationship between attachment and emotion dysregulation, which in turn is associated with the two outcomes. Indeed, it should be noted that the cross-sectional design of the present study hampers the possibility to draw conclusions about the direction of the hypothesized associations. Therefore, results will be taken cautiously as other models might be plausible.

Overall, the present study sought to test a single model in which it is hypothesized that attachment anxiety and avoidance are both directly and indirectly associated with PSNSU and online social anxiety, via emotion dysregulation (Mikulincer & Shaver, 2019) and different motives for SNSs use (Stöven & Herzberg, 2021). Emotion dysregulation and motives, in turn, would be associated with levels of both PSNSU (Süral et al., 2019; Wartberg et al., 2021) and online social anxiety. Additionally, age, gender and time spent on SNSs were included as control variables of the two outcomes because it has been repeatedly showed that being young (e.g., Livingstone, 2008), female (e.g., Hou et al., 2017; Kuss & Griffiths, 2017), and frequently using SNSs (e.g., Zimmer, 2022) are risk factors for problematic patterns of SNSs use (e.g., Marino, Gini, et al., 2018a).

## **2. Methods**

### *2.1. Participants and procedure*

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An online questionnaire batch was used to collect data between December 2020 and January 2021 by means of advertisements shared in social network groups. Before starting the survey, all participants received information about the study and gave their online consent. Anonymity of the participants was guaranteed as no personal data or Internet Protocol address was collected. No compensation was given for participating in the study. Inclusion criteria were as follows: (i) being over 18 years; (ii) being able to complete questionnaires in Italian; and (iii) using at least one SNS. A total of 1017 individuals participated in the study, however incomplete questionnaires ( $n = 186$ ), questionnaires including more than 20% of missing data in the variables of interest ( $n = 19$ ), and non-binary identity ( $n = 2$ ) were excluded. Moreover, for the purpose of the current study, those reporting not using any SNS ( $n = 43$ ) were also excluded. Using the Mahalanobis distance scores, 13 multivariate outliers were identified and removed. Therefore, the analyses were run on a final sample of 756 SNS users (50.4% females; mean age = 28.74 years,  $SD = 8.00$  years; age range = 19-69 years). Participants reported using SNS for about 2 hours and a half per day on average. Preferred SNSs were WhatsApp, Facebook, Instagram, Telegram, TikTok, and YouTube. Twenty eight percent of respondents were university students and 66% workers, whereas the remaining were unemployed, housewives, or retired; 54.8% of the sample reported being single, 44.8% being in a stable relationship, and the remain was divorced or widowed.

This study was part of a larger research project on social media during the COVID-19 pandemic, and other data not related to the current study will be presented elsewhere. The study procedures were carried out in accordance with the Declaration of Helsinki. The Ethical Committee of the Center for Research and Psychological Intervention (CERIP) of the University of Messina approved the study (protocol number: 119094). All participants were informed about the study and all provided informed consent prior to the online survey, which took approximately 30 minutes to complete. This study did not involve human and/or animal experimentation.

### *2.2. Measures*

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*2.2.1. Problematic Social Networking Sites Use.* We used an adaptation of the Italian version of the Problematic Facebook Use Scale (Marino et al., 2017) to assess PSNSU in the last 12 months. Specifically, in each item the word “Facebook” was replaced with “social networking sites”. The scale includes 15 items (e.g., “I prefer online social interaction over face-to-face communication”; “I would feel lost if I was unable to access social networking sites”). Participants were asked to rate the extent to which they agreed with each item on an 8-point scale from 1 (definitely disagree) to 8 (definitely agree). Items were averaged to obtain continuous variables for a total score of PSNSU with higher scores indicating higher levels of PSNSU. The Cronbach’s alpha for the scale was .91 (95% CI .90-.92).

*2.2.2. Online Social Anxiety.* We used the Italian version (Ruggieri et al., 2020) of the Social Anxiety Scale for Social Media Users (SAS-SMU; Alkis et al., 2017) to assess online social anxiety in the last 12 months. The scale includes 21 items (e.g., “I am concerned about being ridiculed by others for the content I have shared”) about shared content anxiety, privacy concern anxiety, interaction anxiety, and self-evaluation anxiety. Participants were asked to rate how often they feel anxious or preoccupied on social media on a 5-point scale from 1 (never) to 5 (always). Items were averaged to obtain continuous variables for a total score of social anxiety concerning SM with higher scores indicating higher levels of online social anxiety. The Cronbach’s alpha for the scale was .95 (95% CI .94-.95).

*2.2.3. Attachment.* Adult attachment was assessed with the Italian adaptation (Carli, 1995) of the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991). The RQ includes four sentences each of which describes four prototypical attachment attitudes: (a) Secure (“It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depending on me. I don’t worry about being alone or having others non accept me”); (b) Dismissing (“I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me”);

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(c) Preoccupied (“I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don’t value me as much as I value them”); (d) Fearful (“I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others”). Participants were required to indicate how well each paragraph described them on a 7-point Likert scale from 1 (It does not describe me at all) to 7 (It very much describes me). Following previous research (Brennan et al., 1998), we used the scores on the four attitudes to calculate the two underlying dimensions of attachment anxiety [(fearful + preoccupied) – (secure + dismissing)] and avoidance [(fearful + dismissing) – (secure + preoccupied)]. The anxiety dimension refers to anxiety about abandonment, rejection, and unlovability, whereas the avoidance dimension refers to avoidance of dependency and intimacy.

*2.2.4. Emotion dysregulation.* Emotion dysregulation was assessed using the Italian version of the Difficulties in Emotion Regulation Strategies (DERS; Sighinolfi et al., 2010). The scale includes 36 items rated on a 5-point scale from 1 (almost never) to 5 (almost always) and covers six dimensions, labeled: lack of emotional awareness, lack of emotional clarity, difficulties controlling impulsive behaviors when distressed, difficulties engaging in goal-directed behavior when distressed, non-acceptance of negative emotional responses, and limited access to effective emotional regulation strategies. Items were averaged to obtain a continuous score for emotion dysregulation with higher scores indicating more difficulties in emotion regulation. The Cronbach’s alpha for the scale was .93 (95% CI .92-.94).

*2.2.5. Motives to use SNSs.* Motives for using SNSs were assessed with an adapted version of the Facebook Motives Questionnaire (Marino, Gini, et al., 2018a; original version by Bischof-Kastner et al., 2014) to SNSs in general. This adapted scale has already been used among Italian adults and showed good validity properties (Marino et al., 2016). Participants were asked how often in the last

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12 months they logged on SNSs for different motivations, thinking of all the times they have been on SNSs during the last 12 months. The scale includes four motives: coping (e.g., “To forget your worries?”), conformity (e.g., “To be liked by others?”), enhancement (e.g., “Because it is exciting?”), and social motive (e.g., “To come into contact with others?”). The questionnaire contains 16 items rated on a 5-point scale from 1 (never or almost never) to 5 (always or almost always) so that higher scores indicate higher levels on each motive. The Cronbach’s alphas for the subscales were as follows: .87 (95% CI .88-.89) for coping; .77 (95% CI .74-.80) for conformity; .70 (95% CI .67-.74) for enhancement; and .84 (95% CI .82-.86) for social motive.

### *2.3. Statistical analysis*

First, in order to test the associations between the variables of interest, correlation analyses were conducted. Second, the pattern of relationships specified by our hypothesized model (Figure 1) was examined through a path analysis, using the package Lavaan (Rosseel, 2012) of the software R (R Development Core Team, 2017) and utilizing a single observed score for each construct included in the model. The covariance matrix of the observed variable was analyzed with Robust Maximum Likelihood method estimator as some variables were non-normally distributed (see Table 1). The Sobel test (Baron & Kenny, 1986; Hayes, 2009) was used to test for mediation. To evaluate the goodness of fit of the model we considered the  $R^2$  of each endogenous variable and the total coefficient of determination (Bollen, 1989; Jöreskog & Sörbom, 1996). In the tested model, PSNSU and online social anxiety were the dependent variables, emotion dysregulation, and the four motives were the mediators, and attachment anxiety and avoidance were the independent variables, whereas age, gender, and time spent on SNSs were included as control variables on the two outcomes (Figure 1).

## **3. Results**

Table 1 shows the means, standard deviations, range, skewness, kurtosis, and bivariate correlations between the variables included in the study. Most of the study variables were correlated

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with each other, with the exception of attachment avoidance which appears to be weakly and positively associated with online social anxiety and DERS, and negatively with social motive only. Of note is that a large positive correlation was found between PSNSU and online social anxiety, as well as between DERS and the two outcomes. The strongest correlations were observed between coping motive and the two outcomes. Overall, time spent on SNSs was positively associated with all the other variables with the exception of avoidance and with the strongest association observed with PSNSU. With regards to demographic characteristics, age was negatively, though weakly, associated with all variables of interest, whereas gender was positively and very weakly associated with the two outcomes, the two attachment dimensions, and two motives (coping and enhancement).

Insert Table 1 about here

The theoretical model was tested including all the variables of interest. Several coefficients did not reach statistical significance: the links between attachment avoidance and four mediators (i.e., DERS, coping, conformity, enhancement), and PSNSU; the associations between attachment anxiety and three mediators (i.e., conformity, enhancement, social), and PSNSU; the association between enhancement and online social anxiety; the associations between age and gender with PSNSU and between age, gender, time spent on SNSs with online social anxiety. As shown in Figure 2 and reported in Table 2, the two attachment dimensions were directly but weakly associated with one outcome (online social anxiety). Overall, positive and medium associations were found especially between attachment anxiety and DERS, and between DERS, two motives (i.e., coping and conformity) and the two outcomes. Smaller associations were observed between DERS and the other two motives (i.e., enhancement and social) that, in turn, were weakly associated with PSNSU. As shown in Table 3, several indirect associations were found to be significant. Results of the Sobel test supported the mediating role of DERS in the association between attachment anxiety and both the outcomes. Coping motive mediated the association between attachment anxiety and PSNSU only. Moreover, the serial mediating role of DERS and two motives (i.e., coping and conformity) in the

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associations between attachment anxiety and the two outcomes were observed, as well as the association between attachment anxiety and PSNSU via DERS and social motive, and the association between attachment anxiety and online social anxiety via DERS and enhancement. Attachment avoidance was only associated with social motive which, in turn, was weakly associated with both outcomes.

Insert Figure 2 and Table 2 about here

The squared multiple correlations for the endogenous variables indicate that the model accounts for 50% of the variance of PSNSU and 37% of online social anxiety. Less variance is explained for mediators: 15% for DERS, 21% for coping, 17% for conformity, 8% for enhancement, and 3% for social motive. Finally, the total amount variance explained by the model (Total Coefficient of Determination, TCD = .29) indicated an acceptable fit to the observed data. In terms of effect size, TCD = .29 corresponds to a correlation of  $r = .54$ . According to the Cohen's (1988) traditional criteria, this is a medium effect size.

Insert Table 3 about here

### **4. Discussion**

The goal of the present study was to examine the contribution of theory-driven factors to PSNSU and online social anxiety. Bivariate correlations showed that the two outcomes were associated with each other sustaining the idea that socially anxious individuals may perceive online interactions as safer but engage in maladaptive safety behaviors that may lead to a long-term preference for online communications rather than face-to-face interactions (Carruthers et al., 2019).

With regards to attachment, bivariate correlations indicated a positive association between attachment anxiety and the two outcome variables and between attachment avoidance and online social anxiety. Overall, results are in line with a recent systematic review (Musetti et al., 2022), indicating a clear association between attachment anxiety and PSNSU, while findings on attachment avoidance appeared to be more controversial. However, when emotion dysregulation and motives



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were included in the path analysis, the results of this study provided additional evidence on the weak associations between attachment anxiety, attachment avoidance and online social anxiety. That is, interestingly, results from the path analysis suggested that individuals with attachment insecurities are more likely to display PSNSU because they have more difficulties in satisfying their social and emotional needs.

With regards to attachment anxiety, it was positively associated with emotion dysregulation, which, in turn, was positively associated with PSNSU (Faghani et al., 2020). Attachment anxiety implies an overinvolvement in SNSs as an attempt to deal with fear of abandonment and rejection (Young et al., 2020). As such, people high in attachment anxiety may tend to have more difficulties in emotion regulation resulting both in PSNSU, for example using of SNSs for mood regulation and cognitive preoccupation about what happens on SNS (e.g., Marino et al., 2017), and in online social anxiety, for example developing specific fears about shared contents, and self-evaluation anxiety (Alkis et al., 2017). Further, difficulties in regulating emotions were associated with stronger motives to use SNSs to satisfy psycho-social needs. Specifically, the strongest associations were observed between emotional dysregulation and the two motives with negative valence (i.e., coping and conformity). This is not surprising because people experiencing difficulties in emotion regulation are likely to attempt to manage engaging in dysfunctional strategies, such as using SNSs to decrease unwanted negative internal states (i.e., coping) and to decrease the feeling of being excluded from others (i.e., conformity). Coherently, these two motives are also the ones showing the strongest associations with the two outcomes. Indeed, coping and conformity are often considered more problematic as compared to enhancement and social motives (Marino, Mazzieri, et al., 2018) because they are driven by the expectancy to decrease a negative state, which is, on the contrary, often frustrated rather than satisfied on SNSs (Brand et al., 2016; O'Day & Heimberg, 2021). Overall, enhancement and social motives are weakly associated with both PSNSU and online social anxiety. Results also indicated that the serial mediation of DERS and enhancement was significant in the

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association between attachment anxiety and online social anxiety. This could indicate that socially anxious individuals compensate for poor relational skills with coping mechanisms, with the intent of presenting themselves as more socially competent (Kardefelt-Winther, 2014).

With regard to attachment avoidance, results from the path analysis showed that it had an overall marginal role in explaining the two outcomes. Specifically, attachment avoidance was only directly and weakly related to online social anxiety. This suggests that SNSs users with high levels of avoidance attachment may employ SNSs not to interact and create close contacts, a situation in which they expose themselves to possible judgment, but to create relationships at a distance so as not to confront others and keep the relation under control (Young et al., 2020). Moreover, attachment avoidance was negatively associated with the social motive, which, in turn, was positively but weakly associated with both PSNSU and online social anxiety. It could be argued that individuals with high levels of attachment avoidance and withdrawing attitudes (Mikulincer & Shaver, 2007) may not use SNSs interactively, due to preoccupations with reciprocal relationships with others. Instead, they would fulfill their social needs and motivations by establishing a safe distance from other individuals (Vaillancourt-Morel et al., 2020). Consequently, it could be noted that people suffering from online social anxiety are afraid of others because of cognitive biases and negative implicit evaluations of others, showing continuity between offline relational impairment and online socializations (Weidman & Levinson, 2015). This is in line with recent studies (Ali et al., 2021), that suggested a close relation between avoidance of direct social contacts, implicit negative evaluations and fear of rejection, and compulsive social networking sites usage. Social interaction may thus be mediated by a compensatory use of online social platforms (Xie & Karan, 2019).

Regarding the control variables, results from the present study indicated that time spent on SNSs is directly associated with PSNSU and online social anxiety, suggesting that a longer time spent on SNSs is related to more PSNSU and online social anxiety. However, some authors (e.g., Laconi et al., 2015; Marino, Gini, et al., 2018a) showed that prolonged use alone does not necessarily imply

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problematic or addictive behaviors but may increase the likelihood of loss of control over SNSs use. Regarding gender differences, in the present study females reported higher levels of PSNSU and online social anxiety in line with several previous research (Marino, Mazzieri, et al., 2018).

Our findings have implications that need to be acknowledged. The creation of digital social environments (Musetti & Corsano, 2018) is leading more individuals to use SNSs as extensions and alternatives to face-to-face interactions. This could result in unsuccessful or maladaptive cognitive and behavioral schemata that could have clinical implications. Psychological and preventive interventions should address the specific intrapersonal and interpersonal mediating factors between different attachment dimensions, PSNSU, and the individual's propensity to online social anxiety (Ruggieri et al., 2020; Zsido et al., 2021).

### *4.1. Limitations*

The present study has a number of limitations. PSNSU is a concept that is still being debated (see Starcevic et al., 2020; Svicher et al., 2021). As such, PSNSU was evaluated as a whole phenomenon and in the present study no specific social media was separately explored. Moreover, given the cross-sectional design of the study, the direction of the associations is only suggestive, and no definitive conclusions can be drawn about the stability of the identified mediated effects. In order to partially overcome this issue, an alternative model (with motives and emotion dysregulation as serial mediators) was explored. This model has a comparable fit to the original model (see APPENDIX A). However, the alternative model accounts for less variance of the two outcomes and mediators (45% for PSMU; 34% for online social anxiety; 6% for coping; 3% for conformity; 7% for enhancement; 1% for social; 32% for emotion dysregulation). Thus, longitudinal studies are still needed to inspect causality relationships among the variables and further examine the proposed serial mediations. Furthermore, we used a snowball convenience sampling, not necessarily representing the general population, and the obtained data were collected through self-report measures, thus being

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susceptible to response bias. Additionally, we did not include a measure of offline social anxiety, therefore we could not draw any conclusions about the risk of developing online social anxiety in absence of pre-existing vulnerabilities to social anxiety. Finally, even though attachment tend to be relatively stable across time, data were collected during the COVID-19 pandemic that influenced people's social media use and increased worries, likely impacting on emotion regulation strategies used to tackle the emergency of the pandemic and motives to use SNSs (e.g., Boursier et al., 2020). For this reason, our results may have been affected by the context during the administration of the questionnaires. Therefore, further studies are needed to test whether our findings may vary during non-pandemic times.

### *4.2. Conclusions*

Despite these limitations, the presented model revealed a complex intertwined phenomenon related to emotional, social, and cognitive factors that at least partially elucidated the mechanism underlying the relationship between attachment patterns, PSNSU, and online social anxiety. Emotion dysregulation and specific psycho-social motives are strictly associated with two different sides of maladaptive SNS use (i.e., PSNSU and online social anxiety) and, as such, could be tackled through clinical and prevention interventions.

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