



## How maladaptive cognitions contribute to the development of problematic social media use

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### ARTICLE INFO

#### Keywords:

Social media problematic use  
Maladaptive cognitions  
Perfectionism discrepancies  
Social hopelessness  
Preference for online social interactions

### ABSTRACT

**Introduction:** The current study investigates the effects of perfectionism discrepancies (PD) and social hopelessness (SH) on problematic social media use as conceptualized by the cognitive-behavioral model. **Methods:** A sample of 400 university students (52.3% women; mean age = 22.01 ± 1.99) completed measures assessing PD, SH, and problematic social media use. **Results:** Structural equation modeling showed that both social hopelessness and feeling discrepant from personal and prescribed standards predicted the preference for online social interactions (POSI). POSI predicted the motivation to use online social media as a means of alleviating distressing feelings, the inability to regulate social media use and the negative outcomes resulting from use of SNS. **Conclusions:** In line with the cognitive-behavioral model of problematic Internet use, the present study suggests the primary importance of maladaptive cognitions about the self (i.e. perfectionism discrepancies) and the world (i.e. social hopelessness) for the development of a preference for online social interactions. In particular, the present study shows that individuals are likely to opt for online social interactions as a function of their pessimistic social expectancies and the sense of inadequacy that comes from perceptions of falling short of expectations.

### 1. Introduction

The use of social networking sites (SNSs) has increased dramatically over the last few years. Many scholars (e.g., Kuss & Griffiths, 2017) argue that SNSs use may be addictive because some individuals experience symptoms similar to those experienced by those who suffer from other forms of addiction. Mood modification, salience, tolerance, withdrawal symptoms, conflict, and relapse appear to be present in people who use SNSs excessively (Kuss & Griffiths, 2011; Andreassen, 2015; Müller, 2016). Andreassen and Pallesen (2014) define SNS addiction as “being overly concerned about SNSs, to be driven by a strong motivation to log on to or use SNSs, and to devote so much time and effort to SNSs that it impairs other social activities, studies/job, interpersonal relationships, and/or psychological health and well-being” (p. 4054).

There are a number of theoretical perspectives which can explain the development of SNS problematic use (Turel & Serenko, 2012), most of them deriving from models on generalized problematic Internet use. The social skill model (Caplan, 2005) suggests that individuals might

use Internet excessively (especially Internet communicative services) because of a preference for online social interaction over face-to-face communication resulting in problematic (i.e. unregulated) SNS use. This preference for online social interactions (POSI)- i.e. the belief that one is safer, more efficacious and more confident with online interpersonal interactions than with traditional face to face relationships - has been conceptualized as the cognitive precursor of the tendency to use the Internet for regulating negative mood states, the compulsive use of Internet (i.e. deficient self-regulation), and the presence of negative outcomes in real life (Caplan, 2010). Various studies found empirical support for the predictive role of POSI levels on the inability to regulate one's own use of Internet services (Caplan, 2010, Casale, Fioravanti, & Caplan, 2015). It has been argued that the social focus in Caplan's cognitive-behavioral model, evidenced by the inclusion of POSI, makes it a good model to study the use and abuse of SNSs (Ryan, Chester, Reece, & Xenos, 2014). In fact, subsequent research found empirical support for the predictive role of POSI levels on the inability to regulate one's Facebook use among both emerging adults (de Veiga et al., 2019; Moretta & Buodo, 2018) and adolescents (Assunção & Matos, 2017).

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<https://doi.org/10.1016/j.abrep.2020.100267>

Received 21 November 2019; Received in revised form 20 February 2020; Accepted 20 February 2020

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Research focused on the possible determinants of preference for online social interactions (POSI) has emphasized the role of maladaptive cognitions about the self (i.e. “I am a failure when I am offline”) and the world (i.e. “People treat me badly offline”) (Davis, 2001; Caplan, 2010). According to the hyperpersonal model (Walther, 1996), the limited amount of information transmitted online represents an interpersonal advantage for people with these maladaptive cognitions because evaluative verbal and non-verbal cues are not present in computer mediated communication (CMC). Online communication allows for greater control over self-presentation since users can manipulate information and choose what to disclose and what to hide in order to make positive impressions on others (Papacharissi & Rubin, 2000; Valkenburg & Peter, 2011). People with distorted thoughts about the self are likely to seek out CMC because it minimizes potential costs such as the risk of negative evaluation and self-presentational failures and enhances their limited abilities. In other words, POSI is associated with being more confident and less threatened online than in face-to-face contexts (Caplan, 2007).

### 1.1. Perfectionism discrepancies and social hopelessness

Although the role of maladaptive cognitions in the development of problematic Internet use has been emphasized, the literature is currently limited in relation to providing practical guidance on which specific cognitions may be most strongly related to problematic SNS use. Relevant research (e.g., Lehmann & Konstam, 2011) has shown that perfectionistic thought patterns partially determine problematic Internet use levels. The belief that others have unrealistic standards and exert pressure to be perfect – i.e. socially prescribed perfectionism (SPP) – was found to have an effect on problematic use of Internet communication services due to fears of negative evaluation (Casale, Fioravanti, Flett, & Hewitt, 2014). Whereas SPP focuses on the need to live up to social expectations, perfectionism discrepancy (Slaney, Rice, & Ashby, 2002; Slaney, Rice, Mobley, Trippi, & Ashby, 2001) involves perceiving shortfalls in meeting standards and being cognitively preoccupied with the possibility that these standards will not be met. We argue that this sense of falling short of expectations might contribute to POSI since SNS might represent a more comfortable communicative environment by those who need to be perfect and, at the same time, feel that their behavior falls short of the expectations of oneself and others. In fact, perfectionism discrepancies are accompanied by feelings of dissatisfaction and leaves people in a double-bind. They want acceptance and belonging, but they are also forced to deal with disapproval, rejection, and criticism from others (Hewitt, Flett, Sherry, & Caelian, 2006). This is also consistent with the Perfectionism Social Disconnection Model (Hewitt et al., 2006; Cox, Clara, & Enns, 2009), which argues that people who regularly struggle with perfectionistic beliefs are prone to experience subjective and objective disconnection from the social environment (i.e., feeling rejected, excluded, and unwanted by others) and tend to perceive themselves as not accepted or not belonging because of their inability to meet the expectations of others (Hewitt et al., 2006; Stoeberl, 2012).

This emphasis on the role of perceived discrepancy is reflected in conceptual models of perfectionism and associated empirical work. For instance, the two-factor model of perfectionism and social anxiety outlined by Alden, Ryder, and Mellings (2002) postulates that social anxiety stems jointly from needing to live up to extreme standards but also feeling a discrepancy in the perceived efficacy or ability to meet these expectations.

According to Hewitt and Flett (1991), the link between perfectionistic thought patterns and social disconnection can be partially explained by the concept of social hopelessness. Social hopelessness is defined as the personal belief about negative outcome expectations in the social domain, and specifically in the type and availability of relationships (Flett, Hewitt, Heisel, Davidson, & Gayle, 2019). People who experience high levels of interpersonal hopelessness are at risk for various

forms of maladjustment, including social anxiety, depression, and suicidal tendencies. Because socially hopeless individuals expect that “they will be unlikely to experience positive interpersonal relationships, to ‘fit in’ in social situations, and to be comfortable in the presence of others” (Heisel, Flett, & Hewitt, 2003; p. 223), the role of social hopelessness as a maladaptive cognition that contributes to POSI needs to be explored. In fact, since SNS use is motivated by both a need to belong and the necessity of controlling one’s self-presentation (Nadkarni & Hofmann, 2012), it could be argued that it represents an ideal communicative environment for people with high levels of social hopelessness.

Given the greater control it affords, SNS could be used as a coping strategy by those who wish to avoid being seen as imperfect in the eyes of others, as well as a tool that allows individuals to better cope with being rejected and disappointed. If a person believes that he or she lacks the personal characteristics required to deal with the expectations of others, it is possible that he or she finds in SNS a less threatening social context and uses this communicative channel to achieve his or her perfectionistic self-presentational goals. At the same time, social hopelessness could lead to prefer online social interaction in order to cope with negative outcome expectations in offline relationships. In other words, SNS use might allow individuals to better manage their own self-presentation while satisfying their need to belong.

### 1.2. Hypotheses

To our knowledge, no study has focused on how perfectionism discrepancies (PD) and social hopelessness (SH) contributes to problematic SNS use dimensions, including POSI. The potential relevance of perfectionism discrepancies and social hopelessness to perfectionism was illustrated in a recent study by Smith et al. (2018). This study tested the perfectionism social disconnection model in a five-month two-wave longitudinal study with 127 undergraduate students. This research confirmed that socially prescribed perfectionism was a predictor of risk of elevated depressive symptoms, but it was also found that discrepancies and social hopelessness were mediators of the link between socially prescribed perfectionism and depression. Collectively, these results point to the relevance of these variables in the maladjustment of vulnerable emerging adults.

Because the interpersonal components of perfectionism are associated with social hopelessness (Hewitt, Norton, Flett, Callander, & Cowan, 1998; Roxborough et al., 2012; Sherry et al., 2013), it is possible to suppose that the effects of perfectionism discrepancies on POSI could differ depending on social hopelessness levels.

We hypothesized that:

- H1.** PD is a positive predictor of POSI, both directly and indirectly through SH
- H2.** SH is a positive predictor of POSI
- H3.** POSI is a positive predictor of Deficient Self-Regulation both directly and through Mood Regulation
- H4.** Mood Regulation is a positive predictor of Deficient Self-Regulation that in turn predicts Negative Outcome

## 2. Methods

### 2.1. Participants

A total of 401 undergraduate students (52.3% females; mean age = 22.01 ± 1.99 years) from the University of Florence in Italy were approached at the end of their lectures. All of the students agreed to join the study. General information about the purpose of the study were announced to the participants. Participants completed questionnaires within a classroom setting. The participation was voluntary

and anonymous. No course credits or remunerative rewards were given. One participant was excluded from the analysis because one of the measures was incomplete (more than 10% of his or her responses were missing).

The study protocol was approved by the Director of the Department of Psychology and study procedures were designed in accordance with the European research ethical guidelines.

2.2. Measures

Problematic SNS use was measured through the Italian adaptation (Fioravanti, Primi, & Casale, 2013) of the Generalized Problematic Internet Use Scale 2 (GPIUS2; Caplan, 2010). The GPIUS2 is a 15-item scale that addresses four higher order dimensions: (a) preference for online social interactions (POSI), which is defined as the belief that one is safer, more efficacious, and more confident with online interpersonal interactions than with face-to-face interactions (e.g., “Online social interactions are more comfortable for me than face-to-face interactions”); (b) mood regulation (MR), which pertains to the motivation to use the Web as a means of alleviating distressing feelings (e.g., “I have used the Internet to make myself feel better when I was down”); (c) deficient self-regulation (DSR), which refers to the inability of users to control their online behavior (e.g., “I find it difficult to control my Internet use) and obsessive thinking about the online world (e.g., “I think obsessively about going online when I am offline”); (d) negative outcomes (NO), which describe the extent to which an individual experiences personal and social problems resulting from use of the Internet (e.g., “I have missed social engagements or activities because of my Internet use”). Since some items are referred to the use of the Internet without differentiating between the uses of different services, for the purposes of the present study respondents were asked of referring only to their use of social network sites when answering to the items (e.g. “I have difficulty controlling the amount of time I spend on SNS”). Responses are specified on a scale ranging from 1 (strongly disagree) to 8 (strongly agree). Higher scores on this scale indicate higher levels of problematic SNS use. The Italian version of the GPIUS2 (Fioravanti et al., 2013) is reliable and demonstrates solid construct and convergent validity. The Cronbach’s alphas of the subscales in this study ranged from 0.69 for POSI, 0.82 for MR, 0.85 for DSR and 0.73 for NO.

The Perfectionism Discrepancies Inventory (PDI; Flett & Hewitt, 2019) is a 20-item scale that was used to measure the discrepancies between the need to be perfect (based on self-oriented and socially prescribed perfectionism) as well as the need to seem perfect (i.e., perfectionistic self-presentation) and self-judgments regarding how perfect one is. Participants were instructed to rate the extent to which they agree with each of the 20 PDI items on a scale ranging from 1 (not at all) to 4 (very much). PDI score was the sum of all 20 items scores. The discrepancy from socially prescribed standards is assessed through items such as “To what extent have you been unable to reach the goals that others have imposed to you?” The discrepancy that reflects not living up the need to seem perfect is assessed through items such as “To what extent have you been able to avoid making mistakes in front of other people?” Participants also respond to items that evaluate discrepancy in terms of public behaviors (e.g., “To what extent do the behaviors you exhibit in front of others fall short of your expectations?”). The Italian version of the PDI was obtained using a back-translation method in which one translator translated the test from the source language to the target language (Italian). A second translator, without having seen the original test, translated the new version of the test back to the source language. The original and the back-translated versions of the test were then compared, and judgments were made about their equivalence. The Cronbach’s alpha for the PDI in the present study was 0.87.

The Social Hopelessness Questionnaire (SHQ; Flett, Hewitt, Heisel, Davidson, & Gayle, 2019) was used to assess individual differences in personal beliefs about outcome expectancies in the social domain. It

includes 20 items that measure the intensity of negative outcome expectations with respect to interpersonal themes, such as the type and availability of relationships, exposure to mistreatment, lack of support, exposure to criticism, negative social comparisons, and direct estimates of hopelessness. Each item is scored from 1 (strongly disagree) to 5 (strongly agree). SHQ score was obtained by summing up the items scores. Sample items from the SHQ include: “Some people do little to inspire hope in me” and “I will always have a hard time coping with some people.” The SHQ has been found to be reliable and valid in a variety of studies with various types of participants (e.g., Heisel & Flett 2004, 2005, 2016; Heisel et al., 2003; Smith et al., 2018). The Italian version of the SHQ was obtained using the same back-translation method used for the PDI. The Cronbach’s Alpha for the SHQ in the current study was 0.89.

2.3. Statistical analyses

Descriptive statistics, zero-order, and partial correlations between the study variables were computed. Structural Equation Modeling (SEM) was performed to test the hypothesized effects. SEM was conducted using LISREL 8.8 with the Robust Maximum Likelihood (RML) estimation method (Jöreskog & Sörbom, 2006). The following profile of goodness of fit indices was considered: the  $\chi^2$  (and its degrees of freedom and p-value), the Standardized Root Mean square Residual (SRMR - Jöreskog & Sörbom, 1993) “close to” 0.09 or lower, the Comparative Fit Index (CFI - Bentler, 1995) “close to” 0.95 or higher (Hu & Bentler, 1999), and the Root Mean Square Error of Approximation (RMSEA - Steiger, 1990) less than 0.08 (Browne & Cudeck, 1993). Indirect effects were tested with a distribution of product coefficients (P) test developed by MacKinnon et al. (1998, 2002).

3. Results

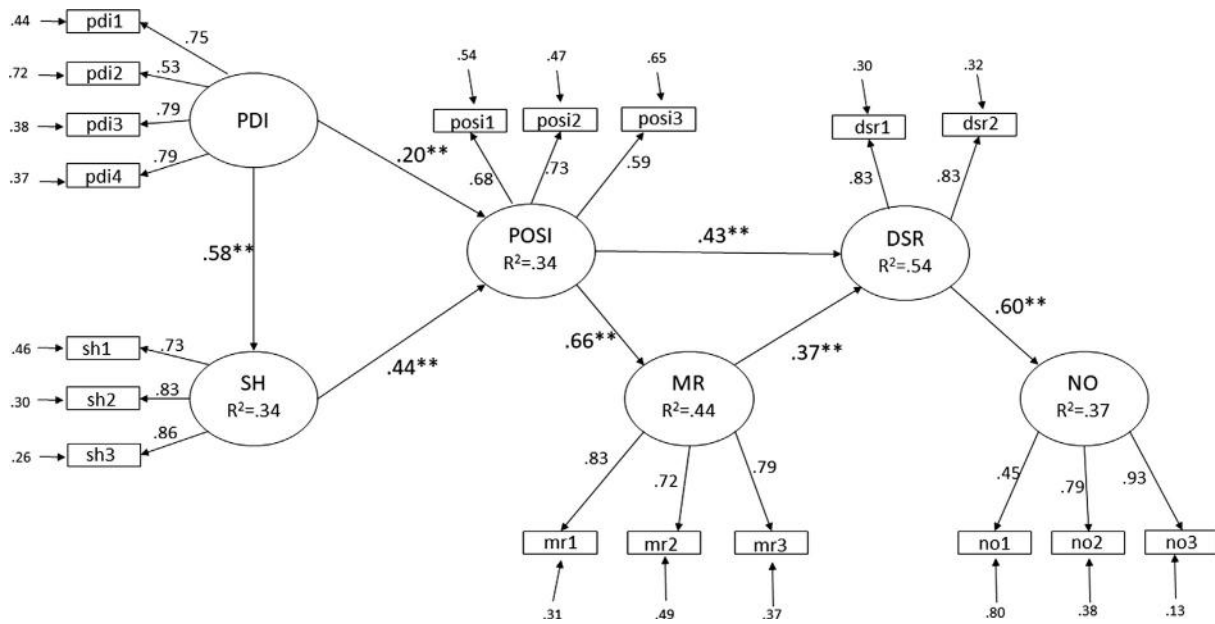
Descriptive statistics and Pearson’s correlations among the study variables are shown in Table 1. Statistically significant correlations in the expected direction were found between the predictor variables, POSI levels, and GPIUS2 dimensions.

The structural model produced adequate fit to the data ( $\chi^2 = 378.13$ ;  $df = 128$ ;  $p < .001$ ;  $RMSEA [90\% CI] = 0.07 [0.06–0.08]$ ;  $CFI = 0.96$ ;  $SRMR = 0.06$ ). All coefficients estimated for

Table 1  
Descriptive statistics and Pearson’s correlations among the study variables.

|          | <i>M (SD)</i>                             | 1 | 2      | 3      | 4      | 5      | 6      |
|----------|---|---|--------|--------|--------|--------|--------|
|          | <i>Skewness (SE<sub>Skewness</sub>)</i>   |   |        |        |        |        |        |
|          | <i>Kurtosis (SE<sub>Kurtosis</sub>)</i>   |   |        |        |        |        |        |
| (1) PDI  | 44.18(8.94)<br>0.07(0.12)<br>0.10(0.24)   | – | 0.50** | 0.34** | 0.27** | 0.29** | 0.31** |
| (2) SHQ  | 43.97(13.77)<br>0.37(0.12)<br>–0.41(0.24) |   | –      | 0.41** | 0.42** | 0.38** | 0.33** |
| (3) POSI | 6.37(3.79)<br>1.37(0.12)<br>2.16(0.24)    |   |        | –      | 0.48** | 0.49** | 0.46** |
| (4) MR   | 9.41(5.65)<br>0.62(0.12)<br>–0.50(0.24)   |   |        |        | –      | 0.56** | 0.32** |
| (5) DSR  | 14.47(8.26)<br>1.02(0.12)<br>0.49(0.24)   |   |        |        |        | –      | 0.57** |
| (6) NO   | 4.92(3.50)<br>2.35(0.12)<br>5.83(0.24)    |   |        |        |        |        | –      |

Note. PDI = Perfectionism Discrepancies Inventory; SHQ = Social Hopelessness Questionnaire; POSI = Preference for Online Social Interaction; MR = Mood Regulation; DSR = Deficient Self-Regulation; NO = Negative Outcome. \*\*  $p < .001$ .



**Fig. 1.** Effect of Perfectionism Discrepancies and Social Hopelessness on problematic social networking sites use. Note. pdi1, pdi2, pdi3, pdi4 = perfectionism discrepancies; sh1, sh2, sh3 = social hopelessness; posi1, posi2, posi3 = preference for online social interactions; mr1, mr2, mr3 = mood regulation; dsr1, dsr2 = deficient self-regulation; no1, no2, no3 = negative outcomes. \*\* $p < 0.001$ .

**Table 2**  
Unstandardized estimates of direct and indirect effects.

|                         | Unstandardized estimate | SE    |
|-------------------------|-------------------------|-------|
| <b>Direct effects</b>   |                         |       |
| PDI → SH                | 0.14                    | 0.02  |
| SH → POSI               | 0.95                    | 0.17  |
| PDI → POSI              | 0.10                    | 0.04  |
| POSI → DSR              | 1.27                    | 0.24  |
| POSI → MR               | 1.01                    | 0.11  |
| MR → DSR                | 0.71                    | 0.15  |
| DSR → NO                | 0.11                    | 0.02  |
| <b>Indirect effects</b> |                         |       |
| PDI → SH → POSI         | 0.13                    | 0.003 |
| POSI → MR → DSR         | 0.71                    | 0.02  |

Note. PDI = Perfectionism Discrepancies; SH = Social Hopelessness; POSI = Preference for Online Social Interaction; MR = Mood Regulation; DSR = Deficient Self-Regulation; NO = Negative Outcome.

the measurement model and the estimates of error variances were significant. The variables in the model accounted for 34% and 37% of the variance in participants' POSI and NO levels respectively. The standardized beta coefficients are shown in Fig. 1. Unstandardized values with standard errors are presented in Table 2. The results supported the hypothesized indirect relationships between perfectionism discrepancies and POSI levels mediated by social hopelessness ( $P = 39.06p < .05$ ). The analysis also revealed a significant direct effect of PDI on POSI. A significant indirect effect of POSI on deficient self-regulation mediated by mood regulation ( $P = 43.42p < .05$ ) was also found. Both POSI and Mood Regulation directly predicted Deficient Self-regulation which, in turn, predicted negative outcomes associated with problematic SNS use.

**4. Discussion**

Drawing on the updated cognitive-behavioral model of Problematic Internet Use (Caplan, 2010) and the hyperpersonal theory (Walther, 1996), the present study investigated the main and interactive effects of perfectionism discrepancies and social hopelessness on the preference for online social interactions, as a cognitive precursor of the tendency to

use SNS for regulating negative mood states, the compulsive use of SNS, and the presence of negative outcomes in real life due to SNS use. In line with previous studies (e.g. Moretta & Buodo, 2018) the obtained results support the feasibility of the updated cognitive-behavioral model of Problematic Internet Use (Caplan, 2010) in the context of SNS addiction. Present findings confirmed the goodness of this model to problematic SNS use (Ryan et al., 2014). Preference for online social interactions and the use of social networking sites to regulate mood were found to predict deficient self-regulation in SNS use, which in turn predicts the negative outcomes associated with SNS use.

The present contribution extended previous results about the association between socially prescribed perfectionism and problematic use of social media (Casale et al., 2014) by investigating the role of the perceived inability to attain unrealistic standards and the personal belief about negative outcome expectations in the social domain. Overall, the results showed that perfectionism discrepancies and social hopelessness predicted POSI levels that in turn predicted the motivation to use SNS as a means of alleviating distressing feelings, the inability to regulate SNS use and the personal and social problems resulting from use of SNS.

Both perfectionism discrepancies and social hopelessness had a main and direct effect on preference for online social interaction. However, the impact of perfectionism discrepancies on POSI was also mediated by social hopelessness levels. On the one hand, this suggest that the belief that one's own behavior falls short the expectations might predispose to consider the online communication context as safer than face-to-face, because it provides greater control over self-presentation and a reduction of evaluative non-verbal cues. On the other hand, perfectionism discrepancies might predispose to the development of problematic social media use by incrementing social hopelessness levels. Previous studies (e.g., Casale et al., 2014) have shown that the fear of being negatively judged mediates the association between socially prescribed perfectionism and problematic use of Internet communication services. The current study shows that this effect might be partially explained by the expectations of not being comfortable in the presence of others (i.e. social hopelessness). In other words, individuals who are cognitively preoccupied that perfectionistic expectations will not be met might be predisposed to prefer online interactions also because of their negative interpersonal expectations. In this vein, online

social interactions might offer a less demanding social context in which to satisfy one's own need to belong. This is consistent with theoretical perspectives (e.g., Nadkarni & Hofmann, 2012; Casale, Fioravanti, & Rugai, 2016) suggesting that individuals tend to use social networking sites for satisfying two primary needs: the need to belong and the need for self-presentation.

The present study builds on previous research that discusses the role of perfectionistic thought patterns on the development of compulsive use of online social media (e.g., Casale et al., 2014; Casale, Fioravanti, Rugai, Flett, & Hewitt, 2016; Lehmann & Konstam, 2011). The interactive effect of perfectionistic maladaptive beliefs about the self and dysfunctional cognitions about the social domain on POSI levels was highlighted for the first time. However, it would be interesting for future research to examine the potential interactive effect of social hopelessness and distorted self-assumptions that have already been found to partially explain POSI levels (e.g., the perceived inability to express and recognize one's own and other emotions). Indeed, to the best of our knowledge, this is the first study that had investigated social hopelessness in relation to problematic use of online communication dimensions. This lack of previous emphasis on an interpersonal form of hopelessness is surprising given that so much of current interpersonal behavior is a reflection of anticipated interactions in particular as well as generalized beliefs about how future interactions with other people are likely to unfold. It is easy to envision a cycle in which people come to rely increasingly and too excessively on online communication as a way of avoiding the anticipated social interactions that would result if they had more actual concern with other people in person.

Various limitations of the current study should be noted. First, longitudinal studies would help clarify issues about directionality. No conclusion about the direction of the associations can be made due to the cross-sectional nature of the study. Thus, the direct and indirect effects suggest possible — rather than definite — causal pathways through which POSI may develop among those with perfectionism discrepancies and feelings of social hopelessness. Subsequent studies with multiple waves of data collection should also investigate if subjective social disconnection is an antecedent, concomitant, or consequence of a preference for online communicative services. Indeed, it is not possible to rule out the hypothesis that a sense of hopelessness in social situations represents a negative outcome that may arise due to a preference for online social interactions. In fact, previous studies (Lee & Stapinski, 2012) have shown that a preference for online social interactions exacerbates face-to-face avoidance. Finally, these findings are based solely on self-report measures. Future research should clarify if objective social disconnection represents a risk factor for developing POSI.

In conclusion, in line with the cognitive-behavioral model of problematic Internet use, the present study suggests the primary importance of maladaptive cognitions about the self and the world for the development of Internet addiction related to social networking sites. Individuals are likely to prefer online social interactions as a function of their pessimistic social expectancies and the sense of inadequacy that comes from perceptions of falling short of expectations. Unfortunately, these tendencies are likely to add to a sense of being disconnected from other people and this can have profound consequences given the mounting of evidence of the destructiveness of being socially isolated.

Future studies should consider the potential role of metacognitions in the development of POSI. Perfectionism discrepancies and social hopelessness are examples of non-metacognitive beliefs, i.e. they are general beliefs about the world and the self rather than being beliefs about thinking. However, over the last twenty years metacognitive theory has provided a novel framework, in the form of the Self-Regulatory Executive Function (S-REF) model, for conceptualizing psychological distress, including behavioral addictions (see Spada, Caselli, Nikčević, & Wells, 2015; Spada, Giustina, Rolandi, Fernie, & Caselli, 2015). Previous studies have already linked metacognitions to problematic Internet use (see Spada, Langston, Nikčević, & Moneta,

2008) and this suggests that the processes which generate, monitor and maintain intrusive experiences deserve scientific attention beyond the content of such experiences (i.e. perfectionism and social hopelessness).

#### Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### CRediT authorship contribution statement

**Giulia Fioravanti:** Conceptualization, Methodology, Data curation, Formal analysis, Writing - original draft. **Gordon Flett:** Writing - review & editing, Methodology, Supervision. **Paul Hewitt:** Writing - review & editing, Methodology, Supervision. **Laura Rugai:** Investigation, Writing - original draft. **Silvia Casale:** Conceptualization, Methodology, Project administration, Supervision, Writing - original draft.

#### Declaration of Competing Interest

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

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