Self-control and problematic use of social networking sites: Examining distress tolerance as a mediator among Argentinian college students

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ABSTRACT

Introduction: Use of Social networking sites (SNSs) is a highly prevalent behavior worldwide and, for some individuals, its use can turn maladaptive. There has been growing interest to identify which variables are associated with problematic use of SNSs.
Aim: The present study cross-sectionally examined whether the associations between different features of self-control (i.e., impulsivity-like traits, self-regulation and emotion regulation) indirectly relate to two outcomes of SNSs (hours of use and problematic use) via distress tolerance.
Methods: A sample of 509 Argentinean college students (70.3% female; Mean age = 21.15 ± 5.15) completed an online survey.
Results: Two significant indirect effects were found: a) higher negative urgency was associated with higher problematic use of SNSs via lower distress tolerance and b) higher self-regulation was associated with lower problematic use of SNSs via higher distress tolerance. Positive urgency, negative urgency and self-regulation had significant direct associations with problematic use of SNSs while neither component of emotion regulation was significantly associated with SNSs outcomes. No significant direct or indirect effects were found between any of the self-control features and time spent using SNSs.
Conclusions: The results highlight dysfunctional self-control, particularly emotion-driven impulsivity and low self-regulation, as relevant components of maladaptive SNSs that seem to operate by decreasing the perceived capacity to tolerate negative affect. In this context, interventions targeting the development and improvement of distress tolerance abilities might have a positive impact on problematic use of SNS.

1. Introduction

Social networking sites (SNSs) are virtual communities aimed at connecting people via sharing of information, messages or experiences (Cudo et al., 2020; Kuss & Griffiths, 2011; 2017). The use of SNSs has been increasing exponentially and nowadays is a highly prevalent behavior worldwide, especially among adolescents and young adults (Kuss & Griffiths, 2017). For instance, the great majority of emerging adults within a U.S. national sample reported regular use (i.e., at least weekly) of SNSs and this prevalence grew from 89.42% in 2014 to 97.5% in 2016 (Villanti et al., 2017). SNSs provide entertainment and social interaction; yet its use can turn excessive or maladaptive for some

individuals. Intense use of SNSs is associated with lower academic performance (Azizi et al., 2019) and psychological distress (Scott et al., 2020) while findings from longitudinal studies have suggested that passive use of SNSs is negatively associated with subjective well-being (Verduyn et al., 2017). Moreover, Hussain and Griffiths (2018) reviewed population-based studies with relatively large samples (i.e., >500 participants) and found that problematic SNSs use was associated with poor mental health, mainly depression and anxiety.

In this context, there has been growing concerns regarding the risks associated with SNSs use (Andreassen, 2015; Kuss & Griffiths, 2017). It has been reported that some individuals may develop maladaptive use of SNSs and experience symptoms typically associated with substance-

related addictions (for a review, see Andreassen, 2015; Kuss & Griffiths, 2017). Some have questioned, however, whether the conceptual core of substance-related *addictions* can be applied to SNSs (Billieux et al., 2015; Kardefelt-Winther et al., 2017; Carbonell & Panova, 2017). Others, in turn, have argued that substance-related and non-substance related addictions share a number of core features (Andreassen, 2015; Griffiths, 2005; Turel & Serenko, 2012), notably salience and conflict (i.e., the activity occupies most of the individual's thinking and behavior, and interferes with academic or social activities), tolerance (i.e., the need of larger amounts of the activity to experience effects priorly achieved with smaller amounts), and a negative emotional state after discontinuing the activity that often promotes relapse (i.e., a return to the activity). Accordingly, Andreassen et al. (2012) defined SNS addiction as a behavioral pattern involving substantial allocation of attention to, and motivation to use, SNSs. The time and effort invested in SNSs impair academic or job performance and affect other social or interpersonal relationships, and are associated with psychological distress. Noteworthy, prior research usually does not differentiate between addiction or problematic/maladaptive SNSs use and these labels are employed interchangeably (Kuss & Griffiths, 2017).

Several theories have proposed putative mechanism underlying the development of problematic/maladaptive SNSs use. One of those, the Interaction of Person-Affect-Cognition-Execution (I-PACE; Brand et al., 2016; Young & Brand, 2017) model, proposes that addictive use of internet applications, including SNSs, results from the interaction of core personality or dispositional features (e.g., impulsivity-like traits; early-life events such as childhood maltreatment) with the consequences of emitting the problem behavior (e.g., gratification, reduction in negative mood). Repetition of this cycle transforms the initially controlled and sporadic internet use activity into a compulsive behavior whose termination is associated with heightened negative mood and the need to reinstate the behavior (i.e., craving), particularly when the individual is exposed to external or internal triggers (Brand et al., 2016). Intriguingly, I-PACE suggests that, particularly during the development of the addiction, the associations between the more distal (dispositional, affective or cognitive) factors and the actual engagement into internet use is affected by the general level of self-control (Hahn et al., 2017).

1.1. Self-control features and social networking sites use

Self-control can be broadly defined (Diamond et al., 2013) as the ability to regulate behavior, cognition and emotion – usually in pursuit of a higher goal – when faced with desires or temptations. Recent developments, however, have moved from a global to a multidimensional definition of the construct. For instance, Kotabe and Hofmann (2015) proposed that self-control involves several psychological components, divided into two clusters. The activation cluster involves desires and goals, as well as the conflict between them; whereas the exertion cluster involves three control components (i.e., capacity, motivation, and effort). Different studies have stressed the role that different features of self-control have on maladaptive use of SNSs (Cudo et al., 2020; Rothen et al., 2018; Turel & Qahri-Saremi, 2016; Wegmann et al., 2020; Wu et al., 2013) or SNSs-related behaviors such as problematic use of the internet (Billieux & Van der Linden, 2012; Gámez-Guadix et al., 2015; LaRose et al., 2003). We will now appraise this literature.

Cudo et al. (2020) found that the tendency to act without thinking or planning was positively associated with Facebook addiction, but not with time using Facebook. In a Chinese sample, higher trait impulsivity was associated with more time spent on SNSs and with problematic/maladaptive use of SNSs (Wu et al., 2013). Rothen et al. (2018) examined, in a sample of Facebook users, the association between different impulsivity-like traits and problematic use of Facebook. They employed the UPPS-P model (Lynam et al., 2006), which encompasses five specific dimensions of impulsivity (i.e., positive and negative urgency, perseverance, premeditation and sensation seeking), that has been relevant to understand substance-related addictive behaviors (Coskunpinar et al.,

2013; Kale et al., 2018; VanderVeen et al., 2016). Findings showed that positive urgency, negative urgency and lower perseverance were associated with problematic use of Facebook (Rothen et al., 2018). The prominent role of urgency (i.e., the tendency to act rashly under intense positive or negative emotional states) suggests that, for some individuals, SNSs use may represent a dysfunctional strategy to regulate intense positive or negative emotions (Rothen et al., 2018). This is consistent with research from the alcohol and food addiction literature where negative urgency was significantly associated with alcohol-related problems (Wolkowicz et al., 2020) or symptoms of food addiction (Pivarunas & Conner, 2015). It is possible, therefore, that a pathway to problematic use of SNSs entails emotion-driven impulsivity or acting impulsively while experiencing intense emotional states attempting to regulate affect.

Another key feature in affect regulation comprises emotion regulation strategies that individuals use trying to modify the course of their emotions (John & Gross, 2004). The Emotion Regulation Questionnaire (Gross & John, 2003) is a well-validated measure that proposes two emotion regulation strategies that differ in terms of when, alongside the emotional processing, the individuals intercede to modify their emotions. Cognitive reappraisal is a healthy (associated with positive health outcomes; Gross, 2014) antecedent-focused strategy that encompasses early attempts to modify the emotional impact of a situation by re-evaluating how the individual thinks about it (e.g., "When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"). In turn, expressive suppression is an unhealthy (associated with negative health outcomes; Gross, 2014) response-focused strategy characterized by attempts to impede the behavioral manifestations of the emotions that are implemented after the emotional response was developed (e.g., "I keep my emotions to myself").

Emotion regulation strategies are associated with emotion-driven impulsivity (Wolz et al., 2017) and have been implicated in different substance-related behaviors (Blanchard et al., 2019; Dir et al., 2016; Weiss et al., 2018). Overall, these studies suggest that individuals with poor emotion regulation tend to engage in maladaptive behaviors as a way to escape from or to cope with their emotions, a pattern that increases the vulnerability for addictive-related disorders. Weiss et al. (2018) found that college students with more difficulties in regulating positive emotions (including here a lower capacity to regulate behaviors when experiencing positive emotions) were more likely to exhibit greater alcohol and drug misuse. Individual differences in emotion regulation have been associated with some, but not all (Barrault et al., 2017), non-substance addictive behaviors (Drach et al., 2021; Yen et al., 2017). For instance, individuals with internet gaming disorder, compared to control individuals, reported lower levels of cognitive reappraisal and higher levels of expressive suppression (Yen et al., 2017). Similarly, college students with problematic use of SNSs reported more deficits in emotion regulation than their peers who did not meet criteria for maladaptive SNS use (Drach et al., 2021). A recent experimental study induced positive, negative or neutral emotional states and then assessed time spent using SNSs or a control website to examine the use of SNSs to regulate emotions (Drach et al., 2021). Participants who used SNSs after being emotionally-induced reported an increase in positive affect while participants assigned to the control website showed a decrease in positive affect, suggesting an emotion regulatory function of SNSs use.

Self-regulation refers to different skills, including the capacity of postponing short-term gratification, by which individuals are able to manage and orientate their behavior to achieve desired goals in the future (Carey et al., 2004; Strauman, 2017). The concept of self-regulation concerns not only the initiation and maintenance of targeted behaviors but also the response to situational demands and the inhibition of unwanted behaviors (Heatherton, 2011). Studies with emerging adults found that self-regulation was negatively associated with compulsive internet use (Muusses et al., 2015), smartphone addiction (Gökçearslan, Mumcu, Haşlaman, & Çevik, 2016) and

problematic use of SNSs (Błachnio & Przepiorka, 2016; Brevers & Turel, 2019; Holmgren & Coyne, 2017); suggesting a potential protective effect of this dispositional trait against these behaviors. Other results (Holmgren & Coyne, 2017; LaRose et al., 2003) have also shown that self-regulation mediates the relationship between problematic use of SNSs and poor mental health (i.e., individuals who reported greater problematic use of SNS use exhibited lower levels of self-regulation which, in turn, were associated with greater level of depression).

1.2. Distress tolerance and addictive behaviors

As already indicated, prior research suggested that poor self-control, particularly difficulties to regulate emotions or to regulate behavior under intense emotional states, could be implicated in problematic SNSs use. However, the underlying mechanisms that link poor self-control and problematic use of SNSs are still mostly unknown. The addiction literature considers impulsivity, and other personality traits like self-regulation, as distal factors that exert their effects via the mediation of factors more proximal to the actual addictive behavior (e.g., drinking motives, Cooper et al., 2016). Distress tolerance (DT), defined as the perceived ability to withstand psychological or physical distress (Simons & Gaher, 2005), might be one proximal factor that mediates the association between dimensions of self-control and problematic SNS use. Past research has suggested that this component of affect regulation is implicated in negative reinforcement pathways that lead to maladaptive patterns of substance use or risky behaviors (Buckner et al., 2019; Gorka et al., 2012; Khan et al., 2018).

Individuals with low levels of DT are more likely to perceive negative affect as unbearable and, therefore, may tend to engage in behaviors to alleviate or reduce the intense negative emotions they are feeling which increase the risk of developing maladaptive behaviors (Simons & Gaher, 2005). Accordingly, low levels of DT have been found to be associated with more substance-related problems via coping motives (Buckner et al., 2007; Bujarski, Norberg, & Copeland, 2012; Hartmann & McLeish, 2020; Khan et al., 2018; Simons et al., 2018).

These studies suggest that individuals with poor DT tend to be more motivated to engage in risky behaviors as a way to regulate negative emotions, a pattern that ultimately increases the number of negative consequences (Smith & Cyders, 2016). Supporting this possibility, a study with emerging adults and adults from Turkey found that those with lower levels of DT exhibited higher scores in a measure of internet addiction and this relationship was mediated by anxiety-related variables like anxiety symptoms (Durak Batıgün et al., 2020). Additionally, Akbari (2017) found that DT significantly mediated the association between emotional dysregulation and problematic internet use, suggesting college students who perceived themselves as less capable to tolerate discomfort were more likely to engage in problematic use of the internet as a way to avoid or deal with distressing situations. Whether DT mediates the association between indicators of self-control, other than emotional dysregulation, and problematic SNSs use is still unknown.

1.3. The present study

In Argentina, a Spanish-speaking South-American country with 45 million habitants, there were around 31.5 million social network users in 2019 (Statista, 2021a) and 36 million by January 2021 (Hootsuite & We Are Social, 2021). Facebook is the most used SNS in Argentina (Statista, 2021b) with a user base of approximately 32 million in 2019, although the number of Instagram users is growing steadily (from 14 million in 2018 and around 20 million in 2021; Statista, 2021c), most likely reflecting the increased preference for Instagram among emerging adults (Villanti et al., 2017).

The elevated prevalence of SNSs use in Argentina contrasts with a general paucity of research examining SNS outcomes (i.e., hours using SNSs and problematic use of SNS) and variables associated with them. We aimed to fill this void in the literature by integrating and extending

findings concerning internet use (Akbari, 2017; Billieux & Van der Linden, 2012) and problematic use of Facebook (Cudo et al., 2020; Rothen et al., 2018). The present study sought to examine, in a sample of college students from Argentina, the association between variables featuring components related to self-control (i.e., impulsivity-like traits, self-regulation and emotion regulation) and two SNSs outcomes (hours using SNSs and problematic use of SNS) via DT. Specifically, the proposed model cross-sectionally tested the atemporal mediation (Winer et al., 2016) of DT in the association between components of self-control and two SNS outcomes as dependent variables (i.e., self-control variables → DT → hours of use and problem use as outcomes).

Based on prior research on SNSs outcomes or other addictive behaviors, we expected that lower levels of self-control (Cudo et al., 2020), particularly emotion-driven impulsivity (Rothen et al., 2018), would be associated with problematic use of SNSs. As maladaptive use of SNSs may represent a dysfunctional strategy to regulate intense positive or negative emotions, we also expected that emotion regulation would be associated with maladaptive use of SNSs (Drach et al., 2021; Yen et al., 2017). Moreover, we hypothesized that DT would mediate the associations between these distal variables and problematic use of SNSs (Akbari, 2017).

2. Methods

2.1. Sample and procedure

The present study used the cross-sectional data of the second and final wave of a longitudinal project. It is important to remark that the project was mainly focused on variables associated with alcohol and marijuana use. Although substance-related variables were repeatedly measured in wave 1 and 2; DT, emotion regulation, self-regulation and problematic use of SNSs were only assessed on the last wave of the study (wave 2). Therefore, the present study is focused on this cross-sectional data.

Participants were college students enrolled in two public universities from the central region of Argentina. At the beginning of the study, the research team visited several classrooms to invite freshmen to participate in the study. We collected contact information (e.g., email and/or cellphone number) from 3820 college students interested in participating in the study. An e-mail with the link to an online survey (*Qualtrics*) was sent to those who were requested to complete the second wave of this longitudinal study. The survey explained the aims of the study, emphasized the voluntary nature of the participation and the confidentiality handling of the data, and provided contact information of the researchers. Those who completed the online survey were eligible for a raffle of four prizes (each equivalent to ≈25 US dollars at time of data collection) and ≈200 small items (e.g., thermos, headphones, cellphone portable charger, among others). By clicking on the "next" option, participants provided their consent to participate. The survey was set up to provide electronic prompts for each missing response. Contact information (i.e., e-mail) was used to identify duplicated responses and for the raffles. Participants received up to eight reminders (via email, phone and social media) to complete the survey.

Although 558 students completed at least 80% of the online survey (which included assessments of variables not considered in the present study), we excluded 49 cases that did not provide responses to the measures assessing problematic SNS use, DT or self-regulation. Therefore, the final sample comprised 509 participants (70.3% female; Mean age = 21.15 ± 5.15). The procedures, which were reviewed and approved by institutional review board of the IIPsi-CONICET-UNC, endorsed the ethical guidelines for human research of the American Psychological Association (2016), the Declaration of Helsinki and the National Law 25.326 for the Protection of Personal Data.

2.2. Measures

For all psychometric measures, composite scores were created by summing/averaging items such that higher scores indicate higher levels of the construct. Table 1 presents internal consistency of all variables, on the diagonals.

Distress Tolerance. We used the Spanish version (Sandín et al., 2017) of the Distress Tolerance Scale (Simons & Gaher, 2005), a 15-item psychometric measure developed to assess the ability to tolerate psychological distress. Participants rated each item on a 5-point scale ranging from (1) *strongly agree* to (5) *strongly disagree*.

Impulsivity-like traits. We used the Spanish version (Bravo et al., 2018; Lozano-Rojas et al., 2018) of the Short UPPS-P Impulsive Behavior Scale (Cyders et al., 2014). This 20-item measure assesses five impulsivity-like dimensions (4 items per dimension): positive urgency, negative urgency, premeditation, perseverance, and sensation-seeking. Participants rated each item on a 4-point scale ranging from (1) *strongly agree* to (4) *strongly disagree*.

Self-regulation. We used a translated into Spanish version of the Short Self-Regulation Questionnaire (SSRQ; Carey et al., 2004). The English version was translated into Spanish by two Spanish-speaking psychologists, in the context of an independent and larger cross-cultural study. The translation task was built on the 17-item Spanish Short Self-Regulation Questionnaire (Pichardo et al., 2014). Participants rated each item on a 5-point Likert scale ranging from (1) *strongly disagree* to (5) *strongly agree* to indicate whether they agree or disagree with each statement. A confirmatory factor analyses (CFA) was conducted with this data set to examine internal validity. As previous research has supported the unidimensionality of SSRQ (Carey et al., 2004), we followed the item-to-construct balance approach described by Little et al. (2002) and created 16 parcels to establish observed indicators of the latent dimension (Garriott et al., 2013). Results suggested fairly adequate model fit (CFI = 0.952; TLI = 0.937; RMSEA 0.084 [90% CI 0.076, 0.093]). Supplementary Table 1 presents the standardized item loadings for the 16 parcels created to represent the observed indicators of the latent dimension of self-regulation.

Emotion regulation. We used the Spanish version (Cabello et al., 2013) of the Emotional Regulation Questionnaire (Gross & John, 2003). This 2-dimension self-report measure assess cognitive reappraisal (6 items) and expressive suppression (4 items). Participants report their level of agreement on a 7-point Likert scale ranging from (1) *strongly disagree* to (7) *strongly agree*) with each statement.

Time spent using SNSs. Participants reported the number of hours they approximately spend on social networking sites (e.g., Facebook, Instagram, Twitter, etc.) during a typical week (*less than 7 h, 8–14 h, 15–20 h, 21–30 h, 31–40 h, 41 or more hours*).

Social Media Addiction. We used a translated into Spanish version of the Bergen Social Media Addiction Scale (BSMAS; Andreassen et al.,

2016) which is an adaptation of the Bergen Facebook Addiction Scale (BFAS; Andreassen et al., 2012). For the translation, two Spanish-speaking psychologists, who were proficient in English and Spanish and knowledgeable of the scale's rationale, translated the original English version into Spanish. This translation task, performed in the context of a different larger cross-cultural study, was built on the Spanish version of the 18-item Bergen Social Media Addiction Scale (Cuadrado et al., 2020). Participants rated each item on a 5-point Likert scale ranging from (1) *very rarely* to (5) *very often* to indicate how frequently they have experienced each situation (e.g., "How often during the last twelve months have you tried to cut down on the use of social networking sites without success?"). We conducted a CFA, with the data set from the present study, to examine the internal validity. Results suggested excellent model fit (CFI = 0.992; TLI = 0.985; RMSEA 0.050 [90% CI 0.021, 0.080]). Supplementary Table 2 presents the standardized item loadings for the six items of the Spanish version of the BSMAS.

2.3. Data analysis

To test study aims, and considering the cross-sectional nature of the data, we employed a path analysis to examine the atemporal mediation (Winer et al., 2016) of DT in the associations between self-control variables (i.e., impulsivity-like traits, self-regulation, and emotion regulation strategies) and SNSs outcomes (i.e., time spent using SNSs and problematic use). Prior research suggested that including all five UPPS-P facets in one model might create a suppression effect because some dimensions are highly intercorrelated (Gunn et al., 2018; Gunn & Smith, 2010). Therefore, before deciding which UPPS-P dimensions to include in the mediation model, we estimated the bivariate Pearson correlations between each UPPS-P facet, DT (i.e., the mediator) and SNS outcomes. We only included those UPPS-P facets associated with both the mediator and at least one outcome (Gunn et al., 2018). Specifically, the mediation model included negative and positive urgency, which were significantly associated with DT and problematic SNS use (see Table 1). These associations are fairly consistent with Rothen et al. (2018) in which negative urgency and positive urgency, but also low perseverance, were significantly associated with problematic Facebook use. The model was fully saturated such that all features of self-control had paths estimated on each DT, time spent using SNSs and problematic SNS use. Further, the residuals of time spent using SNSs and problematic SNS use variables were allowed to co-vary. Bias-corrected bootstrapped estimates were used to assess the total, direct, and indirect effects (Efron & Tibshirani, 1993). This approach resists small violations of normality (Erceg-Hurn & Mirosevich, 2008) and yields a robust test of mediation (Fritz & MacKinnon, 2007). Statistical significance was determined by 95% bias-corrected bootstrapped confidence intervals (CIs) not containing zero. The analyses were conducted with *MPlus 6.12* (Muthén & Muthén, 2018).

Table 1
Bivariate correlations and descriptive statistics among study variables in total sample.

	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. PUSNS	0.77	0.32***	0.34***	−0.07	−0.14***	0.01	0.25***	−0.35***	−0.35***	−0.10*	0.11*	14.62	5.08
2. Hs Use		–	0.12**	0.01	−0.08	0.03	0.03	−0.08	−0.12**	−0.07	0.01	–	–
3. NU			0.75	0.03	−0.26***	0.04	0.36***	−0.47***	−0.44***	−0.17***	0.14**	3.20	0.56
4. Pers				0.72	0.25***	0.09*	−0.06	−0.13**	0.36***	0.17***	0.06	3.20	0.56
5. Prem					0.74	−0.02	−0.16***	0.07	0.39***	0.17***	0.03	3.17	0.54
6. SS						0.70	0.19***	0.01	−0.00	0.01	0.07	2.57	0.72
7. PU							0.77	−0.21***	−0.30***	−0.14	0.09	1.60	0.59
8. DT								0.89	0.35***	0.06	−0.17***	2.91	0.81
9. SR									0.92	0.31***	−0.21***	3.45	0.57
10. ER-CR										0.82	0.10*	4.90	1.09
11. ER-ES											0.71	4.03	1.25

Note. Cronbach's alphas are underlined and shown on the diagonals. PUSNS = Problematic Use of Social Networking Sites; Hs Use = Hours spent using Social Networking Sites within a typical week; NU = Negative Urgency; Pers = Perseverance; Prem = Premeditation; SS = Sensation Seeking; PU = Positive Urgency; DT = Distress Tolerance; SR = Self-regulation; ER-CA = emotion regulation cognitive reappraisal; ER-ES = emotion regulation expressive suppression. *** p < .001; ** p < .01; * p < .05.

3. Results

3.1. Descriptive and bivariate results

Bivariate correlations and summary statistics of self-control dimensions, DT, and SNS outcomes (i.e., time spent using SNSs and problematic use of SNSs) are in Table 1. Problematic use of SNSs was significantly associated with time spent using SNSs, DT and most indicators of self-control (i.e., negative urgency, premeditation, positive urgency, self-regulation and emotion regulation strategies). Time spent using SNSs was significantly correlated with negative urgency and self-regulation. DT was significantly related to negative and positive urgency, perseverance, self-regulation and expressive suppression.

3.2. Model results by self-control feature

Table 2 and Fig. 1 summarize the total, indirect, and direct effects of the different dimensions of self-control on SNSs outcomes via DT. Negative urgency (β = −0.391 [95% CI −0.479, −0.303]) and self-regulation (β = 0.182 [95% CI 0.082, 0.281]) had direct significant associations with DT and problematic use of SNSs. Cognitive reappraisal (β = −0.062 [95% CI −0.151, 0.028]), expressive suppression (β = −0.066 [95% CI −0.158, 0.026]) and positive urgency (β = −0.014 [95% CI −0.091, 0.064]) had non-significant direct associations with DT. Distress tolerance had a significant direct association with problematic use of SNSs (β = −0.205 [95% CI −0.293, −0.116]) but not with time of SNSs use (β = −0.014 [95% CI −0.113, 0.084]). The results of the atemporal mediation model are described below as a function of each distal variable.

Emotion Regulation. Neither component of emotion regulation (i.e., cognitive reappraisal or expressive suppression) had significant direct or indirect effects on either time spent using SNSs or problematic use of SNSs.

UPPS-P Urgency facets. DT significantly mediated the association between negative urgency and problematic use of SNSs (i.e., a higher level of negative urgency was associated with a lower level of DT which in turn was associated with a higher level of problematic use of SNSs). Negative urgency also had a significant positive association with problematic use of SNSs. DT did not significantly mediate the association between positive urgency and SNS outcomes but this UPPS-P facet had, in our model, a significant direct association with problematic use of SNSs. Neither of the UPPS-P facets had a significant direct nor indirect association on time spent using SNSs.

Self-regulation. DT significantly mediated the association between self-regulation and problematic use of SNSs (i.e., higher self-regulation was associated with a higher level of DT which in turn was negatively associated with problematic use of SNSs). Self-regulation also had a significant direct association with problematic use of SNSs. No significant direct or indirect associations were found between self-regulation and time spent using SNSs.

4. Discussion

Theoretical models of behavioral addictions (such as the I-PACE model; Brand et al., 2016; Young & Brand, 2017) are needed to understand the mechanisms underlying the development and maintenance of SNS addiction or a problematic engagement in the use of SNSs. The present study examined the associations between different indicators of self-control and SNSs outcomes via DT. Although they should be interpreted with caution, considering the cross-sectional nature of the data, the present results supported the association between dysfunctional self-control (Cudo et al., 2020), particularly emotion-driven impulsivity (Rothen et al., 2018), and maladaptive SNSs use. Moreover, the findings suggested a potential pathway (i.e., via DT) by which self-control related factors might influence problematic SNSs. In doing so, the current study extends prior research focused on a single SNS (i.e., Facebook) or in

Table 2
Summary of total, indirect, and direct effects of comprehensive mediation path model.

SNSs outcomes	SNS Use		Problematic SNS use	
Predictor Variable: Cognitive Reappraisal	β	95% CI	β	95% CI
Total	−0.029	−0.126, 0.068	0.029	−0.068, 0.127
Total indirect[a]	0.001	−0.007, 0.009	0.013	−0.007, 0.032
Distress Tolerance	0.001	−0.007, 0.009	0.013	−0.007, 0.032
Direct	−0.030	−0.127, 0.067	0.017	−0.079, 0.112
Predictor Variable: Expressive Suppression	**β**	**95% CI**	**β**	**95% CI**
Total	−0.014	−0.113, 0.086	0.019	−0.066, 0.104
Total indirect[a]	0.001	−0.007, 0.009	0.014	−0.006, 0.033
Distress Tolerance	0.001	−0.007, 0.009	0.014	−0.006, 0.033
Direct	−0.015	−0.115, 0.085	0.005	−0.077, 0.087
Predictor Variable: Negative Urgency	**β**	**95% CI**	**β**	**95% CI**
Total	0.078	−0.027, 0.184	**0.217**	**0.129, 0.305**
Total indirect[a]	0.006	−0.033, 0.045	**0.080**	**0.040, 0.120**
Distress Tolerance	0.006	−0.033, 0.045	**0.080**	**0.040, 0.120**
Direct	0.073	−0.040, 0.186	**0.137**	**0.045, 0.229**
Predictor Variable: Positive Urgency	**β**	**95% CI**	**β**	**95% CI**
Total	−0.025	−0.127, 0.078	**0.106**	**0.010, 0.202**
Total indirect[a]	0.000	−0.004, 0.005	0.003	−0.013, 0.019
Distress Tolerance	0.000	−0.004, 0.005	0.003	−0.013, 0.019
Direct	−0.025	−0.127, 0.078	**0.103**	**0.008, 0.198**
Predictor Variable: Self-regulation	**β**	**95% CI**	**β**	**95% CI**
Total	−0.078	−0.181, 0.024	**−0.225**	**−0.324, −0.126**
Total indirect[a]	−0.003	−0.021, 0.016	**−0.037**	**−0.065, −0.010**
Distress Tolerance	−0.003	−0.021, 0.016	**−0.037**	**−0.065, −0.010**
Direct	−0.075	−0.180, 0.029	**−0.188**	**−0.286, −0.090**

Note. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected standardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero.
[a]Reflects the combined indirect associations within the model. SNS = Social Networking Use.

broader online-related behavior (i.e., problematic use of internet) and provides a more comprehensive understanding of the SNSs phenomena.

Similar to research focused on problematic Facebook use (Rothen et al., 2018), greater positive and negative urgency were associated with problematic use of SNSs, stressing the role of emotion-driven impulsivity in the pathway to maladaptive patterns of substance and non-substance related addictive behaviors (Smith & Cyders, 2016). That is, individual differences in the disposition to act rashly when experiencing unusually intense (positive or negative) emotions seem to increase the vulnerability of college students to engage in maladaptive use of SNSs. This is in line with research proposing that the urgency dimensions are salient predictors of problematic patterns of substance-related (e.g., alcohol: Bø
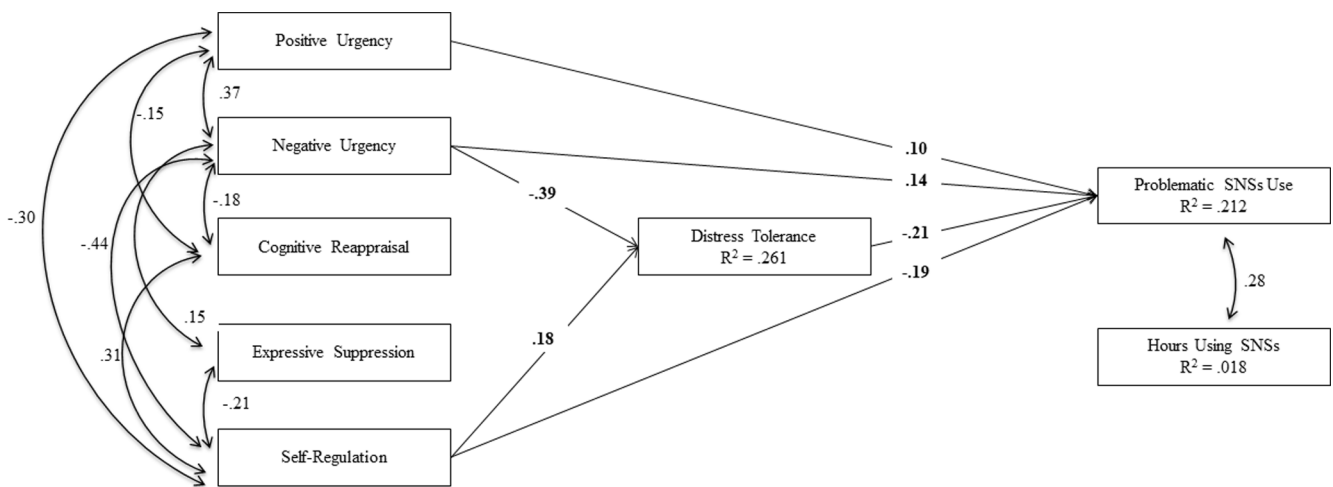
Fig. 1. Depiction of the significant standardized effects of the fully saturated mediation model. Significant associations were determined by a 95% bias-corrected standardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. Non-significant path coefficients are not shown in the figure for reasons of parsimony. These path coefficients are presented in Table 2. The statistically significant covariance between hours using SNSs and problematic SNSs use ($r = 0.28$ [95% CI 0.202, 0.363]) and the statistically significant covariances among distal antecedents (negative urgency with positive urgency [$r = 0.37$ (95% CI 0.292, 0.449)], self-regulation [$r = -0.44$ (95% CI -0.516, -0.361)], cognitive reappraisal [$r = -0.18$ (95% CI -0.271, -0.079)], and expressive suppression [$r = 0.15$ (95% CI 0.045, 0.240)]; positive urgency with self-regulation [$r = -0.30$ (95% CI -0.381, -0.226)] and cognitive reappraisal [$r = -0.15$ (95% CI -0.237, -0.047)]; self-regulation with cognitive reappraisal [$r = 0.31$ (95% CI 0.215, 0.404)] and expressive suppression [$r = -0.21$ (95% CI -0.306, -0.102)]) are depicted in the figure. The non-statistically significant covariances among distal antecedents (positive urgency with expressive suppression [$r = 0.09$ (95% CI-0.003, 0.181)] and cognitive reappraisal with expressive suppression [$r = 0.10$ (95% CI -0.010, 0.205)]) are not depicted for parsimony.

et al., 2016; Bravo et al., 2018; Wolkowicz et al., 2020; marijuana: Gunn et al., 2018) and non-substance related addictive behaviors (e.g., gambling: Canale et al., 2015). Although all UPPS-P facets have been found to be associated with different indicators of diverse addictive behaviors (Coskunpinar et al., 2013; VanderVeen et al., 2016), urgency seems more strongly associated with the negative consequences of these behaviors (Smith & Cyders, 2016).

In the present study, DT significantly atemporally mediated the association between negative urgency and maladaptive use of SNSs. As already indicated, negative urgency is a facet of impulsivity that predicts maladaptive patterns of use of alcohol (Coskunpinar & Cyders, 2012) or other drugs (Gunn et al., 2018). Mediation studies (e.g., Adams et al., 2012) suggested that coping motives underlie this effect by increasing the use of alcohol or other drugs to counteract the negative emotional state (Dvorak et al., 2014). It is possible that a similar pathway applies to our findings and, under this hypothesis, the participants recur to SNSs to reduce the ongoing negative and overwhelming negative state. The present study did not assess the motives underlying SNSs use, a limitation that should be addressed in future studies by using scales analogous to those employed to measure drinking motives (Cooper et al., 2016). It is also possible to postulate a double-mediated pathway, in which negative urgency affects maladaptive use of SNSs via reduced DT, which in turns acts via increased coping motives. These are, however, mere hypotheses that need to be addressed in future work. It is however notable that, in the present study, DT did not significantly mediate the effect of positive urgency. The latter facet exhibits a significant direct effect on problematic use of SNSs, a result that indicates it is acting by factors and pathways not measured in the present study.

Self-regulation, a general aptitude of self-control (e.g., "once I have a goal, I can usually plan how to reach it"), was directly and indirectly (via DT) associated with problematic use of SNSs. This result partially agrees with the general statement that low self-regulation may turn the use of social media into a habitual (LaRose et al., 2003), non-goal directed behavior (Dickinson et al., 2002), which in turn can promote problematic patterns of use. Our results do support the notion that lower self-regulation is indeed associated with problematic internet use. Yet, if this result was just a consequence of lower self-regulation increasing the habitual use of SNSs, we should have observed an association between

self-regulation and time using SNSs, which we did not. Similarly, Cudo et al. (2020) found that a dimension of self-control (i.e., impulsivity) was significantly associated with Facebook addiction but not with time spent using this SNS. In this context, our results seem more in line with the possibility that self-regulation deficits are associated with lower levels of DT which in turn promotes using SNSs as means to cope with negative affect (e.g., stress, anxiety). Consistent with this possibility, a study conducted in the Netherlands (van Deursen et al., 2015) reported that lower levels of self-regulation made respondents feel more stressed in social contexts, and this ultimately promoted addictive smartphone behavior, without significantly altering habitual smartphone use.

Based on prior studies (Drach et al. 2021; Yen et al., 2017), we expected an association between emotion regulation and problematic SNSs use. Our findings supported these findings at the bivariate level but not at the multivariate level. In line with internet gaming disorder research (Yen et al., 2017), we found weak but significant bivariate associations between both emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression) and problematic SNSs use. Specifically, individuals who tend to intercede early in the emotional process to reduce the emotional impact of a particular situation seem less prone to engage in maladaptive use of SNSs. In other words, the use of healthy antecedent-focused strategies, like those measured by cognitive reappraisal, could protect youth from using SNSs as a way to regulate their emotions. On the other hand, those more likely to intercede after the emotional response was unfolded, mainly using the strategy of not expressing their emotions, could be at higher risk for problematic use of SNSs. The latter is usually considered a maladaptive strategy to deal with affect. Although it may prevent negative environmental feedback caused by expressing the emotion, it is unlikely that it will reduce its physiological activation. Moreover, excessive use of emotional suppression could lead to personal dissociation or reduce the ability to identify one's own emotions (O'Driscoll et al., 2014). Interestingly, having more difficulties to regulate negative emotions (assessed by the Difficulties with Emotion Regulation Scale [DERS]; Gratz & Roemer, 2004) seems to put college students at higher risk for meeting criteria for maladaptive use of SNSs (Drach et al., 2021).

Our comprehensive model failed to find a significant association (neither direct nor indirect) between emotion-regulation strategies and

SNSs outcomes. This discrepancy between bivariate and multivariate results could be just indicating that these strategies (i.e., cognitive reappraisal and expressive suppression) are not the most important factors involved in the pathway to maladaptive patterns of SNSs use. It is possible that other emotion regulation-related variables, such as those measured by the DERS, have a more salient and determinant role. Accordingly, Akbari (2017) found a significant indirect effect of deficits in regulating negative affect (i.e., DERS scores) via DT that explained 34% of the variance of problematic internet use. That is, lower abilities to regulate negative affect put college students at increased risk for developing problematic internet use, and probably other online-related behaviors, by affecting their perceived or behavioral capacity to endure experiential or subjective distress.

4.1. Limitations and future

As already indicated, the present results should be interpreted taking into account a number of limitations. First, participants in the present study were Argentinian college students sampled using a convenience procedure which diminishes the external validity of our findings. Due to the cross-sectional nature of the study design, it was not possible to infer temporal influences between distal, mediator and dependent variables. Longitudinal studies are therefore needed to examine the role of self-control related traits as risk factors for problematic use of SNSs and the role of DT as a mediator of these associations. Another limitation is that we obtained a general measure of SNSs use. Specifically, participants reported usual hours using SNSs but did not provide additional information regarding type of use (e.g., active or passive) or preferred SNS. As different ways or patterns of SNSs use seem to differentially impact on problematic use, future studies should examine these behaviors more extensively. Another limitation is that we did not assess motives for using SNSs, a variable that may help to explain the pathways involving emotion-driven impulsivity and distress tolerance.

4.2. Clinical implications and conclusions

The present findings are congruent with theoretical models of behavioral addictions such as the I-PACE model (Brand et al., 2016) which proposes that behavioral addictions, including here SNS addiction or problematic engagement in SNS use, are the resulting consequence of the interplay between predisposing variables (e.g., personality) and mediating variables (e.g., affective and cognitive responses to internal or external stimuli). Our results sustain the relationship between dysfunctional self-control and maladaptive SNSs use. A key result was the identification of the dimensions of self-control more prominently associated with this maladaptive pattern of use, namely the tendency to act rashly when experimenting intense negative emotions and poor self-regulation. Moreover, our results suggest DT as a potential pathway by which these set of variables might exert their influence. In accordance with the I-PACE model, which proposes that treatment should be mainly focused on mediating rather than on dispositional variables (Brand et al., 2016), the results suggest that increasing the ability to tolerate distress could be relevant to disrupt maladaptive SNSs use. Although this mediating role of DT still needs to be confirmed by other studies, the findings suggest that increasing DT might be a promising avenue to tailor interventions aimed at decreasing the problematic use of SNSs and other internet-related behavioral addictions.

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Contributors

Drs. Pilatti, Bravo and Pautassi conceptualized the research questions and designed the study. Dr. Pilatti coordinated the efforts of the research team, conducted the analyses, wrote the first draft of the manuscript and subsequent versions of it. Dr. Bravo coordinated and supervised all the analyses, helped draft the manuscript and edited all the sections of the first draft and subsequent versions of it. Dr. Michelini and Aguirre assisted in drafting and editing the manuscript. Dr. Pautassi helped draft the manuscript and edited all the sections of the first draft and subsequent versions of it. All authors contributed to and approved of the final manuscript.

Credit authorship contribution statement

Angelina Pilatti: Conceptualization, Methodology, Investigation, Resources, Formal analysis, Writing – original draft, Supervision, Project administration, Funding acquisition. **Adrian J. Bravo:** Conceptualization, Methodology, Software, Investigation, Resources, Formal analysis, Writing – original draft, Funding acquisition. **Yanina Michelini:** Writing – original draft. **Paula Aguirre:** Writing – original draft. **Ricardo Marcos Pautassi:** Conceptualization, Investigation, Writing – original draft, Funding acquisition.

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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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.abrep.2021.100389.

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