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Article

Perceived Attachment and Problematic Smartphone Use in Young People: Mediating Effects of Self-Regulation and Prosociality

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Abstract

Background: Problematic use of smartphones is a challenge facing societies around the world. This phenomenon has been associated with negative socialization experiences through the impact they have on how the youth relates to their environment. This study was designed to examine parental and peer attachment, self-efficacy and prosocial reasoning as predictors of different attitudes towards online communication and problematic smartphone use. **Method:** 561 youth aged 14-20 years (Mage = 17.82; SD = 1.64; 67.7% Female) participated in an online survey. **Results:** Results indicated that an increase in self-efficacy or prosocial reasoning is correlated with a decrease in problematic smartphone use and attitudes towards online communication aimed at avoiding reality or constructing a more comfortable parallel social reality. Attachment to parents and peers had direct and indirect effects on problematic smartphone use and attitudes toward online communication through youth personal and social adjustment. **Conclusions:** Attachment plays a relevant role in the symptoms reduction of smartphone addiction and attitudes to online communication in youth, through its impact on self-efficacy perceptions and prosocial reasoning.

Keywords: Parents, peers, self-efficacy, smartphone, addiction, prosociality.

Resumen

Apego Percibido y Uso Problemático de los Teléfonos Inteligentes en los Jóvenes: Efectos Mediadores de la Autorregulación y la Prosocialidad. **Antecedentes:** el uso problemático de los smartphones es un reto al que se enfrentan las sociedades de todo el mundo. Este fenómeno se ha asociado con experiencias negativas de socialización a través del impacto que estas tienen en cómo los jóvenes se relacionan con su entorno. Este trabajo examina el apego (parental y pares), la autoeficacia y el razonamiento prosocial como predictores de diferentes actitudes hacia la comunicación online y uso problemático del móvil. **Método:** 561 jóvenes entre 14 y 20 años (Medad = 17,82; SD = 1,64; 67,7% Mujeres) participaron en una encuesta online. **Resultados:** tanto la autoeficacia como el razonamiento prosocial se correlaciona con una disminución del uso problemático del móvil y de las actitudes hacia la comunicación online orientada a evadir la realidad o a construir una realidad social paralela más cómoda. El apego (parental y pares) tuvo efectos directos e indirectos sobre el uso problemático del móvil y las actitudes hacia la comunicación. **Conclusiones:** el apego juega un papel relevante en la reducción de síntomas de adicción al móvil y en las actitudes hacia la comunicación online en los jóvenes, a través de su impacto en las percepciones de autoeficacia y razonamiento prosocial.

Palabras clave: padres, compañeros, autoeficacia, smartphone, adicción, prosocialidad.

The development of information and communication technologies (ICT, including internet and mobile devices) offers opportunities for positive personal growth, as well as risks. The most recent data show disproportionately high rates of ICT use among youth. The average use among 13 to 18 year-olds is 6.40 hours per day, with a large percentage of this use attributed to the consumption of the internet through smartphones (Rideout & Robb, 2019). Evidence indicates that prevalence rates of problematic mobile use and online communication vary from country to country (Díaz-Aguado et al., 2018) with prevalence ranging from 20.5% to 39.8% (Cortaza-Ramírez et al., 2019; de-Sola et al., 2017; López-Fernández et al., 2017) although inter-geographic and intercultural differences have not been sufficiently studied (de-Sola et al., 2016).

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The Pathological Internet Use model of Davis (2001), suggests that maladaptive perceptions of oneself (e.g., low self-efficacy) and of the world (e.g., I am bad at interacting in person) as well as an absence of social support may be antecedents to problematic internet use (Davis, 2001). As such, unsatisfactory attachment is one of the factors contributing to the excessive use of digital networks and devices in youth (Cacioppo et al., 2019; Estévez et al., 2019; Jia & Jia, 2016). Due to its impact on emotional and cognitive development, unsatisfactory attachment constrains self-efficacy and affects the relationships that young people establish with their social environment (Bolat et al., 2018; Monacis et al., 2017). The present study was designed to examine the mediating role of self-efficacy and prosocial reasoning in the relations between the attachment of parents and peers and problematic ICT use (specifically the problematic use of smartphones and online communication).

Attachment experiences regulate behavior and function as predictors of the relationships youth establish with acquaintances and strangers (Estévez et al., 2019). Evidence suggests that

attachment experiences may determine the security with which youth confront the world and/orserve as a reference for understanding and establishing new relationships (Cassidy & Shaver, 2016). Thus, early experiences of misunderstanding, loneliness, or lack of support from family or peers, would encourage the use of ICT as an escape tool to try to avoid these unpleasant emotions (Worsley et al., 2019) and find new, more satisfying social relationships (Jia & Jia, 2016). Conversely, attachment experiences that include understanding, respect, or security would facilitate the appropriate use of ICT because the young person develops different capacities that allow them to respond favorably to risk factors (Cassidy & Shaver, 2016).

Attachment theorists have claimed that youth with high levels of attachment to both parents and peers have better adjustment outcomes (Laible & Thompson, 2000). A secure and strong attachment to parents and peers can encourage and model moral traits (Armsden & Greenberg, 1987; Carlo, 2014; Carlo et al., 2012; Laible, 2007; Mark et al., 2002) as well as help develop a proper perception of self and abilities (Corcoran & Mallinckrodt, 2000; Laible et al., 2004). More specifically, this type of attachment can facilitate a shift from self-focused forms of prosocial moral reasoning to other-oriented forms by encouraging perspective taking and including references to feelings and moral assessments (Carlo, 2014). Similarly, previous research suggests that attachment quality and self-efficacy are closely related (Cassidy & Shaver, 2016) through better emotional regulation derived from the support offered by parents and peers, who provide the young person with references on which to base their behaviors and positive feedback about their performance and abilities (Pan et al., 2016).

Perceptions of self-efficacy regulate behavior and function as predictors of social and personal adjustment (Corcoran & Mallinckrodt, 2000), just as prosocial reasoning functions as a buffer of risk behavior (Barroso-Hurtado & Serrano, 2019). When the youth perceives inefficacy in his or her real-life (e.g., social, work, family), maladaptive cognitions (weak self-image, loneliness, inability to make decisions, and poor mental health in general) are present that trigger and precede the problematic behavior (Kaur, 2018). Thus, the youth is motivated to create a successful virtual avatar that facilitates the search for the positive feedback.

A key factor to understanding Problematic Internet Use is the reinforcement that the individual receives (Davis, 2001). ICT offers this rewarding feedback in a simple, immediate, and continuous way (Berte et al., 2019) becoming a potentially addictive tool for young people (Alrekebat, 2016; Kim & Davis, 2009). ICT can serve as an escape and as emotional compensation whereby a positive emotional experience is obtained in the short term, yet it is simultaneously increasing youth's perception of social inefficacy (Young & de Abreu, 2011). As a result of these processes, youth mayfocus even more on virtual relationships that have a low social risk and reduce the number of face-to-face interactions (Odacı & Çelik, 2016).

According to theorists, engagement in prosocial behaviors can protect young people from different risk factors (Barroso-Hurtado & Serrano, 2019), as well as increase the number of positive interpersonal relationships (Carlo, 2014; Killen & Smetana, 2013). At the same time, prosociality can facilitate the appropriate use of ICT by encouraging youth'sperspective taking, references to feelings, and self-regulation. Researchers suggest a negative relation between prosocial behavior and Internet addiction (Iten et al., 2018; Ma et al., 2011; Saffarinia et al., 2015) but there are no studies on the relations between prosocial reasoning and problematic ICT indicators.

Given the current evidence as well as the rapid digitization of youth's social interactions, research focused on understanding the socializing role of peers and parents in adolescent prosocial reasoning and self-efficacy is highly relevant. The present study, which is part of an international project examining multiple factors with a cross-cultural lens, was designed to examine parental and peer attachment, perceptions of self-efficacy, and prosocial reasoning as predictors of attitudes to internet communication and problematic smartphone use in Spanish and Mexican youth.

Based on prior research, we hypothesized that the attachment of parents and peers would be positively related to the prosocial moral reasoning and self-efficacy of young people. It was expected that, as with other risk behaviors, self-efficacy would be negatively related to indicators of attitudes to internet communication (IBA) and problematic smartphone use (PCU). More importantly, self-efficacy and prosocial moral reasoning were expected to mediate the association between parental and peer attachment and indicators of IBA and PCU. That is, parent and peer attachment were both expected to be positively related to self-efficacy and prosocial moral reasoning, which in turn, were both expected to be negatively related to IBA and PCU.

Method

Participants

The total sample consisted of 561 youth between the ages of 14 and 20 years (M = 17.82; SD = 1.64). It was composed of 280 Spaniards (M_{age} = 18.40; SD = 1.49) and 281 Mexicans (M_{age} = 17.25; SD = 1.59). Within each group, the gender distribution was 75.1% Spanish women and 60.4% Mexican women.

Instruments

A shortened version of the Parent and Peer Attachment Inventory (IPPA; Raja et al., 1992) that was translated into Spanish and validated by Delgado et al. (2016) was used to assess dimensions of perceived attachment (Armsden & Greenberg, 1987). The self-report inventory consists of 24 items that assess trust (e.g., *"respect my feelings"*), communication (e.g., *"help me better understand myself"*), and alienation (e.g., *"I feel angry with them"*) regarding an adolescent's peer group and parental figures. A 5-point Likert scale ranging from 1 ("Never or almost never true") to 5 ("Always or almost always true") was used. The alienation subscale was inverted, items were averaged and found to be a reliable measure in this study with Cronbach's alphas .91 for Spanish parental attachment and .84 for Mexicans peer attachment.

The Spanish version of the Personal Competence Scale (ECP; Fernández-Castro et al., 1998; Wallston, 1992) was used to ascertain the extent to which young people perceive themselves to be capable of having control over their personal situation and goals (e.g. *"In general, I am capable of achieving what I set out to achieve"*). Participants responded to the 8-item measure using a 6-point Likert scale ranging from 1 ("completely disagree") to 6 ("completely agree"). Items were found to be a reliable measure in the current study (α for Spanish = .82; α for Mexicans = .78).

Prosocial moral reasoning was measured using the Prosocial Reasoning Objective Measure (PROM; Carlo et al., 1992), in

its Spanish version (Mestre et al., 2002). In this measure, three sociomoral problems were used to evaluate the tendency of participants to use moral reasoning of varying complexities when carrying out helpful behaviors in different situations (e.g. "*to share or not to share food after a flood"*). Each sociomoral problem contains 5 items about the reasons for his decision (e.g. *"It depends on what parents and the community think about what he has decided to do"*) that are answered using a 5-point Likert scale ranging from 1 ("not important") to 5 ("extremely important"). The measure assesses five developmental levels of prosocial moral reasoning: hedonistic, approval-oriented, needs-oriented, stereotyped, empathic, and internalized, respectively. Items were aggregated to indicate a global score weighted of prosocial reasoning (see Carlo et al., 1992). The weighted composite is calculated so that a high score indicates the relative preference of higher level reasoning to lower level reasoning. The composite was found to be a reliable measure in the current study (α for Spanish = .99; α for Mexicans = .77).

The Scale of Internet Behavior and Attitudes (Morahan-Martin & Schumacher, 2000) was used to assess trends in online communication. The scale included fifteen items corresponding to the subscales of social confidence (e.g. *"I am more friendly online than in real life"*) and social liberation (e.g. *"My online friends understand me better than other people"*). Using a 4-point Likert scale from 1 ("totally disagree) to 4 ("totally agree"), participants reported the degree to which they use digital tools to escape reality, for ease of communication, and for the comfort they allow as opposed to the difficulties experienced when socializing outside of online environments. In the present study, the alpha for social liberation were between .99 for Spanish sample and .83 for Mexican sample. The Cronbach's alphas for social confidence for the Spanish and Mexican youth were between .99 and .72, respectively.

The Mobile Phone Problem Use scale (MPPUS-10; Foerster et al., 2015) was used in its Spanish translation (López-Fernández et al., 2012). Participants responded to the scale's 10 items (e.g. *"when I have felt bad, I have used the mobile phone to feel better"*) using a 10-point Likert scale ranging from 1 ("not true at all") to 10 ("extremely true"). Items were aggregated to assess the presence of and frequency with which participants experience symptoms associated with the problematic use of mobiles such as tolerance, escape from other problems, abstinence, anxiety, and negative life consequences. The items were found to be a reliable measure in the current study (α for Spanish = .98; α for Mexicans = .85).

Procedure

Data collection was conducted online using the Qualtrix platform between April 2019 and January of 2020. Free and paid advertising tools that were available on different social networking platforms and universities (e.g. University Mass Mail, University Social Networks, etc.) were used to recruit participants. Prior to the start of the survey, participants were informed of the voluntary nature of participation, their right to leave the survey at any point, the objectives of the research, and the channels of contact with researchers. The questionnaires were presented in a randomized way. The survey was configured to guarantee the anonymity of the participants (no personal data or IP addresses were collected). The researchers had the informed consent of the participants included in the study and the approval of IRB protocols.

Data analysis

Data analysis was conducted throughout various stages. First, analyses were carried out to assess the psychometric properties of the measures. Descriptive analyses (i.e. means and standard deviations) were conducted and internal consistencies of the subscales were estimated using the Pearson correlation analysis and the Cronbach's alpha coefficient respectively. Analyses of mean differences were performed according to sex and country of residence. The path analyses procedure adjusted to maximum likelihood parameters with observed variables was used to calculate the fit of the hypothesized models. The chi-square test, the comparative fit index (CFI; fit is adequate at .90 or greater) and the approximation mean square error (RMSEA; fit is adequate at .08 or less) were used as indicators to determine the model fit (Byrne, 2016). Finally, the chi-square increment test ($\Delta \chi^2$) and increment of the normalized index of adjustment (ΔNIF; fit is adequate at .01 or less) were used to estimate the model invariance by country (Bentler, 1990; Bentler & Bonett, 1980).

Results

Descriptives, Correlations and differential analysis

Table 1 shows the descriptive statistics of the scales completed by participants according to gender and country of residence. Overall scores on parental attachment indicate that youths, in general, perceive adequate support from their parental figures, with significantly greater attachment being perceived among Spanish than Mexican youth ($t_{(2,559)} = 2.43$; $p < .05$; $d = .25$). However, there were no significant differences between males and females ($t_{(2,559)} = -.70$; $p > .05$; $d = .08$). Further, there was no significant gender difference in peer attachment ($t_{(2,559)} = -1.40$; $p > .05$; $d = .15$) but it was significantly higher among Spanish than Mexican youth ($t_{(2,559)} = 3.92$; $p < .05$; $d = .40$). No significant differences were found for self-reported self-efficacy for gender ($t_{(2,559)} = -.64$; $p > .05$; $d = -.07$) or country of residence ($t_{(2,559)} = -.05$; $p > .05$; $d = -.01$). Prosocial reasoning was significantly higher among Spanish than Mexican youth ($t_{(2,559)} = 3.07$; $p < .05$; $d = .33$), but no significant differences in gender ($t_{(2,559)} = -1.63$; $p > .05$; $d = -.19$). Finally, there were significant differences between the indicators IBA and PCU, with higher scores among Mexican than Spanish youth for social liberation-oriented use ($t_{(2,559)} = -5.66$; $p < .05$; $d = -.58$), social confidence-oriented use ($t_{(2,559)} = -4.81$; $p < .05$; $d = -.49$) and PCU ($t_{(2,559)} = -2.20$; $p < .05$; $d = -.23$). Only the social liberation-oriented use showed a significant difference in gender, being higher among men ($t_{(2,559)} = 2.47$; $p < .05$; $d = .28$).

Table 2 shows the correlation analyses of the main study variables. Parental attachment was positively related to self-efficacy in both Spanish and Mexican youths. Likewise, in both groups, parental attachment showed a negative association with social liberating, social confidence, and smartphone addiction. Peer attachment was positively related to the self-efficacy and prosocial reasoning of both groups. For Spanish youth, peer attachment was negatively related to both IBA forms and PCU, while for Mexican youth, peer attachment was only negatively related to the social liberation-oriented use. Furthermore, self-efficacy in Mexican youth was positively correlated with prosocial reasoning, and, in both groups, self-efficacy showed negative associations to both the IBA forms and PCU. Finally, prosocial reasoning was negatively

Table 1
Descriptive statistics of the variables

	Spain n=280		México n=281		Spain	México
	Male n=69	Female n=211	Male n=112	Female n=169	α	α
	M (SD)	M (SD)	M (SD)	M (SD)		
PA	10.57 (2.50)	10.90 (2.92)	10.25 (2.60)	10.07 (2.59)	.92	.86
PE	11.69 (1.97)	11.54 (2.19)	10.3 (2.08)	10.88 (2.30)	.87	.84
SE	4.01 (0.74)	4.01 (0.83)	3.93 (0.83)	4.06 (0.82)	.82	.78
PR	192.86 (9.93)	194.57 (9.88)	190.45 (10.74)	191.22 (9.13)	.99	.77
SL	2.17 (0.59)	2.07 (0.59)	2.54 (0.67)	2.42 (0.62)	.99	.83
SC	2.43 (0.75)	2.43 (0.77)	2.80 (0.81)	2.81 (0.69)	.99	.72
CP	4.14 (1.65)	4.23 (1.58)	4.33 (1.80)	4.83 (2.04)	.98	.85

Note: PA, Parental attachment; PE, Peer attachment; SE, Self-efficacy; PR, Prosocial reasoning; SL, Social liberating; SC, Social confidence; CP, Smartphone addiction

Table 2
Correlations between variables included in the study

	1	2	3	4	5	6
1. PA	1					
2. PE	.33**/.27**	1				
3. SE	.26**/.36**	.33**/.38**	1			
4. PR	.10/.06	.14*/.28**	.04/.21*	1		
5. SL	-.34**/-.17*	-.37**/-.28**	-.31**/-.36**	-.24**/-.40**	1	
6. SC	-.29**/-.18*	-.30**/-.08	-.28**/-.32**	-.08/-.17*	.73**/.64**	1
7. CP	-.21**/-.19*	-.27**/-.13	-.29**/-.28**	-.07/-.27*	.44**/.23**	.42**/.30**

Note: PA, Parental attachment; PE, Peer attachment; SE, Self-efficacy; PR, Prosocial reasoning; SL, Social liberating; SC, Social confidence; CP, Smartphone addiction; The values to the left of the space bar (/) refer to the correlations of the Spanish sample. The data to the right of the slash (/) refer to the correlations of the Mexican sample; *$p < .05$; **$p < .01$

related to social liberating-oriented use in Spanish and Mexican youth but was only negatively related to social confidence-oriented use and PCU in the Mexican youth sample.

Path Analysis of the Main Model

Path analysis with observed variables was conducted made using the maximum likelihood estimation method in AMOS version 25 (Byrne, 2016). A model was executed (see Figure 1) in which the direct path between to perceived peer and parental attachment to prosocial reasoning, self-efficacy, PCU, IBA oriented to social confidence and social liberating was tested. The error variances of the social confidence, social liberating and smartphone addiction were allowed to correlate with one another. In addition, the indirect path between parental attachment to social liberating, social confidence and PCU via prosocial reasoning and self-efficacy were tested. The indirect path between peer attachment to social liberating, social confidence and PCU via prosocial reasoning and self-efficacy were tested too. Finally, the effect of gender and age is controlled for social confidence, social liberating and PCU.

Multigroup and Main Analyses

A multi-group analysis was conducted to examine differences in the path model between the Mexican and Spanish youth. A

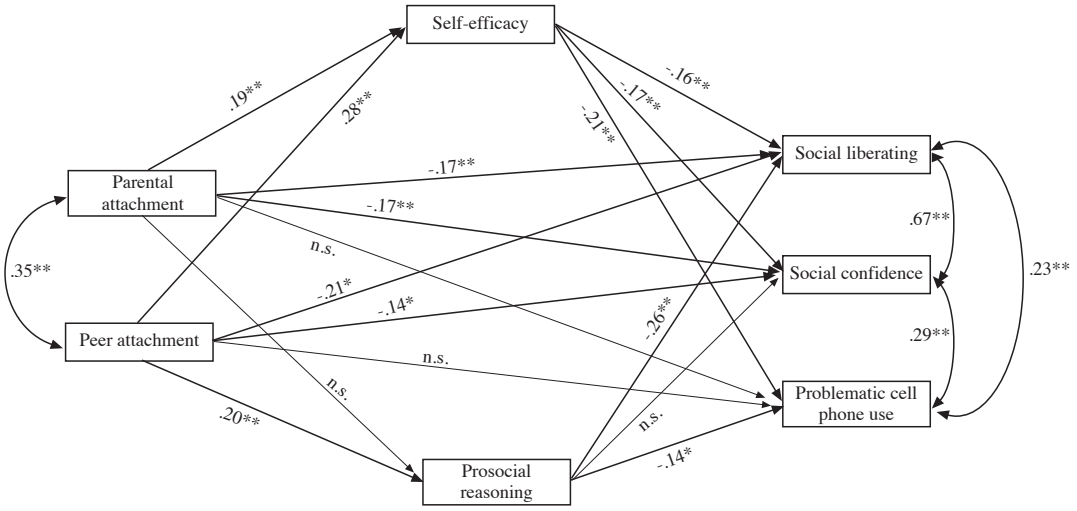

Figure 1. Model linking parental and peer attachment (teen report) to indicators of problematic use of mobile networks and devices through prosocial reasoning and self-efficacy
Note: * $p < .05$; **$p < .01$; Non-significant paths are represented as "n.s"

chi-square increments and NFI increment test were conducted to examine whether there was a significant change between a restricted (i.e., country-separated analysis) and unrestricted model for different levels of the moderating variables (Muthén & Muthén, 2010). The unconstrained model ($\chi^2 = 18.40$, df = 20, $p > .05$; CFI = 1.00; RMSEA = .00; Parsimony-Adjusted Measures [PCFI] = .36) and the constrained model ($\chi^2 = 19.34$, df = 23, $p > .05$; CFI = 1.00; RMSEA = .00; PCFI = .41) were not significantly different, $\Delta\chi^2(3) = 0.92$, $p > .82$; ΔNIF = .00. Therefore, the main path analysis was conducted using the combined full sample.

The model fits acceptably for all participants (χ^2/DF = 1.43 $p = .21$; CFI = .99; RMSEA =.03). Path analysis showed that, as hypothesized, parent and peer attachment were positively associated with self-efficacy. Peer, but not parent, attachment was positively related to prosocial moral reasoning. In addition, self-efficacy was negatively associated with PCU and social liberation and confidence attitudes. Also, prosocial moral reasoning was negatively associated with PCU and social liberating attitude. There were also negative associations between both parental attachment and peer attachment to social liberation and confidence.

Tests of indirect effects

Bias-corrected bootstrap confidence intervals (CIs) were used to test the significance of the mediated effects (MacKinnon et al., 2002). Indirect effects were significant for relations between peer attachment and social liberating both via self-efficacy (indirect effect = -.04, 95% CIs = [-.09, -.01], $p = .01$) and via prosocial reasoning (indirect effect = -.05, 95% CIs = [-.10, -.02], $p = .00$); peer attachment and social confidence, both via self-efficacy (indirect effect = -.05, 95% CIs = [-.10, -.01], $p = .01$) and via prosocial reasoning (indirect effect = -.02, 95% CIs = [-.06, .00], $p = .05$); peer attachment and PCU, both via self-efficacy (indirect effect = -.06, 95% CIs = [-.11, -.02], $p = .00$) and via prosocial reasoning (indirect effect = -.03, 95% CIs = [-.06, -.01], $p = .01$).

Indirect effects were also significant for the relations between parental attachment and social liberating via self-efficacy, indirect effect = -.03, 95% CIs = [-.06, -.01], $p = .01$; between parental attachment and social confidence via self-efficacy, indirect effect = -.03, 95% CIs = [-.07, -.01], $p = .01$; and between parental attachment and smartphone addiction via self-efficacy, indirect effect = -.05, 95% CIs = [-.10, -.01], $p = .00$.

Discussion

The purpose of this study was to examine the direct and indirect associations among parental and peer attachment with IBA and PCU through the mediating roles of self-efficacy and prosocial reasoning in Spanish and Mexican youth. As expected, both self-efficacy and prosocial moral reasoning mediated the relations between peer attachment and the three outcomes (IBA and PCU). In contrast, only self-efficacy mediated the relations between parental attachment and IBA or PCU. The findings were robust across nationality and gender groups. These findings show that there are different patterns of specific associations of parental attachment versus peer attachment and problematic smartphone use or the attitudes to internet communication in youth. The findings contribute to our understanding of the interpersonal and intrapersonal mechanisms associated with IBA and PCU.

Parental attachment was indirectly related to the problematic smartphone use and the attitudes to internet communication through self-efficacy. These results provide further insight into the mechanisms by which lack of family social support would be associated with pathological internet use already noted by Davis (2001) in his cognitive-behavioral model on PIU and are consistent with the notion that secure attachments in the family are important for the development of positive representations of the self, including high levels of self-esteem and self-efficacy (Laible et al., 2004; Chen, 2019). In other words, youth with relatively secure parental attachment reported fewer symptoms of mobile phone addiction and lower levels of use of online environments aimed at escaping one's reality and seeking emotional compensation through greater feelings of self-efficacy. Perhaps high self-efficacy is a reflection of a relatively satisfied basic psychological need for relatedness, a reduced need to improve self-presentation, and/or a greater sense of autonomy, which could serve to reduce problematic mobile phone use and improve the attitudes or behaviors that young people have when communicating online.

Furthermore, it was demonstrated that peer attachment was indirectly related to the IBA and PCU. However, the mediating mechanisms were slightly different in that both self-efficacy and prosocial reasoning showed mediating effects. This finding, in which the role of peer attachment has a negative impact on IBA and PCU, was consistent with the notion that close and supportive relations with peers (as noted above with parental attachments) positively impact young people's self-perception (Corcoran & Mallinckrodt, 2000; Laible et al., 2004), which are in turn associated with fewer risk behaviors such as digital addictions (Kaur, 2018). In addition, the fact that prosocial reasoning mediates relations between peer attachment and indicators of IBA and PCU, highlights the positive role that peer groups might provide in facilitating prosocial moral reasoning and how such reasoning might protect from problematic behaviors or attitudes.

Also, as expected, parental and peer attachment were both negatively associated with the search for liberation and social confidence addiction indicators. These results were consistent with the previous literature that supports negative relations of attachment and addiction (Estévez et al., 2019; Jia & Jia, 2016) and the findings of Eichenberg et al. (2017) that showed that young people with insecure attachment styles showed a greater tendency to pathological use of the Internet. These findings are consistent with the notion that more secure attachment relationships might foster positive internal working models that facilitate the development of positive relationships with others, which might subsequently reduce the need for problematic internet use.

As expected, both self-efficacy and prosocial moral reasoning had direct links to outcomes. These findings are also consistent with research and theories that indicate that both self-efficacy and prosocial reasoning are linked to the quality of social adjustment (Alrekebat, 2016; Berte et al., 2019). Understood as indicators of social and personal well-adjustment, youth who exhibit relatively high levels of prosocial reasoning and self-efficacy correspond with youth who show relatively low levels of problematic smartphone use and better internet communication attitudes. In addition, these findings are consonant with prior research that demonstrates that youth who exhibit high levels of prosocial reasoning and self-efficacy are also more likely to exhibit relatively high levels of empathy and self-esteem (Carlo, 2014; Carlo et al., 2012; Laible, 2007); Such individuals might be less motivated to seek

alternatives for experiencing positive emotions associated with social relationships.

Finally, it should be noted that although the previous findings are the result of the Mexican and Spanish sample joint model, important group differences were detected. For example, Mexican youth presented a lower family and peer attachment than Spanish youth, which, in light of the data presented, the country of residence could represent a risk factor that should be taken into account in future lines of research. New approaches on the prevalence and repercussions of this phenomenon under cultural issues would explain the differences found in the IBA and PCU indicators, where Mexican youths scored significantly higher than Spaniards.

These results have to be interpreted in light of study limitations. First, the measurement of variables using self-report questionnaires and the use of observable variables to establish the models entails certain limitations (e.g., measurement error is not considered). Therefore, future research using multiple methods (e.g., multiple informants, behavioral tasks) is needed to reduce such sources. However, it should be noted that the overall pattern of associations to PCU and IBA in the present study was differentiated and validated and that reliable instruments were used. Second, the present sample is not representative of the broader population of youth. Research is needed on this topic with a community-based sample to better ascertain the generalizability of the findings. And third, the study design was cross-sectional, which does not allow for strong inferences regarding causality and direction of effects. It is possible, for example, that youth had earlier problematic use of internet and social media that could influence their prosocial moral reasoning, self-efficacy, and attachment relationships with parents and peers. Thus, more rigorous study designs (e.g., experimental, prospective longitudinal) that allow stronger causality inferences are needed.

Despite these study limitations, the present findings extend our understanding of the roles of attachment, prosocial moral reasoning, and self-efficacy and their relations to PCU and IBA. Given the relative dearth of research examining these relations, the findings yield evidence that attachment and these socio-cognitive traits could protect against risky ICT behaviors. This paper provides suggestive evidence that young people who experience positive attachment relationships with parents and peers and who exhibit relatively high levels of prosocial moral reasoning and self-efficacy can avoid engagement in problematic ICT use. Scholars have noted that minimizing the associated risks for the youth of the digital generation has become an important objective of policymakers in recent years (Rideout & Robb, 2019; Vondráčková & Gabrhelík, 2016). Although further research is needed, program developers and policymakers might consider supporting interventions that foster secure attachment relationships, prosocial moral reasoning, and self-efficacy to address this objective.

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