



# Anxious Attachment and Facebook Addiction: The Mediating Role of Need to Belong, Self-esteem, and Facebook Use to Meet Romantic Partners

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## ABSTRACT

**Background and aim:** Although the beneficial aspects of web platforms such as Facebook are recognized, excessive social media use can lead to problematic or addictive behavior among a minority of users. Because anxious attachment has usually been analyzed in the relation to internet addiction, social media addiction, and Facebook intensity use, the main aim of the present study was to investigate the relationship between anxious attachment and Facebook addiction. A multiple-mediation model was proposed including a four-path mediating effect via need to belong (NTB), self-esteem, and Facebook use to meet romantic partners.

**Methods:** Data were collected from a sample of 530 university students (39.6% males,  $M_{age}=21.3$  years,  $SD=2.1$ ). Path analysis was performed based on the maximum likelihood estimation with resampling method. The direct and indirect effects in the four-path mediation model were tested by user-defined estimands and bias-corrected bootstrap method.

**Results:** The findings provided evidence for the association between anxious attachment, Facebook addiction, low self-esteem, high NTB, and Facebook use to meet romantic partners. Path analysis showed excellent fit between theoretical model and sample data. Anxious attachment had an indirect effect on Facebook addiction via high NTB, low self-esteem, and Facebook use to meet romantic partners.

**Conclusion:** The novel findings deepen the understanding the mediating mechanisms of the relationship between anxious attachment and Facebook addiction and will help contribute to the development of effective prevention and treatment to enable more responsible and healthy Facebook use.

**Keywords:** Facebook addiction; social media addiction; anxious attachment; belongingness; self-esteem; online dating

## **Introduction**

Facebook provides a communal space where individuals have the experience of being a part of the community (Griffiths et al., 2014), gaining symbolic rewards in the context of cyber-relationships. Facebook is a specific platform where many different online activities can take place (e.g., social networking, gaming, gambling, etc. [Griffiths, 2012]). Although social networking site (SNS) use (e.g., Facebook, Instagram, and YouTube) is an everyday activity in the lives of many individuals (Stănculescu, 2020), excessive engagement among a minority of individuals can lead to maladaptive psychological and social functioning, triggering mental health issues (Kuss & Griffiths, 2017). The World Health Organization (2020) has expressed concerns about the association between problematic SNS use and addictive behaviors among a minority of users. Current statistics (April 2021) indicate that Facebook is the SNS with the greatest number of the active users worldwide – approximately 2.2 billion monthly, representing an 8% increase year-on-year, with 1.59 billion individuals logging onto Facebook daily on average and with about 400 users signing up for Facebook each minute (Zephoria, 2021). Facebook has more monthly active users than WhatsApp (500 million), Twitter (284 million), and Instagram (259 million) combined. These statistics indicate that Facebook is so present in the lives of many users that its psychosocial impacts on them cannot be ignored. Beyond the known advantages of instant social communication, such as maintaining and forming new friendships, Facebook marketing usage, the sharing of business pages, and huge accessibility via the growth of mobile traffic on Facebook (Young et al., 2017), specialists have been interested in exploring possible negative impacts on psychological life and wellbeing (Griffiths, 2013; Pontes et al., 2018).

## ***Theoretical background***

One potentially concerning aspect of Facebook use is that virtual communication is gaining increased time in everyday life, to the detriment of vivid interactions or face-to-face meetings.

A distinction should be made between two aspects: the growing number of Facebook users worldwide and potential SNS addiction among a minority of Facebook users. In addition, it is necessary not to equate excessive use with maladaptive use (Griffiths, 2010). Scholars have drawn attention to the tendency to overpathologize everyday life (Billieux et al., 2015). Consequently, there is a clear need to demarcate genuine pathology from frequent and excessive Facebook use. Further investigation is necessary to extend the understanding of SNS addiction symptoms and their psychosocial antecedents.

Prior research on topics encompassing online communication have emphasized the emergence of new psychological disorders, including iDisorder (Rosen et al., 2013), social media addiction (Vannucci et al., 2017), SNS addiction (Griffiths, 2014), internet addiction and ostracism (Vorderer & Schneider, 2016), Facebook depression (O’Keeffe & Clarke-Pearson, 2011), and Facebook addiction (Andreassen et al., 2012). In addition, individuals who use multiple social media platforms (i.e., more than six) have a higher likelihood of exhibiting increased levels of anxiety and depression compared with those who use only one or two platforms (Primack et al., 2017). Consequently, it is necessary to deepen the understanding the potential routes through which healthy Facebook use turns into maladaptive use.

### **The present research in context**

To date, only a few studies have analyzed mediators of the relationship between anxious attachment (AA) and Facebook addiction (FA) including: (i) metacognition (Marino et al., 2019), (ii) satisfaction needs for relatedness and autonomy (Chen, 2019), and (iii) feedback sensitivity (Tobin & Graham, 2020). Most studies of the relationship between AA and FA, as detailed below, have approached it in terms of correlation and prediction. It is accepted in the literature (Kardefelt-Winther, 2014) that the impact of an isolated predictor can be lowered or even cancelled when various mediators enter in the equation. That is why the present study expands the empirical body of research on mediators of this relationship. More specifically, the

present study investigated whether the direct effect of AA on FA is maintained or (not) while controlling for mediating variables in terms of motivation (need to belong [NTB]), personality traits (self-esteem), and behavior (Facebook use to meet romantic partners). It is necessary to mention that satisfaction needs for relationship and NTB do not overlap each other. Both psychological constructs essentially reflect affiliative drive, but the first one refers to the NTB in terms of satiation (Chen, 2019), and the second in terms of aspiration or desire to prevent loneliness and gain emotional security (Leary et al., 2013). The study aim was to fill the knowledge gap in how AA impacts FA. In addition, the advantage of a multiple mediation (four-path) model, as proposed in the present study, is the examination of simultaneous mediators' role in the relationships between an exogenous variable (AA) and endogenous variables (FA, NTB, self-esteem, and Facebook use to meet romantic partners).

### **Facebook addiction**

FA has been defined as an unhealthy use of Facebook, generating negative effects on personal, family, and professional life (Guedes et al., 2016). Based on the addiction components model (Griffiths, 2005), Facebook addiction has been defined using six core addiction symptoms: (i) salience – the active use of Facebook completely dominates thinking and behavior; (ii) Facebook use causes reliable and consistent mood modification; (iii) withdrawal symptoms when the Facebook use is prevented; (iv) tolerance where there is an increasing amount of daily Facebook activity over time in order to obtain the previous effects of mood modification; (v) conflicts in all areas of the individual's life because of excessive use of Facebook (e.g., occupation/educational problems, relationship problems, subjective loss of control); and (vi) relapse – reversion to earlier habits after a period of abstinence from Facebook. Some studies have drawn attention to a positive relationship between FA and mental health issues as stress symptoms (Chen & Lee, 2013; Marino et al., 2018) and lower life satisfaction (Blachnio et al.,

2016), as well as highlighting the predictive role of FA in poor subjective well-being (Satici, 2018). Consequently, it is important to investigate the psychological aspects which contribute to the transformation of a pleasurable and beneficial activity (i.e., Facebook use) into a problematic one leading to FA.

### **Anxious attachment, Facebook use, and Facebook addiction**

Attachment theory (Mikulincer & Shaver, 2007) offers robust theoretical underpinnings for a deeper understanding of the possible reasons as to why some individuals are more likely to overuse social networking sites, and have a risk for developing behavioral addictions. Adult attachment styles include a set of dispositional psychological traits that reflect the cognitions and emotions influencing social relationships (Ainsworth et al., 2015). Moreover, adult attachment consistently imprints patterns of social relationships and the quality of interpersonal experiences. According to Mikulincer (1998), anxiously attached individuals have a tendency to (i) intensely monitor a relationship partner, (ii) make strong efforts to maintain proximity, (iii) exhibit excessive demands for attention and support or care, and (iv) express high distress in reaction to the attachment figure's lack of responsiveness. Consequently, anxiously attached individuals have lower levels of romantic relationship satisfaction than securely attached individuals. In terms of the relationship between AA and high intensity Facebook use, empirical research support for this positive association has been found (Bashir et al., 2017; Jenkins-Guarnieri et al., 2012; Lin, 2016; Longua Peterson et al., 2017; Oldmeadow et al., 2013). Complementary studies have been conducted on the relationship between AA and: (i) problematic internet use (Jia & Jia, 2016; Schimmenti et al., 2014), and (ii) social media addiction (Blackwell et al., 2017). Regarding the relationship between AA and social media addiction, the situation is less clear in the literature. Apart from the aforementioned positive relationship, it has been reported that AA predicts social media addiction, but no significant

relationship was observed in the model after fear of missing out was taken into account (Baek et al., 2014). Another study reported that the relationship between AA and problematic social media use is mediated by the intensity of psychological well-being (Worsley et al., 2018). However, it is necessary to note that these previous studies explored the psychological correlates and/or predictors of social media addiction, not SNS addiction. Although these are overlapping constructs they are not the same (Kuss & Griffiths, 2017). The difference lies in the fact that social media is a much wider vehicle of communication – transmitting information to other individuals through many different media channels (e.g., videos, blogs, microblogs, etc.), whereas social networking sites comprise mutual communication (Cohn, 2019). Ultimately, all SNS platforms are social media platforms, but not all social media platforms are SNS platforms (Kuss & Griffiths, 2017). Only a few studies have investigated the relationship between AA and FA (Chen, 2019; Eroglu, 2015; Marino et al., 2019; Monacis et al., 2017; Tobin & Graham, 2020). Almost all previous research showed positive correlations apart from a study by Eroglu (2015) in which no association was found. Based on aforementioned studies that provided evidence for a positive association between AA and FA, the same pattern was expected in the present study (Hypothesis 1).

### **Need to belong and Facebook use**

For digital natives (i.e., those who have never known the world without the internet), using Facebook could be considered one of the possible ways to satisfy the need to belong (NTB; Lee & Chiou, 2013). NTB is a basic drive to affiliate with others and obtain social acceptance (Nadkarni & Hofman, 2012). In terms of the belongingness hypothesis (Baumeister & Leary, 1995), those individuals with high levels of NTB may strive to seek more social connections. Although all normal individuals want and hope to be socially accepted, those very high in NTB are concerned about their own social connections. Online communication can have a disabling

effect on a sense of belonging, despite the ease of immersing in a huge social group made possible by social media platforms such as Facebook (Abrams et al., 2011). It appears plausible that individuals with an unsatisfied NTB might have a higher tendency to use the more secure and less emotionally costly route of expanding their social interactions by immersing themselves in Facebook communication. Taking into consideration this aspect, as well as previous findings (Guedes et al., 2012) that showed a positive relationship between NTB and excessive SNS use, it was expected that NTB would be positively associated with FA (Hypothesis 2).

### **Self-esteem and Facebook use**

Regarding the relationship between self-esteem and Facebook use, studies have reported that individuals with low self-esteem have a much greater tendency to use Facebook to boost their self-worth (Nyagah et al., 2015). Upward online social comparisons make individuals feel worse, lowering self-esteem (Vogel et al., 2014). In addition, individuals with poor self-acceptance pay more attention to how others perceive them on social networking sites (Andreassen et al., 2017). Taking into account these findings on the one hand, and that addictive behaviors have a role in suppressing unpleasant emotions related to poor self-worth (Estévez et al., 2017), it was expected that self-esteem and Facebook addiction would be negatively associated (Hypothesis 3).

### **Facebook use to meet romantic partners and anxious attachment**

Recently, various online dating websites and mobile apps have been created enabling users to meet new individuals for dating. One study reported that university students' tendency to be permanently connected to social media was higher among those without a romantic partner than those involved in a romantic relationship (Vorderer et al., 2016). In addition, Kuss et al.,

(2014) highlighted that individuals not involved in a personal relationship are at greater risk of developing addictive social media use than those who have partners. As for the social relationships of anxiously attached individuals, it is known that they (i) are more oriented toward distance avoidance (Locke, 2008), (ii) have a more inhibited and less communicative style (Leary et al., 2013), (iii) face oversensitivity to rejection (Mikulincer & Shaver, 2007), (iv) show more self-doubts about their capacity to initiate a face-to-face interaction because they have more frequent unpleasant experiences, and (v) have a tendency to use the platforms for seeking companionship (Correa et al., 2010). Therefore, it was expected that AA would be positively associated with Facebook use to meet romantic partners (Hypothesis 4).

Based on a recent review emphasizing that the need to alleviate the lack of attachment functioning explains the use of Facebook in the case of individuals with AA (D'Arienzo et al., 2019), it was expected that AA would be a predictor of FA. In line with the findings that highlighted the predicting role of self-esteem in internet addiction (Pantic, 2014), it was expected that that variance of FA would be explained by self-esteem. Building on recent findings emphasizing the association between need satisfaction for relatedness and FA (Chen, 2019), it was expected that NTB would be a predictor of FA. Considering previous research on topic of: (i) relationship alternatives on Facebook (Dibble & Druin, 2014), (ii) AA and high use of Facebook (Oldmeadow et al., 2013), and (iii) compulsive SNS use in finding potential mates (Valenzuela et al., 2014), it was expected that high propensity of Facebook use to meet romantic partners would be a predictor of FA. Collating the aforementioned expectations together, it was expected that AA, NTB, self-esteem, and Facebook use to meet romantic partners would have a predictive role in FA (Hypothesis 5).

In order to verify potential mechanisms of the relationship between AA and FA, a multiple-mediation (four-path) model was proposed. These assumptions were built on a theoretical framework integrating attachment theory (Ainsworth et al., 2015; Mikulincer &



Shaver, 2007), the Interaction of Person-Affect-Cognition-Execution model (I-PACE model; Brand et al., 2016), and the compensatory Internet-use model (CIU; Kardelfelt-Winther, 2014). As aforementioned, empirical studies have used attachment theory to confirm that anxious attached individuals are insecure in their capacity to initiate and maintain partner relationships (Ainsworth et al., 2015), spending more time in bonding on virtual SNSs (Yaakobi & Goldenberg, 2014). Therefore, the present study took into consideration that Facebook addiction may be an unhealthy way to manage insecurities and difficulties in offline interpersonal relationships. Consequently, the model investigated in the present study examined various effects of AA on FA. Proposed mediators in the measurement model were introduced considering: (i) the I-PACE model according to which interactions between core personal, predisposing factors or personal vulnerabilities (in the present model, low self-esteem), affective and cognitive responses, and executive features contribute to the development and maintenance of specific internet-use disorders, more specifically internet applications or SNS and shopping sites; and (ii) the CIU model that is complementary to the I-PACE model, combining psychological and motivation approaches. It highlights that individuals spend more time online in order to diminish the real life problems (motivation to escape from daily pressures, stress, and insecurities). Therefore, the present study advances the idea that compulsive use of Facebook can be explained by compensatory mechanisms for personality deficiency (i.e., low self-esteem) and motivation (i.e., unmet drive for belongingness). Considering both attachment theory and CIU, it was expected that anxious attached individuals would spend more time using Facebook to meet romantic partners in order to compensate their insecurities in offline interactions, more specifically in initiation a partner relationship. Considering the aforementioned theoretical approaches, a four-path mediation model was proposed, formulating the following sub-hypotheses:

H<sub>6.1</sub> – AA directly affects FA

H<sub>6.2</sub> – AA indirectly impacts FA via self-esteem

H<sub>6.3</sub> – AA indirectly impacts FA via NTB

H<sub>6.4</sub> – AA indirectly impacts FA via Facebook use to meet romantic partners

H<sub>6.5</sub> – AA indirectly impacts FA via joint effect of self-esteem and NTB

## **Method**

### ***Participants and recruitment procedure***

The sample comprised 530 university students (48.5% males) with ages ranging between 19 and 23 years ( $M = 21.3$  years;  $SD = 2.1$ ). The research was carried out utilizing a convenience sample at two state universities, participants being recruited from students enrolled on a teacher training program. This option allowed us to have participants for the various faculty profiles. More precisely, the teacher training program enrolls students from both socio-human and sciences profiles. Therefore, the sample included in relatively equal proportions students from both profiles. The Appendix includes more detailed information related to the socio-demographic characteristics of the sample. Out of 600 students invited to participate in the study, 545 agreed to participate. The only inclusion criterion for the study was to be Facebook user. Informed consent was obtained from all individual participants included in the study. They were guaranteed that their data would remain confidential and anonymous. They acknowledged that they could leave the research at any stage, without any justification or consequence of their decision. The participants were informed that the main aim of the study was to explore factors related to Facebook use. The paper-and-pencil questionnaires were administrated at the end of lectures. The survey took approximately 10 minutes to complete. No monetary or other material rewards were offered in return for students' participation in the study. Attrition rate was 2.5% (a few participants gave up after completing the items about socio-demographic characteristics

or few items of the first scale). In the end there were 530 completed questionnaires with no missing data.

## **Ethics**

The research was ethically conducted in accordance with the Helsinki Declaration 1975 as revised in 2000. Approval for the study was granted by the first author's university ethics committee. Students' consent was obtained before data collection. The participants were informed that the data were anonymous, with personal confidentiality being guaranteed in all circumstances. It was specified on the informed consent form that participants had the right at any time to withdraw from participation in the research, and that such an option would be respected without the need for any explanation.

## **Measures**

*Revised Adult Attachment Scale (RASS).* The RASS (Collins, 1996) is an 18-item scale assessing adult attachment style (including three subscales assessing close attachment, AA, and dependent attachment). The six-item subscale of AA (sample item: "When I show my feelings for others, I am afraid they will not feel the same about me") assesses the extent to which an individual is worried about being unloved or rejected. The measure uses a five-point Likert scale (1 = *not at all characteristic of me*; 5 = *very characteristic of me*). Higher scores on this subscale indicate a greater AA style. Cronbach's obtained for this scale was .76 (95% CI [.73, .79]), and for the Anxious Attachment Style Subscale was .74 (95% CI [.73, .77]).

*Bergen Facebook Addiction Scale (BFAS).* The BFAS (Andreassen et al., 2012) is a six-item scale used to assess Facebook addiction (sample item: "How often during the last year have you become restless or troubled if you have been prohibited from using Facebook?"). The scale was developed based on Griffiths' (2005) six core characteristics of addiction (salience, mood

modification, tolerance, withdrawal, conflict, and relapse). The measure uses a five-point Likert scale (1 = *very rarely*; 5 = *very often*). Higher scores indicate the increased likelihood of being at risk of Facebook addiction. The scale has good psychometric properties and in the present study the Cronbach's  $\alpha$  was .85 (95% CI [.82, .87]),

*Need to Belong Scale (NBS)*. The NBS (Leary et al., 2013) is a 10-item scale (sample item: "I seldom worry about whether other people care about me") was used to assess the desire to form and maintain strong social relationships. The measure uses a five-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). Higher scores indicate greater NTB. The Cronbach's  $\alpha$  in the present study was .75 (95% CI [.72, .77]).

*Facebook use to meet romantic partners*. This variable was assessed by a single-item on a five-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*): "Do you use the Facebook to meet romantic partners?" Although using a single item to assess the use of Facebook to meet a romantic partner is debatable, the concept assessed was not a complex or a stable personality trait, but simply a habit. It is accepted practice in such cases in the literature to use a single item (see Bergkvist & Rossiter, 2007).

*The Rosenberg Self-esteem Scale (RSES)*. The RSES (Rosenberg, 1965) is a 10-item scale that indexes participants' affective dimension of the self (sample item: "I am able to do things as well as most other people") and assesses self-esteem. The items are answered on a four-point Likert scale (0=strongly disagree; 3=strongly agree). Higher scores indicate greater self-esteem. The Cronbach's  $\alpha$  in the present study was .87 (95% CI [.84, .89]).

## **Data analysis**

Statistical analyses were done using Statistical Package for Social Sciences (SPSS 23) and Analysis of Moment Structure statistical package (AMOS 23). First, descriptive statistics (mean, standard deviation) as well as skewness, kurtosis, univariate and multivariate normality were calculated. To test the first five hypotheses, Pearson product-moment correlations and

multiple linear regression analysis were computed. The homoscedasticity of residuals in regression and collinearity statistics were checked to be certain the regression model was correct. Verifying the last hypothesis, a path analysis was conducted. A preliminary condition to conduct path analysis, namely identification and management of common method bias was considered. Therefore, Herman's single factor test and computed unrotated single factor were used on all the observed indicators included in path analysis. The cutoff recommended is less than 40% (Fuller et al., 2016). Testing the statistical significance of the proposed theoretical model, three criteria suggested by Schumacker and Lomax (2010) were considered: (i) non-statistically significant chi-square test; (ii) the statistical significance of each parameter estimates; and (iii) the extent of the parameter estimates to show that they are consistent with the substantive theory. The estimation method was maximum likelihood (MLE) with bootstrapping technique (with 5000 bootstrapped samples), as recommended by Byrne (2010) for dealing with multivariate non-normal data. User-new estimands technique with bias-corrected bootstrap method and 95% bootstrap confidence intervals was applied to calculate the total, direct, and indirect effects in the multiple-mediation model. Several inferential goodness-of-fit statistics were used to determine the acceptability of the model. In addition to Chi-square test ( $\chi^2$ ) and  $\chi^2/df$ ; root mean square error of approximation (RMSEA), root mean square residual (RMR), standardized root mean square residual (SRMR), goodness of fit index (GFI), Bollen's incremental fit index (IFI), and Tucker-Lewis fit index (TLI), and Bentler comparative fit index (CFI) were used. According to Hu and Bentler (1999), the cutoff criteria for GFI, IFI, TLI, and CFI is  $\geq .95$ , for RMSEA  $< .06$ , for RMR the smaller the better, with 0 indicating perfect fit, and for SRMR  $< .08$ .

## RESULTS

According to the liberal approach or polythetic scoring scheme recommended by Andreassen et al., (2012), namely, scoring 3 or above on at least four of the six items (total score of 14 or above) indicates the category of those individuals who may have addictive Facebook use. Exploring the descriptive statistics, it was found that 28.6% met the cut-off criteria for being at risk of Facebook addiction ( $n=152$ ) and 20.6% were characterized by AA style ( $n=109$ ). Descriptive statistics displayed in Table 1 showed that all the variables do not have substantial departure from univariate normality, taking into account the cut-off criteria for skeweness ( $< 2$ ) and kurtosis ( $< 7$ ), according to West et al., (1995). AA, FA, and Facebook use to meet romantic partners were positively skewed. Self-esteem and NTB were negatively skewed. It is not uncommon for such asymmetric distributions to be obtained, given that it is a non-clinical sample. Mardia's coefficient (9.513) and CR (6.213) proved the multivariate non-normality of the data.

\*\*\*Insert Table 1 about here\*\*\*

Pearson product-moment correlation coefficients (as shown in Table 2) confirmed the first four hypotheses. FA was positively associated with AA, NTB, and Facebook use to meet romantic partners. Self-esteem was negatively associated with Facebook addiction and AA respectively.

\*\*\* Insert Table 2 about here\*\*\*

The fifth hypothesis that the variance of Facebook addiction would be explained by AA, self-esteem, NTB, and Facebook use to meet romantic partners was confirmed. The results of multiple regression analysis indicated that the four hypothesized predictors explained 28.7% of the variance for Facebook addiction [ $F(4,525) = 52.75, p < .001, R^2 = .28$ ]. AA ( $b = .29, t(525)$

= 7.29,  $p < .001$ ), NTB ( $b = .17$ ,  $t(525) = 4.66$ ,  $p < .001$ ), self-esteem ( $b = -.15$ ,  $t(525) = 3.96$ ,  $p < .01$ ), and using Facebook to meet romantic partners ( $b = .28$ ,  $t(525) = 6.93$ ,  $p < .001$ ) significantly predicted Facebook addiction. Residual statistics showed that residuals mean was .00 which indicates, according to Field (2005), the regression model was good in explaining the evolution of the criterion. Collinearity statistics proved the independence of the residuals, lowest VIF coefficient being 1.05 and the highest 1.23, and the lowest tolerance coefficient was 0.80 and the highest was 0.94. Normal P-P plot of regression standardized residual and rectangular shape of the scatterplot with standardized residual values between -3 and 3 certified the homoscedasticity or normal distribution of the residuals.

A preliminary step to conduct path analysis is identification and management of common method bias. Therefore, Herman's single factor test and computed unrotated single factor were used on all the observed indicators included in the measurement model. The obtained value, i.e., 13.34% was well below the cutoff ( $< 40\%$ ) recommended by Babin (2016). Therefore, the common method variance did not represent a problem for path analysis. Another preliminary analysis was testing the predicting role of AA on NTB, self-esteem, and Facebook use to find romantic partners. Significant equation regressions were found. AA predicted NTB [ $b = .52$ ,  $t(529) = 6.11$ ,  $p < .001$ ], self-esteem [ $b = -.33$ ,  $t(529) = 8.05$ ,  $p < .001$ ], and Facebook use to meet romantic partners [ $b = .23$ ,  $t(529) = 5.41$ ,  $p < .001$ ].

The results obtained in the path analysis showed that all the criteria recommended by Schumacker and Lomax (2010) were met. The absolute fit index ( $\chi^2 = 1.17$ ,  $df = 2$ ) and non-significant  $p$ -value ( $p = .56$ ) shed light a good fit to the data, with GFI = .98, IFI = .99, CFI = .98, TLI = .99, RMSEA = .02 (90% CI, [.00, .06]), RMR = .02, SRMR = .01. All these results proved evidence for excellent fit of the theoretical model to the data.

The strengths of each contributing pathway in the multiple-mediation model (as shown in Figure 1) were calculated with standardized path-coefficients. All paths were significant.

The first sub-hypothesis was certified, because FA was predicted by AA ( $\beta = .31, p < .001$ ). In addition, FA was also predicted by NTB ( $\beta = .12, p < .001$ ), self-esteem ( $\beta = -.11, p < .01$ ), and Facebook use to meet romantic partners ( $\beta = .28, p < .001$ ).

\*\*\* Insert Figure 1 about here\*\*\*

Testing the various effects of AA on FA revealed that the total indirect effects of AA on FA via all mediators was statistically significant (estimates, 95% bootstrap confidence intervals, and bootstrap  $p$ -values are shown in Table 3). The outcomes proved evidence for a partial mediation, because the direct effect of AA on FA remained statistically significant after controlling for the mediator variables (as shown in Table 3). None of the bootstrap confidence intervals included zero, so the null hypotheses of no mediation were rejected for all variance estimators. Therefore, all sub-hypotheses were confirmed. It is important to note that the estimate (i.e., particular or specific indirect effect) of Facebook use to meet romantic partners (.06) was stronger than the estimate of NTB (.04), self-esteem (.03), and joint effect of NTB and self-esteem (.02). Although all mediators had a statistically significant role, Facebook use to meet romantic partners had the greatest contribution in the relationship between AA and FA.

\*\*\* Insert Table 3 about here\*\*\*

## DISCUSSION

In support the hypotheses, the present study found significant associations between dark side of technology use, i.e., ~~Facebook addiction~~ FA and ~~anxious-attachment~~ AA, self-esteem, NTB, and high preference for Facebook use to meet romantic partners. Apart from self-esteem, all the other correlations were positive. These outcomes are in line with previous studies demonstrating that AA correlates with satisfaction need on SNSs (Chen, 2019), and frequent use of Facebook (Lin, 2016). Moreover, the results confirmed the hypothesized predictive role



of AA, low self-esteem, NTB, and Facebook use to meet romantic partners for FA. These findings are complementary to the existing body of research by (i) emphasizing the predictive role of AA on excessive use of Facebook (Rom & Alfasi, 2014), and (ii) needing to have more social ties with others (Jenkins-Guarnieri et al., 2012), therefore improving their sense of social belong (Oldmeadow et al., 2013). In addition, the study provided evidence for the predictive role of Facebook use to meet romantic partners for FA in the case of anxiously attached individuals.

Regarding the predictive role of NTB on FA, it is important to underline that the current research did not assess the actual satisfaction of the NTB, only the desire to form and maintain strong social bonds. This relationship suggests that excessive use of this platform for online encounters by anxiously attached individuals is possibly the result of an unsatisfied NTB. There is a difference between the desire and the perception of the satisfaction of this need in social interactions. This perception represents a subjective impression of fulfilling such need, in term of satiation patterns. Neither the quantity of the interactions, nor a given magnitude of social networking is essential for the satisfaction of the NTB, but rather the quality of the emotional bond. Baumeister and Leary (1995) underlined that emotional connections (especially bonds of caring) really matter for full satisfaction of the NTB.

Moreover, the findings consistently proved the hypothesized direct and indirect relationships between AA and FA, via NTB, self-esteem, and Facebook use to meet romantic partners. An excellent fit was obtained between theoretical multiple-mediation model and the data. The outcomes of the study demonstrate that the relationship between AA and FA is multiply mediated by psychological needs (i.e., NTB, personality trait [self-esteem], and behavioral tendency to use Facebook to meet romantic partners). This multiple-mediation could be explained by taking into account: (i) the core characteristics of anxiously attached individuals (i.e., attention-seeking or reassurance-seeking as strategies to cope with their

insecurities, and fear of abandonment or fear about partner's commitment) and (ii) compensatory potential of Facebook use. Consequently, Facebook use may turn into a compulsive habit for those individuals with AA, low self-esteem, and high NTB.

The mediating role of NTB in the AA-FA connection could appear counterintuitive because the NTB is an important dimension of human motivation. It is necessary to explain why such a positive and survival-oriented trait, conducive to normal social interactions might lead to problematic or maladaptive Facebook use, even to Facebook addiction among a minority of users. In terms of satiation patterns, individuals who have satisfied their NTB would be less driven to search for and form additional interactions. Taking into account various characteristics of anxiously attached individuals (i.e., relational threat, difficulties in regulation of distance-accessibility/closeness to others), and insecurity in intimacy, it could be that their high desire to belong leads to overuse, and possibly addictive use of Facebook. A possible mechanism of the relationship between high NTB and addictive use of Facebook would be biased cognitions about fulfilling in online environments what seems to be very challenging, stressful, and even impossible in offline relationships.

In the matter of the mediating role of self-esteem in the relationship between AA and Facebook addiction, it is known that poor self-perception is specific to a wide range of psychological issues. Individuals with low self-esteem tend to look for external resources to compensate their lack of self-acceptance. In the case of anxiously attached individuals with low self-esteem, online communication via Facebook, more specifically the number of 'likes', respectively number of friends could represent a source of compensation for their negative self-talk and insecurities in social relationships or social intimacy.

The main contribution of the present study is the extension of a less investigated topic (i.e., theory of attachment and CIU as framework to understand the reasons that turn Facebook use into a maladaptive or harmful behavior). The multiple-mediation model presented here

contributes to understanding why a minority of individuals, namely those with AA, spends so much time online, using Facebook excessively, despite experiencing negative outcomes. Therefore, the results contribute to filling the knowledge gap regarding the mediating paths of the association between AA and FA. As aforementioned, very few studies have explored the mediators of this relationship, namely (i) metacognition (Marino et al., 2019), (ii) need satisfaction for relatedness and autonomy (Chen, 2019), and (iii) feedback sensitivity (Tobin & Graham, 2020). The present study confirmed the mediating role of psychological needs as self-esteem and NTB in terms of desire for interpersonal attachment as defined by Baumeister and Leary (1995), not in terms of satiation, and also the preference to Facebook use to meet romantic partners. Additionally, the study found that mediating role of Facebook use to meet romantic partners was stronger than mediating role of NTB and self-esteem. Future research is needed to explore why anxiously attached individuals have the tendency to overuse Facebook to meet romantic partners. More specifically, it would be interesting to investigate why individuals consider Facebook so appealing for interpersonal relationships development, and why they spend so much time on Facebook in relation to building new connections and social intimacy, as well as meeting new romantic partners. Potential explanations may include: (i) emotional aspects such as insecurities in offline relationships related to intimacy and closeness, (ii) low social self-efficacy, (iii) cognitive aspects such as biased cognitions that Facebook is a panacea for compensation of fears, stressors, and self-doubts experienced in unsatisfactory offline relationships. These represent future lines of research to deepen the understanding of the mediating mechanisms of AA-FA connection.

Another contribution of this research is that it provided evidence for the longer mediational chain (i.e., two mediators in series). More specifically, NTB and self-esteem had an impact both as separate mediators as well as a joint effect. Self-esteem is a predictor of the NTB and this chain also mediated the relationship between AA and FA. Poor self-esteem

accentuates the concern for the evaluations of others and implicitly the increased need for acceptance from them.

One limitation of the present study was the exclusive reliance on self-report measures. Therefore, no causal links can be determined, making claims only about direct and indirect relationships. Future studies are necessary, supplementing self-reports with structural clinical interviews in order to find the transdiagnostic mechanism of Facebook addiction. The research should also be replicated longitudinally, in various samples to provide evidence of causal links. More specifically, it is necessary to investigate whether self-esteem and the NTB are causes or effects of problematic Facebook use or whether there is a two-way relationship between AA and Facebook addiction. Moreover, the collected data were obtained from a convenience sample. To overcome the disadvantages of convenience sampling, future studies based on sampling techniques such as random, stratified or cluster sampling that yield generalizable estimates are needed. It is desirable for greater generalizability that future studies examine other age groups and socio-demographic categories, apart from that of university students. However, as mentioned earlier in the paper, emerging adults are the largest consumers of social media. It would be interesting to examine whether the same psychological mechanisms mediating the relationship between AA and FA come into operation with other cohorts. Despite these limitations, the present study is the first to demonstrate the direct and indirect association between AA and Facebook addiction via Facebook use to meet a romantic partners, NTB (in term of desire, not satiation) and self-esteem.

## **Conclusions**

The present study provided empirical support to the notion that the Facebook platform may facilitate the development of Facebook addiction among anxiously attached individuals. The study investigated the mechanisms that explain why individuals with AA use Facebook in a

maladaptive way. The proposed multiple-mediation model highlighted that FA can be better understood as a strategy of anxiously attached individuals to compensate: (i) high and unmet NTB, (ii) low self-esteem, and (iii) understandable Facebook use to meet romantic partners, but as not so healthy way to manage insecurity in bonding. It also lends support to the notion that high preference for Facebook use to meet romantic partners has a stronger mediating role than self-esteem and NTB in the relationship between AA and FA. In the case of anxiously attached individuals with heightened NTB, such a preference could reflect self-doubts about their capacity to meet romantic partners in face-to-face interactions on the one hand and insecurity about the probability of fulfilling interpersonal acceptance on the other. Therefore, clinicians must take into consideration when dealing with FA, various psychological contributors such as AA style, excessive NTB, low self-esteem, and preference for using Facebook to meet romantic partners to compensate their insecurities they feel in offline relationships, more specifically in social intimacy and partner relationships. There is a clear need to target solutions for this specific behavioral addiction or compulsive reliance on Facebook use to counteract unsatisfied NTB, insecurities in interpersonal relationships, and poor self-acceptance experienced by anxious attached individuals.

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**Table 1** Descriptive statistics (central tendency, dispersion, distribution)

Descriptive statistics		Facebook addiction	Anxious attachment	Need to belong	Self- esteem
Central tendency	Mean	11.36	9.25	31.43	31.80
Dispersion	Minimum	6.00	4.00	10.00	10.00
	Maximum	30.00	20.00	50.00	50.00
	Std. deviation	5.62	3.87	7.32	7.05
Distribution	Skewness	1.15	.47	-.28	-.49
	Std. Error of	.106	.106	.106	.106
	Skewness	.76	-.41	-.13	.27
	Kurtosis	.212	.212	.212	.212
	Std. Error of Kurtosis				

**Table 2** Correlation matrix between research variables

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Anxious attachment	-			
Facebook addiction	.43**	-		
Need to belong	.26**	.28**	-	
Self-esteem	-.32**	-.24**	-.18**	-
Facebook use to meet a romantic partner	.24**	.38**	-.05	-.06



**Table 3** Goodness of fit statistics for path analysis (comparative fit indices, goodness of fit index, root mean square of error of approximation, root mean residual, and standardized root mean residual)

	NFI	RFI	IFI	TLI	CFI	GFI	RMSEA	RMR	SRMR
<b>Fit indexes</b>	.99	.98	1.01	1.01	1.00	.99	.00	.02	.01
<b>Confidence interval</b>	[.00; .07]								

**Table 4** User-defined estimands in mediation model – estimate, bootstrap confidence interval, and bootstrap  $p$  value

Parameter	Estimate	Lower	Upper	$p$
a*b	.04	.02	.07	.000
c*d	.03	.01	.07	.010
h*g	.09	.06	.14	.000
Indirect effect	.16	.11	.22	.000
Direct effect	.46	.39	.57	.000
Total effect	.62	.51	.73	.000

*Note.* a\*b – indirect effect of anxious attachment to Facebook addiction through need to belong; c\*d – indirect effect of anxious attachment to Facebook addiction through self-esteem; h\*g – indirect effect of anxious attachment to Facebook addiction through using Facebook to meet romantic partners

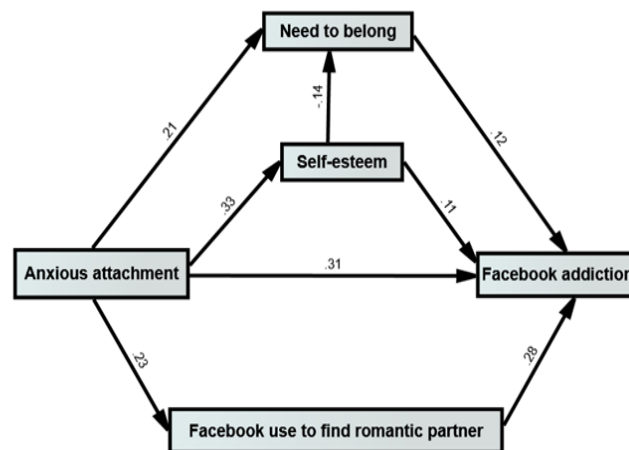


Figure 1. Mediation model depicting significant relationships between anxious attachment, Facebook addiction, need to belong, self-esteem, and using Facebook to meet romantic partner