FULL-LENGTH REPORT

Journal of Behavioral Addictions 7(1), pp. 158–170 (2018)
DOI: 10.1556/2006.7.2018.15
First published online February 19, 2018

# Instagram addiction and the Big Five of personality: The mediating role of self-liking

KAGAN KIRCABURUN[1]* and MARK D. GRIFFITHS[2]

[1]Faculty of Education, Department of Computer and Instructional Technologies, Duzce University, Duzce, Turkey
[2]International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK

(Received: November 7, 2017; revised manuscript received: December 17, 2017; second revised manuscript received: January 21, 2018; accepted: January 25, 2018)

*Background and aims:* Recent research has suggested that social networking site use can be addictive. Although extensive research has been carried out on potential addiction to social networking sites, such as Facebook, Twitter, YouTube, and Tinder, only one very small study has previously examined potential addiction to Instagram. Consequently, the objectives of this study were to examine the relationships between personality, self-liking, daily Internet use, and Instagram addiction, as well as exploring the mediating role of self-liking between personality and Instagram addiction using path analysis. *Methods:* A total of 752 university students completed a self-report survey, including the Instagram Addiction Scale (IAS), the Big Five Inventory (BFI), and the Self-Liking Scale. *Results:* Results indicated that agreeableness, conscientiousness, and self-liking were negatively associated with Instagram addiction, whereas daily Internet use was positively associated with Instagram addiction. The results also showed that self-liking partially mediated the relationship of Instagram addiction with agreeableness and fully mediated the relationship between Instagram addiction with conscientiousness. *Discussion and conclusions:* This study contributes to the small body of literature that has examined the relationship between personality and social networking site addiction and is one of only two studies to examine the addictive use of Instagram and the underlying factors related to it.

**Keywords:** Internet addiction, Instagram addiction, online addiction, personality, self-liking, daily Internet use

## INTRODUCTION

Over the past two decades, Internet addiction has become a popular topic for the researchers in the field of behavioral addictions. Early research in the area drew attention to disordered Internet use and reported that some Internet users appeared to be addicted to Internet in the same way that others were addicted to drugs or alcohol, and that pathological Internet use could have negative impacts on individuals' lives (e.g., Griffiths, 1995, 1996; Young, 1996, 1998). Despite the ongoing debate concerning the risk of over-pathologizing of everyday behaviors (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015), research into disordered Internet use has consistently demonstrated that a small minority of users appear to display symptoms and consequences that are addiction-like (Kuss, Griffiths, Karila, & Billieux, 2014). Using a biopsychosocial framework, Griffiths (2005) described six core components in an attempt to define any behavioral addiction (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse). Griffiths argued that regardless of the type of behavior, any individual engaging in a behavior that fulfilled the six core criteria should be operationally defined as addicted to that particular behavior.

Developments in Internet technologies have brought many different online applications into individuals' lives (e.g., gaming, gambling, sex, shopping, social networking, etc.) leading to many different forms of gratification from these activities (Montag et al., 2015). Consequently, Internet-use motives of individuals have become increasingly varied and specific over time. The problematic use of different Internet applications has led to research into many different Internet-based behavioral addictions. Griffiths (1998, 1999) argued almost two decades ago that disordered Internet use should be considered as an umbrella term, because the majority of excessive Internet users have addictions *on* the Internet not *to* the Internet (i.e., the Internet is a mediating tool for individuals to demonstrate specific behaviors online). Recent cross-cultural studies have supported this argument by reporting that, despite their overlap on each other at certain levels, individuals have distinct forms of specific Internet-related addiction, such as gambling, gaming, shopping, social media, and pornography addictions (Király et al., 2014; Montag et al., 2015).

Furthermore, these applications can also involve subtypes. For instance, scholars have noted that social media and social networking are not the same and that social media is the sum of different specific platforms and applications

* Corresponding author: Kagan Kircaburun, MA; Faculty of Education, Department of Computer and Instructional Technologies, Duzce University, Konuralp Campus, 81620, Duzce, Turkey; Phone: +90 380 542 13 55; Fax: +90 380 542 13 66; E-mail: kircaburunkagan@gmail.com

(Kaplan & Haenlein, 2010; Kuss & Griffiths, 2017). Social media comprises collaborative projects (e.g., Wikipedia), blogs or microblogs (e.g., Wordpress), content communities (e.g., Flickr), social networking sites (e.g., Instagram), and virtual worlds (e.g., Second Life). Social networking site use is a sub-category of social media use and was defined by Hamm et al. (2013) as a medium that "*enable users to connect by creating personal information profiles that can be accessed by friends and colleagues, and by sending emails and instant messages between each other*" (p. 2).

There are several theories suggesting that personality differences play an important role on the development and maintenance of addictive use of different online applications. For instance, uses and gratifications theory suggests that various psychological and social factors affect individuals' preferences of media use. Individuals with different personality traits have different use motives and these differences in personality and motivations may lead to use of different types of addiction or different motivations within a specific addiction (Katz, Blumler, & Gurevitch, 1973; Ryan, Chester, Reece, & Xenos, 2014; Rubin, 1993). In addition, Wegmann and Brand (2016) suggested that individual characteristics and Internet-use expectancies predict online communication applications use disorders. More recently, Brand, Young, Laier, Wölfling, and Potenza (2016) proposed an Interaction of Person-Affect-Cognition-Execution (I-PACE) model for specific Internet-use disorders. They proposed that individuals' addiction to specific Internet applications or sites can be explained with a process that is the consequence of interactions between individuals' core characteristics, different predisposing factors, mediators, and moderators.

During the past decade, social media use and its many subforms including social networking use have evolved rapidly (Carr & Hayes, 2015; Kuss & Griffiths, 2017). Recent statistics suggest that more than two-thirds of Internet users are also active social networking site (SNS) users (Kemp, 2017). This popularity is expected to result in problematic use and abuse of specific platforms for a minority of its users (Kuss & Griffiths, 2017). Internet-related addictions (such as social networking addiction) were not included in the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013), although one application (gaming) was included in the Section 3 appendix as an emerging condition (i.e., Internet gaming disorder) that needed further research before full inclusion in a future edition.

Andreassen and Pallesen (2014) defined SNS addiction as spending too much time on SNSs due to an uncontrollable urge in which excessive use leads to negative consequences in real life areas. Numerous studies have examined the negative factors related to SNS addiction [for reviews, see Griffiths, Kuss, and Demetrovics (2014); Kuss and Griffiths (2017)]. In these studies, it has been reported that problematic use of SNSs is associated with psychological, physiological, and social factors, such as higher depression (Kırcaburun, 2016b), loneliness (De Cock et al., 2014), sleep problems (Vernon, Barber, & Modecki, 2015), lower psychological well-being (Satici & Uysal, 2015), poorer life satisfaction (Błachnio, Przepiorka, & Pantic, 2016), and social connectedness (Savci & Aysan, 2017). However, these studies mainly focused on social media in general or specific SNSs, such as Facebook and Twitter, although a few studies have examined the addictiveness potential of other social networking applications, such as Tinder (Orosz, Tóth-Király, Bőthe, & Melher, 2016) and YouTube (Balakrishnan & Griffiths, 2017a).

Despite the numerous studies concerning SNS addiction (particularly among Facebook users), only one previous study has ever examined Instagram addiction (Ershad & Aghajani, 2017). However, in this small investigation comprising 100 participants, key methodological details were lacking and no information was provided about the non-validated self-devised instrument to assess Instagram addiction (not even one exemplar question). Despite their similarities, each SNS platform (e.g., Facebook, Tinder, and Instagram) has unique and specific features, use habits, motives, and gratifications (Alhabash & Ma, 2017), therefore, those that are much less known about empirically (e.g., Instagram) need investigating along with factors that relate to excessive and potentially addictive use.

More specifically, Instagram facilitates its users to edit and upload photos and videos, to receive comments and "likes" from others, to follow others' profiles, and to be followed by others. With a recently added feature, Instagram now enables its users to broadcast live streams. Such features can sometimes lead to excessive use via the constant urge to frequently share photos and videos by (a) impulsively checking the number of notifications (via likes and comments) for the photos and videos uploaded (Balakrishnan & Griffiths, 2017b), and/or (b) excessively stalking others' profiles and shared photos and videos (Mateo, 2014). Alhabash and Ma (2017) ranked Instagram use motivations (in order of preference) as being for entertainment, convenience, medium appeal, passing time, self-expression, self-documentation, social interaction, and information. Moreover, Sheldon and Bryant (2016) reported that Instagram users mostly fulfilled their needs of self-promotion, surveillance, and documentation rather than communicating with others. Huang (2012) reported that entertainment gratifications were the strongest predictor of SNS addiction, whereas Chen and Kim (2013) indicated that self-presentation and diversion were the most significant positive predictors of SNS addiction.

Consequently, the purpose of this study was to (a) develop a reliable and valid scale for assessing problematic Instagram use and to examine its prevalence among university students, (b) investigate the influences of Big Five personality traits, which have been associated with various behavioral addictions (e.g., Andreassen et al., 2013; Demirhan, Randler, & Horzum, 2016; Kayiş et al., 2016; Randler, Horzum, & Vollmer, 2014; Vollmer, Randler, Horzum, & Ayas, 2014), (c) investigate the role of self-liking, which is an important aspect of self-esteem, and self-esteem is associated with social media addiction (Andreassen, Pallesen, & Griffiths, 2017), and (d) examine the daily time spent online, which has been found to positively relate to higher addictive use of social media (Karadağ et al., 2015; Kırcaburun, 2016a). This study used I-PACE model as the theoretical framework to examine the role of individual differences on addictive use of Instagram. This is discussed in more detail in the following section.

## THEORETICAL BACKGROUND TO THIS STUDY

### *The Interaction of Person-Affect-Cognition-Execution (I-PACE) model*

The I-PACE model asserts that there are several components that contribute to specific Internet-use disorders, such as an individual's core characteristics (e.g., personality, social cognitions, psychopathology, specific motives for engaging in a behavior, and biopsychological constitution), subjectively perceived situations (e.g., being exposed to addiction-related factors, negative mood, and personal conflicts), affective responses (e.g., coping style and Internet-related expectancies), and gratifications (Brand et al., 2016). According to I-PACE model, even though some personality traits have consistently been found to relate with problematic use and addiction (e.g., high neuroticism, impulsivity and shyness, low conscientiousness, and self-esteem; Griffiths, 2017), specific personality profiles are related to different types of Internet-use disorders and therefore it is important to investigate common and unique relationships between problematic use of specific applications and different personality profiles (Brand et al., 2016).

Using the I-PACE model, several studies have explained influences of various factors on different types of Internet-use disorders including Internet gaming disorder (Zhou et al., 2017), Internet communication disorder (Wegmann, Oberst, Stodt, & Brand, 2017), and addictive use of online sexual activity (Wéry, Deleuze, Canale, & Billieux, 2018). Moreover, a recent study developed an affective neuroscience framework to offer further explanation to the role of personality on different dimensions of Internet addiction (Montag, Sindermann, Becker, & Panksepp, 2016). Consequently, the authors have found that genetics plays a role in both personality and Internet addiction, and that different personality domains were associated with different Internet-use disorders. They argued that the affective neuroscience framework can be integrated in the I-PACE model to further explain the role of individual differences in different type of Internet-use disorders. Based on such models, this study expected to find relationship between personality and Instagram addiction.

### *Big Five personality traits and social networking site use*

Various studies have investigated the associations between personality and Internet-related addictions. The Big Five model comprises five personality dimensions including extraversion (being talkative and sociable), agreeableness (being soft-hearted and well-mannered), neuroticism (being short-tempered and unstable), conscientiousness (being well-organized and hard working), and openness to experience (being original and curious) (McCrae & John, 1992). In a recent meta-analytic review that has examined 12 different studies, Kayiş et al. (2016) reported that all personality dimensions had a significant effect on Internet addiction. Individuals who were less open to experience, agreeable, extraverted, conscientious, and more neurotic reported higher levels of Internet addiction. The Big Five model has been used by a number of studies to assess the relationship between personality and general social media use, as well as specific SNS use. Studies have reported that (a) extraverts and neurotics are more addicted to social media (Wang, Ho, Chan, & Tse, 2015), (b) neurotic, introvert, and conscientious students are more likely to be problematic users of Facebook (Marino et al., 2016), (c) being less open to experience, less emotional stable, and less conscientious is associated with Facebook addiction (Błachnio, Przepiorka, Senol-Durak, Durak, & Sherstyuk, 2017), and (d) introverted, less agreeable, and less conscientious students are more addicted to Twitter (Kırcaburun, 2016a).

In a recent study using discriminant analysis, Ershad and Aghajani (2017) reported higher scores of neuroticism, alexithymia, and ambivalent and avoidant attachment styles among Instagram addicts compared with non-addicts. However, because of the small number of participants, the lack of clear presentation of the methods, analyses, and measurement tool that was used to assess Instagram addiction, the accountability of this study is highly questionable. As pointed out earlier, previous studies have mainly focused on the association between personality and problematic use of Internet and social media, as well as specific SNSs, such as Facebook and Twitter. In relation to personality differences, previous literature suggests similar findings concerning the relationship between personality and addictive use of different Internet communication applications and Internet-use disorders more generally. Therefore, this study hypothesized that Instagram addiction would be affected by different personality constructs similar to different types of specific social media activity use and Internet addiction more generally.

### *Self-liking and social networking site use*

Another important individual characteristic that may play a role in the development of addictive behavior is self-liking. Self-liking is claimed to have stronger association with self-esteem than compared with self-competence (Dogan, 2011; Tafarodi & Swann, 2001). Self-esteem refers to the combination of self-liking and self-competence (seeing oneself competent, successful and skillful in achieving goals), whereas self-liking refers to self-worth and self-value taken from the evaluation of an individual's place among their social life regardless of their success in life. In other words, self-liking reflects inner self-approval of one's social value perceived by oneself (Tafarodi & Swann, 1995) and is strongly influenced by acceptance and positive remarks received from peers (Tafarodi & Swann, 2001). Rogers (1961) asserts that self-liking is not being over confident or praising oneself, but rather feeling happy and joyful for being oneself. Individuals with higher self-liking have more acceptance of themselves and they tend to be more relaxed and secure in social settings (Tafarodi & Swann, 1995).

Self-esteem is regarded as a key personality construct and it has been found to strongly relate with other personality traits (McCrae & Costa, 1999). A study with a large heterogenous sample of individuals reported that the Big Five personality dimensions accounted for 34% of the variance in self-esteem, and that emotional stability, extraversion, and conscientiousness have the strongest effects on self-esteem (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). Previous studies have reported that

personality and self-liking are moderately correlated. More specifically, students with higher self-liking were more extraverted, conscientious, agreeable, open to experience, and less neurotic (Ramsdal, 2008). In relation to SNS addiction, self-esteem is reported to be one of the important factors and it is negatively associated with SNS use and social media addiction (Andreassen et al., 2017; Blachino, Przepiorka, & Pantic, 2016; Kırcaburun, 2016b). Studies show that individuals' SNS use affects their self-esteem. Feelings of low self-esteem are related to edited self-presentation (Chua & Chang, 2016) and similarly receiving positive feedback in social media increases users' levels of self-esteem (Burrow & Rainone, 2017).

However, given that these studies are cross-sectional, the direction of effects is unknown. SNS interactions might have led to a change in self-esteem levels or low self-esteem might have been led to such interactions and uses in the first place. Since (as demonstrated in the aforementioned studies) individuals who have low extraversion, conscientiousness, and agreeableness traits, and high neuroticism traits appear to have a lower appreciation toward themselves because of their unsuccessful and unhealthy social relations with their surroundings, a mediating effect of self-liking between personality and Instagram addiction was expected in this study. To date, no previous studies have ever examined the relationship between self-liking and Instagram addiction. The hypotheses were constructed based on the reported associations between self-esteem (which is strongly correlated with self-liking), SNS use, and addiction.

### *Daily Internet use and social networking sites use*

Even though Internet-use disorder is different from the problematic use of specific type of Internet applications, online social networking addiction has the biggest overlap with Internet addiction more generally (Montag et al., 2015). Given that social networking applications have gained significant popularity among Internet applications more generally, and that two-thirds of Internet users are also SNS users, it may be that the daily time spent online will increase the addictive use of Instagram. Moreover, as suggested by Griffiths (2005), social networking applications are different from other Internet applications, such as gambling, gaming, and shopping, because these needs can also be fulfilled in offline contexts but engaging in social networking applications, such as Instagram, can only be carried out online.

### *The present study*

This study examined the relationship between the Big Five personality dimensions, self-liking, daily Internet use, and Instagram addiction among a relatively large sample of university students. Since there is only one previous study that has ever examined Instagram addiction, hypotheses were based on previous studies conducted with social networking use more generally and using the I-PACE model. Based on the study of Wang et al. (2015), it was hypothesized that extraversion and neuroticism would positively be related to Instagram addiction. Based on the study of Kırcaburun (2016a) and Blachino et al. (2017), it was hypothesized lower agreeableness and conscientiousness would be positively related to Instagram addiction. Furthermore, based on the findings of Andreassen et al. (2017) and Kırcaburun (2016b) in which self-esteem was found to relate social media addiction, it was hypothesized that self-liking, which is one of the two dimensions of self-esteem, would negatively be related to Instagram addiction. Based on the study of Kırcaburun (2016a) and Karadağ et al. (2015) that demonstrated daily time spent on Internet is positively related to social media addiction, it was hypothesized that daily Internet use would positively be related to Instagram addiction. Finally, based on the studies of Robins et al. (2001) and Ramsdal (2008), it was hypothesized that self-liking would mediate the associations between the Big Five personality dimensions and Instagram addiction.

## METHODS

### *Participants and procedure*

After necessary permissions were acquired from faculty administrators, pencil and paper questionnaires were distributed to a convenience sample of university students by the research team. A total of 1,124 students participated in the study voluntarily and anonymously. In the first step, 372 students participated in developing the Instagram Addiction Scale (IAS). In the second step, 752 students (69% female; $n = 519$) with an age range of 18 and 24 years (mean = 20.30 years, $SD = 1.46$) participated.

### *Measures*

*Big Five Inventory (short version).* The short version of the Big Five Inventory was developed by Rammstedt and John (2007) and adapted into Turkish by Horzum, Ayas, and Padır (2017). The inventory comprises 10 items on a 5-point Likert scale from "never" to "always," with two items for each personality dimension including openness to experience (e.g., *"I see myself as someone who has an active imagination"*), agreeableness (e.g., *"I see myself as someone who tends to find fault with others"*), neuroticism (e.g., *"I see myself as someone who gets nervous easily"*), extraversion (e.g., *"I see myself as someone who is outgoing, sociable"*), and conscientiousness (e.g., *"I see myself as someone who does a thorough job"*). The minimum and maximum scores of each dimension are 2 and 10, respectively. Confirmatory factor analyses (CFAs) with the Turkish form indicated that inventory has a good fit [$\chi^2/df = 1.8$, root mean square residuals (RMSEA) = 0.06, standardized root mean square residuals (SRMR) = 0.03, comparative fit index (CFI) = 0.98, normed fit index (NFI) = 0.97, goodness of fit index (GFI) = 0.96]. The reported internal consistency value of each personality dimensions in this study ranged between 0.81 and 0.89. The highest scored personality dimension is identified as the dominant personality trait of the participant.

*Self-liking subscale.* The Self-Liking/Self-Competence Scale was developed by Tafarodi and Swann (2001) and was adapted into Turkish by Doğan (2011). The scale comprises 16 items on a 5-point Likert scale from "absolutely disagree" to "absolutely agree" comprising two dimensions (i.e., self-liking and self-competence). In this study, only the self-liking dimension was used. The Self-liking subscale has higher correlations (0.78 and 0.75) with global self-esteem assessed using the Self-Esteem Scale and Rosenberg Self-Esteem Scale (Doğan, 2011). The self-liking subscale consists of items that indicate self-worth and value regarded by individuals to themselves such as "*I am secure in my sense of self-worth*,""*I have a negative attitude toward myself*," "*I feel great about who i am*," and "*I do not have enough respect for myself*." Previous studies have reported optimal validity and reliability of the scale (Doğan, 2011). The Cronbach's α of the scale in the present study was also high (.83).

*Instagram Addiction Scale.* The IAS was developed using a modified version of Internet Addiction Test (Young, 1998). The modification was made by simply changing the word "Internet" with "Instagram." Because of this modification, exploratory factor analyses (EFAs), and CFAs were carried out. The KMO measure of sampling adequacy was 0.92 ($p < .001$). As a result of EFA, it was observed that 15 items (see Appendix) were able to explain 53.9% of the variance and the scale was composed of two factors, which were named as social effect (eight items, e.g., "*How often do you prefer the excitement of Instagram instead of being with your close friends*?") and compulsion (seven items, e.g., "*How often do you try to cut down the amount of time you spend on Instagram and fail*?"). The social effect subfactor refers to negative effects of addictive use of Instagram to individuals' real life social relations and situations. The compulsion subfactor refers the increasing need for Instagram use, the frequency of forgetting about time while logged on to Instagram, and the avoidance of real life troubles using Instagram. The Pearson's correlation coefficient was 0.61 between social effect and compulsion, 0.89 between social effect and total scale, and 0.90 between compulsion and total scale. The Cronbach α coefficient for the total scale and subfactors were .90, .86, and .85, respectively (Table 1). As a result of CFA, goodness of fit indices generated good and acceptable values [$\chi^2/df = 2.93$, RMSEA = 0.07 (90% CI [0.06, 0.08]), SRMR = 0.05, CFI = 0.93, NFI = 0.89, GFI = 0.91]. Standardized regression weights (between 0.54 and 0.77) and squared multiple correlation values (between 0.30 and 0.59) of the scale items were generally good. EFA and CFA results suggest that the scale is valid and reliable in assessing Instagram addiction levels of university students. The scale comprises a 6-point Likert scale from "ever" to "always" and scores can range between 15 and 90. To determine the cut-off points of the scale, two-step cluster analysis was utilized. As a result, cut-off points were determined as follows: non-addiction (15–37), mild addiction (38–58), moderate addiction (59–73), and severe addiction (over 73).

*Table 1.* Means, standard deviations, and factor loadings of the Instagram Addiction Scale items

| Latent varibles | Items | *M* | *SD* | Factor loadings | |
|---|---|---|---|---|---|
| | How often do you prefer the excitement of Instagram instead of being with your close friends? | 1.78 | 1.15 | 0.64 | 0.90 |
| | How often do you form new relationships with fellow Instagram users? | 2.23 | 1.30 | 0.36 | 0.81 |
| Social effect | How often do you become defensive or secretive when anyone asks you what you do on Instagram? | 2.05 | 1.36 | 0.49 | 0.76 |
| | How often do your grades or school work suffers because of the amount of time you spend on Instagram? | 1.73 | 1.16 | 0.50 | 0.68 |
| | How often do you snap, yell, or act annoyed if someone bothers you while you are on Instagram? | 1.96 | 1.36 | 0.44 | 0.66 |
| | How often do you try to hide how long you've been on Instagram? | 1.62 | 1.03 | 0.56 | 0.65 |
| | How often do you choose to spend more time on Instagram over going out with others? | 1.55 | 1.05 | 0.69 | 0.65 |
| | How often do you feel depressed, moody or nervous when you are not on Instagram, which goes away once you are back on Instagram? | 1.77 | 1.32 | 0.56 | 0.43 |
| | How often do you try to cut down the amount of time you spend on Instagram and fail? | 3.55 | 1.25 | 0.55 | 0.83 |
| | How often do you check your Instagram before something else that you need to do? | 2.94 | 1.52 | 0.54 | 0.79 |
| | How often do you block out disturbing thoughts about your life with soothing thoughts of the Instagram? | 3.20 | 1.40 | 0.57 | 0.79 |
| Compulsion | How often do you find yourself anticipating when you will go on Instagram again? | 2.57 | 1.37 | 0.64 | 0.73 |
| | How often do you fear that life without the Instagram would be boring, empty, and joyless? | 2.22 | 1.48 | 0.44 | 0.71 |
| | How often do you lose sleep due to late night log-ins to Instagram? | 2.28 | 1.41 | 0.45 | 0.56 |
| | How often do you find yourself saying "just a few more minutes" when on Instagram? | 2.62 | 1.55 | 0.64 | 0.51 |

*Table 2*. Prevalence of Instagram addiction among participants

| | Count | Percentage |
|---|---|---|
| Severely addicted | 7 | 0.9 |
| Moderately addicted | 46 | 6.1 |
| Mildly addicted | 199 | 26.5 |
| Not addicted | 500 | 66.5 |
| All participants | 752 | 100.0 |

### *Statistical analysis*

In this study, EFA and CFA were utilized to evaluate the construct of the IAS via using SPSS 23.0 and AMOS 23.0 software applications. Following this, means, standard deviations, and skewness and kurtosis values of the variables and correlation coefficients between variables were calculated using descriptives and Pearson's correlation. Finally, the hypothesized model was tested using path analysis. Normality assumptions were checked by examining the skewness and kurtosis values of the variables. Since skewness values were smaller than |3| and kurtosis values were smaller than |10| (Kline, 2004), normal distribution was accepted. In structural equation modeling (SEM), maximum likelihood estimation method was used. During SEM analysis, the bootstrapping method was used to demonstrate the mediating effect of self-liking between Instagram addiction and the Big Five personality dimensions, and to signify the upper and lower bounds and significance of the direct and indirect relationships between variables. Bootstrapping was performed with 2,000 bootstrap samples and 95% bias-corrected confidence intervals. In the CFA and SEM analyses, goodness of fit values designated by Hu and Bentley (1999) were employed. According to these, thresholds for good and acceptable fit values are as follows: RMSEA <0.05 is good, SRMR <0.05 is good, GFI >0.95 is good, CFI >0.95 is good, and NFI >0.95 is good; Additionally, RMSEA <.08 is acceptable, SRMR <.08 is acceptable, GFI >.90 is acceptable, CFI >.90 is acceptable, and NFI >.90 is acceptable.

### *Ethics*

Ethical approval for the study was received from the first author's university ethics committee prior to the recruitment of the participants, and carried out in accordance with the 1975 Helsinki Declaration. All participants were informed about the study and all provided informed consent.

## RESULTS

The prevalence rate of the Instagram addiction using the IAS was examined. According to cut-off points of the IAS, 66.5% of the participants were non-addicted, 26.5% were mildly addicted, 6.1% were moderately addicted, and 0.9% were severely addicted to Instagram. Overall, 33.5% of the participants were risky Instagram users (Table 2). Bivariate correlation coefficients (Table 3) indicated that Instagram addiction was weakly correlated with daily Internet use, agreeableness, self-liking, conscientiousness, and neuroticism. Self-liking was moderately correlated with extraversion, conscientiousness, neuroticism and weakly with agreeableness, and openness to experience.

To test the hypothesized model (Figure 1), path analysis was applied. The IAS was included into the model as latent variable, and the unidimensional constructs of personality dimensions, self-liking, and daily Internet use were included as observed variables. Goodness of fit indices of the model (Figure 2) indicated good fit to the data, indicating that the model was acceptable ($\chi^2/df = 3.34$, RMSEA = 0.06 (90% CI [0.04, 0.06]), SRMR = 0.04, CFI = 0.97, GFI = 0.99). Analysis (Table 4) showed that agreeableness ($\beta = -.16$, $p < .05$; 95% CI [−0.26, −0.05]), self-liking ($\beta = -0.14$, $p < .05$; 95% CI [−0.23, −0.05]), and daily Internet use ($\beta = 0.20$, $p < 0.05$; 95% CI [0.12, 0.27]) were weakly but directly related to Instagram addiction. Moreover, agreeableness ($\beta = -0.02$, $p < .05$; 95% CI [−0.04, −0.01]) and conscientiousness ($\beta = -0.03$, $p < .05$; 95% CI [−0.06, −0.01]) were weakly and indirectly associated with Instagram addiction via self-liking. Self-liking mediated the

*Table 3*. Descriptive statistics and bivariate correlations among variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Instagram addiction | – | | | | | | | |
| 2. Self-liking | −0.17** | – | | | | | | |
| 3. Extraversion | −0.01 | 0.36** | – | | | | | |
| 4. Agreeableness | −0.19** | 0.19** | 0.08* | – | | | | |
| 5. Conscientiousness | −0.11** | 0.32** | 0.31** | 0.13** | – | | | |
| 6. Neuroticism | 0.11** | −0.22** | −0.21** | −0.17** | −0.07 | – | | |
| 7. Openness to experience | 0.02 | 0.13** | 0.18** | 0.07* | 0.18** | −0.17** | – | |
| 8. Daily Internet use | 0.19** | 0.00 | 0.08* | −0.05 | −0.03 | 0.04 | 0.03 | – |
| Range | 15–90 | 8–40 | 5–10 | 5–10 | 5–10 | 5–10 | 5–10 | 1–3 |
| Mean | 35.27 | 31.04 | 7.17 | 7.89 | 7.50 | 6.09 | 6.75 | 2.44 |
| *SD* | 13.12 | 5.82 | 1.81 | 1.44 | 1.64 | 1.71 | 1.66 | 0.62 |
| Skewness | 0.97 | −0.57 | −0.19 | −0.65 | −0.33 | −0.03 | 0.01 | −0.65 |
| Kurtosis | 0.56 | 0.30 | −0.48 | 0.68 | −0.23 | −0.36 | −0.42 | −0.54 |

*Note*. **$p < .01$. *$p < .05$.

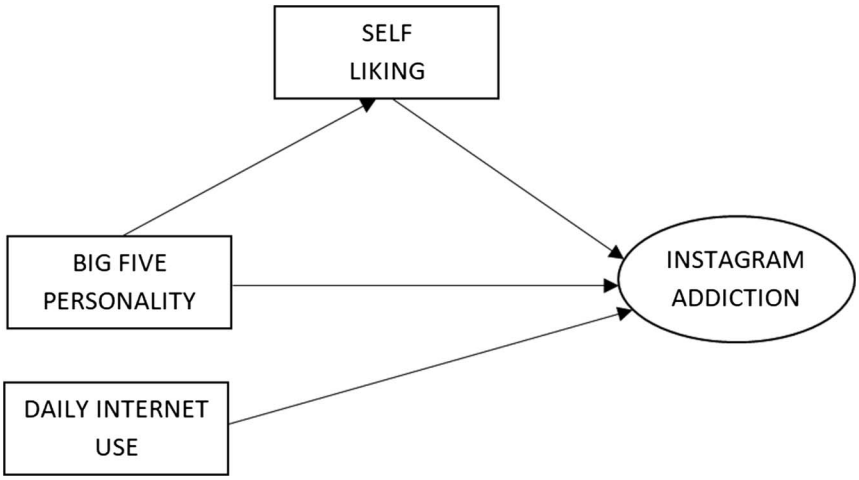


*Figure 1.* Hypothesized model

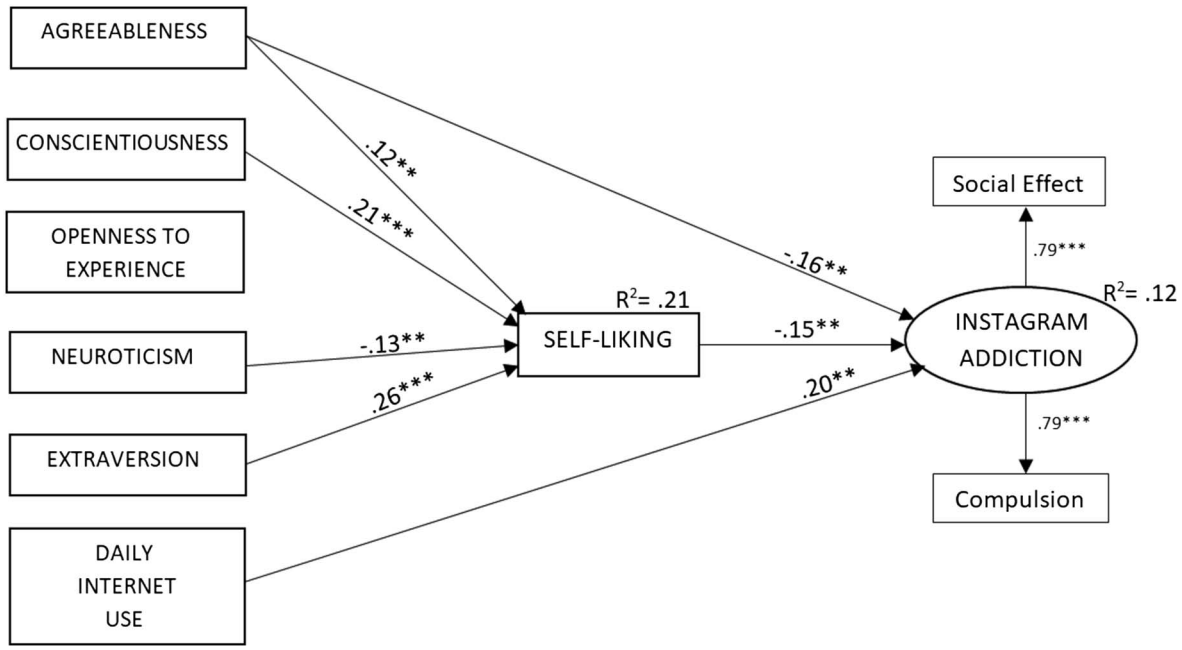


*Figure 2.* Final model of the significant path coefficients between variables. (for clarity, the correlations between the personality constructs and insignificant path coefficients have not been depicted in the figure). ***$p < .001$. **$p < .01$

*Table 4.* Standardized estimates of total, direct and indirect effects on IA and mediator variable

| | Hypothesis | Effect | SE | % explained of total effect |
|---|---|---|---|---|
| Agreeableness → IA (total effect) | Supported | −0.19** | 0.06 | – |
| Agreeableness → IA (direct effect) | | −0.17** | 0.06 | 90 |
| Agreeableness → Self-liking → IA (indirect effect) | | −0.02** | 0.01 | 10 |
| Conscientiousness → IA (total effect) | Supported | −0.10* | 0.05 | – |
| Conscientiousness → IA (direct effect) | | −0.07 | 0.05 | 70 |
| Conscientiousness → Self-liking → IA (indirect effect) | | −0.03** | 0.01 | 30 |
| Self-liking → IA | Supported | −0.14** | 0.05 | – |
| Daily Internet use → IA | Supported | 0.20** | 0.05 | – |
| Extraversion → IA (total effect) | Not Supported | 0.03 | 0.04 | – |
| Neuroticism → IA (total effect) | Not Supported | 0.09 | 0.06 | – |
| Openness to experience → IA (total effect) | Not Supported | 0.06 | 0.04 | – |

*Note*. IA: Instagram addiction.
**$p < .01$. *$p < .05$.

relationships of conscientiousness (fully) and agreeableness (partially) with Instagram addiction. The hypothesized model predicted 21% of self-liking and 12% of Instagram addiction.

## DISCUSSION

This study investigated the relationships between the Big Five personality traits, self-liking, daily Internet use, and Instagram addiction in the context of the I-PACE model. This study is among the very few to examine addictive use of Instagram and the first to examine its association with individual factors using path analysis. According to analyses, and consistent with I-PACE model, students with different personality and individual characteristics showed different levels of addiction to Instagram.

This study modified Young's (1998) Internet Addiction Test to create a new psychometric scale for assessing Instagram addiction. The newly developed IAS comprised two factors (i.e., social effect and compulsion). Rigorous testing showed that the scale can be used for assessing Instagram addiction among university students in future studies. Moreover, this study examined the prevalence of Instagram addiction by categorizing individuals into one of four categories: "severely addicted," "moderately addicted," "mildly addicted," and "not addicted." Analyses indicated that one-third of the students had risky levels of Instagram use.

Contrary to the hypotheses, the results indicated that extraversion and neuroticism were not related to Instagram addiction. The non-significant relationship between extraversion and Instagram addiction might be because Wang et al. (2015) reported an association between extraversion and addictive use of social media in general rather than being specific to Instagram addiction. Yang (2016) reported that higher loneliness – which is associated with lower extraversion (Cheng & Furnham, 2002) – was related to increased sharing of photographs and videos on Instagram. Furthermore, higher extraversion was found to be related to increased possibility of leaving comments on or "liking" others' selfies (Choi, Sung, Lee, & Choi, 2017).

On the other hand, Kuss and Griffiths (2011) asserted that while extraverts use SNSs for the purpose of social consolidation of their existing relationships, introverts compensate for their lack of real life social relationships via SNS use. Here, both introverted and extraverted students might have become similarly addicted to Instagram due to different usage aims and motivations. Neuroticism was another personality dimension found not to be related to Instagram addiction in this study. Despite the positive correlation between neuroticism and Instagram addiction found in this study, it was non-significant in the constructed model. This result parallels the findings of Hong, Huang, Lin, and Chiu (2014) but not those of Wang et al. (2015). Neurotics are mostly unstable and impatient, and they tend to get angry quickly and perceive life negatively (McCrae & John, 1992). Thereby, with the constant flow of colorful photos and videos from all around the world, Instagram is arguably a safe and joyous medium for them to escape from real life troubled social relationships. Furthermore, since neurotics are curious about what others think or say about them, they may lose track of time reading comments of others about their selfies and videos and/or stalking others' profiles (Choi et al., 2017). This is the second study to examine the relationship between Instagram addiction and neuroticism although the previous study (i.e., Ershad & Aghajani, 2017) found neuroticism was associated with Instagram addiction. However, this previous study had major methodological flaws and only 100 participants. Future research should therefore further investigate the association between these two variables with bigger and more representative samples and psychometrically robust instruments.

With regard to the association between agreeableness, conscientiousness, and Instagram addiction, the study found that agreeableness was related to addictive use of Instagram both directly and indirectly. This finding is in line with the hypothesis based on the study of Kırcaburun (2016a) who argued that less agreeable individuals may become pathological users of SNSs, such as Twitter, because they have difficulties in constructing new relationships and pursue existing ones. On the other hand, Kim and Chock (2016) and Choi et al. (2017) reported that agreeableness was related positively to posting group selfies, involvement in others' responses, observing others' selfies, and commenting or posting "likes" on others' selfies. Based on these studies, it may be argued that individuals with low agreeableness are not expected to involve themselves in others' uploads or to try to compensate their loneliness or real life relations by constructing online relationships. They may simply spend excessive time on Instagram viewing celebrity's profiles or uploads of unique hobby profiles, such as cars, sports, technology, or in any other topic, that draw their interest and occupy them. From a uses and gratifications theory perspective, less agreeable individuals may be argued as becoming addicted to Instagram via the gratifications of passing time, entertainment, self-documentation, and information. Furthermore, findings of this study also suggest that lower agreeableness and conscientiousness were indirectly related to higher Instagram addiction via self-liking. Lower agreeableness and conscientiousness among students were associated with lower self-liking, which in turn were related to higher levels of Instagram addiction. Self-liking is strongly influenced by the accepting or rejecting attitudes, and/or positive or negative remarks by individuals' peers (Tafarodi & Swann, 2001). Individuals with lower agreeableness may be expected to experience rejection and negative remarks from their friends or surroundings, resulting in a decrease in self-liking. Conscientious individuals are systematic, punctual, and hard working, whereas individuals with lower conscientiousness have lower self-discipline, are emotionally driven, unambitious about what they do, and they tend to behave irresponsibly and inconsistently (Costa & McCrae, 2000). These traits may lead them to lower self-liking with having problematic peer relationships and having constant criticism from their social surroundings.

Individuals with higher self-liking are comfortable in social settings and in communicating with others (Tafarodi & Swann, 1995). Wilkinson (2010) noted that students with higher self-liking demonstrated lower avoidance and anxiety in friendship attachments and that they had a higher quality of attachment with their parents and peers. Therefore, they are expected to start new real life social

relationships and to pursue the existing ones easily. On the contrary, individuals with lower self-liking may be expected to have higher levels of depression (Wilkinson, 2010), which is positively associated with social media addiction (Andreassen et al., 2016; Kırcaburun, 2016b), to be uncomfortable in social settings and to experience attachment issues with their peers and family (Wilkinson, 2010). Therefore, they may spend excessive time on virtual platforms, such as Instagram, where there are no necessities of socializing, communicating, or bonding with others. However, as much as they may be expected to use Instagram excessively, they are not likely to upload personal selfies or videos very often. Stefanone, Lackaff, and Rosen (2011) reported that public-based and appearance contingencies of self-worth were positively related to online photo sharing. Furthermore, Chua and Chang (2016) argued that in individual's use of social networking sites, peer judgement on physical appearances strongly affected the norm of beauty, and that teenage girls were strongly affected by peer evaluations of their shared selfies. Therefore, instead of uploading personal photos and videos, they may consume time on Instagram by viewing and lurking without commenting or liking others' uploads and sharing nothing, or they may share content regarding common interest of others or may even purchase likes and followers to get deceptive likes and fake popularity for self-satisfaction. Dumas, Maxwell-Smith, Davis, and Giulietti (2017) noted that a weaker sense of peer belonging among teenagers was positively related to deceptive like-seeking on Instagram. These individuals might have become addicted Instagram users to fulfill their need for social connectedness. As Ryan et al. (2014) indicated, individuals become addicted, because they are experiencing different gratifications via these platforms that they cannot have in their real life, and problematic use may be expected to continue as long as they keep getting their needed gratifications repeatedly.

Finally, daily time spent on the Internet was a significant positive predictor of Instagram addiction. This result concurs with the findings of Kırcaburun (2016b) and Karadağ et al. (2015) who reported positive associations between daily Internet use and social media addiction. Social networking platforms, such as Instagram, have become highly popular on the Internet and have become the most used and accessed online applications that constantly upgrade their features according to the need of their users. Recent statistics show that two-thirds of the Internet users are also active social media and SNS users and that the number of users is increasing annually (Kemp, 2017). The findings of this study support the assertions made almost two decades ago that addictions on the Internet are not the same as addictions to the Internet (Griffiths, 1998), and that even among social media addictions, there are differences in the personality characteristics of potentially addicted Instagram users and other types of SNS addicts using different platforms (e.g., Facebook, Twitter, and Tinder). Future research examining social media users as a whole need to consider that social media use is not a homogenous activity (Kuss & Griffiths, 2017). In addition, given that the relationship between personality traits and different forms of pathological online communication use is not consistent overall, personality traits may have an effect on which form of online communication individuals prefer in the first place. For example, personality may influence how individuals experience gratification or social connectivity online and such issues could be investigated in future research.

This study is not without limitations. The data were self-report in relation to questions regarding Instagram addiction, personality, and self-liking. Self-report methods suffer from a number of well-established biases (such as memory recall and social desirability). The sample was also cross-sectional and self-selecting and therefore non-representative. In addition, cross-sectional nature of the study does not allow the drawing of causal relationships among the variables examined. Future studies could use more in-depth qualitative methods, such as interviews, for more detailed insights. Longitudinal studies would also help in examining causal relationships more fully. Finally, the hypothesized model predicted a relatively low proportion of Instagram addiction in terms of overall variance (12%). This means that there are many other variables that affect addictive use of Instagram, which were not included in this study. It should also be noted that the studies of Robins et al. (2001) and Ramsdal (2008) only showed a correlation between self-esteem or self-liking and the Big Five scores. Some may argue that the moderate correlation is not a sufficient explanation for a mediation effect. A bivariate correlation or an assumed interaction could also be a sign of a moderation effect.

Despite these limitations, this is the first study to examine addictive use of Instagram and the influences of personality, self-liking, and daily Internet use on Instagram addiction, and also the first to investigate the mediating role of self-liking between personality and Instagram addiction. The study presented evidence that agreeableness, conscientiousness, and self-liking are negatively associated with Instagram addiction, and that daily Internet use is positively associated with Instagram addiction, and that self-liking fully mediates the relationship of Instagram addiction with conscientiousness, and partially with agreeableness. These results have important contributions to I-PACE model, because it provides empirical evidence that an individual's core characteristics have an important contributory role in specific Internet-use disorders, such as Instagram addiction. The findings of this study indicate that some individuals use Instagram problematically and different personality constructs are associated with this problematic use. The findings should be taken as seriously as other popularly studied online addictions generally as well as other more specific addictions to social networking sites (e.g., Facebook, Twitter, Tinder, YouTube, etc.). Instagram addiction along with personality and other psychological factors that may relate to Instagram addiction and consequences of Instagram addiction should also be further investigated using different samples and methodologies. Moreover, future studies should examine the mediating role of Instagram use motives between personality differences and Instagram addiction.

*Funding sources:* No financial support was received for this study.

*Authors' contribution:* Both authors significantly contributed in the preparation of the manuscript.

*Conflict of interest:* The authors declare no conflict of interest.

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## APPENDIX: INSTAGRAM BAĞIMLILIK ÖLÇEĞI

1. Ne sıklıkla arkadaşlarınızla birlikte olmak yerine Instagram'ı tercih edersiniz?
2. Ne sıklıkla Instagram kullanan kişilerle yeni ilişkiler kurarsınız?
3. Herhangi biri Instagram'da ne yaptığınızı sorduğunda ne sıklıkla kendinizi savunur ve ne yaptığınızı gizlersiniz?
4. Ne sıklıkla okuldaki ders notlarınız ve ödevleriniz Instagram'da kalma sürenizden olumsuz yönde etkilenir?
5. Biri sizi Instagram'dayken rahatsız ettiğinde ne sıklıkla kırıcı konuşur, bağırır veya kızgın davranışlar gösterirsiniz?
6. Instagram'da kaldığınız süreyi ne sıklıkla saklamaya çalışırsınız?
7. Ne sıklıkla başkalarıyla dışarı çıkmak yerine Instagram'da daha fazla zaman geçirmeyi yeğlersiniz?
8. Ne sıklıkla Instagram'da olmadığınızda kendinizi çökmüş, aksi veya sinirli hissedip, Instagram'a girince rahatlarsınız?
9. Ne sıklıkla planladığınızdan daha fazla süre Instagram'da kalıyorsunuz?
10. Ne sıklıkla bir işe başlamadan önce Instagram'ınızı denetlersiniz?
11. Hayatınız hakkında sizi rahatsız eden düşünceleri dağıtmak için ne sıklıkla Instagram'a girersiniz?
12. Ne sıklıkla Instagram'a girmek için sabırsızlanırsınız?
13. Ne sıklıkla Instagram'sız hayatın, sıkıcı, boş ve eğlencesiz olacağını düşünürsünüz?
14. Gece geç saatlerde Instagram kullanmaktan ötürü ne sıklıkta uykunuz kaçar?
15. Kendinizi ne sıklıkla Instagram'dayken "yalnızca birkaç dakika daha" derken bulursunuz?