



## Research article

## Facebook addiction and personality

Thipparapu Rajesh<sup>\*</sup>, Dr B. Rangaiah

Department of Applied Psychology, Pondicherry University, Puducherry, 605014, India



## ARTICLE INFO

## Keywords:

Psychology  
Loneliness  
Narcissism  
Facebook intensity  
Big five personality traits  
Facebook addiction

## ABSTRACT

This study explored the associations between Facebook addiction and personality factors. A total of 114 participants (age range of participants is 18–30 and males were 68.4% and females were 31.6 %) have participated through an online survey. The results showed that 14.91 % of the participants had reached the critical polythetic cutoff score, and 1.75 % has reached the monothetic cutoff score. The personality traits, such as extraversion, openness to experience, neuroticism, agreeableness, conscientiousness, and narcissism, are not related to Facebook addiction and Facebook intensity. Loneliness was positively related to Facebook addiction, and it significantly predicted Facebook addiction by accounting to 14% of the variation in Facebook addiction. The limitations and suggestions for further research have been discussed.

## 1. Introduction

Addiction is a state of constant engagement in a substance or behavior which rewards the user, despite its debilitating consequences (American Psychiatric Association, 2013). Substance abuse or addictions involve intake of drugs or alcohol, while behavioral addictions are about engaging in repetitive behavior. Nonetheless, researchers have acknowledged the significant similarities between chemical addictions and excessive behaviors which are non-chemical (Albrecht et al., 2007; Grant et al., 2010). Typically, various types of behavioral addictions include gambling addiction, shopping addiction, food and sex addiction.

The rise of technology-mediated assistance in providing better communication services made our lives easier, but as a byproduct, behavioral addictions like internet addiction and social media addiction have become prevalent. Internet addiction is a problematic behavior which is defined as an impulse control disorder without the ingestion of psychoactive intoxicants. There are five different types of internet addiction. 1) *Computer addiction* is characterized by excessive video game playing, 2) *information overload* is addiction to web surfing, 3) *net compulsions* are addictions like online gambling and online shopping, 4) *cyber sexual addiction* is excessive indulgence in online pornography or online sex addiction, and 5) *cyber-relationship addiction* is addiction to form online relationships (Young, 1998).

Internet addiction is a nested term for various addictive behaviours engaged on the internet platform. Accordingly, social media addiction may be considered as a subtype of internet addiction. It involves symptoms similar to internet addiction that are negative consequences

associated with social media use such as preoccupation about using social media, withdrawal, excessive engagement, mood control and losing control over usage (Ryan et al., 2016). However, social media addiction is different in manifestation as it does not involve the usage of other internet applications (Griffiths et al., 2014).

Social media addiction is defined as "being overly concerned about social media, driven by an uncontrollable motivation to login to or use social media, devoting so much time and effort in social media that it impairs other important life areas" (Griffiths, 2005). Social media addiction is an overarching term which clubs excessive use of all social media applications like Facebook, Twitter, Instagram, Whatsapp, and YouTube.

Considering the idiosyncratic nature of different social media applications and how they are influencing users, exhorts researchers to study and investigate them in an isolated manner. Facebook usage, given its tremendous popularity, is worthy of studying separately. Facebook addiction is characterized by *salience* (preoccupation and cravings about usage), *mood modification* (desiring an experience to alter mood), *tolerance* (increasing amounts of usage), *withdrawal symptoms* (experiencing unpleasant feelings in the absence of usage), *conflict* (prioritizing usage over other actions) and *relapse* (failing to stop usage) (Griffiths, 2005).

Among all social media applications, Facebook has gained the most popularity and amassed the highest number of users in the world. At the global level, there are over 2.27 billion monthly active users and 1.15 billion daily active users. Currently, India has the world's most significant number of Facebook users, with over 300 million users, and it is expected to reach 444.2 million users by 2023. Facebook visiting frequency is

<sup>\*</sup> Corresponding author.

E-mail address: [thipparapu.rajesh@gmail.com](mailto:thipparapu.rajesh@gmail.com) (T. Rajesh).

more than three times a day, and 76% of Facebook users are men and 24% users are women (Statista, 2019). On an average Facebook user spends 60 min, log in 2–5 times daily (Balakrishnan and Shamim, 2013). 13 % of the Norway university students (Andreassen et al., 2013), 9% of the German college students (Brailovskaia et al., 2018) are addicted to facebook. 41.8% of the Thai high school students (Khumsri et al., 2015), 38% of university students in Jordan (Alzougool, 2018) and 47% Malaysian students found to be addicted to facebook (Jafarkarimi et al., 2016). 39.7 % of the Bangladesh students (Al Mamun and Griffiths, 2019) and 33% of Indian students are at risk for facebook addiction (Shettar et al., 2017).

Facebook usage has grown exponentially in India. Teenagers and young adults are its prominent users. Indian Market Research Bureau (IMRB) reported that social media penetration in rural India is increasing and Facebook continues to be the most popular social media platform as about 84% of the internet users in India use internet primarily to access social media sites like Facebook (Anita, 2015). Among Indian students, 46% of the facebook addicted individuals found to have depressive symptoms (Elavarasan and Dhandapani, 2017), 26% of the facebook addicted felt lonely (Shettar et al., 2017), and 3% of facebook addicted experienced stress and anxiety (Meena et al., 2015).

Young individuals, students, singles; people from low income and low educational background are the at-risk populations for addictive social media use (Andreassen et al., 2017). The propensity to develop Facebook addiction is contingent upon active use frequency, use duration, usage comprehensiveness and access to heterogeneous devices (Turel, 2015).

With the advent of smartphones (Andreassen and Pallesen, 2014) and the availability of internet facility, social media usage has increased. Excessive use of social networking sites may be problematic (Kuss and Griffiths, 2011), as it may develop into Facebook addiction (Brailovskaia et al., 2018). The increasing engagement in Facebook by large sections of people created the impetus to scrutinize the precedents and antecedents of its usage.

Uses and gratifications theory (Sarnoff and Katz, 1954) propounds that scrutiny into users motives will enhance understanding of the medium. Motivation is a process which guides goal-oriented behaviors. An array of motivations initiates the use of Facebook, such as maintaining personal connections, relationship maintenance with family and friends, passing time, entertainment, and building companionship (Ryan et al., 2014). The primary motivation appears to be constructing a self-identity in the realm of facebook. Self-presentation is an attempt to present oneself in a pertinent way to invoke the desired impression, which influences our outcomes in life (Hogan and Briggs, 1986). Facebook features facilitate individuals to present themselves in myriad ways. The need to present one's self pleasingly to impress others and to boost self-esteem through the likes of others perpetuates Facebook use (Burrow and Rainone, 2017). Promoting activities that are, are self-enhancing satisfies the need for popularity which in turn drives Facebook usage (Caers et al., 2013).

The self operates in a social network in its relational form, so people inadvertently compare their abilities and attitudes with others which play a role in forming self-image (Festinger, 1954). Facebook is a platform where its users present their personal information and activities which necessitates comparison. Regularly checking Facebook allures users into comparing their lives with others, this resultantly, invokes insecurity and fear of missing out what others are experiencing, which are positively related to Facebook addiction (Muench et al., 2015; Pontes et al., 2018).

Low level of self-regulation, maladaptive cognitions about perceived identities in Facebook combined with a preference for online social interaction is related to Facebook addiction (Hughes et al., 2012; Pontes et al., 2018).

Despite Facebook use negatively affecting users mood, the anticipated bolstering of one's mood by using Facebook, affective forecasting, seemed to cause Facebook addiction (Sagioglou and Greitemeyer, 2014).

The expectation for mood elations might be due to the nature of facebook structural features underpinned by algorithms which are

purposefully designed to hook the users. The underlying algorithms are designed to influence the personal preferences and choices of the users through customized feedback loops. These algorithms capitalize on behavioural principles, i.e., intermittent reinforcement, which pursues users efficiently to spend more time on facebook. Furthermore, this can increase the probability of addictive facebook usage (Harris, 2016; Lanier, 2018).

The excessive use of Facebook creates conflict in the intrapersonal and interpersonal relationship, which may hamper the wellbeing of the user. The impact of Facebook use on wellbeing is contentious. For a short term Facebook use seems to enhance wellbeing by increasing happiness and life satisfaction (Kim and Lee, 2011; Liu and Yu, 2013) but on a longer-term Facebook, use is negatively related to mental health (Kross et al., 2013) and diminished wellbeing (Satici and Uysal, 2015). Facebook addiction is positively associated with depression (Blachnio et al., 2015), anxiety symptoms (Brailovskaia and Margraf, 2017) and lowered wellbeing (Satici and Uysal., 2015).

Personality factors also play a role in Facebook usage and addiction. Previous studies explored the association between Big five personality factors. Extraverted individuals are outgoing and social; neurotic individuals are prone to experience unpleasant emotions; conscientious individuals are self-disciplined and achievement-oriented. Agreeable individuals are compassionate and cooperative. Individuals who are open to experience, appreciate and curious to have a variety of experiences (McCrae and Costa, 1999). Extraverted individuals may get gratification in maintaining their social circles and having a high number of friends on Facebook. Neurotic individuals may use Facebook to alter their mood whenever they go through unpleasant moods. Extraversion, conscientiousness, openness to experience, agreeableness, and neuroticism are related to Facebook use, which depends upon how particular facebook feature is appealing to the particular personality trait (Mahmood and Farooq, 2014; Marshall et al., 2015; Sharma and Isha, 2015; Wang et al., 2012; Yesil, 2014).

Factors which are associated with Facebook use were found to be associated with Facebook addiction also. Extraversion, neuroticism, low conscientiousness is related to Facebook addiction (Caers et al., 2013; Hwang, 2017; Wang et al., 2015). Conscientiousness, extraversion, neuroticism, and loneliness strongly predicted Facebook addiction (Biolcati et al., 2018). Personality mediated through perceived social support related to Facebook addiction (Zafar et al., 2018).

Personality traits, which are not under the purview of the five-factor model, such as narcissism and loneliness, drive facebook usage (Ross et al., 2009). Narcissism is an excessive preoccupation with oneself and lack of empathy or disregard for others emotions. Facebook features make it possible to promote oneself, presenting oneself in a better light and creating a positive or even idealistic lifestyle (Blachnio et al., 2013). High levels of narcissism and low level of self-esteem predicted Facebook use. Narcissistic individuals tend to self-objectify and spent more time on Facebook in editing their photos (Fox and Moreland, 2015). High levels of narcissism and loneliness are associated with Facebook users than nonusers (Ryan and Xenos, 2011). Visual forms of facebook use, i.e. posting photos and images, mediated the relation between problematic internet use and narcissism (Reed et al., 2018).

Loneliness is an involuntary state of social isolation or the feeling of being alone (Russell, 2009). Lonely individuals tend to use online social communication as a means of escaping from negative mood states (Caplan, 2003). Loneliness is positively associated with Facebook usage. Shyness and low social support induced loneliness increased Facebook use, which typically mitigates mood change (Song et al., 2014).

Cultural differences account for facebook usage. Abbas and Mesch (2015) found a positive association between collectivism and the desire to use facebook. In collectivistic cultures, individuals invest a higher amount of time in caring about family, friends and community. These social motives are gratified when they engage in facebook. So, members of collectivistic cultures perceive facebook as a facilitating medium to maintain existing relationships and to expand other social ties (Jackson

and Wang, 2013). When individuals construe their self as interdependent, not independent, they tend to focus on improving social relationships. These individuals get gratification from using facebook to strengthen their relations (Kim et al., 2010).

However, considering the breadth of social media usage, robust studies are lacking to explain the facebook phenomenon. The literature on Facebook addiction in the Indian context is also scant. Diagnostic and Statistical Manual of mental disorders is waiting for adequate empirical evidence to categorize and to include facebook addiction in the nomenclature (Brailovskaia and Margraf, 2017).

The main aim of this study is to investigate Facebook addiction and Facebook intensity and its associations with big five personality traits, loneliness and narcissism. Considering the previous research about the association between Facebook use and big five traits (Wang et al., 2015), it was assumed that the big five personality traits are positively related to Facebook addiction (Hypothesis 1). Highly narcissistic individuals spent more time on Facebook (Fox and Moreland, 2015), so it was expected that narcissism is positively related to Facebook addiction (Hypothesis 2). Loneliness was associated with Facebook usage (Song et al., 2014; Shettar et al., 2017); it was assumed that loneliness is positively related to Facebook addiction (Hypothesis 3).

## 2. Materials and methods

### 2.1. Procedure and participants

Data were obtained through the online survey mode by creating Google forms; the links were circulated in social media applications such as Facebook and WhatsApp. A Google form was attached with a consent form which explained the purpose of the study and the confidentiality and anonymity of the participant's personal information. The age range of participants is 18–30 and males were 68.4%, and females were 31.6%. Students comprised 63.2%, among them, undergraduates are 35.2%, postgraduates are 45.6%, PhDs are 19.2%, and employees are 36.8%. Daily, 83.9% of the participants used Facebook for 2 h, 11.3% used for 3–4 h, 3.2% used for 5–6 h, .8% used for 7–8 h and .8% used for more than 9 h. The data was collected from 2018 February to 2018 June. The participation was voluntary and active use of facebook was the requirement. The Institute Ethics Committee (Human Studies) of Pondicherry University has reviewed the study procedure, research tools and approved it.

Before using the tools, a pilot study was conducted to check the feasibility of collecting a sample and reliability of the scales. During the pilot study, total of 50 respondents were administered the tools; based on the pilot study results, tools were found to be reliable with adequate Cronbach values. Among the pilot study sample, females comprised of 32% and males were 68%. 52% of the students were pursuing under graduation, 32% were pursuing post-graduation and 16% were doctoral students. The age range of the participants was 18–30, 66% of them being 18 to 24 and 34% being 25 to 30.

### 2.2. Measures

#### 2.2.1. Ten item personality inventory

A short ten-item personality measures big five personality traits, namely extraversion, agreeableness, conscientiousness, neuroticism and openness to experience. It consists of 10 items which are rated on a 7-point likert scale with a degree of agreement on each statement, ranging from 1 = disagree strongly to 7 = agree strongly. The 10-item personality inventory has been standardized with adequate levels of validity, reliability and external correlates. However, reliability was checked for this sample. The Cronbach alphas for each individual trait are .77, .71, .76, .70, and .62 for the extraversion, agreeableness, conscientiousness, emotional stability and openness to experience respectively (Gosling et al., 2003). The cronbach alphas of each

individual trait for the current sample are .61, .60, .62, .67, and .60 for the extraversion, agreeableness, conscientiousness, emotional stability and openness to experience respectively. The total Cronbach's  $\alpha$  for Current sample is .62. The 10 item personality inventory was devised as a brief measure of the big five dimensions of personality. Brief measures eliminate item redundancy, reducing participant boredom and the frustration about "answering the same question again and again." So it can be used as a proxy for the longer big-five instruments. A short measure should not aim at maximizing Cronbach alpha, because each set of items of a personality trait needs to capture the breadth of the concept (Gosling et al., 2003).

#### 2.2.2. Narcissistic personality inventory

Narcissistic personality inventory (NPI) – 40 was used to assess narcissism, which has an acceptable face, internal, discriminant and predictive validity (Raskin and Terry (1988). Items like "Modesty does not become me" and "I am essentially a modest person". Higher scores indicate a more narcissistic personality. Cronbach's  $\alpha$  for Current sample is .79.

#### 2.2.3. UCLA loneliness scale

UCLA loneliness scale developed by Russell et al. (1978) is a 20 item scale (O indicates "I often feel this way", S indicates "I sometimes feel this way", R indicates "I rarely feel this way", N indicates "I never feel this way") which measures one's subjective feelings of loneliness as well as feelings of social isolation. The reliability of the scale is  $\alpha = .73$ . Cronbach's  $\alpha$  for Current sample is .92.

#### 2.2.4. Bergen Facebook addiction scale

Bergen facebook addiction scale was used to assess the Facebook addiction level. It contains 6 items (e.g., "using Facebook in order to forget about personal problems") according to the six core addiction features (i.e., salience, tolerance, mood modification, relapse, withdrawal, and conflict) rated on a 5-point Likert scale (1 = very rarely, 5 = very often). Higher values indicate higher levels of Facebook addiction. The reliability of the scale is  $\alpha = 0.86$ . Cronbach's  $\alpha$  for Current sample is .84. A monothetic scoring with a rating of 3 or above for all items and polythetic approach with a rating of 3 or above on at least four of the six items was used to indicate Facebook addiction (Andreassen et al., 2012).

#### 2.2.5. Facebook intensity scale

Facebook intensity scale (Ellison et al., 2007) was used to find out the intensity of Facebook usage and degree of emotional involvement in facebook. This scale consists of 8 items, two of them measuring the number of Facebook friends and the amount of time spent on Facebook on a typical day and the remaining six items (e.g., I would be sorry if facebook is shutdown) uses a Likert scale (1 = strongly disagree to 5 = strongly agree). Cronbach's  $\alpha$  for Current sample is .88.

#### 2.2.6. Statistical analysis

Descriptive statistics, Pearson product-moment correlation, was used to analyze the association between variables. Simple regression was used to analyze the predictive power of the variables.

## 3. Results

Table 2 shows the mean and standard deviations of Bergen Facebook addiction scale items. According to the polythetic scoring (rating of 3 or above on at least four of the six items of BFAS scale), 17 (14.91) and monothetic scoring (rating of 3 or above for all items) 2 (1.75) participants reached the critical cutoff score. Item 4 (relapse) and item 3 (mood modification) have gained the highest values (See Table 1).

Table 3 shows Pearson product-moment correlation coefficients which were used to analyze hypotheses. The big five traits extraversion ( $r = -.12$ ), agreeableness ( $r = .11$ ), conscientiousness ( $r = -.13$ ),

**Table 1.** Means and standard deviations of the study variables.

Variables	M	SD	N
Extraversion	4.27	1.55	114
Agreeableness	4.92	1.23	114
Conscientiousness	4.83	1.4	114
Neuroticism	4.59	1.52	114
Openness to experience	5.41	1.26	114
Loneliness	19.73	12.34	114
Narcissism	16.27	5.96	114
Facebook addiction	10.65	4.022	114
Face book intensity	67.16	15.39	114

**Table 2.** Means and standard deviations of Bergen Facebook addiction scale items.

	M (SD)	Polythetic scoring	Monothetic scoring
BFAS	10.87 (4.52)	17 (14.91)	2 (1.75)
BFAS: Item 1 (salience)	1.58 (0.83)		
BFAS: Item 2 (tolerance)	1.83 (0.93)		
BFAS: item 3 (Mood modification)	1.96 (1.09)		
BFAS: item 4 (relapse)	2.05 (1.04)		
BFAS: item 5 (withdrawal)	1.71 (1.03)		
BFAS: item 6 (conflict)	1.75 (1.08)		

neuroticism ( $r = -.04$ ), openness to experience ( $r = -.14$ ) and narcissism ( $r = -.04$ ) was found to be not related to face book addiction and face book intensity. Loneliness and Face book addiction are significantly related  $r = .38, p < .01$ .

Table 4 shows the simple regression coefficients. Loneliness significantly predicted Face book addiction,  $\beta = .38, t(110) = 4.37, p < .001$ . Loneliness also explained a significant proportion of variance in face book addiction,  $R^2 = .14, F(1, 110) = 19.1, p < .001$ .

**4. Discussion**

This study aimed to investigate the association between personality factors and facebook addiction among young students in southern India. Results showed that big five personality traits were not related to Facebook addiction and facebook intensity. This result is in contradiction with other studies which found the associations with Facebook addiction such as Extraversion, neuroticism, low conscientiousness (Caers et al., 2013; Hwang, 2017; Wang et al., 2015). Extraverted individuals may consider Facebook as an online space for conducting social activities which is an extension to offline social activities rather than an

alternative. Extraversion is associated with more number of friends and use Facebook to communicate about their social activities. Openness to experience is associated with a greater tendency to be sociable through Facebook (Ross et al., 2009). High Conscientious individuals may avoid social media because it may distract and interfere in doing their duties (Hughes et al., 2012). Agreeability was associated with having more number of friends on facebook (Wang et al., 2012). Neurotic individuals use photos and share more personally-identifying information to satisfy their need for self-assurance and self-validation (Ross et al., 2009). Thus big five personality factors are related to the usage of particular facebook features, and this usage need not necessarily develop into an addiction.

Jackson and Wang (2013) found that users from collectivistic cultures use social networks less often than people from individualistic cultures. Individuals from collectivistic cultures tend to adhere to traditional cultural values such as caring about family and friends. These cultural values shape facebook use. Thus, for these individuals, Facebook is a tool to maintain existing relationships and expand social ties but not at the cost of real-world social relationships. These cultural values may buffer against excessive behaviours like facebook addiction. In collectivistic cultures, parents influence and monitor their children's activities. This safeguarding possibly can weed out excessive and addictive use of facebook.

Individuals from collectivistic cultures are less likely to have multiple internet-connected devices. Less connectivity acts as a protective factor, as Turel (2015) indicated that access to heterogeneous devices is associated with facebook addiction.

Cultural factors such as power distance (individuals place in a given social hierarchy) predict motivation for using Facebook. Power distance in India is high, which indicates the high inequality of power and wealth. A large proportion of the population is deprived of socio-economic resources. This depravity limits access to technology, which suggests the improbability that individuals from these circumstances may not engage in intensive and addictive facebook usage.

Jackson and Wang (2013) also indicated that personal characteristics, such as the big five personality factors, exhibit the better predictive value of facebook use in individualistic cultures than they are for collectivistic cultures (Abbas and Mesch, 2015; Jackson and Wang, 2013).

This study found no association between Narcissism and facebook addiction. Narcissism is related to self-expression through posting self-focused pictures, update statuses about achievements for self-validation (Marshall et al., 2015). Narcissism is not always related to Facebook

**Table 4.** Summary of linear regression analysis for loneliness.

Variable	B	SE B	$\beta$	t	p
Loneliness	.12	.02	.38	4.37	.00

$R^2 = .14$ .

**Table 3.** Summary of correlation between variables.

	1	2	3	4	5	6	7	8	9
1. Extraversion									
2. Agreeableness	-.04								
3. Conscientiousness	.27**	.18*							
4. Neuroticism	.24**	.23*	.39**						
5. Openness to experience	.12	.18	.19*	.20*					
6. Loneliness	-.11	-.07	-.04	-.12	-.02				
7. Face book intensity	-.01	-.03	-.15	-.16	-.18	-.06			
8. Facebook addiction	-.12	.11	-.13	-.04	-.14	.38**	.01		
9. Narcissism	-.11	.03	-.00	.06	.09	-.00	-.04	-.06	

\* $p < 0.05$ ; \*\* $p < 0.01$ .

addiction (Blachnio et al., 2016) and is not a strong predictor of the amount of time spent on the social networking sites (Bergman et al., 2011).

Loneliness was found to be associated with Facebook addiction. Even in collectivistic cultures, high expectations about reciprocations in social relationships and lack of sufficient skills for fostering social ties may set individuals at risk for loneliness (Jylha and Jokela, 1990). For lonely individuals using Facebook may compensate for lacking social skills and interactions in face to face offline social settings (Song et al., 2014; Shettar et al., 2017). High levels of loneliness are associated with Facebook usage and low social support induced loneliness increased Facebook use (Ryan and Xenos., 2011; Song et al., 2014).

#### 4.1. Limitations and further research

This study has a small sample size, which can compromise on the generalizability of the results. Future studies can employ a bigger sample size and study why India has the highest number of subscribers in the world. The big five traits were measured using ten item personality inventory, in which, each trait is measured using merely 2 items. The Cronbach alpha values are low but within acceptable range only as it has been stated that a Cronbach alpha higher than 0.60 is still acceptable in social sciences (Blachnio et al., (2017); Correa et al., (2010); Ellinoudis et al. (2011); Florio et al. (2020); Darusalam, 2008, Hosoda (2006); Mohamad et al. (2015); Shankman and Allen, 2010, p. 429). Our study employed a self-report survey which is prone to social desirability. The addicted individual tends not to disclose their real behaviour so self-reports can be biased. This study recruited participants through social media like Facebook and WhatsApp. The anonymity of the participants can lower accountability as there is a chance for sloppy responding and providing false answers (Gosling and Mason, 2015).

To tackle with these problems, future studies can substantiate self-reports with physiological markers such as heart rate, skin conductance, and blood pressure that are proven to be reliable markers in substance addictions and internet addiction (Brailovskaia et al., 2018; Romano et al., 2017; Reed et al., 2017). Our study used correlation measures which makes causal implications unwarranted. Studies about Facebook usage in the Indian context are need of the hour which can focus on why its popularity is growing in India and especially in rural India. One can study and compare the level and type of usage among adolescents and young adults. Future studies can focus on the structural features of Facebook and its influence on addiction.

## 5. Conclusion

This study is the first of its kind to throw light on Facebook addiction in India. Our study suggests that the big five personality traits and narcissism are not related to Facebook addiction even though they are related to Facebook use as suggested by earlier studies. Loneliness emerged as a significant risk factor for Facebook addiction.

## Declarations

### Author contribution statement

T. Rajesh: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

B. Rangaiah: Contributed reagents, materials, analysis tools or data.

### Funding statement

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

## Competing interest statement

The authors declare no conflict of interest.

## Additional information

No additional information is available for this paper.

## References

- Abbas, R., Mesch, G.S., 2015. Cultural values and Facebook use among Palestinian youth in Israel. *Comput. Hum. Behav.* 48, 644–653.
- Al Mamun, M.A., Griffiths, M.D., 2019. The association between Facebook addiction and depression: a pilot survey study among Bangladeshi students. *Psychiatry Res.* 271, 628–633.
- Albrecht, U., Kirschner, N.E., Grüsser, S.M., 2007. Diagnostic instruments for behavioral addiction: an overview. *GMS Psycho-Soc.-Med.* 4.
- Alzougool, B., 2018. The impact of motives for Facebook use on Facebook addiction among ordinary users in Jordan. *Int. J. Soc. Psychiatr.* 64 (6), 528–535.
- American Psychiatric Association, 2013. *Diagnostic and Statistical Manual of Mental Disorders*, fifth ed. American Psychiatric Association, Washington, DC.
- Andreassen, C.S., Pallesen, S., 2014. Social network site addiction—an overview. *Curr. Pharmaceut. Des.* 20 (25), 4053–4061.
- Andreassen, C.S., Griffiths, M.D., Gjertsen, S.R., Krossbakken, E., Kvam, S., Pallesen, S., 2013. The relationships between behavioral addictions and the five-factor model of personality. *J. Behav. Addict.* 2 (2), 90–99.
- Andreassen, C.S., Pallesen, S., Griffiths, M.D., 2017. The relationship between addictive use of social media, narcissism, and self-esteem: findings from a large national survey. *Addict. Behav.* 64, 287–293.
- Andreassen, C.S., Torsheim, T., Brunborg, G.S., Pallesen, S., 2012. Development of a Facebook addiction scale. *Psychol. Rep.* 110 (2), 501–517.
- Balakrishnan, V., Shamim, A., 2013. Malaysian Facebookers: motives and addictive behaviors unraveled. *Comput. Hum. Behav.* 29 (4), 1342–1349.
- Bergman, S.M., Fearington, M.E., Davenport, S.W., Bergman, J.Z., 2011. Millennials, narcissism, and social networking: what narcissists do on social networking sites and why. *Personal. Individ. Differ.* 50 (5), 706–711.
- Biolcati, R., Mancini, G., Pupi, V., Mugheddu, V., 2018. Facebook addiction: onset predictors. *J. Clin. Med.* 7 (6), 118.
- Blachnio, A., Przepiórka, A., Pantic, I., 2015. Internet use, Facebook intrusion, and depression: results of a cross-sectional study. *Eur. Psychiatry* 30 (6), 681–684.
- Blachnio, A., Przepiórka, A., Rudnicka, P., 2013. Psychological determinants of using Facebook: a research review. *Int. J. Hum. Comput. Interact.* 29 (11), 775–787.
- Blachnio, A., Przepiórka, A., Rudnicka, P., 2016. Narcissism and self-esteem as predictors of dimensions of Facebook use. *Personal. Individ. Differ.* 90, 296–301.
- Blachnio, A., Przepiórka, A., Senol-Durak, E., Durak, M., Sherstyuk, L., 2017. The role of personality traits in Facebook and Internet addictions: study on Polish, Turkish, and Ukrainian samples. *Comput. Hum. Behav.* 68, 269–275.
- Brailovskaia, J., Margraf, J., 2017. Facebook Addiction Disorder (FAD) among German students—a longitudinal approach. *PLoS One* 12 (12), e0189719.
- Brailovskaia, J., Schillack, H., Margraf, J., 2018. Facebook addiction disorder in Germany. *Cyberpsychol. Behav. Soc. Netw.* 21 (7), 450–456.
- Burrow, A.L., Rainone, N., 2017. How many likes did I get?: purpose moderates links between positive social media feedback and self-esteem. *J. Exp. Soc. Psychol.* 69, 232–236.
- Caers, R., De Feyter, T., De Couck, M., Stough, T., Vigna, C., Du Bois, C., 2013. Facebook: a literature review. *New Media Soc.* 15 (6), 982–1002.
- Caplan, S.E., 2003. Preference for online social interaction: a theory of problematic Internet use and psychosocial well-being. *Commun. Res.* 30 (6), 625–648.
- Correa, T., Hinsley, A.W., De Zuniga, H.G., 2010. Who interacts on the Web?: the intersection of users' personality and social media use. *Comput. Hum. Behav.* 26 (2), 247–253.
- Elavarasan, N.P., Dhandapani, T., 2017. Facebook addiction and depression in adults [19 years–64 years]. *Int. J. Commun. Med. Publ. Health* 4 (8), 2999–3004.
- Ellinoudis, T., Evagelinou, C., Kourtessis, T., Konstantinidou, Z., Venetsanou, F., Kambas, A., 2011. Reliability and validity of age band 1 of the movement assessment battery for children—second edition. *Res. Dev. Disabil.* 32 (3), 1046–1051.
- Ellison, N.B., Steinfield, C., Lampe, C., 2007. The benefits of Facebook “friends”: Social capital and college students' use of online social network sites. *J. Computer-Mediated Commun.* 12 (4), 1143–1168.
- Festinger, L., 1954. A theory of social comparison processes. *Hum. Relat.* 7 (2), 117–140.
- Florio, E., Caso, L., Castelli, I., 2020. The Adult centrism Scale in the educational relationship: instrument development and preliminary validation. *New Ideas Psychol.* 57, 100762.
- Fox, J., Moreland, J.J., 2015. The dark side of social networking sites: an exploration of the relational and psychological stressors associated with Facebook use and affordances. *Comput. Hum. Behav.* 45, 168–176.
- Darusalam, Ghazali, April 2008. *Kesahan dan Kebolehppercayaan Dalam Kajian Kuantitatif dan Kualitatif*. Jurnal Institut Perguruan Islam.
- Gosling, S.D., Mason, W., 2015. Internet research in psychology. *Annu. Rev. Psychol.* 66.
- Gosling, S.D., Rentfrow, P.J., Swann Jr., W.B., 2003. A very brief measure of the Big-Five personality domains. *J. Res. Personal.* 37 (6), 504–528.

- Grant, J.E., Potenza, M.N., Weinstein, A., Gorelick, D.A., 2010. Introduction to behavioral addictions. *Am. J. Drug Alcohol Abuse* 36 (5), 233–241.
- Griffiths, M., 2005. A 'components' model of addiction within a biopsychosocial framework. *J. Subst. Use* 10 (4), 191–197.
- Griffiths, M.D., Kuss, D.J., Demetrovics, Z., 2014. Social networking addiction: an overview of preliminary findings. In: *Behavioral Addictions*. Academic Press, pp. 119–141.
- Hogan, R., Briggs, S.R., 1986. A socioanalytic interpretation of the public and the private selves. In: *Public Self and Private Self*. Springer, New York, NY, pp. 179–188.
- Hosoda, Y., 2006. Development and testing of a clinical learning environment diagnostic inventory for baccalaureate nursing students. *J. Adv. Nurs.* 56 (5), 480–490.
- Hughes, D.J., Rowe, M., Batey, M., Lee, A., 2012. A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Comput. Hum. Behav.* 28 (2), 561–569.
- Hwang, H.S., 2017. The influence of personality traits on the facebook addiction. *KSII transactions on internet & information systems*, 11(2). *J. Personal. Assess.* 42, 290–294.
- Jackson, L.A., Wang, J.L., 2013. Cultural differences in social networking site use: a comparative study of China and the United States. *Comput. Hum. Behav.* 29 (3), 910–921.
- Jafarkarimi, H., Sim, A.T.H., Saadatdoost, R., Hee, J.M., 2016. Facebook addiction among Malaysian students. *Int. J. Inf. Educ. Technol.* 6 (6), 465.
- Jylhä, M., Jokela, J., 1990. Individual experiences as cultural: a cross-cultural study on loneliness among the elderly. *Ageing Soc.* 10, 295–315.
- Khumsri, J., Yingyeun, R., Manwong, M., Hanprathet, N., Phanasathit, M., 2015. Prevalence of facebook addiction and related factors among Thai high school students. *J. Med. Assoc. Thai.* 98 (3), S51–S60.
- Kim, J.H., Kim, M.S., Nam, Y., 2010. An analysis of self-construals, motivations, Facebook use, and user satisfaction. *Int. J. Hum. Comput. Interact.* 26 (11–12), 1077–1099.
- Kim, J., Lee, J.E.R., 2011. The Facebook paths to happiness: effects of the number of Facebook friends and self-presentation on subjective well-being. *Cyberpsychol., Behav. Soc. Netw.* 14 (6), 359–364.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D.S., Lin, N., Ybarra, O., 2013. Facebook use predicts declines in subjective well-being in young adults. *PLoS One* 8 (8), e69841.
- Kuss, D.J., Griffiths, M.D., 2011. Online social networking and addiction—a review of the psychological literature. *Int. J. Environ. Res. Public Health* 8 (9), 3528–3552.
- Lanier, J., 2018. *Ten Arguments for Deleting Your Social media Accounts Right Now*. Random House.
- Liu, C.Y., Yu, C.P., 2013. Can Facebook use induce well-being? *Cyberpsychol., Behav. Soc. Netw.* 16 (9), 674–678.
- Mahmood, S., Farooq, U., 2014. Facebook addiction: a study of big-five factors and academic performance amongst students of IUB. *Glob. J. Manag. Bus. Res.* 14, 5.
- Marshall, T.C., Lefringhausen, K., Ferenczi, N., 2015. The Big Five, self-esteem, and narcissism as predictors of the topics people write about in Facebook status updates. *Personal. Individ. Differ.* 85, 35–40.
- McCrae, R.R., Costa Jr., P.T., 1999. A five-factor theory of personality. In: *Handbook of personality: Theory and research*, 2, pp. 139–153.
- Meena, P.S., Soni, R., Jain, M., Paliwal, S., 2015. Social networking sites addiction and associated psychological problems among young adults: a study from North India. *Sri Lanka J. Psychiatr.* 6 (1).
- Mohamad, M.M., Sulaiman, N.L., Sern, L.C., Salleh, K.M., 2015. Measuring the validity and reliability of research instruments. *Procedia-Soc. Behav. Sci.* 204, 164–171.
- Muench, F., Hayes, M., Kuerbis, A., Shao, S., 2015. The independent relationship between trouble controlling Facebook use, time spent on the site and distress. *Journal of behavioral addictions* 4 (3), 163–169.
- Pontes, H.M., Taylor, M., Stavropoulos, V., 2018. Beyond "Facebook addiction": the role of cognitive-related factors and psychiatric distress in social networking site addiction. *Cyberpsychol., Behav. Soc. Netw.* 21 (4), 240–247.
- Raskin, R., Terry, H., 1988. A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *J. Personal. Soc. Psychol.* 54, 890–902.
- Reed, P., Birceck, N.I., Osborne, L.A., Viganò, C., Truzoli, R., 2018. Visual social media use moderates the relationship between initial problematic internet use and later narcissism. *Open Psychol. J.* 11 (1).
- Reed, P., Romano, M., Re, F., Roaro, A., Osborne, L.A., Viganò, C., Truzoli, R., 2017. Differential physiological changes following internet exposure in higher and lower problematic internet users. *PLoS One* 12 (5), e0178480.
- Romano, M., Roaro, A., Re, F., Osborne, L.A., Truzoli, R., Reed, P., 2017. Problematic internet users' skin conductance and anxiety increase after exposure to the internet. *Addict. Behav.* 75, 70–74.
- Ross, C., Orr, E.S., Sisic, M., Arseneault, J.M., Simmering, M.G., Orr, R.R., 2009. Personality and motivations associated with Facebook use. *Comput. Hum. Behav.* 25 (2), 578–586.
- Russell, D., 2009. Living arrangements, social integration, and loneliness in later life: the case of physical disability. *J. Health Soc. Behav.* 50 (4), 460–475.
- Russell, D., Peplau, L.A., Ferguson, M.L., 1978. Developing a measure of loneliness. *J. Personal. Assess.* 42 (3), 290–294.
- Ryan, T., Xenos, S., 2011. Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Face book usage. *Comput. Hum. Behav.* 27 (5), 1658–1664.
- Ryan, T., Chester, A., Reece, J., Xenos, S., 2014. The uses and abuses of Facebook: a review of Facebook addiction. *J. Behav. Addict.* 3 (3), 133–148.
- Ryan, T., Reece, J., Chester, A., Xenos, S., 2016. Who gets hooked on Facebook? An exploratory typology of problematic Facebook users. *Cyberpsychology* 10 (3).
- Sagioglou, C., Greitemeyer, T., 2014. Facebook's emotional consequences: why Facebook causes a decrease in mood and why people still use it. *Comput. Hum. Behav.* 35, 359–363.
- Sarnoff, I., Katz, D., 1954. The motivational bases of attitude change. *J. Abnorm. Soc. Psychol.* 49 (1), 115.
- Satici, S.A., Uysal, R., 2015. Well-being and problematic Facebook use. *Comput. Hum. Behav.* 49, 185–190.
- Shankman, M.L., Allen, S.J., 2010. *Emotionally Intelligent Leadership for Students: Facilitation and Activity Guide*. John Wiley & Sons.
- Sharma, A., Isha, J., 2015. Personality and patterns of Facebook usage. *Int. J. Acad. Res. Psychol.* 2, 2.
- Shettar, M., Karkal, R., Kakunje, A., Mendonsa, R.D., Chandran, V.M., 2017. Facebook addiction and loneliness in the post-graduate students of a university in southern India. *Int. J. Soc. Psychiatry* 63 (4), 325–329.
- Song, H., Zmyslinski-Seelig, A., Kim, J., Drent, A., Victor, A., Omori, K., Allen, M., 2014. Does Facebook make you lonely? A meta-analysis. *Comput. Hum. Behav.* 36, 446–452.
- Turel, O., 2015. An empirical examination of the "vicious cycle" of Facebook addiction. *J. Comput. Inf. Syst.* 55 (3), 83–91.
- Wang, C.W., Ho, R.T., Chan, C.L., Tse, S., 2015. Exploring personality characteristics of Chinese adolescents with internet-related addictive behaviors: trait differences for gaming addiction and social networking addiction. *Addict. Behav.* 42, 32–35.
- Wang, J.L., Jackson, L.A., Zhang, D.J., Su, Z.Q., 2012. The relationships among the Big Five Personality factors, self-esteem, narcissism, and sensation-seeking to Chinese University students' uses of social networking sites (SNSs). *Comput. Hum. Behav.* 28 (6), 2313–2319.
- Yesil, M.M., 2014. The relationship between Facebook use and personality traits of university students. *Int. J. Acad. Res.* 6 (2).
- Young, K.S., 1998. Internet addiction: the emergence of a new clinical disorder. *Cyberpsychol. Behav.* 1 (3), 237–244.
- Zafar, M., Lodhi, I.S., Shakir, M., 2018. Impact of personality traits on facebook addiction: the mediating role of perceived social support. *J. Res. Soc. Sci.* 6 (1), 239–258.

## Web references

- Anita, B., 2015. Social media penetration in rural India grows faster than urban. Retrieved from: [https://www.business-standard.com/article/technology/social-media-penetration-in-rural-india-grows-faster-than-urban-115061701121\\_1.html](https://www.business-standard.com/article/technology/social-media-penetration-in-rural-india-grows-faster-than-urban-115061701121_1.html). on 25th march 2019.
- Statista, 2019. Retrieved from: <https://www.statista.com/statistics/304827/number-of-facebook-users-in-india/on-7th-April-2019>.
- Harris, T., 2016. How technology Hijacks People's Minds — from a magician and Google's design ethicist. Retrieved on 18th july, 2019. <http://www.tristanharris.com/essays/>.