Facebook Addiction among Students: Validity of Measurement and Relationship with Personality and Well-Being

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ABSTRACT

Facebook addiction has been suggested as a potential behavioral addiction emerging from the framework of the theory and research on social networking sites addiction and Internet addiction. Previous studies showed that Facebook addiction is related to specific personality traits and well-being. However, there are no studies showing the relative contribution of different personality characteristics to Facebook addiction, and the unique contribution of this addiction in terms of explaining different facets of well-being above and beyond personality characteristics consistently shown to be related to psychosocial functioning. The present study demonstrates validation of the Bergen Facebook Addiction Scale (BFAS) in the sample of Polish students and a tentative integrated model of potential Facebook addiction personality risk factors. BFAS was administered to 1182 students. In addition, participants were asked about demographic variables, and personality traits (Big Five, self-esteem, self-efficacy, narcissism), loneliness, social anxiety, and well-being indicators were measured. BFAS had acceptable fit with the data and demonstrated good reliability. The investigated model showed that Facebook addiction was related to higher extraversion, narcissism, loneliness, social anxiety, and lower general self-efficacy. Facebook addiction was further related to impoverished well-being (impaired general health, decreased sleep quality, and higher perceived stress), which is congruent with previous findings.

Key words: Facebook addiction, health, personality, scale, social anxiety, stress

1. Introduction

Numerous studies have been conducted on Internet addiction (Chou, Condron, & Belland, 2005; D'Hondt & Maurage, 2017; Kuss, Griffiths, Karila, & Billieux, 2014; Kuss & Lopez-Fernandez, 2016; Weinstein & Lejoyeux, 2010; Widyanto & Griffiths, 2006; Young, 1996). Nevertheless, it has been questioned whether this reflects an addiction to the platform, to the content, or to the activity performed (Griffiths, 1999, 2000; Young, 2009). Similar doubts were raised when the Facebook addiction concept emerged (Griffiths, 2012). However, there are important premises which warrant systematic study of Facebook addiction.

Among Social Networking Sites (SNSs), Facebook is by far the most popular one. It involved on average 1.23 billion daily active users and 1.86 billion monthly active users in December 2016 (Facebook, 2017). In Poland there are 15.53 million registered members. Studies show differences between users that prefer different online activities (Thompson, 2001). Furthermore, even within the social networking sites users there are variations in motivations of usage (Gülnar, Balcý, & Çakýr, 2010; Mull & Lee, 2014). This could be related to different forms of gratification drawn from using a particular site and distinct needs underlying this use. In line with this, it is crucial to separate out results from specific sites in order to understand the development of SNSs (Ryan, Chester, Reece, & Xenos, 2014). In addition, it seems that Facebook has the strongest addictive quality and the strongest potential negative consequences for younger populations (Denti et al., 2012). Therefore studies on its risk factors among primary, secondary and tertiary education students are warranted.

Social Network Sites addiction is defined as "being overly concerned about SNSs, driven by a strong motivation to log on to or use SNSs, and to devote so much time and effort to SNSs that it impairs other social activities, studies/job, interpersonal relationships, and/or psychological health and well-being" (Andreassen & Pallesen, 2014, p. 4054). This definition also refers to the Facebook addiction, as an example of SNS addiction. Therefore, one of the main aims of this study was to investigate whether Facebook addiction can be validly and

reliably measured among university students. The Bergen Facebook Addiction Scale (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) is a scale based on the six core components of addiction distinguished by Griffiths (2005). In line with this conceptualization of addiction, other measures of distinct behavioral addictions have been created and showed good validity and reliability (Andreassen, Griffiths, Hetland, & Pallesen, 2012; Atroszko, Andreassen, Griffiths, & Pallesen, 2015; Griffiths, 2005; Lemmens, Valkenburg, & Peter, 2009; Terry, Szabo, & Griffiths, 2004). What is more, taking into account currently rapidly growing research on behavioral addictions (Karim, & Chaudhri, 2012) there is a need to investigate the role of specific personality characteristics related to Facebook addiction, and the unique contribution of this addiction when it comes to explaining various facets of well-being above and beyond personality traits consistently related to psychosocial functioning in previous studies (Burger & Samuel, 2017; Pinquart & Sörensen, 2000; Ryan & Deci, 2001). This study aims to provide such data.

1.1 Facebook addiction and personality

Personality traits have been identified as risk factors for various behavioral addictions (Andreassen et al., 2013). With reference to the Big Five personality model, there have been shown positive relationships between addictive tendencies and neuroticism (Andreassen, Torsheim et al., 2012; Błachnio, Przepiorka, Benvenuti et al., 2016; Błachnio, Przepiórka, Senol-Durak, Durak, & Sherstyuk, 2017; Mahmood & Farooq, 2014) and negative relationships between Facebook addiction and conscientiousness (Andreassen, Torsheim et al., 2012; Andreassen et al., 2013; Błachnio, Przepiórka, Senol-Durak et al., 2017; Błachnio, Przepiorka, Benvenuti et al., 2016; Tang, Chen, Yang, Chung, & Lee, 2015). What is more, some studies show positive relationships between Facebook addiction and extraversion (Andreassen, Torsheim, et al, 2012; Andreassen et al., 2013) and negative relationships between Facebook addiction and openness to experience (Andreassen et al., 2013; Błachnio Przepiórka, Senol-

Durak et al., 2017; Błachnio, Przepiorka, Benvenuti et al., 2016). General self-efficacy has been identified as an important factor in addiction, as it is related to the motivation to initiate or to resist the addictive behavior (Marlatt, Baer, & Quigley, 1995). Some studies showed that low gambling control self-efficacy is related to pathological gambling (Kaur, Schutte, & Thorsteinssen, 2006; May, Whelan, Steenbergh, & Meyers, 2003). Furthermore, low self-efficacy predicts Internet Communication Disorder (Wegmann & Brand, 2016). Although, self-efficacy is not related to Facebook intensity and Facebook intrusion (Błachnio, Przepiórka, & Czuczwar, 2017), the insufficient self-control and low level of failure-related action orientation can put Facebook users "at-risk" of Facebook addiction (Błachnio & Przepiórka, 2016). Moreover, studies show that narcissism is positively related to SNS addiction (Andreassen, Pallesen, & Griffiths, 2016), as well as, Facebook addiction (Malik & Khan, 2015). Furthermore, people with low self-esteem regard social media as a safer place to express themselves than people with high self-esteem (Forest & Wood, 2012). In line with these findings, excessive SNS use was found to be related to lower self-esteem (Andreassen et al., 2016; Błachnio, Przepiórka, & Rudnicka, 2016; Malik & Khan, 2015; Wilson, Fornasier, & White, 2010).

1.2 Facebook addiction and social functioning

Although in the field of SNS use and addiction, researchers have distinguished between a large number of motivations to use it (Chen & Kim, 2013; GlobalWebIndex, 2016; Huang, 2012; Mull & Lee, 2014; T. Ryan et al., 2014). Numerous studies have emphasized relationship maintenance as a key reason for Facebook use (Joinson, 2008; Sheldon, 2009; Valentine, 2012) as well as for all SNS use (Kuss & Griffiths, 2011). In line with this, studies show that Facebook addiction is related to poor social functioning, e.g. relationship dissatisfaction (Elphinston & Noller, 2011), loneliness (Błachnio, Przepiórka, Boruch, & Bałakier, 2016), social anxiety (Dobrean & Păsărelu, 2016), and lack of social support (Tang et al., 2015), as well as preference

for online social interaction (POSI; Lee, Cheung, & Thadani, 2012). Individuals who suffer from psychosocial problems may prefer online social interaction over face-to-face conversation, thus the POSI may facilitate compulsive Internet use that results in negative outcomes (Caplan, 2003). On the other hand, it should also be taken into account that online social networking may have positive influence on social functioning (Burke, Marlow, & Lento, 2010; Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008).

1.3 Facebook addiction and well-being

The crucial requirement for considering behavior as addictive is the negative consequences that it brings for the psychosocial functioning of the individual and people close to him/her (Andreassen & Pallesen, 2014; Atroszko, 2012; Griffiths, 2005). Thus far, Facebook addiction has been linked to lower subjective well-being (Denti et al., 2012; Kross et al., 2013), lower life satisfaction (Błachnio, Przepiórka, & Panic, 2016; Satici & Uysal, 2015), as well as lower subjective happiness and subjective vitality (Uysal, Satici, & Akin, 2013). In the context of health, Facebook addiction has in addition been related to insomnia, poor sleep quality, and somatic symptoms (Andreassen, Torsheim et al., 2012; Hanprathet, Manwong, Khumsri, Yingyeun, & Phanasathit, 2015; Koc & Gulyagci, 2013; Wolniczak et al. 2013). What is more, using social networks can increase stress. The longitudinal study of Campisi et al. (2012) showed that Facebook users find use of the social network to be stressful, and generating negative emotions. Another study showed that online chatting is associated with prolonged stress, at least for women (Thomée, Eklöf, Gustafsson, Nilsson, & Hagberg, 2007). What is more, meta-analysis showed that Internet addiction is associated with tendency to escape from self, insufficient self-control, difficulties in emotional regulation, and negative stress coping (Koo & Kwon, 2014). These findings can be applied to the social skill model of generalized problematic Internet use (Caplan, 2010). According to this model those who prefer online communication are at greater risk of addiction. Moreover, individuals who manifest deficient

self-regulation of Internet use tend to engage in social media to release stress and improve mood. Communicating online relieves negative moods, which then reinforces online use.

1.4 Tentative model of Facebook addiction risk factors

On the basis of the existing literature and understanding of addiction in the context of stress coping/emotion regulation (Jacobs, 1986) we suggest a tentative model in which Facebook addiction would be a result of ineffective mood regulation by individuals who have problematic social life, specifically those who have high social anxiety and loneliness, as well as general emotional instability, low self-esteem, and low general self-efficacy combined with low openness to new experience. At the same time these individuals are typically extraverted and narcissistic, therefore they crave for social interaction, especially self-validation through these interactions. Consequently, because underlying causes of distress are not confronted and dealt with by these individuals due to their low general self-efficacy, the increasingly compulsive Facebook activity generates additional stress and, in consequence, negatively affects their psychosocial functioning.

On the basis of previous research and theoretical frameworks, it was hypothesized that (i) the Bergen Facebook Addiction Scale has a single factor solution in the student sample (H1); (ii) low emotional stability, conscientiousness, and openness to experience, as well as high extraversion would be positively related to Facebook addiction (H2); (iii) high narcissism, low self-esteem and low self-efficacy would be positively related to Facebook addiction (H3); (iv) loneliness and social anxiety would be positively related to Facebook addiction (H4); (v) Facebook addiction would be related to impaired well-being (lower quality of life, sleep quality, general health and higher stress) (H5).

2. Methods

2.1 Sample

The sample comprised 1182 undergraduate students. Due to missing data on relevant variables, 25 participants were eliminated from the analyses. When data were missing at random and only a very small portion of data were missing (less than 2% overall), missing data were imputed using Missing Values Analysis within SPSS 24.0. This algorithm provides unbiased parameter estimates and improves statistical power of analyses (Enders, 2001; Scheffer, 2002). The final sample therefore comprised 1157 full-time students: 601 females (51.9%), 546 males (47.2%) and 10 persons (0.9%) who did not report gender, with mean age of $M = 20.33$ years ($SD = 1.68$). The individuals were studying at the universities from Gdańsk: University of Gdańsk, Gdańsk Technological University, Gdańsk University of Sport and Recreation. Students were affiliated with different faculties, courses of study and years of study.

2.2 Instruments

Facebook addiction. The Polish adaptation (Charzyńska, & Góźdź, 2014) of the Bergen Facebook Addiction Scale (BFAS; Andreassen, Torsheim et al., 2012) includes 6 items that are based on core addiction components (Griffiths, 2005). The questions concern symptoms experienced during the past 12 months. The responses are provided on a 5-point Likert scale ranging from *very rarely* (1) to *very often* (5). Higher scores indicate greater Facebook addiction. The BFAS has shown good validity and reliability in previous research (Charzyńska, & Góźdź, 2014). In the present sample the Cronbach's alpha reliability coefficient was .86.

Personality. The Polish version of Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) was used to assess the five-factor model of personality: Extraversion, Agreeableness, Conscientiousness, Emotional stability, and Openness to experience. Respondents provided answers on a 7-point Likert scale, ranging from *strongly disagree* (1) to *agree strongly* (7). Each of Big Five factors is measured with two items, one for its positive extremity and one for its negative extremity. It has shown good validity and reliability in previous research (Atroszko, 2015; Atroszko, Andreassen, Griffiths, & Pallesen,

2016a, 2016b). In the present sample the Spearman-Brown reliability coefficient was of .68 for Extraversion, .29 for Agreeableness, .65 for Conscientiousness, .56 for Emotional stability and .28 for Openness to experience.

Self-efficacy was measured by two items from General Self-Efficacy Scale (GSES; Schwarzer & Jerusalem, 1995). The items were: "I can usually handle whatever comes my way" and "I can solve most problems if I invest the necessary effort". Respondents provided answers on a 9-point Likert scale, from *no* (1) to *yes* (9). In the present sample the Spearman-Brown reliability coefficient was of .81.

Single Item Narcissism Scale (SINS) described by Konrath, Meier, and Bushman (2014) was used to measure narcissism. The participants were presented the following statement: "I am a narcissist (Note: The word 'narcissist' means egotistical, self-focused, and vain)" with response range from *No* (1) to *Yes* (9). In this study response format has been extended to a 9-point scale. The item has shown good validity and reliability in previous research (Konrath et al., 2014).

Self-esteem. Self-esteem was measured with a single-item scale developed on the basis of item from WHOQOL Bref scale (Skevington, Lotfy, & O'Connell, 2004). The following question was asked: "How satisfied are you with yourself?" with 9-point response scale, from *very dissatisfied* (1) to v*ery satisfied* (9). The scale has shown good validity and reliability in previous research (Atroszko, Sawicki, Sendal, & Atroszko, 2017), and it has been argued that its indirect character may provide a better estimate of self-esteem than direct questions about "having high self-esteem". In previous study the intraclass correlation coefficient (ICC) for test-retest reliability was .79.

Loneliness. It was measured by Short Loneliness Scale (SLS; Hughes, Waite, Hawkley, & Cacioppo, 2004), which includes 3 items with a 3-point response format scale, ranging from *almost never or never* (1) to *often* (3). The scale has shown good validity and reliability in

previous research (Atroszko, 2015). In the present sample the Cronbach's alpha reliability coefficient was .79.

General health, sleep quality, and quality of life. Three questions were measured with ultra-brief scales based on the items from WHOQOL Bref scale (Skevington et al., 2004). General health was measured by the question: "How satisfied are you with your health?" with 9-point response scale, from *very dissatisfied* (1) to *very satisfied* (9). Sleep quality was measured by the question: "How satisfied are you with your sleep?" with 9-point response scale, from *very dissatisfied* (1) to *very satisfied* (9). Quality of life was measured by the question: "How would you rate your quality of life?" with a 9-point response scale, from *very poor* (1) to *very good* (9). The scales have shown good validity and reliability in previous research (Atroszko, Andreassen, Griffiths, & Pallesen, 2015; Atroszko, Bagińska, Mokosińska, Sawicki, & Atroszko, 2015).

Social anxiety. Social anxiety was measured with shortened version of Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987). It consists of nine items from the original scale concerning the component of fear experienced in social situations. The responses are provided on a 4-point scale ranging from *none* (0) to *severe* (3). The Cronbach's alpha reliability coefficient of social anxiety in this sample was .83.

Stress. Perceived stress was measured by Perceived Stress Scale (PSS-4; Cohen, Kamarck, & Mermelstein, 1983). It consists of four items with a 5-point Likert response format scale, ranging from *never* (1) to *very often* (5). The scale has shown good validity and reliability in previous research (Atroszko, 2015; Atroszko et al., 2015). The Cronbach's alpha reliability coefficient in this sample was .69.

2.3 Procedure

Data collection was based on convenience sampling. Students were invited to participate anonymously in the study during lectures or classes. The estimated response rate was above

95%. Participation in the study was totally anonymous and no monetary or other material rewards were offered.

2.4 Factor analysis

Mplus 6.11 (Muthén & Muthén, 1998-2010) was used to perform factor analyses. Robust Maximum Likelihood (RML) estimator was used due to nonnormality of distributions of items. The latent variable was scaled by fixing factor variance to one. Missing data were handled with the expectation-maximization (EM) algorithm. Following measures were used to evaluate fit of the model: χ^2 divided by degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Squared Error of Approximation (RMSEA). Cut-off scores for those indexes for acceptable fit are: $\chi^2/df \leq 3$, CFI ≥ 0.95, TLI ≥ 0.95, RMSEA ≤ 0.06 to 0.08 (Hu & Bentler, 1999; Schreiber, Nora, Stage, Barlow, & King, 2006).

2.5 Statistical analyses

Means, standard deviations, percentages, and correlation coefficients were calculated. Five hierarchical regression analyses were conducted where Facebook addiction, stress, general health, sleep quality, and quality of life were dependent variables. Independent variables introduced in subsequent steps can be found in Tables 2 and 3. For all linear regression analyses, preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. All tests were two-tailed and the significance level was set to $\alpha = .05$.

2.6 Ethics

The project was approved by the Research Ethics Committee at the Psychology Department of the University of Gdańsk. Attaining formal and written informed consent was not regarded as necessary as voluntary completion of the questionnaires was regarded as providing consent.

3. Results

3.1 Factor analysis

The model with one factor of Facebook addiction showed following fit indices: $\chi^2/df = 29.78$, CFI = .88, TLI = .79, RMSEA = .158 (90% CI = .142 – .174). Standardized factor loadings on items were: .75, .94, .70, .78, .72, .87, respectively. Due to the lack of acceptable model fit, residuals of the first and second item were correlated on the basis of modification indices similarly to previous studies (Charzyńska, & Góźdź, 2014). The modified model had a good fit: $\chi^2(8) = 12.89$ ($p = .012$), $\chi^2/df = 1.61$, CFI = .998, TLI = .996, RMSEA = .023 (90% CI = .000 – .045). Standardized factor loadings on items were: .60, .86, .71, .81, .74, .89, respectively. The correlation between residuals of the first and second item was .51.

3.2 Descriptive statistics

Table 1 presents mean scores, standard deviations, percentages, and correlation coefficients of the study variables.

[INSERT TABLE 1 ABOUT HERE]

3.3 Predictors of Facebook addiction

Regression analysis for Facebook addiction (see Table 2) showed that the independent variables explained a total of 11.6% of the variance of Facebook addiction, $F_{12,1124} = 12.26$, $p < .001$. Significant independent variables in Step 4 were gender ($\beta = -.10$), showing that females score higher on Facebook addiction, age ($\beta = .07$), extraversion ($\beta = .17$), narcissism ($\beta = .17$), self-efficacy ($\beta = -.12$), social anxiety ($\beta = .16$), and loneliness ($\beta = .07$).

[INSERT TABLE 2 ABOUT HERE]

3.4 Facebook addiction as predictor of well-being

Regression analysis for stress (see Table 3) showed that the independent variables explained a total of 35.8% of the variance of stress, $F_{13, 1123} = 48.14$, $p < .001$. Significant independent variables in Step 5 were Facebook addiction ($\beta = .10$), gender ($\beta = -.05$, $p = .055$), showing that females score higher on quality of life, emotional stability ($\beta = -.12$), openness to experience ($\beta = .06$) self-esteem ($\beta = -.28$), self-efficacy ($\beta = -.17$), social anxiety ($\beta = .09$), and loneliness ($\beta = .13$).

Regression analysis for general health (see Table 3) showed that the independent variables explained a total of 15.6% of the variance of general health, $F_{13,1123} = 15.99$, $p < .001$. Significant independent variable in Step 5 were Facebook addiction ($\beta = -.11$), age ($\beta = -.11$), and self-esteem ($\beta = .33$).

Regression analysis for sleep quality (see Table 3) showed that the independent variables explained a total of 13.8% of the variance of sleep quality, $F_{13,1123} = 13.79$, $p < .001$. Significant independent variables in Step 5 were Facebook addiction ($\beta = -.08$), emotional stability ($\beta = .08$), openness to experience ($\beta = -.08$), and self-esteem ($\beta = .32$).

Regression analysis for quality of life (see Table 3) showed that the independent variables explained a total of 34.4% of the variance of quality of life, $F_{13,1123} = 45.26$, $p < .001$. Significant independent variables in Step 5 were gender ($\beta = -.11$), showing that females score higher on quality of life, age ($\beta = -.07$), extraversion ($\beta = .09$) self-esteem ($\beta = .33$), self-efficacy ($\beta = .23$), and loneliness ($\beta = -.14$).

[INSERT TABLE 3 ABOUT HERE]

4. Discussion

4.1 Psychometric properties of BFAS

Factor-analytical results showed that original 6-item one factor solution had mediocre fit to the data. Examination of the modification indices showed that error term of Item 1 had substantial covariance with error term of Item 2. The results were similar to the results obtained by Charzyńska and Góźdź (2014). The error correlations were introduced also in the case of other addiction scales based on the core components of addiction, and it was suggested that it may be related to the fact that addiction, apart from the core compulsion, also includes general component of high time and energy investment concerning particular behavior measured by these scales (Atroszko, Pallesen, Griffiths, Andreassen, 2017). The 6-item one-factor solution of the Bergen Facebook Addiction Scale with correlated error terms had acceptable fit (H1 substantiated). All factor loadings were significant, with standardized values above .40.

4.2 Facebook addiction and personality

Before including all personality variables in the tested model there was a negative relationship between Facebook addiction and emotional stability as well as conscientiousness and openness to experience, which is congruent with previous studies (H2 substantiated) (Andreassen, Torsheim et al., 2012; Andreassen et al., 2013; Błachnio, Przepiórka, Sendol-Durak et al., 2017; Błachnio, Przepiorka, Benvenuti et al., 2016; Mahmood & Farooq, 2014; Tang et al., 2015). Furthermore, there was a positive relationship between Facebook addiction and extraversion even after controlling for all the investigated personality characteristics. This suggests that strong need for social interactions might be an independent risk factor for Facebook addiction (Tang et al., 2015).

Facebook addiction was positively related to narcissism but there was no relationship between Facebook addiction and self-esteem (H3 partially substantiated). Expressing ambitions and showing successes to a potentially large audience while obtaining highly visible rewards

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through "likes" and comments, may be strong gratification for narcissists attracted to engaging in ego-enhancing activities (Andreassen et al., 2016; Wang, Jackson, Zhang, & Su, 2012). On the other hand, positive and negative feedback from other users as well as different motivations to use Facebook, can both enhance or lower self-esteem (Valkenburg, Peter, & Schouten, 2006). What is more, Facebook addiction was negatively related to self-efficacy. People with low self-efficacy, who do not believe in their own abilities to cope with wide range of situations, have limited strategies to cope with stress or social anxiety (Wegmann & Brand, 2016). They could get involved in activities on Facebook to escape from problems.

4.3 Facebook addiction and social functioning

Both social anxiety and loneliness were positively related to Facebook addiction (H4 substantiated) which is congruent with previous studies (Błachnio, Przepiórka, Boruch, & Bałakier, 2016; Dobrean & Păsărelu, 2016). It shows that although loneliness is one of the effects of social anxiety it might be as well an effect of another affliction and have unique contribution to Facebook addiction even after controlling the level of social anxiety. Thus, results show relative contribution of social anxiety and loneliness to Facebook addiction within a more complementary model of personality risk factors.

Facebook addiction and well-being

Facebook addiction was positively associated with perceived stress and negatively with general health and sleep quality above and beyond personality factors and social functioning (H5 partially substantiated). These results are congruent with previous studies (Hanprathet et al., 2015) and show that Facebook dependence may have detrimental effect on health. However, Facebook addiction was not related to quality of life (part of H5 not substantiated). Single item measure of quality of life might be excessively general and/or not sensitive enough to identify small differences in global quality of life. As a general indicator of psychosocial functioning

quality of life may deteriorate at a relatively slow rate, and since study included young people, it may take time to observe overall decrease in their well-being due to Facebook addiction.

4.4 Strengths and limitations

To the authors' knowledge the current study is the first to investigate the relative contribution of a wide range of relevant personality characteristics to Facebook addiction, and the unique variance which this addiction explains in different facets of well-being above and beyond these personality characteristics. The present study comprised a relatively large sample size providing high statistical power and valid and reliable psychometric tools were included. Consequently, the study significantly adds to the existing literature on behavioral addictions, and provides further insights into the nature of Facebook addiction, and its relationship to health and psychological well-being. On the other hand, the study has some limitations that should be noted. All data were self-reported, which is in turn open to the usual weaknesses of such data (e.g., common method, social desirability and recall biases). Furthermore, as the Polish sample was not representative, this puts restrictions on the generalizability to other populations.

5. Conclusions and future research directions

Based on the findings in the present study it is concluded that Facebook addiction can be validly and reliably measured among university students in Poland. What is more, results provide some initial support for the general hypothesis that Facebook addiction might be a result of ineffective mood regulation by individuals who have a problematic social life. When suggested tentative personality risk factors model were investigated, addictive Facebook use was related to being female, being older, extraverted, narcissistic, having low sense of self-efficacy as well as feeling loneliness and social anxiety. In the light of these results, it seems that Facebook dependent individuals crave for social interactions, especially self-validation through these interactions. However, because underlying causes of distress are not confronted and dealt with, due to their low general self-efficacy, the increasingly compulsive Facebook

activity may generate additional stress and in consequence may negatively affect their psychosocial functioning. In line with the addiction framework, Facebook addiction is related to higher stress, lower general health and lower sleep quality. Future research should attempt to collect and analyze further data on the psychometric properties of the Bergen Facebook Addiction Scale, including reasons for the correlated error terms between items. Due to the fact that the results of previous studies are not always coherent, future investigations on the impact of Big Five personality traits on the Facebook addiction should be conducted, as well as on the impact of self-efficacy and insufficient self-control on Facebook addiction. The role of motivation to use Facebook may provide useful information in terms of possible correlates of Facebook addiction. Furthermore, longitudinal studies using representative samples of young adults would aid the examination potential developmental risk factors of Facebook addiction. The temporal stability of Facebook addiction should also be investigated.

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Table 1

Mean scores and standard deviations (*SD*), percentages, and correlation coefficients (Pearson product-moment/point-biserial) between study variables.

Variable	Mean (SD)/ Percentages	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Facebook addiction	12.15 (5.12)	—															
2. Gender [a]	51.9% females	−.13**	—														
3. Age	20.33 (1.68)	.06*	−.04	—													
4. Extraversion	8.88 (2.90)	.04	−.10**	.01	—												
5. Agreeableness	9.71 (2.26)	−.05	−.09**	−.02	.07*	—											
6. Conscientiousness	9.37 (2.66)	−.07*	−.09**	.08**	.11**	.07*	—										
7. Emotional stability	8.48 (2.76)	−.15**	.19**	.03	.09**	.35**	.16**	—									
8. Openness to experience	9.92 (2.23)	−.07*	−.10**	−.06*	.37**	.04	.10**	.02	—								
9. Self-esteem	5.85 (1.81)	−.10**	.06*	.09**	.32**	.15**	.29**	.31**	.22**	—							
10. Narcissism	3.81 (2.14)	.13**	.20**	.00	.02	−.36**	−.04	−.08**	.03	.04	—						
11. Self-efficacy	14.02 (2.67)	−.17**	.09**	.05	.27**	.09**	.26**	.29**	.32**	.44**	.09**	—					
12. Social anxiety	18.29 (5.43)	.19**	−.17**	−.04	−.39**	.08**	−.18**	−.20**	−.31**	−.32**	−.11**	−.39**	—				
13. Loneliness	4.75 (1.70)	.13**	−.01	−.11**	−.35**	−.05	−.17**	−.26**	−.15**	−.42**	.03	−.33**	.37**	—			
14. Stress	10.80 (2.97)	.22**	−.15**	−.06	−.21**	−.05	−.21**	−.32**	−.11**	−.48**	−.05	−.42**	.35**	.38**	—		
15. General health	6.09 (2.08)	−.15**	.04	−.08**	.11**	.12**	.12**	.17**	.06*	.35**	−.04	.20**	−.09**	−.14**	−.21**	—	
16. Sleep quality	5.23 (2.16)	−.11**	.04	.05	.07*	.06*	.06*	.19**	−.00	.33**	.00	.16**	−.12**	−.18**	−.25**	.41**	—
17. Quality of life	6.99 (1.39)	−.07*	−.07*	−.01	.30**	.15**	.18**	.21**	.17**	.50**	−.02	.43**	−.23**	−.37**	−.37**	.30**	.26**

[a] Point-biserial correlation coefficient (0 = female, 1 = male).

*p < .05. **p < .01.

Table 2

Results of hierarchical multiple regression analyses in which age, gender, big five personality traits, self-esteem, narcissism, self-efficacy, social anxiety and loneliness were regressed upon the scores on BFAS ($n = 1137$).

Predictor	β	ΔR^2
Step 1		.020**
Gender [a]	−.13**	
Age	.06	
Step 2		.032**
Gender [a]	−.12**	
Age	.06	
Extraversion	.08**	
Agreeableness	−.02	
Conscientiousness	−.06*	
Emotional stability	−.12**	
Openness to experience	−.09**	
Step 3		.024**
Gender [a]	−.14**	
Age	.06*	
Extraversion	.09**	
Agreeableness	.04	
Conscientiousness	−.05	
Emotional stability	−.11**	
Openness to experience	−.09**	
Self-esteem	−.07*	
Narcissism	.16**	
Step 4		.040**
Gender [a]	−.10**	
Age	.07**	
Extraversion	.17**	
Agreeableness	.00	
Conscientiousness	−.01	
Emotional stability	−.05	
Openness to experience	−.04	
Self-esteem	.00	
Narcissism	.17**	
Self-efficacy	−.12**	
Social anxiety	.16**	
Loneliness	.07*	
Total R^2		.116**

[a] 0 = female, 1 = male.

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

Table 3

Results of hierarchical multiple regression analyses in which Facebook addiction, age, gender, big five personality traits, self-esteem, narcissism, loneliness, self-efficacy and social anxiety were regressed upon the scores on anxiety, stress, general health, sleep quality and quality of life (n = 1137).

Predictor	Stress β	Stress ΔR^2	General health β	General health ΔR^2	Sleep quality β	Sleep quality ΔR^2	Quality of life β	Quality of life ΔR^2
Step 1		.046**		.024**		.014**		.007**
Facebook addiction	.21**		−.16**		−.12**		−.08**	
Step 2		.020**		.005*		.005		.007*
Facebook addiction	.20**		−.15**		−.12**		−.09**	
Gender [a]	−.13**		.02		.03		−.09**	
Age	−.07*		−.07*		.06*		−.01	
Step 3		.137**		.044**		.034**		.138**
Facebook addiction	.16**		−.12**		−.10**		−.06*	
Gender [a]	−.11**		.02		.01		−.07*	
Age	−.05		−.08**		.05		−.02	
Extraversion	−.18**		.09**		.08*		.25**	
Agreeableness	.07*		.06		.00		.04	
Conscientiousness	−.15**		.09**		.03		.11**	
Emotional stability	−.26**		.11**		.16**		.16**	
Openness to experience	−.03		.00		−.04		.06	
Step 4		.107**		.080**		.084**		.136**
Facebook addiction	.15**		−.11**		−.09**		−.04	
Gender [a]	−.07**		.00		−.02		−.10**	
Age	−.02		−.11**		.03		−.06*	
Extraversion	−.09**		.01		.00		.14**	
Agreeableness	.07*		.03		−.01		.02	
Conscientiousness	−.07*		.02		−.05		.02	
Emotional stability	−.18**		.04		.09**		.08**	
Openness to experience	.01		−.03		−.08*		.01	
Self-esteem	−.37**		.33**		.33**		.42**	
Narcissism	−.02		−.03		.00		−.01	
Step 5		.048**		.003		.001		.056**
Facebook addiction	.10**		−.11**		−.08**		−.00	
Gender [a]	−.05†		.01		−.02		−.11**	
Age	.00		−.11**		.02		−.07**	
Extraversion	−.01		.03		−.01		.09**	
Agreeableness	.05		.02		−.01		.03	
Conscientiousness	−.03		.02		−.05		−.01	
Emotional stability	−.12**		.05		.08*		.02	
Openness to experience	.06*		−.03		−.08*		−.03	
Self-esteem	−.28**		.33**		.32**		.33**	
Narcissism	−.01		−.03		.00		−.02	
Self-efficacy	−.17**		.04		.01		.23**	
Social anxiety	.09**		.06		−.01		.01	
Loneliness	.13**		.02		−.03		−.14**	
Total R^2		.358**		.156**		.138**		.344**

[a] 0 = female, 1 = male.

* $p < .05$. ** $p < .01$. † $p = .055$.