




Emerging Adults and Facebook Use: the Validation of the Bergen Facebook Addiction Scale (BFAS)

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Abstract

Based on the six key components of addiction, the Bergen Facebook Addiction Scale (BFAS) is a widely used instrument to assess Facebook addiction. This study aimed to conduct a psychometric validation in a Portuguese sample of emerging adults (ages 18 to 29 years). The construct validity analyses confirmed the one-factor solution and a statistically significant association found between Facebook addiction and Preference for Online Social Interaction, measured by the Generalized Problematic Internet Use Scale 2, warranted the scale criterion validity. Internal consistency was scrutinized using Cronbach's α ($\alpha = .87$) and stability measured by test-retest ($r = .94$). Associations between BFAS scores and Brief Symptom Inventory dimensions scores (e.g., interpersonal sensitivity, depression, anxiety) and the GPIUS2 subscale, deficient self-regulation, scores were evaluated. A subsample with higher levels of addiction was analyzed. In summary, the results of the present study support the use of the Portuguese version of the BFAS in both research and clinical milieus. Further implications for research and practice were considered.

Keywords Behavioral addiction · Social networking sites · Bergen Facebook addiction scale (BFAS) · Portuguese psychometric studies · Emerging adults

Social networking sites (SNSs) are a global phenomenon, enjoying an exponential increase in their use (e.g., Facebook, Twitter). Participation in SNSs is currently one of the main activities on the Internet, especially for younger generations (Eurostat 2016; Kuss and Griffiths 2011). In Portugal, the use of SNSs is also extremely popular, being one of the preferred online activities of Portuguese adolescents and young adults (Pontes and Patrão 2014). SNSs constitute virtual communities where users can: (1) create a public or semi-public profile, (2) manage a list of other users with whom they have a connection, and (3) view and intersect their list of connections with those made by other users (Boyd and Ellison 2008). One specific aspect of SNSs is their focus on

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connecting with other individuals (Kuss and Griffiths 2017), which relates to certain fundamental human needs, such as social support and self-expression (Andreassen et al. 2012; Kuss and Griffiths 2011), further increasing the popularity of SNSs and overall levels of engagement. However, previous research has suggested that excessive engagement with SNSs and their users' perceived need to be constantly connected to these services are considered problematic (Kuss and Griffiths 2017). Although the use of SNSs is a common behavior, excessive and compulsive use has recently been suggested as a behavioral addiction (Andreassen 2015).

Turkle (2015) has argued that diminishing social skills (e.g., empathy) in excessive SNSs users may be partly attributable to an increasing overdependence on technology as meaningful social interactions are disregarded and replaced with a constant, though shallow or unsubstantial, virtual connection (Turkle 2015). Other authors have also argued that the need for a constant virtual connection may increase the risk of SNS overuse, which in extreme cases may present characteristics similar to those of substance-related addictions (Kuss and Griffiths 2017). Given the potential addictive properties of SNSs, a large body of research has investigated problematic use and addiction to SNSs and its potential negative consequences for users, such as reduced communities in "real life" and diminished interpersonal relationships, impoverished family time, decline in academic and professional performance, increased levels of psychopathological symptoms, and poor health, among other detrimental health-related effects (Andreassen et al. 2012; Jacobsen and Forste 2011; Carvalho et al. 2017; Kuss and Griffiths 2017; Pontes 2017; Satici and Uysal 2015; Turkle 2015).

Since the appearance of the first studies on SNS addiction, research in the field has advanced rapidly, with a growing number of studies published internationally in the last few years (Kuss and Griffiths 2011). In Portugal, however, research in this area is still in its infancy, and although studies are scarce, they mostly focus on adolescents' use of SNSs (e.g., Assunção and Matos 2017; Pontes et al. 2016a; Pontes 2017). More recently, international studies have emphasized the need to investigate more diverse age groups, such as emerging adults (e.g., Coyne et al. 2013; Holmgren and Coyne 2017). Emerging adulthood is a developmental stage particularly susceptible to an ever-expanding use of these virtual communities as emerging adults no longer feel the constraints present in adolescence (e.g., parental control) and have not yet assumed the full duties of adulthood (e.g., professional/family responsibilities) (Coyne et al. 2013). Thus, it is common for emerging adults to spend a significant part of their day using SNSs (Jacobsen and Forste 2011).

According to Griffiths (2013), SNS addiction can be defined as a behavioral addiction within a biopsychosocial framework, featuring six core components: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Griffiths 2005). Although gambling disorder is currently the only behavioral addiction officially recognized by the American Psychiatric Association [APA] (APA 2013), Internet gaming disorder has been added to section III of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a tentative disorder (APA 2013), further underscoring the potential negative impact of specific Internet-related activities, as numerous studies and authors have suggested (Dieter et al. 2017; Griffiths and Szabo 2014; Pontes et al. 2015a, b; Pontes and Griffiths 2016).

With regard to the estimation of prevalence rates of SNS addiction, findings in this area remain mostly inconclusive as most studies relied on inconsistent psychometric assessment methods and heterogeneous theoretical frameworks (Kuss and Griffiths 2017). Moreover, the lack of consensus in measurement methods is likely to inflate prevalence rates of SNS addiction (Bányai et al. 2017). Therefore, in order to overcome such methodological drawbacks, research has focused on developing psychometrically sound instruments to assess SNS addiction, such

as the six-item Bergen Facebook Addiction Scale (BFAS) (Andreassen et al. 2012). The BFAS offers many advantages, including but not limited to its solid theoretical framework, brevity and ease of use, and extensive cross-cultural validity across many countries and samples (e.g., Jafarkarimi et al. 2016; Phanasathit et al. 2015; Salem et al. 2016; Silva et al. 2015), applicable to Portuguese teenage populations as well (Pontes et al. 2016a).

The Specific Case of Facebook

Although SNSs are a specific type of the broader set of social applications available online, there is still great diversity in both their composition and purpose (e.g., information sharing, photo sharing, messaging, gaming, etc.) (Kuss and Griffiths 2017). Facebook is a particular case. Launched in 2004, it became the most popular SNS, and the number of users has been growing ever since (Statista 2018). Unlike other SNSs, where only one main activity is developed (e.g., Instagram), Facebook brings together several features and possible activities, and as such, different gratifications are enjoyed by individuals who use it. Facebook's main attraction is the maintenance and establishment of relationships, but the network is also a means for self-expression, content sharing, entertainment, information seeking, spending leisure time, and gaming, among other activities (Andreassen et al. 2012; Holmgren and Coyne 2017; Kuss and Griffiths 2017; Ryan et al. 2014). Due to Facebook's unique characteristics and potential to trigger addictive behavior, several studies have argued for the need to conceptualize Facebook addiction as a mental health disorder (Andreassen et al. 2012; Andreassen and Pallesen 2013; Blachnio and Przepiorka 2016, Ryan et al. 2014).

Several positions underlying our understanding of the phenomenon of addiction may be appropriately employed for the study of Facebook addiction taken as a particular case. According to the General Theory of Addiction (Jacobs 1986), addiction encompasses persistent, out-of-control behavioral patterns involving substances (e.g., alcohol) and activities (e.g., gambling), acquired over time, performed as a coping strategy (i.e., as a way to escape unpleasant situations or thoughts). Additionally, the adoption of addictive behaviors is noted by researchers as being a stress relief mechanism associated with lack of self-regulation, leading to increased procrastination and depressive symptoms (Holmgren and Coyne 2017). Concordantly, several authors have corroborated that Facebook is used for reasons of mood modification, avoidance of negative or undesired thoughts, and procrastination (Holmgren and Coyne 2017; Ryan 2014).

Caplan's model of generalized pathological Internet use (2010) proposes that individuals who prefer online interactions (versus face-to-face interaction) are more likely to use online communication to regulate their mood. Similarly, preference for online social interactions and the motivation to use the Internet for mood regulation are predictors of deficient self-regulation. As argued by Caplan (2010), individuals who are socially anxious or have poor social skills are more predisposed to exhibit a preference for online social interactions as they perceive online communication as less threatening and believe it to be more efficacious when interacting online. Such individuals are at a greater risk for experiencing the negative consequences of Internet overuse (Caplan 2010). Additionally, it has also been argued that online communication may represent a way to mitigate their anxiety about self-representation in interpersonal situations, feelings of loneliness, and depression (Caplan 2010). Accordingly, several studies have explored the association between Facebook addiction and the existence of psychological symptoms such as anxiety and depression (Andreassen et al. 2012; Holmgren and Coyne 2017; Ryan et al. 2014) or feelings of inadequacy and diminished interpersonal qualities (Holmgren and Coyne 2017; Ryan et al. 2014).

Emerging Adults, SNSs, and Facebook

In recent decades, the period of transition from adolescence to adulthood has become increasingly longer due to a wide range of social, economic, and demographic transformations, and occurring most notably in countries with higher incomes (Arnett 2000). This extension is corroborated by contemporary person's age at those events which are the traditional markers for entry into adulthood, such as marriage, parenthood, and stable employment. Today, the average age for these markers is close to 30 years, signaling a clear break from previous generations (Arnett, Žukauskiene, and Sugimura 2014). In Portugal, the average age at first marriage is 32.8 and 31.3 years for men and women, respectively (Pordata 2017a, b), and the average age of a mother at the birth of her first child is 30.3 years (Pordata 2017a, b). Thus, although individuals have reached physical and sexual maturity, the stability associated with adulthood is not yet present, making this a period of exploration marked by instability (Arnett et al. 2014). The period between late adolescence and adulthood has now become so long that it can be considered a distinct period of development as opposed to a brief transitional phase. It was defined by Arnett (2000) as emerging adulthood, a developmental period distinct from adolescence and adulthood, which encompasses individuals from 18 to 29 years of age (Arnett et al. 2014).

Although the characterization of this period must be framed within the context of the culture and socioeconomic status of individuals where this phenomenon is studied, one of the main features of this period seems to be the use of the new forms of media and the importance they assume at this stage of development (Brown 2006). Accustomed since childhood to using computers, mobile phones, and other devices, emerging adults embrace the use of new means of communication which in turn occupy an ever-expanding space in their daily lives. During this period, new forms of media can function as an expression of autonomy, an exploration of one's identity, or socialization, allowing the maintenance and building of relationships (Coyne et al. 2013). It should be noted that many emerging adults also use social media as a way to obtain virtual social support, thus compensating for the decrease in their offline social support network, a result of the instability in their lives (Arnett et al. 2014). Although most emerging adults appear to develop healthy media use habits that complement relationships and social support networks, some authors point to effects such as diminished academic performance and real-life interaction, with overuse being indicative of difficulties in establishing relationships in real life (Coyne et al. 2013; Jacobsen and Forste 2011). In this sense, the scarcity of studies on the use of SNSs in emerging adults, and Facebook in particular, makes this area of research particularly relevant for understanding and intervening in technological addictions.

The Present Study

Given the aforementioned rationale and following on the studies carried out with Portuguese adolescents, this research aimed to evaluate the validity and reliability of the BFAS in a Portuguese sample of emerging adults (i.e., 18 to 29 years). The focus on this particular group of users arose from the observation of the pervasive use of SNSs in their lives, particularly Facebook, as well as the lack of research on this period particular of development. The following specific objectives were defined to assess the psychometric properties of the Portuguese version of the BFAS: (a) determining the construct validity; (b) evaluating the criterion validity with the Preference for Online Social Interaction subscale measured by the

Portuguese version of the Generalized Problematic Internet Use Scale 2 (GPIUS2) (Pontes et al. 2016b); and (c) ascertaining reliability by analyzing internal consistency and time stability.

The present study also aimed to explore Facebook use among emerging adults through: (d) assessing the correlation between Facebook addiction and the interpersonal sensitivity, depression, anxiety subscales measured by the Portuguese version of the Brief Symptom Inventory (Canavarro 2007) as well as with the deficient self-regulation subscale measured by the Portuguese version of the GPIUS2; and (e) characterizing a subsample of emerging Portuguese adults with higher levels of addiction to Facebook through descriptive analyses and according to the criteria proposed by Andreassen and collaborators (Andreassen et al. 2012).

Methods

Participants and Procedure

The present study was granted ethical approval by the research team's University Ethics Committee before data collection began. All participants had to provide an informed consent prior to starting the survey, and informed that the data collected were anonymous and confidential. The BFAS translation and back-translation process was carried out following the protocol proposed by Harkness et al. (2010). Two different translations carried out by two independent teams, as well as a pretest, were performed before the elaboration of the final version. Once the final version of the instrument was prepared, data collection started, both in-person and through an online survey. The sample was selected on the basis of availability through a non-random sampling method between January and May 2017. All data obtained remained anonymous and confidential, and no financial rewards were provided to participants. The inclusion criteria used were: (a) age between 18 and 29 years old; (b) Portuguese nationality; and (c) Facebook user.

Data was collected from 404 individuals, aged from 18 to 29 years ($M = 21.65$; $SD = 3.24$). Most participants were women (73.3%), residing in mainland Portugal (87.6%). The majority of individuals were students (84.8%), having completed the 12th grade (70%) (see Table 1).

Measures

Sociodemographic and Facebook Usage Survey

Specifically designed for the present study, this survey included questions about participants' sociodemographic data (e.g., age, gender, education, occupational status, geographic region, and relationship status) and Facebook use (time spent on the platform daily, activities usually pursued, and content viewed).

Bergen Facebook Addiction Scale (BFAS)

The BFAS (Andreassen et al. 2012) is a six-item tool that assesses Facebook addiction via a self-reporting scale, with each item corresponding to one of the six central components of addiction according to the model proposed by Griffiths (2005): salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Relative to the respondents' last

Table 1 Sociodemographic data

		<i>N</i>	%
Age	18–21	249	61.6
	22–25	87	21.6
	26–29	68	16.8
Gender	Female	296	73.3
	Male	108	26.7
Education	4th grade	1	0.2
	6th grade	-	-
	9th grade	1	0.2
	12th grade	282	70
	Bachelor's degree	89	22.1
	Master's degree	28	6.9
	PhD	2	0.5
Occupational status	Studying	340	84.2
	Working (PT) ^a	13	3.2
	Working (FT) ^b	36	8.9
	Unemployed	12	3
Geographic region	Continental Portugal	353	87.6
	Autonomous regions	50	12.4
Relationship Status	Single	229	56.7
	In a relationship	151	37.4
	Living together, unmarried	20	5
	Marriage	3	0.7
	Remarried	1	0.2

^a Part-time^b Full-time

12 months, the items are scored between 1 (very rarely) and 5 (very frequently) (e.g., “How often during the last year did you use Facebook in order to forget about personal problems?”). The overall score ranged from 6 to 30, with higher scores reflecting a greater addiction to Facebook (Andreassen et al. 2012). The original authors have suggested that a score of 3 or more in response to four of the six items is an indicator of addiction (Andreassen et al. 2012). The original version of the BFAS revealed good psychometric properties, namely good internal consistency ($\alpha = .83$), test-retest reliability ($r = .82$), convergent validity with related scales, and a one-factor structure with good fit indicators (RMSEA = .046, CFI = .99). The BFAS has also been shown to have excellent psychometric properties in younger samples (Pontes et al. 2016a).

Generalized Problematic Internet Use Scale 2 (GPIUS2)

The GPIUS2 was developed by Caplan (2010) and recently validated for the Portuguese population by Pontes and colleagues (Pontes et al. 2016b). It is a multidimensional scale that contains 15 self-report items, covering six dimensions and assessing the degree of problematic Internet use experienced through cognitions, behaviors, and negative consequences. Higher scores reflect a more problematic level of Internet use for individuals.

In the present study, the following subscales were used: Preference for Online Social Interaction (POSI) and deficient self-regulation (DSR). These two dimensions were assessed given their empirical relevance in understanding SNS addiction (Caplan 2010; Jacobs 1986; Holmgren and Coyne 2017; Pontes et al. 2016a). POSI is an important cognitive symptom of

problematic Internet use, and is characterized by the belief that one is more secure, confident, and comfortable in performing social interactions through online communication rather than in a face-to-face context. DSR refers to the unsuccessful attempts to monitor and moderate the use of the internet and represents the interaction of cognitive preoccupation (e.g., obsessive thoughts about Internet use) and the behavioral symptoms of compulsive internet use (Caplan 2010). The GPIUS2 was scored using a seven-point Likert type response format, ranging from 1 (strongly disagree) to 7 (strongly agree). The validity and reliability analysis of the Portuguese version demonstrated adequate results in previous studies (Pontes et al. 2016a). In the present study, Cronbach's α for the dimensions was: POSI $\alpha = .86$ and DSR $\alpha = .86$.

Brief Symptom Inventory (BSI)

Developed by L. Derogatis (1993), this inventory evaluates the presence of psychopathological symptoms and psychological distress. The Portuguese version used in this study was previously validated by Canavarro in 1999 and updated in 2007 (Canavarro 2007). The BSI is a self-report instrument, using a five-point Likert response format, that ranges from 0 (never) to 4 (very often) and focusing on how the symptoms affected the individual in the past 7 days. The presence of psychological symptoms is translated into higher score values. The BSI has shown excellent psychometric proprieties and can be administered either to clinical or general populations (Canavarro 2007). Although the inventory assesses nine dimensions, the present investigation only evaluated the following: interpersonal sensitivity, depression, and anxiety.

Interpersonal sensitivity focuses on examining feelings of inferiority and personal inadequacy. The depression dimension includes items that reflect indicators of clinical depression (e.g., dysphoric mood, lack of motivation). The anxiety dimension measures symptoms of generalized anxiety as well as general indicators (e.g., nervousness, tension) (Canavarro 2007). These dimensions were chosen based on the current literature, which has established links between feelings of inadequacy, anxiety, and depression symptoms with SNS addiction (Andreassen et al. 2016; Holmgren and Coyne 2017; Ryan et al. 2014) and diminished interpersonal capabilities with a preference for online communication (Caplan 2010). The Cronbach's alphas for the dimensions in the present study were: depression subscale $\alpha = .84$; anxiety subscale $\alpha = .86$; interpersonal sensitivity $\alpha = .80$.

Data Analyses

Statistical analyses were preceded by (a) identification of missing values, (b) a guarantee of the complete randomization of missing values, using the Missing Completely at Random (MCAR) method, (c) checking for normal distribution on all instruments by inspection of the symmetry and kurtosis values in the present sample. The use of specific parametric tests was decided (Norman 2010). A Student's *t* test was performed to ascertain any differences between the two methods of data collection, and no statistically significant differences were found between the results collected online ($M = 1.95$, $SD = .74$) and in person [$M = 1.79$; $SD = 0.78$; $t(402) = 1.49$, $p = 0.12$]. Taking this result into account, subsequent analysis was performed without any differentiation between subgroups.

Descriptive analyses were performed in order to characterize the sample and the key findings related to the main variables assessed in the study. To analyze the construct validity of the instrument, a Confirmatory Factor Analysis (CFA) was performed. Criterion validity was conducted through a structural equation modeling (SEM) analysis, using the POSI

construct, measured by GPIUS2 as a predictor. The structural equation modeling analysis used the following conventional fit indices and thresholds to examine the goodness of fit of the model under analysis: χ^2/df [1;4] and $p > .05$, root mean square error of approximation (RMSEA) [0.05;0.08], RMSEA 90% confidence interval with its lower limit close to 0 and the upper limit below .08, Probability level value of the test of close fit (Cfit) $> .05$, Standardized Root Mean Square Residual (SRMR) [0.05;0.08], Comparative Fit Index (CFI), and Tucker-Lewis Fit Index (TLI) [.90;.95] (Bentler 1990; Hu and Bentler 1999).

To study BFAS reliability, the internal consistency method (Cronbach's α) and the method of temporal stability analysis (test-retest), with a time interval of 2 weeks, were used. Moreover, BFAS scores were correlated with scores obtained in three dimensions of BSI and the deficient self-regulation subscale, measured by GPIUS2. Data collection, processing, and statistical analysis were performed using the Statistical Package for the Social Sciences (SPSS) and IBM SPSS Amos, version 22.

Results

Descriptive Analysis

Table 1 shows the sociodemographic characteristics of the participants ($N=404$). As for Facebook, most individuals (89.8%) reported that their use includes conversations and accessing information (72.4%), while 61.4% use Facebook to view multimedia content, 12.4% for purchases, 9.5% for gaming, and only 2.5% to view erotic content. Average daily usage of Facebook was reported to be 120.57 minutes (SD = 130.87 minutes). In the present study, the sample recruited obtained the following average BSI scores: interpersonal sensitivity .91 (SD = .75), depression .89 (SD = .71), and anxiety .87 (SD = .69). According to Canavaro (2007), the mean scores of the general Portuguese population in these dimensions are: interpersonal sensitivity ($M = .96$; SD = .73), depression ($M = .89$; SD = .72), and anxiety ($M = .94$; SD = .77). The present sample also had the following GPIUS2 subscales mean scores: POSI 1.98 (SD = 1.20) while the DSR obtained 2.36 (SD = 1.23). In BFAS, an average score of 1.81 (SD = 0.78) was found within the sample recruited. In terms of the descriptive statistics concerning individual BFAS items, item 1 ("... spent a lot of time thinking about Facebook or planned use of?") presented a higher average score ($M = 2.26$, SD = 1.17), followed by item 2 ("...felt an urge to use Facebook more and more?") ($M = 2$, SD = 1.03). The ordering is completed as follows: item 3 ("...used Facebook in order to forget about personal problems?") ($M = 1.81$, SD = 1.01), item 4 ("...tried to cut down on the use of Facebook without success?") ($M = 1.70$, SD = 0.96), item 6 ("...used Facebook so much that it has had a negative impact on your job/studies?") ($M = 1.63$, SD = 0.96) and, with the lowest mean score, item 5 ("...become restless or troubled if you have been prohibited from using Facebook?") ($M = 1.49$, SD = 0.81).

Construct Validity

To test the one-factor solution of the Facebook addiction construct (Andreassen et al. 2012), a CFA was performed on the six items of the BFAS using the maximum likelihood estimation method. The analysis produced the following results: $\chi^2(9) = 56.889$, $p < .001$, $\chi^2/df = 6.321$; RMSEA = .115 [90% CI: 0.088–0.145], CFI = .956; GFI = .950, TLI = .927. Additionally,

standardized item loadings were all statistically significant and ranged from .65 to .84. Overall, these results clearly demonstrate that the one-factor solution model for the BFAS presents a good fit to the data (Fig. 1).

Criterion Validity

Criterion validation was investigated through a SEM analysis. The structural model included POSI as the predictor of Facebook addiction, as established by previous studies (Pontes et al. 2016b). The results of this analysis produced an excellent fit to the data ($\chi^2 = 80.307$, $df = 26$, $\chi^2/df = 3.089$, $p < .001$; CFI = .970, TLI = .958; RMSEA = .072, 90% CI [0.055–0.091]; GFI = .954). A further inspection to the correlation coefficient, with 95% BCa CI between the two variables, provided additional support for the BFAS's criterion validity ($r = .27$, $R^2 = .073$, $p < .0001$, 95% BCa CI [.18–.35]) (Fig. 2).

Reliability

In the present study, the Cronbach's α of the BFAS was .87, which is adequately high (DeVellis 1991) and does not exceed the unwanted threshold of .90 (Streiner 2003). Furthermore, the Cronbach's α could not be improved by deleting any item of the BFAS. Finally, the estimation of the correlation coefficient for the interval between the two test administrations (test-retest) revealed a statistically significant result [$r = .94$; $n = 62$, $p < .001$], which translates to a "large" effect size (Cohen 1988).

Correlations Between BFAS Scores and BSI and GPIUS2 Subscales

Due to its theoretical relevance, the association between BFAS scores and the GPIUS2 subscale deficient self-regulation and the three subscales of BSI (interpersonal sensitivity, depression, and anxiety) was investigated through Pearson correlations. Overall, the BFAS results were positively associated with all constructs (Table 2), demonstrating that greater

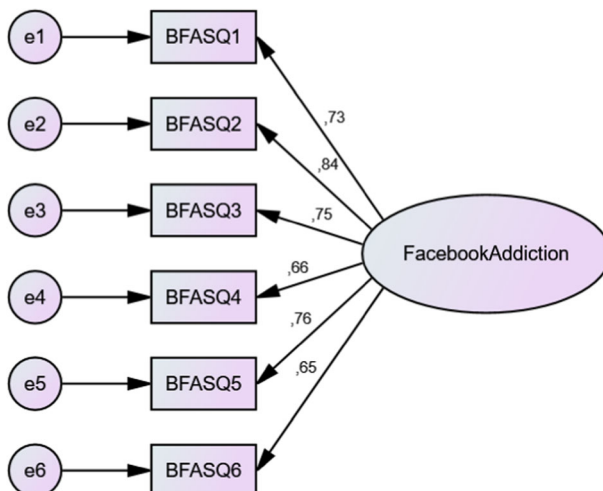


Fig. 1 Summary of the Confirmatory Factor Analysis of the BFAS

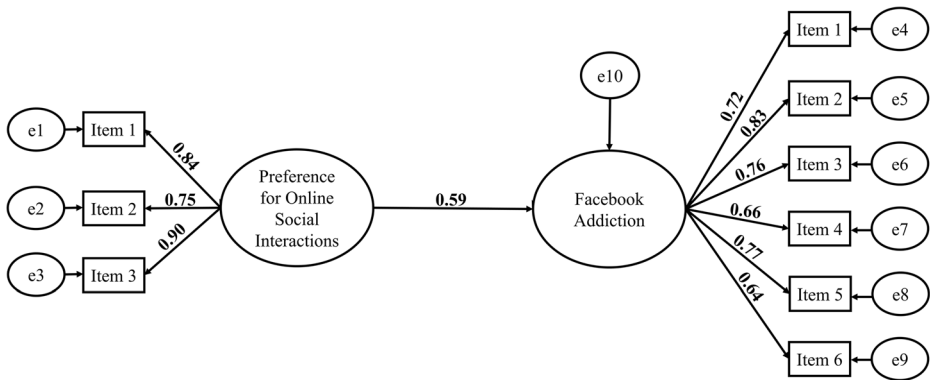


Fig. 2 Criterion validation of the Bergen Facebook Addiction Scale

Facebook addiction was correlated with increased depression and anxiety symptomatology, as well as a growth in interpersonal sensitivity and more difficulties in self-regulation of internet use.

Characterization of a Subsample of Emerging Adults with Higher Levels of Addiction to Facebook

Following the suggested diagnostic criteria in the BFAS original study—scoring 3 or above on at least four of the six items (Andreassen et al. 2012)—a subsample of individuals with higher levels of addiction was found. This subsample comprised 59 participants, of which 38 were females (64.4%), with a mean age of 21.46 years ($SD = 2.97$). The majority these of individuals were residents in mainland Portugal (94.9%) and identified themselves as students (89.8%) having completed the 12th grade (78%). Most participants of this subgroup were not in a relationship (74.6%). In relation to types of Facebook use, almost all participants reported using this SNS for conversations (98.2%), 80.7% reported accessing information content, 77.2% reported using Facebook to view multimedia content, 21.1% for gaming, 14% for purchases, and 1.8% for viewing erotic content. Among the potentially addicted participants, Facebook's average daily usage was 188.20 minutes ($SD = 127.59$ minutes). This subsample has obtained the following average scores on the GPIUS2 subscales: POSI ($M = 3.05$; $SD = 1.40$) and DSR ($M = 3.93$; $SD = 0.99$), showing an increment, regarding the overall sample. The scores of this subsample in the BSI dimensions were: interpersonal sensitivity ($M = 1.20$, $SD = 0.81$), depression ($M = 1.09$, $SD = 0.67$), and anxiety ($M = 1.05$, $SD = 0.73$), showing an increase in all psychological symptoms, regarding the overall sample.

Table 2 Correlations between Facebook addiction and subscales

Subscales	Facebook addiction
Deficient self-regulation	.72**
Interpersonal sensitivity	.32**
Depression	.29**
Anxiety	.23**

** $p < .001$

Discussion

The aim of the present study was to conduct a psychometric validation of the BFAS in a sample of Portuguese emerging adults. Overall, the results obtained in the present study demonstrated that this instrument of recognized conceptual and psychometric merit (Andreassen et al. 2012; Pontes et al. 2016a) presents adequate validity and reliability as a measure of Facebook addiction within the Portuguese cultural context. Emerging adulthood is a developmental stage characterized by instability, often associated to diminished support networks and a potential increase in anxiety and depressive symptoms (Arnett et al. 2014). As the presence of new media, particularly Facebook, is for the most part ubiquitous, emerging adults may rely on SNSs for social support and/or mood alteration. Although most users appear to be able to use SNSs in a healthy way, the risk of overuse and possible addiction compounded by heightened psychological symptoms (e.g., depression and anxiety) or diminished social skills (Andreassen et al. 2012; Caplan 2010; Holmgren and Coyne 2017; Ryan et al. 2014) is nevertheless present. Therefore, there is a growing need for sound psychometric instruments that allow for the valid and reliable assessment of Facebook use of emerging adults.

To achieve the main goal set in the present study, the BFAS underwent psychometric scrutiny in terms of construct validity, criterion validity, and reliability. The CFA confirmed the one-factor structure proposed by the original authors (Andreassen et al. 2012) and was replicated in the study with Portuguese adolescents (Pontes et al. 2016a). Although the BFAS presents a unidimensional factor structure, according to Andreassen et al. (2012), the six key components of addiction (i.e., salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse) are reflected in the BFAS (Andreassen et al. 2012; Griffiths 2005). For criterion validity, participants' preference for online social interaction was measured through a GPIUS2 subscale. According to the literature, individuals who demonstrate a preference for online communication present a higher risk for developing excessive use (Caplan 2010; Holmgren and Coyne 2017). The present research found empirical support for this relationship as participants who obtained higher BFAS scores exhibited a higher preference for online social interaction. Psychometric studies have shown that the BFAS has adequate internal consistency ($\alpha = .87$), a slightly higher result than those reported in the original investigation ($\alpha = .83$) and in the Portuguese adolescent population ($\alpha = .83$). Moreover, the present study found adequate levels of reliability as measured by the test-retest correlation for a time interval of 2 weeks ($r = .94$). The test-retest coefficient of the present study was also slightly higher than the one reported in the original investigation ($r = .82$), which could be due to the short time interval of the present study (i.e., 2 weeks versus 3 weeks). Deficient self-regulation, interpersonal sensitivity, depression, and anxiety also showed to be associated to Facebook addiction. This was consistent with previous theoretical work on online addiction (Andreassen et al. 2012; Donnelly and Kuss 2016; Holmgren and Coyne 2017; Ryan et al. 2014).

The present study found that for most emerging adults, the main attraction underlying one's use of Facebook is maintaining relationships. This is consistent with results of previous research (Andreassen et al. 2012). Interestingly, the second most popular activity found within the sample was viewing informative or information-based content. This finding may be due to the characteristics of the developmental stage assessed and the individual's need for self-exploration (Coyne et al. 2013), or it may be a consequence of the growing presence of official news organizations on Facebook, which reflects the platform's adaptability in terms of contents. The emerging adults in this sample spent an average of 121 minutes a day using Facebook, which represents a considerable amount of time.

The BFAS showed higher scores on items reflecting salience (e.g., spent a lot of time thinking about Facebook or planned use of Facebook?) and tolerance (e.g., felt an urge to use Facebook more and more?) as reported in the original study (Andreassen et al. 2012). The lowest mean score was found for the item reflecting withdrawal (e.g., become restless or troubled if you have been prohibited from using Facebook). This score may reflect the absence of periods when access is effectively prohibited or unavailable, as nowadays internet access arguably nearly universal. By using the diagnostic criteria suggested by the original authors (Andreassen et al. 2012), it was found that 59 (14.60%) individuals could be identified as potentially addicted to Facebook. This is a higher prevalence than those previously reported in the literature, either with respect to addiction to Facebook or to broader SNSs addiction (Kuss and Griffiths 2017; Ryan et al. 2014). These participants spent significantly more time on Facebook. In terms of sociodemographic characteristics, participants in the potentially addicted subsample were those who most often reported themselves as not being in a relationship (74.6%), a result that can suggest difficulties with interpersonal communication and/or the use of the platform as a means to establish or nurture new relationships. Furthermore, “gaming” as a regular activity had a higher prevalence, which in turn may contribute to increasing time spent on Facebook, as found by previous studies (Pontes 2017). This result may point to different gratifications obtained from online activities and should be a concern for future research as it may contribute to the field of online addictions (Griffiths et al. 2016).

The present research may present some limitations that are worth mentioning. The results reported should be interpreted with caution and not generalized to the Portuguese population as the study relied on a non-probability sample, which does not allow generalizations of the present findings to the entire population. The sample collected was unbalanced, as most participants were women and students. Also, the average age was lower than expected. Additionally, other potential biases might have impacted the study’s findings, such as biases stemming from the adoption of a cross-sectional design and the reliance on self-reports (e.g., memory recalls biases, random responses, social desirability, etc.). Although this study has shed light on the uses and gratifications obtained with Facebook, future studies will indeed contribute to our knowledge on this complex phenomenon. Also, future studies should attempt to replicate the findings of the present study using samples of participants at different developmental stages. Furthermore, longitudinal studies exploring potential negative long-term effects should also be conducted to provide further insights on the phenomenon, and family-focused studies investigating the familiar implications and effects of excessive Facebook use would also be beneficial to clarify the implications of addiction to social media and its family-related costs (Carvalho et al. 2015).

In conclusion, this study showed that the BFAS is a psychoetric valid and reliable instrument to assess Facebook addiction in Portuguese emerging adults. Given that the BFAS has demonstrated adequate psychometric properties in distinct domains (i.e., reliability, construct validity, criterion validity), it can be concluded that this instrument is a suitable measure for assessment of Facebook addiction symptoms in Portuguese emerging adults. This research contributes to the much-needed knowledge of a recent phenomenon, as it encourages both the advancement of future scientific investigation and the consideration of possible psychotherapeutic approaches.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Statement The present study was granted ethical approval by the research team's University Ethics Committee before data collection began. All participants had to provide an informed consent prior to starting the survey, and informed that the data collected were anonymous and confidential.

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References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Andreassen, C. S. (2015). Online social network site addiction: a comprehensive review. *Current Addiction Reports*, 2(2), 175–184. <https://doi.org/10.1007/s40429-015-0056-9>.
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychology of Addictive Behaviors*, 30(2), 252–262. <https://doi.org/10.1037/adb0000160>.
- Andreassen, C. S., & Pallesen, S. (2013). Facebook addiction: a reply to Griffiths (2012). *Psychological Reports*, 113(3), 899–902. <https://doi.org/10.2466/02.09.PR0.113x32z6>.
- Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, 110(2), 501–517. <https://doi.org/10.2466/02.09.18.PR0.110.2.501-517>.
- Arnett, J. J. (2000). Emerging adulthood: a theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <https://doi.org/10.1037/0003-066X.55.5.469>.
- Arnett, J. J., Žukauskiene, R., & Sugimura, K. (2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *The Lancet Psychiatry*, 1(7), 569–576. [https://doi.org/10.1016/S2215-0366\(14\)00080-7](https://doi.org/10.1016/S2215-0366(14)00080-7).
- Assunção, R. S., & Matos, P. M. (2017). The generalized problematic internet use scale 2: validation and test of the model to Facebook use. *Journal of Adolescence*, 54, 51–59. <https://doi.org/10.1016/j.adolescence.2016.11.007>.
- Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., Andreassen, C. S., & Demetrovics, Z. (2017). Problematic social media use: results from a large-scale nationally representative adolescent sample. *PLoS One*, 12(1), e0169839. <https://doi.org/10.1371/journal.pone.0169839>.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>.
- Błachnio, A., & Przepiorka, A. (2016). Personality and positive orientation in internet and Facebook addiction. An empirical report from Poland. *Computers in Human Behavior*, 59, 230–236. <https://doi.org/10.1016/j.chb.2016.02.018>.
- boyd, D. M., & Ellison, N. B. (2008). Social network sites: definition, history, and scholarship. *International Review of Research in Open and Distance Learning*, 13, 210–230. <https://doi.org/10.1111/j.1083-6101.2007.00393.x>.
- Brown, J. (2006). Emerging adults in a media-saturated world. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: coming of age in the 21st century* (pp. 279–299). Washington, DC: American Psychological Association.
- Canavarro, M. (2007). Inventário de Sintomas Psicopatológicos (BSI). Uma revisão crítica dos estudos realizados em Portugal. In Simões, M., Machado, C., Gonçalves, M., Almeida, L. (Eds.), *Avaliação Psicológica Instrumentos validados para a população portuguesa, volume III* (pp.305–331). Coimbra: Quarteto.
- Caplan, S. (2010). Theory and measurement of generalized problematic Internet use - a two-step approach. *Computers in Human Behavior*, 26, 1089–1097.
- Carvalho, J., Francisco, R., & Relvas, A. P. (2015). Family functioning and information and communication technologies: how do they relate? A literature review. *Computers in Human Behavior*, 45, 99–108. <https://doi.org/10.1016/j.chb.2014.11.037>.
- Carvalho, J., Francisco, R., & Relvas, A. P. (2017). ICTs and family functioning: a study on Portuguese families with adolescents and emerging adults. *Contemporary Family Therapy*, 39(4), 281–288. <https://doi.org/10.1007/s10591-017-9436-8>.

- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (Second ed.). New York: Lawrence Erlbaum Associates.
- Coyne, S. M., Padilla-Walker, L. M., & Howard, E. (2013). Emerging in a digital world: a decade review of media use, effects, and gratifications in emerging adulthood. *Emerging Adulthood, 1*(2), 125–137. <https://doi.org/10.1177/2167696813479782>.
- Derogatis, L. R. (1993). BSI brief symptom inventory: administration, scoring, and procedure manual (4th Ed.). Minneapolis, MN: National Computer Systems.
- DeVellis, R. (1991). *Scale development: theory and applications*. London: SAGE.
- Dieter, J., Hoffmann, S., Mier, D., Reinhard, I., Beutel, M., Vollstädt-Klein, S., & Leménager, T. (2017). The role of emotional inhibitory control in specific internet addiction – an fMRI study. *Behavioural Brain Research, 324*, 1–14. <https://doi.org/10.1016/j.bbr.2017.01.046>.
- Donnelly, E., & Kuss, D. (2016). Depression among users of social networking sites (SNSs): the role of SNS addiction and increased usage. *Journal of Addiction and Preventive Medicine, 1*, 107.
- Eurostat (2016). Internet access and use statistics - households and individuals. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Internet_access_and_use_statistics_-_households_and_individuals#Main_statistical_findings
- Griffiths, M. D. (2005). A “components” model of addiction within a biopsychosocial framework. *Journal of Substance Use, 10*(4), 191–197. <https://doi.org/10.1080/14659890500114359>.
- Griffiths, M. D. (2013). Social networking addiction: emerging themes and issues. *Journal of Addiction Research & Therapy, 4*(5), 4–5. <https://doi.org/10.4172/2155-6105.1000e118>.
- Griffiths, M. D., Pontes, H. M., & Kuss, D. J. (2016). Online addictions: conceptualizations, debates, and controversies. *Addicta: The Turkish Journal on Addictions, 3*(2), 1–20. <https://doi.org/10.15805/addicta.2016.3.0101>.
- Griffiths, M. D., & Szabo, A. (2014). Is excessive online usage a function of medium or activity? An empirical pilot study. *Journal of Behavioral Addictions, 3*(1), 74–77. <https://doi.org/10.1556/JBA.2.2013.016>.
- Harkness, J., Villar, A., & Edwards, B. (2010). Translation, adaptation, and design. In J. Harkness, M. Braun, B. Edwards, T. Johnson, L. Lyberg, P. Mohler, B. Pennell, & T. Smith (Eds.), *Survey methods in multinational, multiregional, and multicultural contexts* (pp. 117–140). Hoboken, NJ: Wiley.
- Holmgren, H. G., & Coyne, S. M. (2017). Can't stop scrolling!: pathological use of social networking sites in emerging adulthood. *Addiction Research and Theory, 0*(0), 1–8. <https://doi.org/10.1080/16066359.2017.1294164>.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>.
- Jacobs, D. F. (1986). A general theory of addictions: a new theoretical model. *J Gambling Stud, 2*, 15–31. <https://doi.org/10.1007/BF01019931>.
- Jacobsen, W. C., & Forste, R. (2011). The wired generation: academic and social outcomes of electronic media use among university students. *Cyberpsychology, Behavior, and Social Networking, 14*(5), 275–280. <https://doi.org/10.1089/cyber.2010.0135>.
- Jafarkarimi, H., Sim, A. T. H., Saadatdoost, R., & Hee, J. M. (2016). Facebook addiction among Malaysian students. *International Journal of Information and Education Technology, 6*(6), 465–469. <https://doi.org/10.7763/IJNET.2016.V6.733>.
- Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction—a review of the psychological literature. *International Journal of Environmental Research and Public Health, 8*(9), 3528–3552. <https://doi.org/10.3390/ijerph8093528>.
- Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: ten lessons learned. *International Journal of Environmental Research and Public Health, 14*(3). <https://doi.org/10.3390/ijerph14030311>.
- Norman, G. (2010). Likert scales, levels of measurement and the “laws” of statistics. *Advances in Health Sciences Education Theory Practice, 2010 Dec*;15(5):625–632. <https://doi.org/10.1007/s10459-010-9222-y>.
- Phanasathit, M., Manwong, M., Hanprathet, N., Khumsri, J., & Yingyeun, R. (2015). Validation of the Thai version of Bergen Facebook addiction scale (Thai-BFAS). *Journal of the Medical Association of Thailand, 98*, S108–S117.
- Pontes, H. M. (2017). Investigating the differential effects of social networking site addiction and internet gaming disorder on psychological health. *Journal of Behavioral Addictions, 6*, 1–10. <https://doi.org/10.1556/2006.6.2017.075>.
- Pontes, H. M., Andreassen, C. S., & Griffiths, M. D. (2016a). Portuguese validation of the Bergen Facebook addiction scale: an empirical study. *International Journal of Mental Health and Addiction, 14*(6), 1062–1073. <https://doi.org/10.1007/s11469-016-9694-y>.
- Pontes, H. M., Caplan, S. E., & Griffiths, M. D. (2016b). Psychometric validation of the Generalized Problematic Internet Use Scale 2 in a Portuguese sample. *Computers in Human Behavior, 63*, 823–833. <https://doi.org/10.1016/j.chb.2016.06.015>.

- Pontes, H. M., & Griffiths, M. D. (2016). Portuguese validation of the Internet gaming disorder scale-short-form. *Cyberpsychology Behavior and Social Networking*, 19(4), 288–293. <https://doi.org/10.1089/cyber.2015.0605>.
- Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015a). Clinical psychology of internet addiction: a review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience and Neuroeconomics*, 4, 11–23. <https://doi.org/10.2147/NAN.S60982>.
- Pontes, H. M., & Patrão, I. M. (2014). An exploratory study on the perceived motivations underpinning excessive internet use among adolescents and young adults. *Psychology & Health Research Unit*, 3(2), 90–102. <https://doi.org/10.5964/pch.v3i2.93>.
- Pontes, H. M., Szabo, A., & Griffiths, M. D. (2015b). The impact of Internet-based specific activities on the perceptions of Internet addiction, quality of life, and excessive usage: a cross-sectional study. *Addictive Behaviors Reports*, 1, 19–25. <https://doi.org/10.1016/j.abrep.2015.03.002>.
- Pordata (2017a). *Idade média ao primeiro casamento, por sexo*. Retrieved from <http://www.pordata.pt/Portugal/Idade+m%c3%a9dia+ao+primeiro+casamento++por+sexo-421>
- Pordata (2017b). *Idade média da mãe ao nascimento do primeiro filho*. Retrieved from <http://www.pordata.pt/Portugal/Idade+m%c3%a9dia+da+m%c3%a3e+ao+nascimento+do+primeiro+filho-805>
- Ryan, T., Chester, A., Reece, J., & Xenos, S. (2014). The uses and abuses of Facebook: A review of Facebook addiction. *Journal of Behavioural Addictions*, 3(3), 133–148. <https://doi.org/10.1556/JBA.3.2014.016>.
- Salem, A. A. M. S., Almenay, N. S., & Andreassen, C. S. (2016). A psychometric evaluation of Bergen Facebook addiction scale (BFAS) of university students. *International Journal of Psychology and Behavioral Sciences*, 6(5), 199–205. <https://doi.org/10.5923/j.ijpbs.20160605.01>.
- Satici, S. A., & Uysal, R. (2015). Well-being and problematic Facebook use. *Computers in Human Behavior*, 49(August), 185–190. <https://doi.org/10.1016/j.chb.2015.03.005>.
- Silva, H. d. R., Areco, K. C. N., Bandiera-Paiva, P., Galvão, P. V. M., Garcia, A. N. d. M., & da Silveira, D. X. (2015). Equivalência semântica e confiabilidade da versão em português da Bergen Facebook Addiction Scale. *Jornal Brasileiro de Psiquiatria*, 64(1), 17–23. <https://doi.org/10.1590/0047-2085000000052>.
- Statista (2018). Number of Facebook users worldwide 2008–2016. Retrieved from <http://www.statista.com/statistics/264810/number-of-monthlyactive-facebook-users-worldwide/>
- Streiner, D. (2003). Starting at the beginning: an introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80(1), 99–103.
- Turkle, S. (2015). *Reclaiming conversation: the power of talk in a digital age*. New York: Penguin Press.

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