TITLE: PORTUGUESE VALIDATION OF THE BERGEN FACEBOOK ADDICTION SCALE: AN EMPIRICAL STUDY.

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Abstract

Previous research on Social Networking Sites (SNSs) addiction have suggest the need to improve assessment of this behavioral addiction. The present study aimed at validating a Portuguese version of the Bergen Facebook Addiction Scale (BFAS), a widely used instrument to assess addiction to Facebook. A study was conducted in a sample of 509 Portuguese adolescent using an online survey. The psychometric properties (construct validity, criterion validity, and reliability) of the Portuguese BFAS was scrutinized. The results from the psychometric analyses suggested that the new validated instrument had excellent psychometric properties. The CFA confirmed the original one-factor solution of the BFAS and criterion validity was warranted. The reliability of the BFAS was supported by satisfactory levels of internal consistency as measured by the Cronbach's alpha (α = .83), composite reliability (CR = .82), and factor determinacy (FD = .91). Overall, the results provided empirical support for the validity and reliability of the Portuguese BFAS. Moreover, the results were highly comparable with the findings of the original development study of the BFAS and cross-cultural support for the scale was obtained.

Keywords: Behavioral addictions; Bergen Facebook Addiction Scale; BFAS; Facebook addiction; Psychometric validation; Portuguese samples;

Introduction

The use of social networking sites (SNSs) like *Facebook* has become a major day-to-day activity in many individuals' lives due to its rapidly increasing popularity. According to *Facebook's* own statistics (Facebook, 2015), in June 2015, the company reported they had a worldwide average of 968 million daily active users and 844 million daily active users via mobile devices. Furthermore, *Facebook* estimated that as of June 2015, an average of 1.49 billion active users and 1.31 billion mobile phone users actively used their services (Facebook, 2015). During the first-quarter of 2015, Europe had 225 million daily active users (Internet World Stats, 2015).

Motives for using SNSs may vary. A recent study examining most popular motives for using *Facebook* reported several motives: relationship maintenance, passing time, entertainment, and companionship (Ryan, Chester, Reece, & Xenos, 2014). Additionally, these motives may be related to *Facebook* addiction through use that is habitual, excessive and/or motivated by desire to alter one's mood (Ryan et al., 2014). SNS addiction (e.g., *Facebook* addiction) is defined as "being overly concerned about SNSs, to be 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." (p. 4054) (Andreassen & Pallesen, 2014).

A recent large-scale survey study based on a representative sample of children/adolescents students from Ottawa (Canada) found students with poorer mental health tended to use SNSs excessively (Sampasa-Kanyinga & Lewis, 2015). The results also showed that youth using SNSs for more than two hours per day had poorer self-rated mental health, psychological distress, suicidal ideation, and/or unmet need for mental health support. These

findings led to the conclusion that frequent SNS use may be a potentially useful indicator of youths' poor mental health. Although these findings provide insights into consequences of frequent and excessive SNS use, some authors have argued that judicious SNS use can be beneficial to some individuals (Wang, Jackson, Gaskin, & Wang, 2014), especially older adults (Heo, Chun, Lee, Lee, & Kim, 2015). Although SNS use is likely to be highly beneficial for most users, a small minority appear to show addiction-like symptoms (e.g., salience, withdrawal symptoms, conflict with jobs and/or relationships, relapse, etc.) (Ryan et al., 2014). Currently, Gambling Disorder is the only officially recognized behavioral addiction (APA, 2013). However, several scholars have argued the case for SNS/*Facebook* addiction (Griffiths, Kuss, & Demetrovics, 2014; Ryan et al., 2014).

Internet use and Internet addiction findings in Portugal

Although Internet use in Portugal is a pervasive phenomenon as in most Western European countries, research in this specific cultural context aimed at examining the potential effects of both excessive and addictive Internet use on physical and mental health is severely lacking, with the exception of a few peer-reviewed studies (Pontes, Griffiths, & Patrão, 2014; Pontes & Patrão, 2014; Pontes, Patrão, & Griffiths, 2014). Although research in the area of Internet addiction (IA) began internationally back in the mid-1990s (Griffiths, 1996), it took almost two decades for the first Portuguese empirical IA studies (Pontes, Patrão, et al., 2014). The latest government figures estimated 65% of the Portuguese population (aged 16-74 years) now use the Internet regularly, and that 57% do so while on the move via mobile devices such as smartphones/tablets (Instituto Nacional de Estatística, 2014). Moreover, it could be argued that Portuguese adolescents are more vulnerable to SNS addiction since the highest proportion of

Portuguese Internet users are those aged 16-24 years (Instituto Nacional de Estatística, 2014). Unsurprisingly, 95% of all Portuguese pre-adolescents/adolescents aged 10-15 years used the Internet regularly in 2012 (Instituto Nacional de Estatística, 2012), while 93% used cell phones on a regular basis (Instituto Nacional de Estatística, 2012).

More recently, Pontes and Patrão (2014) conducted an exploratory study highlighting the patterns and preferences of Internet use among 144 Portuguese adolescents and young adults. The study found that 77% of the participants reported using the Internet on their cell phones, while the most frequently used channel for accessing the Internet was via laptop computers (43.1%) and desktop computers (34%). Participants reported spending an average of 28 hours-a-week on the Internet for leisure, and had been Internet users for about 13 years on average. This study also found that the most preferred online activities were social networking and information seeking (64%), followed by e-mailing/online chatting (61%). A few empirical studies have reported moderate to low prevalence of IA among Portuguese youth. A recent exploratory study conducted among 131 Portuguese school children and adolescents, found that approximately 13% of the sample were potentially addicted to the Internet (Pontes, Griffiths, et al., 2014), while a larger empirical study (n=593 Portuguese students) reported a prevalence rate of IA around 1.2% (Pontes, Patrão, et al., 2014). Although not without limitations (e.g., convenience samples, self-selected samples, cross-sectional designs, self-report methodology), these studies provided preliminary evidence supporting the existence of Internet-related (e.g., SNS addiction) problems among Portuguese youth, expressing a preference for online and interactive computer-mediated communication. Because the concept of generalized IA is controversial, some scholars have long argued that the Internet is just a channel that individuals can use to access whatever content they want (e.g., SNSs, shopping, gambling), and because of that, "Internet users are no more addicted

to the Internet than alcoholics are addicted to bottles" (p. 389) (M. G. Kim & Kim, 2010). Hence, further research on SNS usage effects in this population is warranted.

The need to further investigate the potential SNS misuse among Portuguese youth may be of clinical relevance since addictive SNS use has been systematically linked to several problem behaviors and health-related impairments including deficient social skills (J. Kim, LaRose, & Peng, 2009), increased impulsivity (Wu, Cheung, Ku, & Hung, 2013), increased psychopathological symptoms (Wegmann, Stodt, & Brand, 2015), difficulties with emotional regulation and problematic alcohol drinking (Hormes, Kearns, & Timko, 2014), social anxiety (Casale & Fioravanti, 2015), decreased life satisfaction (Satici & Uysal, 2015), and aggressive behavior (Ko, Yen, Liu, Huang, & Yen, 2009). Several personality traits have also been associated with SNS addiction including augmented extroversion, reduced openness to experience, and low conscientiousness (Andreassen et al., 2013).

The present study

Given the pervasiveness of Internet and SNS use among Portuguese youth, coupled with the need of further investigation into contextualized Internet use (not simply generalized non-contextualized Internet use), it has become critical to understand the potential effects that such behaviors have on adolescents' mental health, especially when these behaviors are carried out in an arguably unhealthy manner. However, SNS addiction research also suffers from methodological inconsistencies in robust and rigorous assessment given the arbitrary use of non-validated criteria (e.g., alcohol craving and problem drinking) to assess this behavior (Hormes et al., 2014). This led scholars to assert the need for more validation studies to enhance the construct validity of SNS addiction (Ryan et al., 2014). Consequently, before reliable data can be

gathered on the effects SNS addiction has on mental health, the issue surrounding lack of validity and reliability in assessment has to be overcome.

Given the aforementioned rationale, the main aim of the present study is to conduct a psychometric validation of the Bergen Facebook Addiction Scale (BFAS) (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) in a Portuguese adolescent sample. To the best of the authors' knowledge, no previous study has been conducted in Portugal examining *Facebook* addiction, and this might be partly due to the fact that currently there are no psychometric instruments validated to assess SNS addiction among this population. For this reason, the present study has the potential to contribute to advancing cross-cultural knowledge in this field, and also cater for the lack of valid and reliable findings concerning *Facebook* addiction in the broader scientific community.

Although other existing instruments assess *Facebook* addiction, the BFAS was chosen for this study because its brevity and high suitability for large-scale surveys, wide international acceptance, and most importantly, sound theoretical basis, reflecting the components model of addiction (Griffiths, 2005), which posits that behavioral addictions are a biopsychosocial phenomena comprising six core components: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Griffiths, 2005).

Methods

Participants and procedure

The study's target population was adolescent students (N = 700) enrolled in the sixth, seventh, eighth, and ninth grades of a major school in the Algarve (south Portugal) during the 2014-2015 academic year. The study was approved by the institutional review board of

Nottingham Trent University, and authorization from the school's principal and parents was obtained. Participants filled out an online survey with the assistance of computers within the school's library during students' extra-curricular activities. The period of data collection spanned from May to June 2015. All participants were briefed by a research assistant at the study's outset. Students were informed that all data collected were anonymous and confidential, and that they could leave the study at any time without penalties. No financial rewards were provided to participants in order to enhance the voluntary nature of the study. The school was selected on the basis of availability (i.e., non-probability sampling), and the students were selected by randomly sampling the pool of classes comprising sixth, seventh, eighth, and ninth grades to achieve optimal school population representativeness. Data were collected from 509 students (72.7% of the population sampled). The sample's mean age was 13 years (SD = 1.64, range = 10-18 years) and there was a relatively equivalent gender split with 53.5% (n = 265) being male (see Table 1).

Measures

  Sociodemographics, Internet, and SNS usage: The survey included questions concerning sociodemographic characteristics (e.g., gender, age, relationship status), Internet and *Facebook* usage patterns (e.g., preference of access, frequency and intensity of use).

  The Bergen Facebook Addiction Scale (BFAS): The BFAS (Andreassen, Torsheim, et al., 2012) comprises six items, covering six core features of addiction (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse) (Griffiths, 2005). The items are scored on a 5-point scale (i.e., 1: *Very rarely* to 5: *Very often*) within a time-frame of 12 months (e.g., "*How often during the last year have you spent a lot of time thinking about Facebook or planned use of Facebook?*") for assessing *Facebook* addiction. Total scores are obtained by summing

participant ratings of each item (ranging 6-30), with higher scores indicating heightened addiction to *Facebook*. To develop a Portuguese version of the BFAS (see Appendix), standard back-translation protocols were adopted (Harkness, Pennell, & Schoua-Glusberg, 2004) and all six items were subjected to a preliminary English-Portuguese translation by the first author, and then back-translated from Portuguese-English by an independent experienced bilingual psychologist for comparison purposes. After comparing the translated and back-translated versions of the Portuguese BFAS, a final version of the instrument was achieved in the target language by matching both versions. The items were further refined using feedback from ten *Facebook* users that piloted the Portuguese BFAS to strengthen the face validity of the newly translated instrument.

Preference for Online Social Interaction (POSI): Participants' POSI was assessed with a subscale from the Generalized Problematic Internet Use Scale–2 (GPIUS2) (Caplan, 2010) recently validated to be used in Portugal (authors' reference). POSI is defined as beliefs that one is safer, more efficacious, confident, and comfortable with online interpersonal interactions and relationship than with traditional face-to-face social activities (Caplan, 2010), and was assessed using three items (e.g., "*Online social interaction is more comfortable for me than face-to-face interaction.*") that were rated on a 7-point scale (i.e., 1: *Strongly disagree* to 7: *Strongly agree*). Cronbach's alpha for POSI in the present study was .87.

Data management, analytic strategy, and statistical analysis

Data management involved (i) cleaning the dataset by inspection of cases with missing values above the conventional threshold of 10% in all relevant instruments; (ii) checking for univariate normality of all items of the BFAS using standard guidelines (i.e., Skewness > 3 and

Kurtosis > 9) (Kline, 2011); screening for univariate outliers that scored ± 3.29 standard deviations from the BFAS z-scores (Field, 2013); and multivariate outliers using Mahalanobis distances. This procedure resulted in 14 excluded cases, yielding a final dataset of 495 valid cases. Statistical analyses comprised (i) descriptive analysis of the main sample's characteristics; (ii) assessment of the construct validity of the BFAS by means of a confirmatory factor analysis (CFA); (iii) criterion validity of the BFAS by using bootstrapped structural equation modeling (SEM) with 95% Bias-corrected and accelerated (BCa) confidence interval (CI) for the coefficient estimates of a theoretical model with POSI as the latent predictor of *Facebook* addiction, and examination of the bootstrapped Pearson's correlation coefficients with 95% BCa CI of these two variables alongside its coefficient of determination (R^2); (iv) analysis of the scale's reliability using the Cronbach's alpha, composite reliability, and factor determinacy coefficients of internal consistency. All statistical analyses were performed using Mplus 7.2 (Muthén & Muthén, 2012) and IBM SPSS Statistics 20 (IBM Corp, 2011).

Results

Descriptive statistics

Most participants preferred accessing the Internet via their cell phones (43.2%, n = 214) at home (86.5%, n = 428) (see Table 1). Moreover, the vast majority of participants reported not being in a relationship (80%, n = 396) and using the Internet for leisure purposes for long periods on a daily (M = 4.32 hours, SD = 4.37) and weekly basis (M = 17.91 hours, SD = 23.35).

Please insert Table 1 about here.

Construct validity

A CFA was performed on the six items of the BFAS using maximum likelihood estimation method with robust standard errors (MLR) in order to test the pre-established one-factor solution of the *Facebook* addiction construct (Andreassen, Torsheim, et al., 2012). Conventional fit indices and thresholds were used 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; Bentler & Bonnet, 1980; Hu & Bentler, 1999). The results of this analysis produced the following the results: $\chi^2(8) = 11.9$, *p* = .15, χ^2/df = 1.5; RMSEA = 0.032 [90% CI: 0.000–0.066], Cfit = .776; SRMSR = 0.023, CFI = .992; TLI = .986. Additionally, the results of the CFA provided acceptable standardized item loadings (i.e., $\lambda_{ij} \geq .50$, *p* < .0001) (see Figure 1). Overall, these results clearly demonstrate that the one-factor solution model presents an excellent fit to the data.

Criterion validity

Criterion validation can be conducted by ascertaining the degree of statistical accuracy in predicting scores of a well-accepted indicator of the particular concept in question (e.g., POSI) (Bryant, King, & Smart, 2007). Thus, a full bootstrapped SEM was performed to assess the BFAS' criterion validity. The structural model included POSI as the predictor of *Facebook* addiction because the cognitive-behavioral model of pathological Internet use (PIU) and several empirical studies have long established POSI as a predictor of *Facebook* addiction (Davis, 2001;

Lee, Christy, & Thadani, 2012). The results produced an excellent fit to the data ($\chi^2 = 52.5$, df =

25, $p = .001$; CFI = .982, TLI = .975; RMSEA = 0.047, 90% CI [0.029-0.065]; Cfit = .577;

SRMR = 0.034) and the model explained approximately 10.2% of the total variance in *Facebook*

addiction ($R^2 = .102$, $p = .002$). A further inspection to correlation coefficient with 95% BCa CI

between the two variables provided additional support for the BFAS' criterion validity ($r = .27$,

$R^2 = .073$, $p < .0001$, 95% BCa CI [.18-.35]).

Please insert Figures 1-2 about here.

Reliability analysis

The reliability of the BFAS as assessed by the Cronbach's alpha was relatively high ($\alpha =$

.83) and could not be improved upon deletion of any item. Moreover, inter-item correlations

were relatively high (i.e., $\geq .30$) in general. The composite reliability of the BFAS was .82,

which is well beyond the accepted threshold of .70 (Fornell & Larcker, 1981; Hair, Black, Babin,

& Anderson, 2010). Finally, factor determinacy for the BFAS was .91, which is above the

desired threshold of .80 (Muthén & Muthén, 2012). These results show that the Portuguese

BFAS presents adequate internal consistency levels as evaluated by several different indicators.

Discussion

The main aim of the present study was to develop a Portuguese version of the BFAS in a

sample of Portuguese adolescents. To achieve this goal, the BFAS underwent psychometric

scrutiny in terms of construct validity, criterion validity, and reliability. Although the concept of

Facebook addiction remains controversial as the real issue of addiction should be modeled after

the activity itself (i.e., social networking) and not a particular company's service (Griffiths, 2012), it is premature to completely abandon the idea that people might become addicted to a particular type of SNS (i.e., *Facebook*) given the emerging evidence regarding the potential effects of addiction to this specific SNS (Soron, 2015). Additionally, SNS use among the general Portuguese population is increasing steadily, and a study conducted by Marktest (2015) using a nationally representative sample of Portuguese individuals aged 15-64 years (N = 802) found that 96% of all Portuguese SNSs users had a *Facebook* account and used this SNS regularly.

The analyses performed concerning construct validity of the BFAS were satisfactory given the excellent fit indices obtained, and CFA results confirmed the original one-factor solution of the BFAS. Although the BFAS appears to be unidimensional, the instrument's six items tapped into different and well-established behavioral addiction criteria (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse). In fact, the components model of addiction (Griffiths, 2005) has received empirical support for several behavioral addictions, such as exercise addiction (Terry, Szabo, & Griffiths, 2004), Internet Gaming Disorder (Pontes, Király, Demetrovics, & Griffiths, 2014), generalized IA (Kuss, Shorter, van Rooij, van de Mheen, & Griffiths, 2014), work addiction (Andreassen, Griffiths, Hetland, & Pallesen, 2012), shopping addiction (Andreassen et al., 2015), and even addiction to studying (i.e., a precursor to work addiction) (Atroszko, Andreassen, Griffiths, & Pallesen, 2015).

In terms of criterion validation of the BFAS, the results supported the theoretical and empirical association between POSI and *Facebook* addiction. Similarly to previous research (Lee et al., 2012), POSI was a significant predictor of *Facebook* addiction, and therefore, a significant criterion. This finding was also supported by correlational analysis performed between these two constructs, which in turn, supported the established assumptions regarding the interplay between

POSI and *Facebook* addiction. Further research could be conducted to determine how POSI impacts on other technological addictions including Internet Gaming Disorder, online gambling disorder, and online sex addiction.

In terms of the BFAS' reliability, results of the analyses provided robust evidence of its reliability. Andreassen, Torsheim, et al. (2012) have reported an alpha coefficient of .83 and a 3-week test-retest reliability coefficient of .82, which was the same as the results found in the present study. Additionally, the results from the inter-item correlation analysis, composite reliability, and factor determinacy further supported the overall reliability of the Portuguese BFAS.

Although the SNS addiction field is still in its infancy, more studies examining the diagnostic features of the BFAS should be conducted. For instance, assessment of the optimal cut-off point for this instrument based on clinical data (e.g., structured interviews) or empirical data (e.g., latent class/profile analysis) could be carried out. Previous studies have used similar approaches in determining cut-off points of instruments assessing behavioral addictions (Pontes, Király, et al., 2014). For this reason, and because to date there are no clinical or empirical evidence from such studies to support the suggested cut-off point for this instrument, caution is needed when classifying potential cases of addiction to *Facebook*.

As with any study, the present study may present with potential limitations that are worth acknowledging. For instance, the overall findings reported here should be interpreted with caution and not generalized to the broader Portuguese population as the study relied on a non-probability sample that was sampled on the basis of self-selected convenience sampling strategy which does not allow to gather a representative sample of the entire population of Portuguese *Facebook* users. Moreover, other well-known potential biases might have impacted on the

study's findings, such as biases stemming from the adoption of a cross-sectional design and the reliance of self-report methodology (e.g., social-desirability, memory recall biases, etc.). For this reason, it is advisable that future studies using other designs should be carried out (e.g., longitudinal studies) with larger and more representative samples (e.g., probability samples). Finally, further psychometric investigation of the BFAS should be conducted among the older Portuguese population to corroborate the present findings, and validation studies to ascertain the invariance (i.e., configural, metric, and scalar) of the BFAS among different age groups within the Portuguese population are recommended.

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

Ethical Approval: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

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Table 1. Main Characteristics of the Sample.

N	495
Gender (female, %)	265 (53.5)
Age (years) (mean, SD)	13.02 (1.64)
Not in a relationship (n, %)	396 (80)
Preferred Internet access (n, %)	
Cell phone	214 (43.2)
Tablet	76 (15.4)
Desktop computer	65 (13.1)
Laptop	134 (27.1)
Other	6 (1.2)
Preferred place of Internet use (n, %)	
Home	428 (86.5)
School	12 (2.4)
No specific location (e.g., cell phone)	51 (10.3)
Other	4 (0.8)
Daily time spent on the Internet (mean, SD)	4.32 (4.37)
Weekly time spent on the Internet (mean, SD)	17.91 (23.35)

Appendix

Versão Portuguesa da Escala de Adição ao Facebook de Bergen *

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1. Passaste demasiado tempo a pensar sobre o Facebook ou planeaste usá-lo?

2. Sentiste necessidade em usar o Facebook cada vez mais?

3. Usaste o Facebook para esqueceres os teus problemas?

4. Tentaste reduzir o uso do Facebook sem sucesso?

5. Ficaste irrequieto(a) ou perturbado(a) caso te tenham proibido de usar o Facebook?

6. Usaste o Facebook em demasia de modo a que isso tivesse tido um impacto negativo no teu trabalho/estudos?

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* Instruções de administração: "*Com que frequência durante o último ano…*".
Notas: Os items devem ser avaliados pelos participantes na seguinte escala de resposta:1 = Muito raramente, 2 = Raramente, 3 = Às vezes, 4 = Frequentemente, 5 = Muito frequentemente. Participantes que obtenham pontuações de 3 (i.e., "Às vezes") ou superior em todos os seis items, poderão ser classificados como prováveis dependentes ao Facebook. Todavia, este procedimento deve ser feito com cautela uma vez que este ponto de corte não foi validado clínica ou empiricamente até o presente momento.