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Psychometric Analysis and Validation of the Italian Bergen Facebook Addiction Scale

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Abstract
Social media use, and specifically Facebook use, has become increasingly popular over the past decade. Despite the many benefits of social networking, a small minority of individuals appear to develop issues surrounding social media use, and more specifically Facebook use. It has, therefore, led some scholars to describe such problematic activity as a behavioral addiction. Such problematic behaviors have been reported in many countries including Italy. The present study validated and examined the reliability and validity of the Italian version of the Bergen Facebook Addiction Scale (BFAS) by conducting a psychometric examination among an Italian sample of adults ($n = 217$; aged 18 to 68 years). Internal reliability was examined using various indicators, including Cronbach's α, which was excellent ($\alpha = 0.94$). Results indicated that Facebook addiction was significantly correlated with social media addiction, smartphone addiction, narcissism, depression, and self-esteem. The results of the present study support the use of the Italian version of the BFAS in research and confirms the uni-dimensional nature of the single factor proposed by the original authors.

Keywords Behavioral addiction · Social networking site addiction · Social media addiction · Bergen Facebook Addiction Scale · BFAS

Social networking sites (SNSs), such as Facebook, Twitter, and Instagram, are virtual communities whose main objective is for users to be able to interact with other people from all over the world, sharing opinions and passions via direct messages or in public virtual spaces such as comments, statuses, and groups (Boyd and Ellison 2007; Kuss and Griffiths 2017). Besides being beneficial to individuals for the diffusion of shared knowledge and potential academic and professional opportunities, connecting with people allows the satisfaction of several basic human needs, such as social support or being able to express one's skills (or some aspects of one's self) with as many people as possible (e.g., Li 2010). The search for friends, social

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support, information, and entertainment comprise the most significant motivations for using SNSs (Kim et al. 2011). Such motivations are shared by both male and female users, although female users tend to use SNSs to communicate with peer group members and discuss entertainment and everyday problems, while men use it for social compensation and social identity rewards (i.e., identification with group members that share similar characteristics; Barker 2009).

Although several factors significantly predict users' preferences over specific SNSs (i.e., the degree of fun and pleasure derived from the SNSs, number of active users, trustworthiness, perceived ease of use, and perceived usefulness; e.g., Kuss and Griffiths 2011; Sledgianowski and Kulviwat 2009), SNSs as a whole have seen a marked increase in popularity since the 2000s, to the point where engaging in SNSs is one of the main activities of internet users in terms of time, in particular for Millennials and Gen-Z (Eurostat 2016; Kuss and Griffiths 2011).

Following the rise in popularity, several studies have suggested that involvement with SNSs, if taken to excess, may be considered problematic, especially in connection with the consequent need perceived by some users to be constantly online (e.g., Kuss and Griffiths 2017; da Veiga et al. 2018). Previous research highlights how individuals suffering from SNS addiction (Andreassen 2015; Griffiths 2013) present symptoms similar to those experienced by those suffering from substance addictions or other compulsive behaviors (e.g., Echeburúa and Corral 2010; Kuss and Griffiths 2011). Just like substance-related addictions, SNS addiction incorporates bona fide addictive symptoms, namely, mood modification (i.e., where engagement in using SNSs leads to favorable changes in mood states), salience (i.e., total cognitive and behavioral preoccupation with use of SNSs), tolerance (i.e., increasing use of SNSs over time), withdrawal symptoms (i.e., the experience of unpleasant physical and emotional symptoms when the use of SNSs is limited or interrupted), conflict (i.e., interpersonal and intrapsychic problems resulting from the use of SNSs), and relapse (i.e., tendency to quickly return to excessive use of SNSs after a period of abstinence (e.g., Echeburúa and Corral 2010; Kuss and Griffiths 2011). Moreover, SNSs are used by some individuals to cope with negative life events. Because coping has been found to be associated with both substance and behavioral addictions, it appears logical to hypothesize that there would be an association between dysfunctional coping and problematic/addictive SNS use (e.g., Yiğitoğlu and Keskin 2019).

Nonetheless, scholars have also suggested that a combination of biological, psychological, and social factors contributes to the etiology of addictions (Griffiths 2005; Shaffer et al. 2004). Applying Uses and Gratification Theory, SNSs are intentionally used to achieve gratification of users' needs (Katz et al. 1974). In particular, due to their structure, SNSs allow individuals to guide the impression of others by fixing their appearance and presenting their best face to the world (Goffman 1956), consequently improving their mood. Presumably, self-centered construction, defined as an individual's tendency to perceive their self in the form of a solid, permanent, and independent entity (Dambrun and Ricard 2011), can also serve as a factor that attracts individuals to use SNSs in a potentially excessive (and in some cases, problematic) way. Relatedly, there appears to be a particular relationship between narcissism and SNS activity (Andreassen et al. 2017), since narcissists tend to have an unbalanced sense of self, fluctuating between grandeur and low self-esteem (Campbell et al. 2007; Cain et al. 2008). Nonetheless, low self-esteem has also been consistently associated with internet addiction more generally (e.g., Armstrong et al. 2000; Ghassemzadeh et al. 2008; Widyanto and Griffiths 2011).

Because different types of internet addictions have already been theorized over the past 25 years and because the diagnostic criteria for addictions appear relevant for individuals who

excessively use SNSs, the compulsive use of SNSs can be seen as a form of cyber-relationship addiction (i.e., a form of addiction to online relationships; Kuss and Griffiths 2011). As specified by previous research (e.g., Kuss and Griffiths 2011), such complexity has significant implications for clinical practice because, unlike other addictions, the goal of treating SNS addiction cannot be total abstinence from internet use, as it has become such an integral element of cultural, professional, and leisure activities in contemporary society. On the contrary, it has been asserted that the therapeutic goal should be the controlled use of the internet and SNSs, and the prevention of relapses using strategies developed in the context of cognitive-behavioral therapies (Echeburúa and Corral 2010).

Among SNSs, Facebook can be considered as a particular and specific case because of its offer of different functionalities and activities (da Veiga et al. 2018; Griffiths 2012). Besides the focus on relationship-building, this SNS platform also provides opportunities for sharing different kinds of content (writing, photography, videos), as well as gaming and other forms of entertainment, including gambling (Andreassen et al. 2012; Holmgren and Coyne 2017; Griffiths 2012, 2015; Kuss and Griffiths 2017; Ryan et al. 2014).

Because of such features and facilities found in Facebook, and its ability to provide different rewards to its users, several scholars have supported the need to define and operationalize Facebook addiction as a specific and diagnosable mental health disorder (Andreassen et al. 2012; Andreassen and Pallesen 2013; Błachnio and Przepiorka 2016; Ryan et al. 2014). Consequently, there are now many different scales assessing problematic and/or addictive Facebook use. Arguably, the Bergen Facebook Addiction Scale (BFAS) (Andreassen et al. 2012) is the most utilized and is based on the addiction components model which postulates that all addictions comprise six core components (i.e., salience, mood modification, tolerance, withdrawal, conflict and relapse; Griffiths 2005). Although the BFAS has been validated in several languages, it has never been validated in Italian (therefore, it is the focus of the present study).

Facebook is currently the most widely used SNS in Italy (We Are Social 2019; Autorita Per Le Garanzie Nelle Comunicazioni [AGCOM] 2019). According to the most recent statistics, 26.8 million of the 35 million Italian social media users use Facebook as their primary SNS, among who 98% access the SNS every day for approximately 2 h a day (We Are Social 2019; AGCOM 2019). Consequently, it would be of great utility to have a valid psychometric instrument for use in Italy, for research purposes. In this context, the present study had the primary objective to validate the Italian version of the BFAS. The present study aimed to (i) examine the psychometric properties of the Italian BFAS utilizing confirmatory factor analysis (CFA); (ii) assess Facebook addiction in an Italian sample using the Italian BFAS; (iii) confirm whether the Italian BFAS is unidimensional, as found in other validation studies; and (iv) examine if scores on the Italian version of the BFAS test are positively correlated with narcissism, self-esteem, anxiety, and depression.

Methods

Participants and Procedure

Participants were recruited by posting links to an online survey in Italian online forums and social network communities (e.g., Facebook). A total of 217 voluntary participants (aged 18 to 68 years) responded to the online survey, which took around 10–15 min to complete. The

period of the data collection spanned from December 2019 to January 2020. The inclusion criteria used were that participants had to be (i) at least 18 years old, (ii) Italian-speaking citizens, and (iii) Facebook users. All the participants completed the survey anonymously and gave their informed consent.

Measures

Socio-demographics Parameters and General Internet Use The survey included questions concerning the socio-demographic aspects of the participants (e.g., sex, age, occupation, and educational level).

Internet and Social Media Use and Life Habits The survey included questions concerning general internet and SNS use of the participants. These questions concerned the average daily number of hours spent online daily (on the internet and SNSs specifically). Other questions related to the frequency of online information retrieval (i.e., *How often do you look for information* [e.g. *culture, technology, entertainment,* etc.*] on social networks like Facebook, Instagram,* etc.?), gaming frequency via SNSs ("never" to "very often"), and the perceived importance of SNSs and the internet in the participant's life. Other questions concerned the frequency of consumption of psychoactive substances (cigarettes, alcohol, drugs/narcotics).

Questions Related to the Use of Social Networking Sites as a Coping Tool Two specific questions were asked concerning the possible use of SNSs as a coping strategy to temporarily escape from a difficult or problematic situation in one's life. The questions were "Have you ever used Facebook to temporarily escape from a negative mood (e.g., anxiety, anger, etc.)" and "Have you ever used Facebook to forget your personal problems?". Answers were given on a 5-point Likert scale (1 = never and 5 = very often).

Narcissism To investigate narcissism, a single-item question was used: "How much you agree with the statement: I am a narcissist (Note: the word 'narcissist' means egotistical, focused on itself and vain)" previously used by Konrath et al. (2014). As suggested by the original authors, answers were given on a 7-point Likert scale from 1 (*completely disagree*) to 7 (*completely agree*), with a higher score indicating higher narcissism.

General Life Factors The survey included questions concerning general life factors including the perceived quality of life ("How satisfied are you with your life?"), sociability ("Do you consider yourself sociable [offline]?"), online relationships ("How often do you make friendships or have love affairs with people you know online through chat, forums or social networks?"), and public anxiety ("Do you usually feel anxious when you need to perform an action in public" [e.g., public speaking]?). All responses were given on a 5-point Likert scale from 1 (*never*) to 5 (*very often*). Other items included questions on sleep quality ("How do you rate your sleep quality over the last 12 months?"), occupation, and education efficacy ("How do you rate your work performance in the past 12 months?" and "How you rate your educational performance over the past 12 months?"). All responses were given on a 5-point Likert scale from 1 (*poor*) to 5 (*very good*).

Self-esteem The Italian version (Prezza et al. 1997) of Rosenberg's (1965) ten-item Self-Esteem Scale (RSES) was used to assess self-esteem (e.g., "On the whole, I am satisfied with

myself") using a 4-point Likert type scale from 0 (*strongly disagree*) to 3 (*strongly agree*). Scores range between 0 and 30 and higher scores indicate greater self-esteem. Cronbach's alpha in the present study was very good (.80).

Bergen Social Media Addiction Scale The Bergen Social Media Addiction Scale (BSMAS) (Andreassen et al. 2016; Italian version: Monacis et al. 2017) is a six-item instrument that assesses the risk of social media addiction based on the addiction components model (Griffiths 2005) over a period of 12 months. The six items (e.g., "Over the past 12 months, have you spent a lot of time thinking about social media or have you planned to use them?") are answered using a 5-point Likert scale from 1 (*never*) to 5 (*very often*) with scores ranging from 6 to 30, with a higher score indicating a greater risk of social media addiction. Cronbach's alpha in the present study was excellent (.91).

Adult PROMIS Emotional Distress/Anxiety-Short Form The seven-item Adult PROMIS Emotional Distress/Anxiety-Short Form (APEDA-SF) (Pilkonis et al. 2011; Italian version: Fossati et al. 2015) assesses anxiety among individuals aged 18 years and older. The seven items (e.g., "I feel anxious") are assessed on a scale of 1 (*never*) to 5 (*very frequently*) with scores ranging from 7 to 35, with a higher score indicating a higher level of anxiety. Cronbach's alpha in the present study was excellent (.95).

Adult PROMIS Emotional Distress/Depression-Short Form The eight-item Adult PROMIS Emotional Distress/Depression-Short Form (APEDD-SF) (Cella et al. 2010; Italian version: Fossati et al. 2015) assesses depression among individuals aged 18 years and older. The eight items (e.g., "I feel useless") are assessed on a scale of 1 (*never*) to 5 (*very frequently*) with scores ranging from 8 to 40, with a higher score indicating a higher level of depression. Cronbach's alpha in the present study was excellent (.96).

Smartphone Application-Based Addiction Scale The Smartphone Application-Based Addiction Scale (SABAS) (Csibi et al. 2018; Italian version: Soraci et al. 2020) is a six-item scale that assesses the risk of smartphone application-based addiction based upon the components model of addiction (Griffiths 2005). The six items (e.g., "Conflicts have arisen between me and my family (or friends) because of my smartphone use") are assessed on a 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*) with scores ranging from 6 to 36, with a higher score indicating a greater risk of addiction to smartphones. Cronbach's alpha in the present study was excellent (.90).

Bergen Facebook Addiction Scale The BFAS (Andreassen et al. 2012) is a six-item scale that assesses Facebook addiction based on the addiction components model (Griffiths 2005). The six items (e.g., "How often during the last year did you used Facebook in order to forget about personal problems?") are scored between 1 (*very rarely*) and 5 (*very frequently*) with scores ranging from 6 to 36. Indicating "often" or "very frequently" on at least 4 of the 6 items could be an indicator of greater risk of Facebook addiction. For the Italian BFAS, the items were independently translated by two mother-tongue translators and internationally accepted practices for translation were employed (Beaton et al. 2000). More specifically, a native translator initially translated the items from English into Italian. Subsequently, the items were translated again from Italian into English by a second native translator for comparison. In addition, the Italian BFAS was piloted on 15

participants of different ages and education levels to investigate if there were be any problems in understanding the items themselves (see Appendix 1). Cronbach's alpha in the present study was excellent (.94). To avoid the effect of the order and the sequence, the order of presentation of scales and the items within the survey were randomized.

Statistical Analysis

Before analyzing the data obtained from the sample, univariate normality of the data was verified using the guidelines proposed by Kim (2013), Tabachnick and Fidell (2007), and Muthén and Kaplan (1985) (i.e., skewness and kurtosis in the − 1; + 1 range). Descriptive statistics concerning the items (frequencies, percentages) were calculated. Nomological validation of the translated BFAS comprised the testing the reliability of the scale via the average variance extracted (AVE) and composite reliability (CR) verifying their respective values lay above their desired threshold (values of AVE greater than 0.5 and values of CR greater than 0.7 are associated with strong reliability of the test; Fornell and Larcker 1981). To determine the goodness of fit of the confirmatory factor analysis (CFA) for confirming a single factor model structure, root mean square residuals (RMSEA), standardized root mean square residuals (SRMR), Tucker-Lewis Index (TLI), comparative fit index (CFI), and goodness of fit index (GFI) were all calculated. A good model should have the following characteristics: GFI > 0.90, CFI and TLI > 0.95, RMSEA < 0.06, and SRMR < 0.08 (i.e., Browne and Cudeck 1993) The analysis was carried out using the following statistical packages: FACTOR v. 10.10.01 (Ferrando and Lorenzo-Seva 2017), SPSS Statistics v.25 (IBM Corporation 2017), "R" software (R Core Team 2014) with the *lavaan* package (Yves Rosseel 2012), and Mplus v.8 (Muthén and Muthén 2017) (Fig. 1).

Ethics

The study was approved by the ethics committee of the *Group Cognitive Behavioral Psychotherapy Association*. Informed consent was obtained from all participants. The anonymity of the individuals and organizations participating in the research was guaranteed. Participation in the study was voluntary and no personal information was gathered that could identify participants. Furthermore, all individuals were fully aware of the study's purpose and that they could withdraw their participation at any time without giving reasons. All procedures performed in this study involving human participants were in accordance with the 1975 Helsinki Declaration. All procedures followed were in accordance with the ethical standards of the Italian Psychological Society.

Results

Descriptive Statistics

The participants' socio-demographic characteristics and their Facebook and social media use are summarized in Tables 1 and 2. The sample ($n = 217$) comprised 64% female and
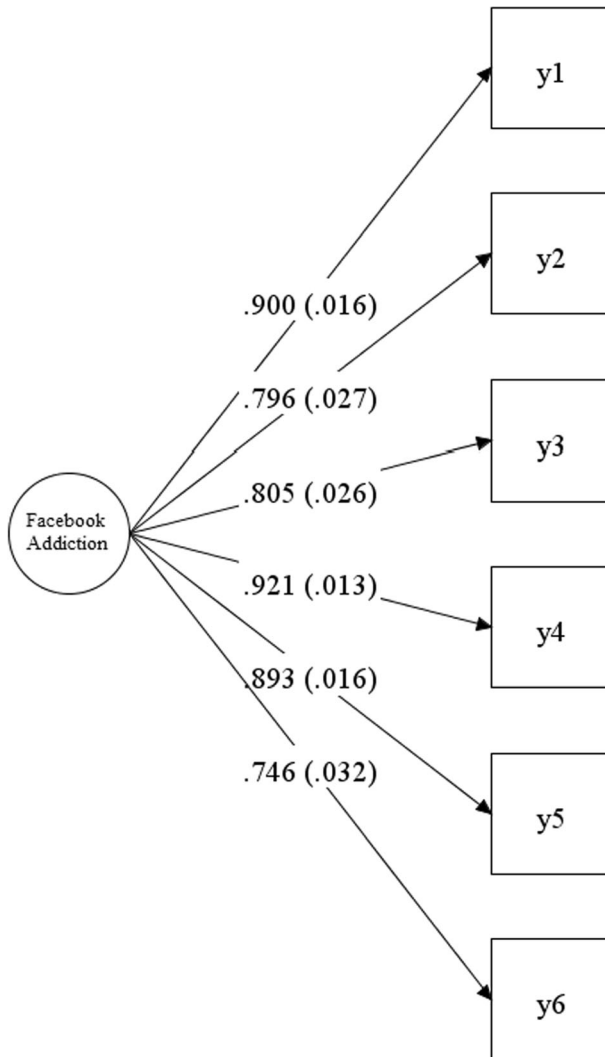
Fig. 1 Factor structure and standardized loadings of items (CFA) in the Italian Bergen Facebook Addiction Scale

36% male participants, with a mean age of 32.14 years (SD ± 10.99). In terms of education level, 52.5% had a university-level degree, 41.9% had a high-school degree, and 5.5% had a lower-level educational degree. Among participants, 40.1% said they had a significant other, 32.7% were married, and 24% were single. Regarding the main motivation for participants' SNS use, 77.9% said they engaged in SNS use mainly for entertainment reasons, 37% for chatting, while 23% mainly engaged in SNS use to update their profile (participants were able to provide more than one answer). Participants also reported using SNSs for a mean time of 3 h per day (SD ± 2.62). Most of the participants did not use narcotic substances (80.2%), and over half did not smoke cigarettes (58%). In terms of employment/education, 59.4% had a stable job, 34.6% were still in the educational system, and 9.2% were unemployed.

Table 1 Socio-demographic characteristics ($n = 217$)

Gender (male)	36%
Gender (female)	64%
Age (mean, SD)	32.14 (± 10.99)
Social network-use hours daily (mean, SD)	3.00 (± 2.62)
Type of employment	
Workers	59.4%
Students	34.6%
Education level	
University	52.1%
High school	41.9%

Descriptive Analysis and Confirmatory Factor Analysis

In the present study, the distribution of the six items of the BFAS was analyzed (Table 3). The majority of the items presented high frequencies of lower scores and low frequencies of high scores (i.e., a positive asymmetric distribution). Regarding asymmetry and kurtosis, all items are distributed in a substantially non-normal manner (some items are out of ± 1 interval, see Muthén and Kaplan 1985; Tabachnick and Fidell 2007). Further testing showed the Italian BFAS to have a unidimensional structure (i.e., a single factor). Furthermore, the Italian BFAS had eigenvalues > 1 in a single factor model (see Gorsuch 1983) which indicates one factor as the optimal model to use (more specifically, eigenvalues = 4.55 with a proportion of variance = 0.759). Furthermore, the scree plot (Fig. 2) showed that the ideal factor (i.e., Cattell 1966) of the model is one (as previously demonstrated by da Veiga et al. 2018), consequently, the scree plot demonstrated the scale was unidimensional.

A confirmatory factor analysis (CFA) was conducted on the six BFAS items and demonstrated acceptable goodness-of-fit (GOF) indexes for the one-factor model. Since there is no consensus on the indexes of adaptation for the evaluation of models (see Bollen and Long 1993; Boomsma 2000; Hoyle et al. 2002), the GOF indexes were based on different indices. In this specific case, since the items were distributed in a non-normal way (all items in the range of ± 1.5, [see Muthén and Kaplan 1985; Tabachnick and Fidell 2007]), the diagonally weighted least squares method (DWLS, polychoric correlation, parallel analysis) was used

Table 2 Descriptive statistics of scales and variables examined ($n = 217$)

Scale/variable	Mean	Standard deviation	Skewness	Kurtosis
BFAS	11.15	6.0	1.255	0.814
SABAS	11.53	5.7	1.163	0.896
BSMAS	11.67	5.4	1.213	0.811
Narcissism	2.91	1.6	0.620	− 0.335
Self-esteem	15.96	3.2	0.231	0.322
Anxiety	17.10	7.6	0.360	− 1.000
Depression	17.10	9.1	0.840	− 0.500

BFAS Bergen Facebook Addiction Scale, *BSMAS* Bergen Social Media Addiction Scale, *SABAS* Smartphone Application-Based Addiction Scale

Table 3 Descriptive item analysis of the BFAS

Variable	Mean	Confidence interval	Variance	Skewness	Kurtosis
V1	1.848	(1.66–2.04)	1.226	1.143	0.309
V2	1.968	(1.77–2.17)	1.294	0.951	− 0.029
V3	1.968	(1.76–2.18)	1.460	0.928	− 0.418
V4	1.806	(1.62–1.99)	1.170	1.248	0.655
V5	1.696	(1.51–1.88)	1.152	1.439	0.926
V6	2.115	(1.92–2.31)	1.236	0.843	0.064

(Mindrila 2010). The results indicated that $\chi^2 = 8.78$ (df = 9, $n = 217$), $p = 0.458$ (i.e., not significant at $p < 0.01$, with $\chi^2/df = 0.97$ the ratio of χ^2 to degrees of freedom [df] < 3 to consider the data-model fit as acceptable [Kline 2011]), TLI = 1, CFI = 1, RMSEA = 0.001 (90% confidence interval, lower limit 0.000, upper limit 0.079), and SRMR = 0.018 (Hu and Bentler 1999). The explained common variance (ECV) was 80% (Fornell and Larcker 1981). The results support the factorial validity of BFAS (Cerny and Kaiser 1977; Kaiser 1974) given that the indices obtained were acceptable and all factor loadings were high on all items (min = 0.746, max = 0.921; i.e., $\lambda_{ij} \geq 0.50$, Ferguson and Cox 1993). Furthermore, all items were positively related to each other (Table 4). Furthermore, using the item-total correlation, all items were positively and significantly correlated with the total BFAS score (min = 0.77, max = 0.88). These results demonstrate that the BFAS presented a good fit to the data (Fig. 1).

Validity of the Construct and Convergence Validity of the BFAS

To analyze the construct and convergence validity (Cronbach and Meehl 1955), the total score of the BFAS was correlated with a series of variables which have been previously been associated with addiction to Facebook and SNSs in general (e.g., frequency of SNS use, smartphone addiction, anxiety, depression). The BSMAS was used to test for convergent validity, as both scales concern SNS addiction (one specific [BFAS] and one general [BSMAS]). Results showed that the BFAS was positively correlated with the mean daily hours of internet use ($r = 0.10$) and social media use ($r = 0.30$), as well as with the perceived
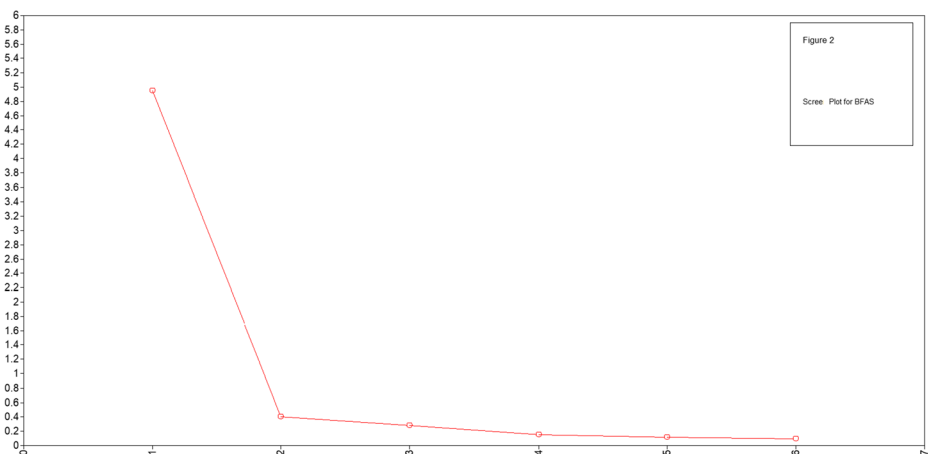

Fig. 2 Scree Plot of the eigenvalues of factors for Italian Bergen Facebook Addiction Scale

Table 4 Standardized variance/covariance matrix (polychoric correlation) of BFAS items

Item	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1	1.000					
Item 2	0.803**	1.000				
Item 3	0.810**	0.705**	1.000			
Item 4	0.887**	0.809**	0.833**	1.000		
Item 5	0.886**	0.832**	0.803**	0.897**	1.000	
Item 6	0.739**	0.606**	0.670**	0.788**	0.741**	1.000

**Statistically significant at $p < 0.001$. Polychoric algorithm: Bayes modal estimation (Choi et al. 2011)

importance of the internet ($r = 0.26$) and importance of social media ($r = 0.60$) in the respondents' everyday life. Similarly, the total score positively correlated with the frequency of search for information on social networks ($r = 0.32$), and with the frequency of playing videogames via social media ($r = 0.25$).

The BFAS's total score was positively correlated with (i) the establishment of friendships and romantic relationships with individuals they met via online chat forums, SNSs, or videogames ($r = 0.51$), (ii) anxiety ($r = 0.47$), and (iii) anxiety specifically associated with performing actions in public (e.g., public speaking, $r = 0.32$). The BFAS total score was also positively correlated with the use of social media in order to escape from a negative mood state ($r = 0.58$) and from personal issues ($r = 0.62$), as well as with depression ($r = 0.48$). Moreover, the BFAS total score was positively correlated with self-reported narcissism ($r = 0.35$) and self-esteem ($r = 0.23$).

Additionally, the BFAS total score was positively correlated with the frequency of alcohol consumption ($r = 0.32$), cigarette smoking ($r = 0.32$), and narcotic use ($r = 0.53$). The BFAS was also highly positively correlated with the BSMAS score ($r = 0.87$) and with the SABAS score ($r = 0.87$). The BFAS total score was negatively correlated with self-reported scholastic performance ($r = -0.10$) or job performance ($r = -0.20$). The total score was also negatively correlated with the perceived quality of life ($r = -0.39$) and sleep quality ($r = -0.20$). Finally, the total BFAS score was negatively correlated to the respondents' offline sociability ($r = -0.20$), and the age of the participant ($r = -0.09$). Also, regression analyses were performed to investigate whether anxiety and depression were significant predictors of Facebook addiction. Linear regression showed that depression ($R^2 = 0.23$, $\beta = 0.48$, SE $= 0.04$, $t = 8.0$, $p < 0.001$) and anxiety ($R^2 = 0.22$, $\beta = 0.47$, SE $= 0.05$, $t = 7.8$, $p < 0.001$) were both significant predictors of Facebook addiction. In addition, a multiple regression was carried out, which used the number of daily hours spent on social networking sites and the number of hours spent gaming on social networking sites as independent variables, and the BFAS score as a dependent variable, with the following results: $\beta = 0.272$ ($p < 0.01$; daily hours spent social networking sites), $\beta = 0.217$ ($p < 0.01$; gaming frequency on social networking sites). $F = 17.2$ ($p < 0.01$), and $R^2 = 0.37$ (i.e., these two variables explained 37% of the variance of the BFAS score). Both were both significant predictors of Facebook addiction.

Reliability

The reliability of the Italian BFAS was assessed using several indices. The Cronbach alpha coefficient was excellent ($\alpha = 0.94$) and it could not be improved by the removal of any item. The factor score determinacy was excellent (.97), well above the suggested

threshold of 0.80 (Muthén and Muthén 2012). All the individual items were statistically relevant and positively correlated with the total BFAS score (item 1, $r = 0.87$; item 2, $r = 0.92$; item 3, $r = 0.84$; item 4, $r = 0.91$; item 5, $r = 0.89$; item 6, $r = 0.89$). Overall, the results strongly support the adequacy and reliability of the unidimensional factor solution of the Italian BFAS in the present sample. The composite reliability coefficient was also very good (.93), and well above the recommended 0.70 thresholds (i.e., Fornell and Larcker 1981). Furthermore, the Loevinger H statistic was calculated and produced the following results: > 0.7 for each item and $H = 0.730$ for the total scale score (with a standard error of 0.03, $H > 0.5$, the scale was viewed as strong [Sijtsma and Molenaar 2002]). In addition, the McDonald's ordinal Omega index (McDonald 1999) was excellent ($\omega = 0.95$) These results also supported the reliability of the Italian BFAS test.

Discussion

In the present study, the psychometric properties of the Italian BFAS and factor analysis of the six BFAS items confirmed a unidimensional factor (i.e., a single construct component). Analyzing the psychometric characteristics of the BFAS, the analyses showed good internal reliability and consistency. Convergent validity was confirmed by its significant correlation with BSMAS (which assesses the risk of social media addiction more generally). The results confirm other validation studies of the BFAS demonstrating a one-factor construct (e.g., Andreassen et al. 2012), alongside good reliability and validity. Furthermore, the positive high correlation between these two scales can be interpreted, as shown by recently published research (Balcerowska et al. 2020), that general addiction to SNSs and addiction to Facebook specifically basically refer to the same addiction. However, the assessment of addiction to a specific SNS (e.g., Facebook) should be conducted when researchers are interested in unique aspects of the participant's functioning, which may differ between individuals, dependent upon the specific SNS.

The findings in the present study confirmed that some variables (i.e., the frequency of use of SNSs, anxiety, depression) are associated with potential Facebook addiction, as assessed by the BFAS. Total scores on test BFAS were correlated with the (i) hours of daily internet use, (ii) hours of daily SNS use, and (iii) perceived importance of the internet and social networks in the life of the individual, indicating that the BFAS has good criterion validity and convergence. Furthermore, the BFAS score positively correlated with the establishment of friendships or romantic relationships with individuals they knew via online chat forums, social networks, or video games. As reported by Caplan (2010), many individuals with potential addiction to Facebook tend to establish more online relationships than offline, thus increasing the risk factor of the addiction itself. The BFAS score was positively correlated with the frequency of searching for information on SNSs (as reported by Centro Hikikomori [2012] the search for information, done very frequently on Facebook is one of the possible components of the addiction itself), and with the frequency of using videogames via SNSs (confirming previous research by Mentzoni et al. 2011). In addition, the BFAS score positively correlated with the frequency of alcohol consumption, cigarette smoking, and drug use as has been found previously (e.g., Moreno et al. 2012). Furthermore, the BFAS score was positively correlated with the frequency of use of social networks to temporarily

escape from a negative state and with the use of social networks to forget about personal problems. These two variables refer to SNS use (and in this specific case, Facebook), as a coping tool, as demonstrated in previous research (e.g., Correa et al. 2010; Ehrenberg et al. 2008).

In addition, narcissism and self-esteem level were positively associated with the BFAS total score. As reported previously (e.g., Andreassen et al. 2017; Buffardi and Campbell 2008), narcissism has been identified as one of the variables related to problematic Facebook use and SNSs more generally. This might be because SNS allow their users to display their successes to a large audience, consequently receiving gratification through positive reactions (Andreassen et. al. 2017), such as in Facebook's case, "Like," "Wow," or "Love," and therefore sustaining prolonged use.

The BFAS score was also positively associated with scores on anxiety and depression. The association between Facebook addiction and these variables confirm what was found in previous research showing that anxiety and depression are present among individuals with technological addictions (e.g., Correa et al. 2010; Tsai et al. 2009; Yen et al. 2009; Xie and Karan 2019). Previous research has suggested that it might be due to the fact that people who suffer from technological addiction have smaller social circles, as the time spent with friends and relatives decreases in favor of solitary online activities, leading to higher levels of perceived stress and loneliness (e.g., Nie et al. 2002). Furthermore, the BFAS was positively related to smartphone addiction (as assessed using the SABAS) (Csibi et al. 2018) which is unsurprising given that the majority of SNS use is carried out via smartphones (Kuss and Griffiths 2017).

Predictably, total BFAS score was negatively associated with self-reported occupational and/or educational performance, participant age (i.e., younger participants more likely to be at risk of Facebook addiction), perceived quality of life, and perceived sleep quality. These variables have already been investigated in previous research (e.g., Alimoradi et al. 2019; Dewald et al. 2010; Brunborg et al. 2011), which have shown that problematic online use (including problematic SNS use) decreases occupational/educational performance and sleep quality. A further correlation was found between performing an action in public and experiencing social anxiety (for example, speaking in public), as reported in previous research (Kuss and Griffiths 2011).

The present study is not without limitations. The study was conducted on a small sample of healthy participants, rather than on a large clinical sample, and the analyses were based on self-report cross-sectional data from a small self-selected sample of participants and included a few single-item measures (e.g., quality of life, narcissism, and sociability). These single-item measures were collected solely for exploratory purposes for an initial validation of the test in the Italian territory. Further investigation on Italian participants is needed to confirm the preliminary results provided by the present study using bigger and more representative samples, and utilizing more robust scales rather than non-single-item measures. However, the psychometric testing of the Italian BFAS demonstrates that it assesses a unidimensional construct and that it is a reliable and valid tool for assessing the risk of addiction to Facebook among Italian adults. Consequently, future research in Italy will now specifically be able to investigate this risk of addiction because this is the first time the BFAS has been validated into Italian. Additionally, Italian researchers can use the Italian BFAS as an additional tool for targeted research on the Facebook phenomenon, or use this test for convergent validity in future studies examining social media dependence.

Compliance with Ethical Standards

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

Ethical Approval All procedures performed in this study involving human participants were in accordance with the ethical standards of the University's Research Ethics Board and with the 1975 Helsinki Declaration.

Informed Consent Informed consent was obtained from all participants.

Appendix 1. Italian version of the Bergen Facebook Addiction Scale

1. Trascorri molto tempo pensando a Facebook o a programmare come usarlo?
2. Senti il bisogno di utilizzare Facebook sempre più spesso?
3. Usi Facebook per non pensare ai tuoi problemi personali?
4. Hai provato a non utilizzare più Facebook senza riuscirci?
5. Ti senti irrequieto/ansioso o turbato se non puoi utilizzare Facebook?
6. Utilizzi Facebook così tanto che il suo uso ha avuto un impatto negativo sul tuo lavoro o sui tuoi studi?

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