

Validation of the brief screening of Social Network Addiction Risk

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ABSTRACT

Introduction: This study aims to develop a valid and reliable tool to evaluate social network behavior in young adults.

Methods: To validate the Brief screening for Social Network Addiction Risk (BSNA), data from 776 Italian young adults (64.3 % of women) were collected. The suitability of the instrument was statistically assessed. Experts' opinions, item reliability, exploratory and confirmatory factor analyses, and convergent validity were adopted to validate the BSNA items. Internal consistency coefficients were also calculated.

Results: According to the statistical analyses, a 2-factor structure was confirmed. The two scales of BSNA assess behavior and motivation frame of social networks use. The second order model proved a global score of risk of social network addiction. Fit indices highlighted the high goodness of the model. Preliminary analyses of prevalence estimated that about 18 % of participants reported problematic Social Network use, which may overtime represent a marker of addictive behavior.

Conclusion: The final version of the BSNA, with 11 items evaluated on a 5-point Likert- scale, is a short but valid tool for measuring the risk of social network addiction. It represents a promising screening tool aimed to not overpathologize a behavior, but to furnish adequate insight into this phenomenon.

1. Introduction

In recent years, great interest has developed in new approaches to the social world, characterized by adopting technological tools and virtual content that largely changes our way of approaching the world (Biclesanu et al., 2021). The role and impact that technology and novel devices play in modern society continue to provoke a high debate (Stieger & Lewetz, 2018; Twenge, 2017). Social media and social networks remain the core of these concerns since they radically changed the way to broadcast information, socialize, create and carry out relationships especially among young users, highly active on these platforms and open to interacting with technologies (Yu et al., 2019). Recent studies analyzed the influence of social media, artificial intelligence-enabled assistants and virtual/augmented reality tools on body image, self-esteem, and purchase behavior among young consumers of Generation Z, finding some significant effects (Ameen et al., 2022). In this context, the co-occurrence of smartphone usage abusive tendencies and online compulsive buying behaviors was also observed (Mason et al.,

2022). The amount of social interactions via the web progressively increased in the last years (Azzaakiyyah, 2023), allowing instant sharing of news and personal information with many people and providing a spread of knowledge in multiple areas (Savastano et al., 2017; Subrahmanyam et al., 2008). These activities are primary to the basic human need for obtaining social relatedness and satisfaction, and reducing loneliness and isolation (Day et al., 2018). Accordingly, some elements of social networks have been found to improve psychosocial well-being (Cheung et al., 2018; Obst & Stafurik, 2010) with an increase in satisfaction toward life due to the constant contact with "online friends" (Sheldon et al., 2011). Conversely, some evidence reported a risk for negative outcomes, including low self-esteem and life satisfaction (Andreassen et al., 2017), that may be ascribed to personological or contextual dimensions, making the excessive adoption of social media comparable to addictive behavior. In the theoretical model of social network addiction (SNA), a core dimension is the compulsive use, driven by an uncontrollable urge (Andreassen & Pallesen, 2014), which negatively affects the quality of life (Griffiths, 2000). This model suggests

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that is not the use of media per se to represent a risk of addiction, but rather the ways of approaching them.

According to a recent review (Cheng et al., 2021), the prevalence of SNA varied widely across studies and nations, ranging from 1 to 82 % (Cheng et al., 2021). In Italy, a recent study of Marino and colleagues (Marino et al., 2020) indicated that about 10 % of adolescents experienced problematic use of social networks, while Cannito et al. (2022) reported a prevalence of 14 %. This discrepancy is mainly due to the frames of the diagnostic protocol adopted. In fact, as suggested by the authors, studies adopting a conservative schema detected a prevalence of SNA around 5 %. An increase of up to about 13 % emerged in studies adopting a cut-off score to define the severity of addiction. While in studies in which prevalence tested around 25 %, the cut-off involved lower to moderate levels of addiction. These variations emphasize the crucial role that diagnostic tools play in defining the SNA, as well as the theoretical framework in which these tools are developed. The concerns on the prevalence of SNA involved the diagnostic criteria to adopt and the features to be attended to. As in other behavioral addictions, a focus should be on the psychological feature of SNA. Studies showed alteration in mood, cognition, physical and emotional reactions, and interpersonal approaches (Balakrishnan & Shamim, 2013; Blachnio et al., 2017; Zaremohzzabieh et al., 2014). High levels of stress, anxiety, and depression were reported by individuals who compulsively adopted social networks (Eraslan-Capan, 2015; Malik & Khan, 2015; Shakya et al., 2017), with an impact on the quality of life (Al-Menayes, 2014, 2015). From this evidence, the theoretical approach of including in an addiction framework a series of frequently adopted behaviors can run the risk of confusing what represents a leisure activity from what really is a health risk for individuals, also in the case of social network use.

To this aim, it is important to find tools able to not over-pathologize the social-network approach but to screen the risk of addiction easily. In this sense, it is relevant to find a key distinction between normal over-engagement in social networks that may be occasionally experienced and SNA. The latter is associated with unfavorable consequences when online social networking becomes uncontrollable and compulsive (Andreassen, 2015).

Starting from these premises, this study aimed to develop, validate, and establish the reliability of a tool for evaluating social network behavior. Moreover, the perspective of reducing the risk of over-pathologizing new and spread behavior drove this work to focusing on both positive and negative characteristics of the continuum of social network use. In this sense, the objective to develop a new questionnaire should consider the purpose to not refer to any theoretical model or clinical definition of addiction (e.g., Griffiths' addiction model; 2020) capturing some indicators that may discriminate between the continuum of social network use and misuse without overpathologize them.

2. Materials and methods

2.1. Participants

A web-based survey, broadcasted through different platforms and mainstream social media between April 2022 and June 2022, collected data among the Italian-speaking population. Due to the observational and validation aim, being at least 18 years old was the exclusive inclusion criterion. Only data from completed surveys were included in the statistical analyses (about 98 % of the total respondents; $N = 776/793$). The final sample included 776 respondents (mean age = 24.23; $SD = 3.43$; 64.3 % of women). Participants' characteristics are reported in Tables 1 and 2.

2.2. Measures

2.2.1. Demographic questionnaire

The demographic questionnaire collected information about age, gender, education, and occupational and marital status to describe the

Table 1
Demographic characteristics of the sample.

	N (percentage, %)
Gender	
Male	267 (34.4)
Female	499 (64.3)
Other	10 (1.3)
Education	
Middle school degree	24 (3.1)
High school degree	320 (41.2)
Undergraduate degree	303 (39.0)
Graduate degree	115 (14.8)
Post graduate specialization	14 (1.8)
Sentimental status	
In a relationship	433 (57.1)
Single	333 (42.9)

Table 2
Internet and social networks behavior habits.

	N (percentage, %)
Time spent in social networks platform	
No time spent in social networks	3 (0.4)
<1 h per die	48 (6.2)
1–2 h per die	296 (38.2)
3–5 h per die	246 (44.6)
6–8 h per die	69 (8.9)
>8 h per die	14 (1.8)
User type of social networks	
Active (active interaction with other users)	114 (14.7)
Blogger (active user, content sharing)	94 (12.2)
Passive (no active interaction with other users)	126 (16.2)
Scroller (unreasoned actions in scrolling through home page)	438 (56.4)
Missing/no users	4 (0.5)

sample. Moreover, information about the frequency and characteristics of the use of social networks was collected (i.e., “How many hours do you spend on social networks during the day?”; “what kind of user are you?”; see Table 1). This information was included in descriptive statistics reported in Table 2.

2.2.2. Brief screening to assess the risk of Social Network Addiction (BSNA)

The BSNA was built starting from an original pool of 24 items. Items were created ad hoc according to the existing literature on new addictions connected to the evolution of social media and social networks (e.g., Internet, smartphone, Facebook). Existing tools to evaluate social network addiction in the national and international frame, such as the Bergen Social Media Addiction Scale (Monacis et al., 2017), were also consulted. According to the aim of furnishing a brief but complete tool to define the main characteristics of social network behavior, a preliminary focus group selected the most appropriate items. This focus group consisted of psychologists specialized in the diagnosis of behavioral addictions. They analyzed and selected the items focused on the characteristics that may better define behavioral and psychological features of social network users, discriminating between social networks as a leisure activity and an at-risk of addiction behavior. After thorough selection and preliminary item analysis, eleven items were finally selected and analyzed to confirm their reliability and validity. According to the theoretical background, which highlighted specific behavioral and psychological patterns in behavioral addictions, items should converge into two different subscales: behavioral modification and motivation. These two scales would help define the motivational dimensions to achieve the behavior and discriminate it from an adaptive leisure activity. The items were pointed on a 5-point Likert scale, from 0 (never) to 4 (always).

2.2.3. Other questionnaires

The Behavior Motivation System Scale (BIS/BAS) was adopted to assess convergent validity. The BIS/BAS (Carver & White, 1994) is a 24-item self-report questionnaire measuring the behavioral inhibition system (BIS) and the behavioral activation system (BAS), two systems involved in motivation and selection of adaptive behavior. Particularly BIS subscale was considered in the study because it was reported an association between emerging at-risk behavior and inhibition system assessed by BIS/BAS (Forte et al., 2023). The Italian validation (Leone et al., 2002) reported good reliability of the instrument (Cronbach's α for the BIS and BAS, respectively, of 0.72 and 0.74) with similar results to the original validation (Carver & White, 1994).

2.3. Procedure

All the respondents were recruited via dissemination of the research to the main social media platforms (Facebook, Instagram, TikTok, YouTube, WhatsApp; Telegram) and were invited to access the questionnaires via a link. Then, they were informed about the aims of the study and had to confirm their consent before starting the survey. After the short demographic questionnaire, participants completed the BSNA. No personal information that could allow participants' identification was collected to guarantee anonymity (e.g., name, email contact, address).

2.4. Data analyses

Descriptive statistics considered frequencies, means, and standard deviations of the variables. A preliminary analysis was conducted to reduce items and ensure the inclusion in the scale only of functional and internally consistent items. The deletion of items was supported by focus groups and the estimation of inter-item and inter-total correlations. The factorial structure of the scale was examined by exploratory (EFA) and confirmatory factor analyses (CFA).

The EFA was computed as a preliminary explorative analysis to confirm the two-factor structure provided by the focus group. Oblique rotation (Oblimin) was adopted since factors are assumed to be related (Yong & Pearce, 2013). The scree plot was used to confirm the theorized factors. The maximum likelihood (ML) estimation was employed in CFA. Goodness-of-fit was assessed using chi-square, Comparative Fit Index (CFI), Tucker Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA) indices (Forte et al., 2021; Mastropietro et al., 2022). Other normed fit indices included were the Incremental Fit Index (IFI), Goodness of Fit (GFI), and Normed Fit Index (NFI). It is difficult to designate a specific cutoff value for each fit index because it does not work equally well with various conditions (Hu & Bentler, 1999). It is considered to be a good model fit if the values of fit indices for the GFI, CFI, NFI and TLI are >0.90 and if the value for RMSEA is <0.08 (Hu & Bentler, 1999). Cronbach's alpha examined internal consistency. The Composite Reliability (CR) of the identified factors was also calculated to identify construct reliability. The convergent validity of the construct was evaluated through the correlations among the subscales and the BSNA global score with the BIS score of the BIS/BAS scale.

A psychometrically defined cut-off scores, considering 1 and 2 standard deviations from the average score of the sample, was calculated to suggest potential at risk levels of BSNA which may be considered.

Jamovi free software was adopted for the analyses.

2.5. Ethics

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. Informed consent was obtained from all participants for being included in the study. All the procedure was approved by the

ethical committee of the XXXXX (protocol number: XXXX).

3. Results

3.1. Exploratory and confirmatory factor analysis

Cronbach's alpha of the final items included in the questionnaire reported good unidimensional reliability ($\alpha = 0.87$; 95%CI: 0.86–0.88; Proportion variance: 0.46).

To explore the provided factorial structure of the questionnaire, exploratory factor analysis (EFA) was applied, considering Bartlett's Test of Sphericity and the Kaiser–Meyer–Olkin (KMO) Measure of Sampling. Maximum likelihood (ML) was selected as the factor extraction method; eigenvalues >1 and the Kaiser criterion were checked for agreement. The hypothesized bifactorial structure (Factor 1: behavioral modification; Factor 2: motivation) was confirmed (Bartlett's Test <0.0001 ; KMO = 0.88). The reliability of Factor 1 ($\alpha = 0.84$; 95%CI: 0.82–0.85; Proportion variance: 0.25) and Factor 2 ($\alpha = 0.82$; 95%CI: 0.80–0.84; Proportion variance: 0.25) were adequate and confirmed the provided structure of the questionnaire.

The CFA confirmed the optimal model fit ($\chi^2/df = 4.15$; CFI = 0.99; TLI = 0.99; RMSEA = 0.06 (CI 90 % = 0.05–0.07); SRMR = 0.05; NFI = 0.99; IFI = 0.99; GFI = 0.99). Moreover, the CR values were higher than the threshold of 0.75 (Factor 1 = 0.82; Factor 2 = 0.77), suggesting good construct reliability (see Fig. 1).

3.2. Convergent validity

The BSNA, considering both the two subscales (f1: $r = 0.20$, $p = 0.001$; f2: 0.25, $p = 0.001$) and the global score ($r = 0.25$; $p = 0.001$), showed significant positive correlations with the BIS subscale of the BIS/BAS adopted to assess the convergent validity of the scale.

3.3. BSNA scores

The whole sample of participants who use social networks (773) was considered to define the distribution of the scores. Means and standard deviations were computed for the global score (27.1; SD = 8.9). To define possible problematic social network use behavior, a cut-off was calculated considering one standard deviation from the mean (defined cut-off = 36). According to this cut-off, 18 % of participants (139/773) reported problematic behavior. Moreover, for descriptive purposes, the value of 2 DS cut-off was reported (i.e., 45) as a psychometrically defined cutoff to define highly problematic behavior. In this case, 3.5 % of participants obtained scores higher than the cut-off.

4. Discussion

In line with the increasing public concern about the use of social networks and its possible decline in addiction, a growing body of literature attempts to define its characteristics from a behavioral to a psychological perspective (Lozano Blasco et al., 2020). However, in the absence of a reliable tool able to assess the continuum from positive to negative features of this novel behavioral pattern, the use of social networks as addiction suffers from many methodological problems, which may affect the definition of risks and outcomes. In a world currently characterized by the high use of social networks among individuals from different cultures, ages, and genders, social networks represent a new way to communicate and interact with the world (Bala, 2014). Accordingly, this study aimed to define and validate a brief screening tool to assess social network behavior in its continuum from leisure and potential positive activity, entertaining and facilitating relationships, to risk addiction activity.

Previous studies (De Pasquale et al., 2017; Mastropietro et al., 2022) reported the validation of questionnaires to analyze internet addiction and smartphone addiction, which included, to some degree, the use of

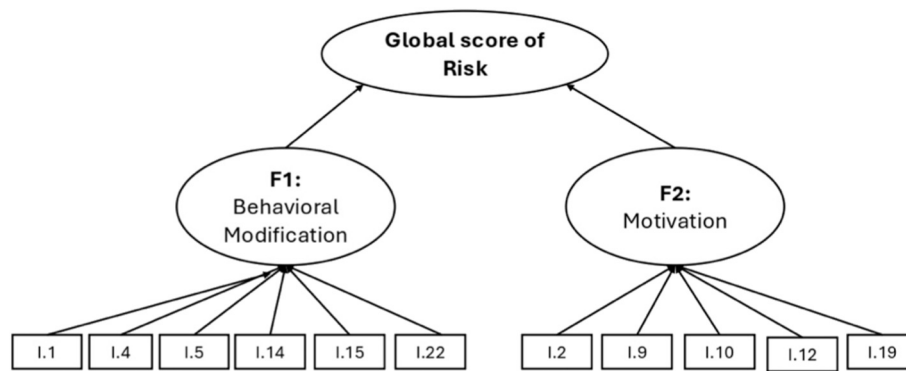


Fig. 1. Factorial model of the scale.

social networks but are not focused on them. However, due to the social implication of life constantly online and the impact of the change in the style of communication and in relationship building, which may characterize the intensive use of social networks, we found it relevant to focus specifically on them and their analysis. In this sense, some authors preliminarily developed instruments specifically focused on popular social media and social networks, such as Facebook, attempting to extend this assessment to the general use of social networks, such as in the Balcerowska et al. study (Balcerowska et al., 2020). Similarly, a very short but reliable instrument to assess social media addiction was introduced by Andreassen and colleagues (Andreassen et al., 2016). The authors developed the Bergen Social Media Addiction Scale (BSMAS; (Andreassen et al., 2016)), a six items questionnaire specifically focused on defining the dimensions involved in social media addiction (e.g., anxiety, craving, and impact on daily life). Similarly, in the Italian context, a general paucity of academic research was underlined. Previous studies reported psychometric properties of the Italian version of the Bergen Social Media Addiction Scale (Monacis et al., 2017) and the Bergen Facebook Addiction Scale (BFAS) (Soraci et al., 2020), which were developed into the theoretical frame of addiction. However, no attention was paid to developing a brief scale that considered the SNA continuum, adopting a vision of both psychological and behavioral components that motivate the use of social networks, and which may represent the risk of occurrence of the SNA. Moreover, the two-factor structure of the BSNA allowed us to explore the characteristics of the excessive use of the social networks, lacking among the tools currently adopted and characterized by a single factor structure. The aims of this study were: (a) to provide empirical evidence of the psychometric properties of the BSNA in a sample of young Italian adults and (b) to explore the prevalence of this behavior in the young Italian population.

Overall, the results underline a two-factor second-order solution, confirming the provided dimension given. Moreover, confirmatory analyses showed an excellent fit of the model to the data. All items significantly loaded on the hypothesized factors (i.e., behavioral modification and motivation). Considering the BSNA as a tool to detect a possible risk of behavioral addiction, the results of the current study revealed that social network behavior is a higher-order construct having two first-order dimensions, which can discriminate against behavioral addiction that is not an either-or phenomenon (Young, 2009). Behavioral addictions, such as other forms of addiction, can be manifested in dissimilar ways in different individuals (Davazdahemami et al., 2016) and, therefore, can be considered on a spectrum with varying levels of severity (Soraci et al., 2015). Accordingly, in developing the BSNA, we focused on the aim to bring out characteristics that may contribute to both positive and negative outcomes of the use of the social network, and both behavior and psychological subscales contribute to describe the pattern that characterizes individual use of social networks. However, the lack of people who do not use social networks did not allow us to analyze the positive effects of this activity.

As for reliability, the internal consistency of the BSNA was supported by high value in several indicators (i.e., Cronbach's α , CR) (Andreassen et al., 2012, 2016). Future studies should replicate these findings in cross-cultural contexts to confirm the overall construct validity and reliability.

Consistent with previous findings on behavioral addiction (e.g., Forte et al., 2021), this investigation confirmed the strong association between BSNA and the behavioral inhibition system, which is a dimension implicated in the control of behavior and impulsivity traits. Concerning the theoretical associations between these variables, similarly to previous evidence, our results generally supported the hypotheses regarding the causal relationship between the two constructs. Higher impulsivity positively predicted behavioral addiction (Rømer Thomsen et al., 2018). Interestingly, previous evidence suggested that also in internet addiction, which involves social media and social network use, vulnerability is predicted by alteration in the behavioral inhibition system (Li et al., 2019; Park et al., 2013).

Considering the second aim of the study, the prevalence of risk of social network addiction was based on the global score distribution. In our sample, 18 out of 100 people crossed the threshold, highlighting a possible risk of addiction; this finding is not far from the wide range of prevalence reported in other studies, as suggested by the cited Cheng and colleagues' meta-analytic work (2021). In fact, as aforementioned, the prevalence definition remains one of the most problematic aspects of this behavior (Cheng et al., 2021). This problem would also be ascribed to the difficulty of discriminating between internet use, social media, and social network approach, which implicate diverse degrees of virtual interactions and involve the need to interact with others differently. However, another problematic aspect is the definition of the wide range of symptoms severity reported by the SNA, which may consequently affect the prevalence rate. For example, a cut-off for moderate level may serve the purpose of identifying at-risk groups who can benefit from preventive programs to contrast the SNA, especially in the younger population, who is more exposed to the risk. In contrast, using more conservative classification schemas may be appropriate to consider this behavior as an addiction and psychiatric problem to safeguard against over-diagnosis. For this reason, we suggested different cut-offs and reported prevalence considering both thresholds that could be adopted both for preventive and diagnostic purposes. Moreover, it could be useful to avoid the over pathologizing of common behavior (Forte et al., 2021). Therefore, we defined an-at risk addiction dimension, and not a diagnostic cut-off of SNA. Surely, more research is needed to evaluate the symptom threshold and its relationship with distress and functional impairment.

Despite interesting findings, the present study clearly shows some limitations. Although the short version of the questionnaire, with 11 items, allows a rapid assessment, it reduces its capability to analyze other aspects involved in social network behavior. However, this choice comes from the desire to use this instrument in a dual manner, namely as

an initial screening as well as a tool sensitive to unearthing the risk of SNA. The sample's characteristics represent another limit. The survey was mainly disseminated via social networks. On the one hand, this allowed us to collect data from a large sample; on the other hand, this choice resulted in a partial coverage of the general population. It especially excluded all the people who did not use social networks because they could not access the survey, reducing the generalizability particularly about the prevalence of addiction reported in the study. Moreover, this choice did not allow for a real understanding of the continuum characteristics, especially preventing the positive aspects of this activity compared to the total absence of social network use. Moreover, another limit could be the adoption of a cut-off based on the standard deviation from the mean. Further studies should verify the robustness of these cut-offs. Another limitation is the lack of comparison with other questionnaires adopted to measure SNA behavior, to define if similar data were reported cross-sectionally independently from the tools. Finally, this scale was validated in an Italian-speaking population, and further studies should test their validity in different cultures and languages.

5. Conclusions

Taken as a whole, this study demonstrated that the BSNA resulted in a psychometrically robust instrument. Our questionnaire provides a brief evaluation of social network use without a strict reference to any theoretical model or clinical definition of addiction (e.g., Griffiths' addiction model; 2020). In contrast to previous studies, the interest was to focus on the behavior without over-pathologizing it, providing a measure of potential use to screen rather than a true classification of addictive behavior. This allowed us to capture some indicators of social network use and misuse, rather than a series of signs of addiction.

Findings from validity and reliability analysis show that BSNA is a valid and reliable measurement tool that can be used both in a preventive way to define the at-risk population and effectively determine social network addiction. However, to fully consider the instrument as a valid diagnostic tool, future research should replicate these results and assess the optimal cut-off point based on clinical data. Moreover, further research should be conducted on both problematic and unproblematic social network users to define the link with other psychopathological aspects. These would have strong clinical implications in terms of prevention (i.e., defining the risk factors) and intervention (i.e., highlighting the intervention areas). Therefore, the presented questionnaire could be useful to future researchers, in various research fields, to deepen our insight into different aspects of the social network addiction phenomenon.

Ethics

The work was approved by the Ethical Committee of the Department of Dynamic and Clinical Psychology and Health Studies, "Sapienza" University of Rome (protocol number: 0000181). Each participant indicated the availability to participate in the study via a flag of the informed consent forms.

CRediT authorship contribution statement

Francesca Favieri: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Giuseppe Forte:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Marco Savastano:** Writing – review & editing, Methodology. **Maria Casagrande:** Writing – review & editing, Writing – original draft, Validation, Methodology.

Declaration of competing interest

The authors did not receive support from any organization for the submitted work.

The authors have no relevant financial or non-financial interests to disclose.

Data availability

Data will be made available on request.

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