

Assessing problematic use of social media: where do we stand and what can be improved?

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The increased popularity of social media has brought clinicians and researchers to question the potential problematic outcomes of such Internet-based applications. Over the past two decades, an increasing number of studies identified the so-called problematic use of social media (PUSM), which led to the development of various assessment tools requiring constant revisions because of the ever-evolving nature of the Internet. This review summarizes the most frequently used measurement tools in PUSM research while suggesting best practices and directions for future research based on the most recent evidence in the field.

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Introduction

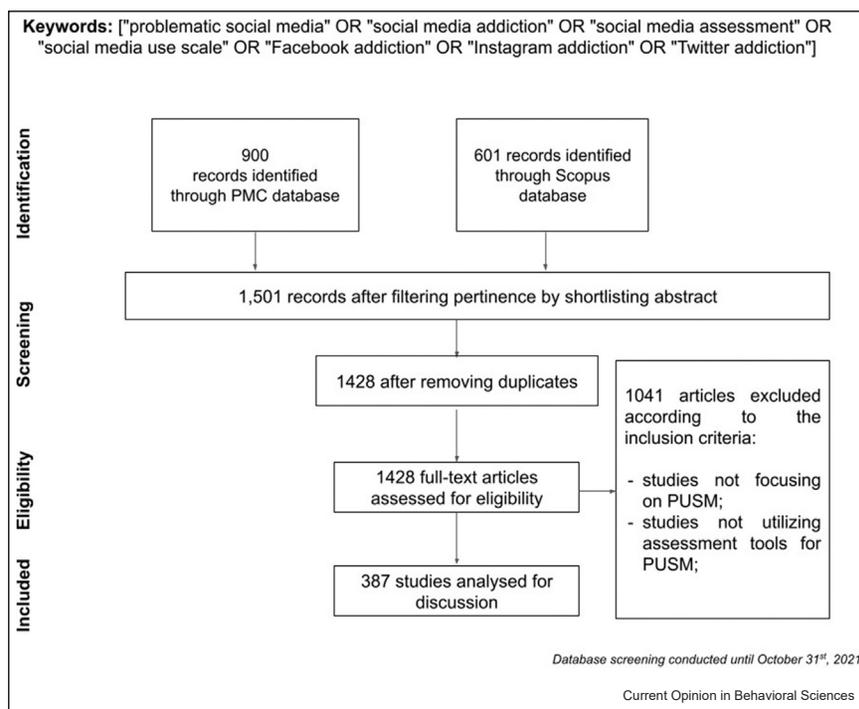
Since the first social media advent, such as *Bolt* in 1996, *Six Degrees* in 1997, *MySpace* in 2003, and *Facebook*, which went public in 2006, online media platforms have received increased global attention, undeniably one of the phenomena that most characterize the new millennium. In an increasingly digitalized society, social media represent a multifaceted tool that meets various social needs, such as self-expression, entertainment, support, and others, with over 4.39 billion active users [1] (for updated data, see DataReportal.com, *last access November 2021*). Evidence suggests that its popularity significantly

contributed to an increased time spent on the Internet and associates its excessive use with a wide range of problematic outcomes (e.g. conflicts, addiction-like symptoms) [2–4]. This is part of a larger phenomenon that involves the unprecedented diffusion of a wide range of behavioral addictions in society. Such behaviors started to be formally recognized as a problem in 2013 when gambling disorder was reclassified as addictive behavior and aligned with substance-use disorders in the 5th Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, [5]). At the same time, ‘Internet Gaming Disorder’ (IGD) was also considered a ‘condition for further study’ included in Section *Discussion* of the same manual. The first official recognition of a condition belonging to the spectrum of technologically mediated disorders resulted from the inclusion of gaming disorder in the 11th International Classification of Diseases (see Billieux et al. [6] for the rationale beyond this inclusion). Although this recognition represents a major milestone in advancing clinical practices and research in problematic online behaviors, many questions remain unanswered regarding the problematic use of social media (PUSM). PUSM can be defined as excessive use of social media platforms with detrimental consequences on the user’s personal, professional, or social functioning [7], who experiences adverse outcomes at a psychological and social level [2].

Current debates in assessing problematic use of social media and aim of the present review

Although most of the available evidence suggests that PUSM is a clinical condition and associated with a functional impairment affecting a small minority of vulnerable users [4,8], other scholars tend not to consider PUSM as a genuine addictive behavior [9,10] and warn about the risk to overpathologizing and erroneously consider PUSM as a primary condition in situations where it manifests itself as a coping mechanism to adverse life events or psychopathological symptoms such as depression or anxiety [11]. Despite the debate, an increasing consensus has now been reached on the importance of better profiling the clinical characteristics of PUSM and the overall problematic use of the Internet (PUI) [12], while cautiously adopting criteria that avoid the risk of overpathologizing everyday-life habits [4]. Accordingly, researchers started to explore PUSM as independently from the PUI spectrum, allowing the

Figure 1



PRISMA flowchart for search criteria and paper eligibility.

identification of specific risks and protective factors unique to PUSM [3,13]. However, the constantly changing nature of social media platforms characterized by the emergence of new platforms and the implementation of advanced features has resulted in the development of a growing number of assessment tools for the investigation of PUSM. Such measurement tools originated from multiple theoretical assumptions, but, in most of the cases, followed a ‘confirmatory’ approach based on previously adopted criteria for substance-use and addictive disorders (e.g. loss of control, tolerance, and withdrawal) [11,14]. The present review aims to discuss the major commonalities and discrepancies across the most used instruments in the field of PUSM and highlight the missing gaps in light of the latest scientific and technological advancements.

Methods and results

To identify the most used instruments to investigate the PUSM, a systematic review of the scientific literature was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (see Figure 1). PubMed Central and Scopus were searched using the following string of keywords: [“problematic social media” OR “social media addiction” OR “social media assessment” OR “social media use scale” OR “Facebook addiction” OR “Instagram addiction” OR “Twitter addiction”] and limiting the

search to the articles published in English until October 31st, 2021. The preliminary search led to 1501 articles shortlisted according to eligibility criteria. Studies not involving a questionnaire or another measurement tool for PUSM (in general or on a specific platform) were excluded from the analysis. As highlighted in Table 1, the resulting 387 articles were further filtered according to the type of instrument being used to facilitate the discussion considering the evaluated criteria.

After shortlisting the documents following the eligibility criteria, a total of 387 papers were filtered subsequently according to the tools adopted to assess PUSM. Among the included publications, 105 (27.13%) were studies published in 2021 (until October 31st), 105 (27.13%) were published in 2020, 65 (16.80%) in 2019, 43 (11.21%) in 2018, 26 (6.72%) in 2017, 16 (4.14%) in 2016, 18 (4.65%) in 2015, 4 (1.03%) in 2014, 3 (0.76%) in 2013, and 2 (0.52%) in 2012. Finally, 31 (8.01%) included unnamed scales or questionnaires built ad-hoc to assess constructs like frequency or indexes of usage (i.e. number of friends, contacts, or followers), and 38 studies (9.82%) investigated PUSM but referred to as problematic social networking activity (see Table 1). The critical discussion of the results involves research tools that have been used in at least three different articles among the publications that emerged from the review process. The complete list of eligible papers resulting from the

Table 1

List of the instruments most frequently used to assess PUSM. N = Number of studies included in the review process that adopted the described instrument. Several studies adopted more than one instrument to assess PUSM.

N	Instrument	Components
107	BFAS [15]	Saliency, mood modification, tolerance, withdrawal, conflict, and relapse
87	BSMAS [16]	Saliency, mood modification, tolerance, withdrawal, conflict, and relapse
24	^a IAT [17]	Preoccupation, increased time online, failure to reduce usage, mood modification, negative impact on life activities, hiding information, and Internet as a way to escape
36	SMDS [18]	Preoccupation, tolerance, withdrawal, persistence, displacements, problems, deception, escape, and problems
21	FIQ [19]	Cognitive saliency, behavioral saliency, interpersonal conflict, conflict with activities, euphoria, loss of control, withdrawal, and relapse
13	FIS [20]	Contacts, time spent online, and engagement in Facebook community
10	SMAS-SF [21]	Virtual tolerance, virtual communication, virtual problem, and virtual information
6	SMAS1 [22]	Occupation, mood modification, relapse, and conflict
5	SMAS2 [23]	Social consequences, time displacement, and compulsive tendencies
5	SMUQ [24]	Withdrawal, compulsion
4	^b GPIUS-2 [25]	Preference for online social interactions, mood regulation, cognitive preoccupation, compulsive Internet use, and negative outcomes
3	PFUS [26]	Preference for online social interactions, mood regulation, cognitive preoccupation, compulsive Internet use, and negative outcomes

^a IAT includes derived scales adopting the same items and structure but replacing the term 'Internet' with 'social media' in general or with a targeted platform (i.e. Instagram and Facebook).

^b GPIUS-2 includes derived scales adopting the same items and structure but replacing the term 'Internet' with general 'social network'.

systematic review is available on the Open Science Framework at <https://osf.io/zcvw6>.

From the list presented in Table 1, it is clear that most of the tools used in PUSM research derive from models based on psychobiological mechanisms that are hypothesized to be at the roots of addictive behaviors, with items tapping into the classic features of substance-use and addictive disorders. Following, the tools included in the review are presented within their theoretical frames.

The component model of addiction

The component model of addiction was proposed by Griffiths [27], who defined a set of common elements for addictions in general, including behavioral ones. The six-core criteria identified, namely (i) saliency, (ii) mood modification, (iii) tolerance, (iv) withdrawal, (v) conflict, and (vi) relapse, represent the main features that are supposed to describe substance-use disorders and reflect the current medical framework of illness for behavioral addictions such as gambling disorder. The great success of this model came with the validation of the *Bergen Facebook Addiction Scale* (BFAS) [15] and the subsequent *Bergen Social Media Addiction Scale* (BSMAS) [16], which are, up to date, the most used instruments in the research of PUSM. These short scales are composed of six items, delineating a unifactorial model [28–31]. BFAS and BSMAS have served as models for other questionnaires on targeted social media such as Twitter [32,33], YouTube [33], and QQ [34], rewording 'Facebook' or 'Social Media' with the investigated platform. The *Social Media Addiction Scale* (SMAS1) [22] presents four factors: occupation (merging intensity and cognitive

resources spent in thinking about social media), mood modification, relapse, and conflict, reflecting the core criteria of the biopsychosocial theoretical framework, which are investigated through 41 items.

Scales based on the Diagnostic and Statistical Manual of Mental Disorders criteria for substance-use and addictive disorders

Young's pioneer study on Internet addiction brought to the development of the *Internet Addiction Test* (IAT) [17], which has been developed following the DSM-IV-TR criteria for gambling disorder [35]. Specifically, the eight indicators concern (i) the person's preoccupation with the Internet, (ii) the need to increase the time spent online, (iii) the failure in attempting to control, reduce, or quit the use of the Internet, (iv) feelings of depression or anxiety when reducing or interrupting the Internet usage, (v) using the Internet longer than intended, (vi) negative impact on work or study career, (vii) hiding or concealing information about addictive behaviors from others, and (viii) using the Internet as a way to escape. Although the IAT was developed before social media became popular, several studies adopted this test to investigate PUSM by replacing the word 'Internet' with 'social media' in general or with the name of a specific platform, like Instagram (therefore named *Instagram Addiction Scale*) [36] or Facebook [37]. The *Social Media Use Questionnaire* (SMUQ) [24] has been developed following the criteria retained to define gambling disorder in the DSM-5 [5], the IAT, and the Fagerstrom Test for Nicotine Dependence [38], SMUQ subscales comprehend control dysfunction, craving, impairment in occupational, academic, or relational area, risky use,

tolerance, and withdrawal, revealing a two-component model focused on withdrawal and compulsion. Two eight-item instruments based on the same criteria have been used specifically in relation to Facebook use [39], one with a significant focus on the consequences of academic work (*Facebook Addiction Scale*) [40] and the other on the negative impact of romantic relationships (*Facebook Intrusion Questionnaire* (FIQ) [19], both providing a unifactorial structure, similarly to the BFAS and BSMAS. Among the included articles, another *Social Media Addiction Scale* (SMAS2) [23] emerged as a frequently used tool; this version, validated by Al-Menayes, is derived from the IAT and presents a three-factor model, defined by (i) social consequences of social media, (ii) time displacement, and (iii) compulsive tendencies. Later, Sahin developed another *Social Media Addiction Scale* specific for students (SMAS-SF) [21], which is based on a four-factor model investigating (i) virtual tolerance, (ii) virtual communication, (iii) virtual problem, and (iv) virtual information.

Scales based on the Diagnostic and Statistical Manual of Mental Disorders-5 criteria for Internet Gaming Disorder

IGD has been the first Internet-related issue recognized and included as a tentative disorder in Section *Discussion* of the DSM-5 [5]. The definition is based on nine specific criteria, namely (i) preoccupation, (ii) tolerance, (iii) withdrawal, (iv) persistence (or relapse), (v) displacement, (vi) external consequences or problems, (vii) deception, (viii) escape (or mood modification), and (ix) presence of conflict. Since PUSM still lacks a precise and shared definition, IGD criteria have been used to develop the *Social Media Disorder Scale* (SMDS) [18], highlighting that external problems and the presence of conflict might not apply to PUSM, and that deception might resent of the subjective perception of the people close to the person that shows an addictive attitude toward social media.

Cognitive-behavioral model of problematic use of Internet technologies

Starting from Davis's assumption that depression, perceived loneliness, or other psychosocial problems could represent a risk factor in developing problematic Internet-related cognition and behaviors [41], Caplan adopted a two-step approach to build and validate the *Generalized Problematic Internet Use Scale 2* (GPIUS-2) [25]. This 15-item tool assesses four cognitive and behavioral constructs associated with adverse outcomes associated with maladaptive Internet use: (i) preference for online social interaction, (ii) mood alteration, (iii) cognitive preoccupation, and (iv) compulsive behavior. In this view, a lack of self-regulation exposes the individual to cognitive preoccupation difficulties in

controlling impulses, resulting in negative outcomes linked to PUI. In the included articles, GPIUS-2 has been used to assess PUSM either by replacing the term 'Internet' with 'social network sites' [42,43,44] or by asking participants to focus on their use of social media sites while evaluating each item [45]. GPIUS-2 has been translated and validated in different languages to assess PUI [46–51]. Starting from the GPIUS-2, Marino and colleagues developed the *Problematic Facebook Use Scale* (PFUS) [26], keeping the same 15-item structure, the constructs investigated, and replacing the words 'Internet' and 'online' with Facebook. The authors compared the PFUS with the BFAS to prove the convergent validity of their scale. BFAS construct has been further confirmed in the context of the problematic use of Facebook [52].

Intensity as an early alert of addiction

Most of the questionnaires created and adopted in PUSM research are rooted in behavioral models that imply the presence of addiction. The outcomes are usually distributed on a continuum that goes from absence to high levels of addiction. To detect the possible presence of precursors of PUSM, the *Facebook Intensity Scale* (FIS) [20] measures the number of contacts and the approximate time spent per day on Facebook, together with the perceived engagement of the user in being part of the platform's community. Derived from Ellison et al. FIS, the *Multidimensional Facebook Intensity Scale* (MFIS) [53] proposes a four-factor model. Starting from the consideration that high intensity of Facebook use is a potential indicator of addictive behavior, this tool measures the (i) persistence in using Facebook, which includes the emotional bond toward the social media platform; (ii) boredom as an emotional trigger to use Facebook; (iii) Facebook overuse as an indicator of the user's perception of his/her engagement in the social media activity; and (iv) self-expression on Facebook, which merges affective and behavioral aspects related to one's profile editing. Compared to the other instruments, the MFIS appears to be more focused on the motivation that might explain a high involvement in Facebook usage and potentially leads to problematic use.

Discussion

Population at risk

In line with the research priority suggested in the Manifesto of the European Research Network for Problematic Usage of the Internet [12], the increasing number of studies on PUSM reflects the potentially detrimental effects of excessive or addictive-like usage of social media platforms, as distinct from the more

general Internet usage [54]. Much evidence reports an association between social media usage and mental health issues, especially in the younger population, increasingly being exposed to Internet use since the early years of life [55,56,42]. The focus on teenagers and young adults in PUSM research, such as college or university students, is not just a matter of convenient sampling, but it is based on the relevance of social interactions at this developmental stage. In fact, the person's identity is formed between 10 and 19 years of age, and it is determined by the interaction with peers and adults, among other sociocultural factors, allowing the awareness of one's emotional, affective, and physical changes in the transition to adulthood. In an image-focused society, where appearance has become synonymous with power and success, body dissatisfaction has, for example, increasingly been linked to PUSM [42], especially in young females [57], who appear to be more vulnerable to peer and media influence, independently from other possible factors. Social media platforms have witnessed a growth of popular profiles, known as 'influencers,' that promote and affect their 'followers' lifestyles and decisions on purchasing and other general behaviors, including physical appearance [58]. Such a phenomenon, often reinforced by prolonged hours spent following ideal contents promoted for commercial purposes and social media trends, such as fitspiration (promotion of often unrealistic toned/fit bodies) or thinspiration (promotion of extremely thin bodies) [59], could cause deleterious effects on offline behavior, like compulsive shopping or excessive physical exercise and one's body-image perception [58,60]. In this context, the PUSM can be seen not only as a potential disorder per se but also as an intermediate step or reinforcement in the development of other forms of psychopathology and addictive behaviors, including the unsupervised use of image and performance-enhancing drugs (IPEDs) to boost the physical performance (IPEDs), with the possibility to develop other problematic behaviors [61], such as body-image dissatisfaction, appearance anxiety, eating disorders, depression, and the perception of an overall decreased quality of life [58], especially in younger populations [60].

Transition to a digitalized world

The scientific literature involving the assessment of PUSM has almost doubled in the last two years. As a matter of fact, the period of restrictions caused by the COVID-19 pandemic has likely accelerated the transition to even more digitalized habits, offering online alternatives to convey and satisfy social needs during a prolonged time of social isolation. This transition was not limited to interactions and leisure time but extended to work and education, thanks to the implementation of ad-hoc-tailored features on social media platforms. Besides the increasing concerns related to the PUSM, evidence in the literature suggests that the greater usage

of the Internet and Internet-based technologies during the COVID-19 pandemic was not necessarily corresponding to an increasingly problematic use, but could be due to a variety of reasons and served more as an adaptive strategy to fulfill essential needs and to cope with the adverse context [62]. Given these considerations, focusing on the amount of usage can be misleading in assessing PUSM since the attempt to control, reduce, or quit functional motives can prevent the use of social media. Conversely, moving the focus of the investigation from the quantity of usage to the quality of usage, with greater attention to the emotional and behavioral consequences, could offer insightful material to track the line between normal and dysfunctional or pathological use. In addition, more efforts are required to the research community to timely track and analyze the evolution of social media use in terms of both new platforms and new features. In fact, most of the evidence in the scientific literature is based either on social media as general Internet-based technology or on Facebook, Twitter, and more recently, Instagram, leaving uncovered the understanding of the other equally relevant platforms. For instance, Masciantonio and colleagues confronted the motivation to use Facebook, Instagram, Twitter, TikTok, and general social media during the COVID-19 pandemic, revealing substantial differences across the diverse platforms and the general use [63]. While sharing many common features, each platform emphasizes selected characteristics in a distinctly designed interface, hence requiring the investigation of the relationship between these unique factors and the user's problematic usage [36].

Need for an updated theoretical framework

So far, the addiction framework has been an overly dominant reference model in explaining and driving the development of assessment tools for PUSM [17,27,15,16]. However, the rapid and hard-to-predict evolution of more sophisticated digital technologies and social media has made it difficult for researchers to understand the mechanisms underlying the development and maintenance of social media-related problematic behaviors. While the literature suggests a wide overlap among PUI, PUSM, and IGD [64], it is possible to find differences among the components that describe each Internet-based technology [18]. Moreover, the current models of addiction do not clearly distinguish between offline behavioral addiction and PUI [15,27]. Recently, an attempt has been made by Brand and colleagues who revised the Interaction of Person–Affect–Cognition–Execution (I-PACE) model of addictive behaviors [65]. Unlike the more traditional models of addiction, the I-PACE model has been developed to explain better the development and maintenance of disorders related to PUI [66]. The updated version of the model places the behavioral component at the center of the model and the environment, which can be either offline or online,

as a context where the addiction is expressed, with the subsequent possibility to retrieve the differences and consequences at a psychological and neurobiological level [65]. The model also considers the temporal trajectory of the addictive behavior, considering separately predisposing factors and early versus later stages, to identify more precisely the possible mediating and moderating variables occurring during the development of addiction [13]. Another issue with currently predominant models is the inclusion of substance-use disorder criteria, such as tolerance, that have been criticized in their ability to distinguish high involvement (i.e. intensive but healthy use) from pathological involvement in online activities [11,67]. For instance, a recent international Delphi study showed that several DSM-5 criteria used to define ‘Gaming Disorder’ are not clinically valid, useful, nor have a prognosis value, suggesting that they should not be incorporated in screening instruments [11,68]. In line with such evidence, it is particularly preoccupying that half of the items (3 out of 6) of the most popular scale to assess PUSM (i.e. the BSMAS) measure criteria that might not be able to distinguish high from pathological involvement, thus promoting pathologization of normal online behavior.

Old tools and new possible models

A frequent characteristic of the analyzed scales and questionnaire, such as the BFAS, the BSMAS, and derived tools, is the unifactorial scale that, while being extremely practical in research due to the short six-item structure and the simplicity of interpretation, at the same time, hinders research from working separately on the components of the PUSM, represented by one item each [69]. Furthermore, unidimensional scales do not allow to consider if individual components (e.g. tolerance and preoccupation) that have been criticized in their ability to distinguish healthy versus intensive pathological involvement in videogaming [67,70,71] present the same problems about PUSM. Thus, an additional step that would further maximize the applicability of such tools would be the definition of alternative multifactorial models to describe PUSM starting from the six-core constituents. In addition, the revision of already-validated tools should test cross-cultural statistical performances. For instance, a recent work involving five countries across Europe, Asia, and Africa highlighted a lack of measurement invariance of the BFAS in the comparison of the different samples [72], suggesting that the results generated from studies adopting the BFAS are not generalizable and, as such, not comparable on a cross-cultural level. Conversely, the SMDS presented good psychometric properties like measurement invariance, criterion validity, reliability, and structural validity when comparing samples from different countries [73].

Conclusion

While the evidence supporting the PUSM and its assessment methods has rapidly developed in recent years, it remains a call for a better understanding of its associated mechanisms. If, on the one hand, the goals are clearly defined, the methodology requires further improvement that starts and proceeds with research [12]. First, ‘social media’ and ‘social networking sites’ are still used as synonyms, while researchers in the field should consider social networking as a possible application of social media [2]. Second, future studies should adopt more appropriate assessment tools to detect, diagnose, and assess the severity of PUSM. Third, when investigating a specific application, it would be relevant to adopt shared and more rigorous terms to describe the specific feature or behavior to reduce the number of medicalized neologisms (i.e. selftics, Twitteritis) that might mislead future research [14].

Moreover, while shortlisting the articles according to the eligibility criteria, we noticed that some tools adopted the same name and/or acronym, with the risk of overlapping or confusing results obtained with the different scales. As such, researchers should carefully check and choose the name, avoiding homonyms when validating new instruments. In delineating the model and the components, ambiguous terms should be avoided to define better the investigated construct (i.e. ‘occupation’ instead of ‘preoccupation’, see SMAS1 in Table 1 [22]). To ensure the validity and utility of PUSM screening tools, and to reduce the risk of considering normal online behavior as problematic or pathological, it will also be essential to refine current instruments to avoid them containing items that cannot differentiate between an ‘intensive and healthy’ involvement versus ‘intensive and dysfunctional’ usage that significantly compromises the social, relational, or working spheres of the person. Lastly, due to the complex nature of online addictive behaviors, future research should target the underlying psychological, neurobiological, and social processes rather than limiting itself to a surface symptom-based approach of PUSM.

Author contributions

Conceptualization: OC, JB, and IC. Methodology: JB and IC. Formal analysis: IC. Investigation: IC and GE. Writing – original draft preparation: IC. Writing – review & editing: IC, GE, JB, and OC. Supervision: GE and OC. Funding acquisition: OC. All authors have read and agreed to the published version of the paper.

Conflict of interest statement

The authors declare no conflict of interest.

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