The development and validation of the Indian social media addiction scale

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Abstract

Purpose – Millions of social media users over the last two decades have become dependent on social media that has negatively affected their lives, both physically and mentally. Earlier attempts on social media addiction (SMA) scale development have not been made in India which makes it essential to undertake such a study in this region. One of the objectives of this study was to explore and identify the relevant dimensions of the SMA in the literature. The main study objective was to develop and validate a scale on SMA in India.

Design/methodology/approach – The research design applied in this work was both qualitative and quantitative. Based on the literature review, some themes of SMA were recognized that were used to conduct semi-structured interviews with the concerned subjects. The interviews conducted were then transcribed, and using NVivo software application, content analysis was carried out. This helped in the identification of relevant themes that were used for preparing the questionnaire. After that an exploratory study was conducted to explore the factors of SMA. This was followed by a confirmatory analysis on a different sample that validated the instrument.

Findings – This work developed and validated a six-factor measure of SMA. The total numbers of items in the final instrument are 22. Salience, Tolerance, Mood Modification, Relapse, Withdrawal and Conflict are the six factors of the final scale.

Practical implications – The current designed instrument can be exceptionally functional for evaluating the occurrence and level of the SMA. This can also serve to assist in the handling and management of such online addictive behavior. A lot of productivity is lost due to the unwarranted time spent on the social media. By better understanding the dimensions of SMA, one can limit one's time on such networks.

Social implications – This work can provide valuable insight into this domain and help in understanding and treatment of this malaise. It can also help parents and other stakeholders at large to comprehend the danger linked with the excessive social media use and therefore, contribute towards the society. These dimensions can also help counsellors and psychologists to better understand the addiction behavior and accordingly counsel the concerned individual.

Originality/value – Although many instruments have been developed in the past by researchers to measure SMA, still some aspects of the concept remain under-researched. Moreover, most of such research has been confined to the developed world regions.

Keywords Social media, Scale development, Social media addiction, Online addiction, Scale validation.

Paper type Research paper

Introduction

Through its revolutionary virtual platforms, social media has completely transformed the means and ways people interact with each other (Beig and Khan, 2018; Beig and Khan, 2020; Cao *et al.*, 2020; Klobas *et al.*, 2018a, b; Lee *et al.*, 2017; Olanrewaju *et al.*, 2020; Saqib and Amin, 2022). Over the years, the emerging digital upheaval in smartphones, electronic wearable devices, etc., has led billions of people to use social media (Michael and Agur, 2018). Social media users often spend much time on such platforms and post much multimedia content on such networks (Klobas *et al.*, 2018a, b; Leong *et al.*, 2019). The pervasiveness of many social media websites has

made many users addicted to such networks without even feeling it (Leong *et al.*, 2019). Social media addiction (SMA) could be slackly conceptualized as an emotional dependency on social media networks that affects more critical events in one's life (Turel *et al.*, 2018). Addiction to social media has become a foremost concern for scholars (Kircaburun, 2016) in recent times. This growing phenomenon has led many researchers to focus on SMA, and many attempts have been made to conceptualize, characterize, describe and, more importantly, measure it (Liu and Ma, 2018). Some of such scales concern the addiction on precise social media networks, like the Bergen Facebook Addiction Scale (BFAS) (Andreassen *et al.*, 2012), widely adapted to many cultural environments (Liu and Ma, 2018). Some have based their instrument on the internet gaming disorder norm, like the social media disorder instrument (van den Eijnden *et al.*, 2016).

Furthermore, some academicians have adapted the already developed Internet addiction instruments to social media domains (Assunção and Matos, 2017; Caci *et al.*, 2017; Marino *et al.*, 2016). However, the addiction phenomenon on Facebook that has been the focus of most studies is not considered identical to SMA syndrome (Griffiths, 2013; Kuss and Griffiths, 2011). Subsequently, a broader platform and psychometrically sound scale are needed to assess this growing predicament (Kuss and Griffiths, 2017). The constructs/elements of current tools on SMA diverge greatly because these dimensions are based on varied theoretical settings. Besides, most such scales/tools were characteristically developed and validated in the Western regions (Liu and Ma, 2018).

Further, validating such scales across different cultural environments is necessary (Liu and Ma, 2018). Recently, one such scale has been developed and validated in the Chinese context, with some new dimensions identified and attributed to the SMA scale (Liu and Ma, 2018). Still, its results have not been generalized in other studies. However, the SMA scale development seems to be missing in the Indian context.

In India, social media network usage has become a habitual routine for most people, who now have easy access to social media sites that provide information and content concerning their interests and pastime to diverse groups (Bharucha, 2018). These online forums used for communication by individuals are popular amongst people who have seen a rise throughout the whole population, particularly among youth and teenagers (Oberst *et al.*, 2017). As per Statista (2021), India, as of 2021, had a substantial digital citizen population rapidly increasing, with more than 680 million dynamic Internet users. India's Facebook users stood at 300 million, the highest for any country globally. In 2019, a massive 99% of all rural Internet users in India chiefly used mobile devices to use the Internet. Indians also love their social media portals (Bharucha, 2018). In 2020, India had the maximum number of downloads for WhatsApp and TikTok applications.

Moreover, the average Indian Internet user spends more than three hours on such networks. By some estimates, in 2023, there will be approximately 450 million users of social network users in India, an increase from 326 million in 2018. Although quite a few authors have applauded social media for changing the societal background of India, topical research has begun to inspect the disparaging role of such networks. The research in understanding this phenomenon is still in the preliminary phase in India. However, there is no denying that a considerable Indian population is developing a reliance/dependence on social media that has integrated people globally (Bharucha, 2018). Most of the research in India has focussed on the consequences or the antecedents of SMA, such as stress, physical and mental disorders, etc. However, scholars have made limited attempts to develop and validate such a scale in the Indian context. It is vital to conduct such a study in India as it has a unique cultural, ethnic and demographic diversity unparallel to anywhere in the world (Bharucha, 2018). Thus, this study makes a valiant attempt to develop and validate a scale on SMA in India.

In addition, variables such as "Preference for Online Social Interaction," "Fear of Missing Out (FOMO)," and "Continuous Use" have also been included in order to test the developed scale for criterion-related validity analyses.

Literature review

Theory

There are a wide variety of perspectives on the phenomenon of addiction to social networks (Azizi *et al.*, 2019). Although many underlying theories explain SMA, the most significant one concerning this work is behavioral elucidation. According to the behavioral explanation theory, a person utilizes social networks for gratifications such as evading reality and having fun. This is one of the basic tenets of the theory (Sadock and Sadock, 2007). People tend to utilize social networks as a means of escaping internal and external difficulties, which, according to the cognitive explanation hypothesis, is evidence that social networking addiction is caused by errors in cognition (Alavi *et al.*, 2012). People often think of addiction to social networking sites as an addiction to online relationships (Can and Kaya, 2016). From the perspective of rational behavior, social media platforms offer several technological features that can help to satisfy or intensify an individual's needs for information-seeking and social connection (Chen, 2011). In this sense, addiction to social media arises from "regular" use habits that look "harmless," and its harmful repercussions are often "accepted" by the folks who are worried (Wang *et al.*, 2014). The usefulness of social media, on the other hand, might persuade users to participate in excessive usage, which in turn can alter individuals' habitual ways of thinking and feeling. Therefore, the reasonable usage of social media advances from habit toward illogical conduct (Xu and Tan, 2012), leading to SMA (Wang *et al.*, 2014). Therefore, the theory of rational addiction also explains how individuals initially engage in repetitive behavior to maximize the utility of the media (Chen, 2011). On the other hand, the irrational behavioral paradigm is used to explain how overdeveloped habits give rise to biased cognition and affect and even psychological dependence (Turel *et al.*, 2011). Based on this theoretical foundation, a habit-developed cognitive-affective-behavioral model is offered to explain the processes determining the user's degree of dependency on social media leading to SMA (Wang *et al.*, 2014).

Social media addiction

Over the last ten years, addictive behaviors, including excessive Internet and social media usage, have become essential parts of modern life. Addictive behavior is engaging in recurrent patterns that result in a person's likelihood of contracting a sickness or encountering societal issues (Azizi *et al.*, 2019). SMA can be described as "being overly concerned about SNSs, driven by a strong motivation to log on to or use SNSs, and to devote so much time and effort to SNSs that it impairs other social activities, studies/job, interpersonal relationships, and psychological health and well-being". As per Błachnio and Przepiorka (2016), addictive social media usage has been illustrated as a unique technological dependence. SMA (social media addiction) can also be described as an individual's usage of social media, which causes considerable impairment in her/his life to such an extent that they may be incapable of managing their behavior which then hampers their routine assignments extensively (Ryan *et al.*, 2014). These behaviors include obsessive behavioral participation accompanied by an interest deficit in regular activities and physical and psychological symptoms while preventing this behavior (Soper and Miller, 1983). Scholars have also recognized a remarkable resemblance between substance dependence and non-chemical addictive behavior (Andreassen, 2015; Van den Eijnden *et al.*, 2016). But, the surprisingly current adaptation of the "Diagnostic and Statistical Manual of Mental Disorders" (DSM-5) does not classify SMA as a disorder (APA, 2013). However, some authors have considered social media addiction a dysfunctional psychosomatic condition concerning the usage of social networks, which manifests as a regular practice accompanied by diminishing control and leads to the neglect of necessary actions (LaRose *et al.*, 2003; Turel and Serenko, 2012). In particular, SMA involves traits such as disdain for the issues that need to be addressed,

emotional swings, and hiding addictive behaviors and habits, as well as having mental difficulties (Azizi *et al.*, 2019; Guedes *et al.*, 2016). In addition, behavior such as overindulgence on social networks, ignoring work to satisfy curiosity about the profiles of other users, and experiencing feelings of anxiety result from SMA (Sun and Ng, 2012). These behaviors manifested by social media users make the concept of SMA different from "social media problematic use" or "social media disorder." This is the reason that the current work has focussed on SMA.

Moreover, the application and the usage of social media platforms have grown immensely over the last many years now (Kizgin *et al.*, 2018), but, the popularity of social media websites like Snapchat, Facebook, WhatsApp, YouTube, Google +, WeChat, Pinterest, Twitter, Instagram, LinkedIn, etc. (Kapoor *et al.*, 2018) has induced many users into addiction behavior without being aware of such behavior (Leong *et al.*, 2019). Scholars have emphasized that social media consumption in terms of pathology and reliance is a new issue in the IS literature. Social media addictive behavior is, in essence, reflected by the following (Thadani *et al.*, 2016; Wang, 2019).

(1) "Salience" (when social media website usage controls the user behavior and thought process). It has also been defined as the activity that controls SM users' thoughts and behavior (Andreassen *et al.*, 2012).

(2) "Mood adjustment/modification" (when a user's involvement with social media changes his/her mood).

(3) "Tolerance" (when an increment of social media consumption is required to sustain or attain the favored affirmative sentiment).

(4) "Withdrawal" (cessation of the social media consumption will create awful feelings or sentiments).

(5) "Conflict" (attachment with social media leads to clash in relations, learning, occupation and others) and,

(6) "Relapse" (i.e. a propensity to return to previous forms of social media usage after control or abstinence). It can also be described as the amount of activity required to realize prior outcomes (Andreassen *et al.*, 2012).

Relationship of SMA with other related constructs

Fear of missing out (FOMO) and social media addiction. The term FOMO has been defined as "a pervasive apprehension that others might be having rewarding experiences from which one is absent" (Przybylski *et al.*, 2013, p. 1841). It is being concerned about missing something significant on social media. Recent research work (Buglass *et al.*, 2017; Oberst *et al.*, 2017; Sultan, 2021) suggests that high levels of engagement within the realm of social networking are, to some extent, due to the phenomenon which has been termed as FOMO. These results suggest that FOMO might be a major forecaster or potential constituent of probable SMA, an argument that necessitates additional deliberation in future works (Kuss and Griffiths, 2017; Sultan, 2021).

Preference for online social interaction and social media addiction. It is defined as a user's preference for social media communication over real-world relations. Recent data suggests that the desire for online social connection (Caplan, 2003; Chung, 2013; Fioravanti *et al.*, 2012; Yu *et al.*, 2017) might be a factor in the development of inclinations towards online addiction (for example, SMAs) (Liu and Ma, 2018). Social encounters that occur online are more comfortable than those that occur face-to-face (Caplan, 2003). In addition, recent research has offered some preliminary data concerning the association between "preference for online

social connection" and SMA (Liu and Ma, 2018). Researchers have also demonstrated that the propensity for online contact was related to a favorable relationship with excessive use of social media leading to addiction (Assunção and Matos, 2017).

Continuous use and social media addiction. It is defined as a persistent usage of social networking platforms. It is a sort of a person's mental state that may be characterized as one in which the individual user is reasonably cognizant of the adverse implications of their social media activities (Liu and Ma, 2018). Continued usage is a term that refers to a particular circumstance in which a person is aware of the bad outcomes that might result from excessive use of social media yet is unable to refrain from continuing to use it. Nevertheless, they continue to use such platforms despite being aware of these consequences (Liu and Ma, 2018). There is a good chance that these adverse effects and outcomes have a psychological side as well as a physical side (Liu and Ma, 2018). Interestingly, many people continue to use social media even though they are aware of the potential negative implications of doing so, which are more likely to be psychological and social than physical (Liu and Ma, 2018; Przepiorka *et al.*, 2016).

Research methodology
The study focuses on how addiction to social media may be measured and the steps that need to be taken to build a new tool to assess it. As a result, the authors of this research looked through the relevant literature on various websites and online databases, including Web of Science, Google Scholar, Proquest, J-store and Google Scholar. A search for the themes of interest was carried out from the 15th of January 2021 through the 15th of March 2021. The studies were retrieved from the existing body of research via the use of specific keywords, such as "social media addiction," "Internet addiction," "smartphone addiction," "gaming addiction," "problematic social media usage," and "online addiction," and "social network addiction." The way the previous research was analyzed includes four steps (Gough, 2017).

(a) Identification

In the first step, 7,993 research papers were retrieved from these sources.

(b) Screening

The second step involved screening for articles based on the keywords, and the subsequent filtering process resulted in removing 3,233 articles since they did not match the keywords.

(c) Qualification

During the third phase, we excluded an additional 3,097 items that did not satisfy the criterion match. During the qualifying stage, after analyzing the articles' keywords and abstracts, 566 papers were considered for inclusion, while 1,097 papers were excluded.

(d) Eligibility

In the last step, the "eligibility" stage, 193 articles accessible in English were ultimately chosen for the comprehensive study.

Ethical concern
During the in-depth analysis of the relevant literature, a complete check was performed to ensure that the correctness and objectivity of the readily available intellectual facts and the accuracy of the references were kept. Publications that were unnecessary or redundant, non-obvious findings, and, most significantly, instances of plagiarism were avoided. The subsequent steps that were used in this study are listed below.

(1) Only reputable publishers and online databases were searched for articles. After receiving the appropriate clearances and permissions, these sources were obtained from the "University of Kashmir."

(2) Only those articles or studies were used for this study that had ethical approval, informed sanction and had a declaration of "no conflict of interest."

(3) Only original studies written in English could be accessed and were looked at in line with the study's goals.

In addition, the following ethical concerns were also addressed.

(1) Confidentiality of each participant's engagement was secured and maintained at all times; this was a requirement throughout the process.

(2) Participation in the study was completely voluntary as the respondents were urged to participate on their own time. There was no assurance of monetary compensation or any other benefit being offered.

(3) A participant was free to withdraw at any time throughout the survey.

Design

The research plan (design) that was followed and implemented in this study is an exploratory one. Its purpose is to investigate the different variables and determinants of "SMA" in India. As a result, the exploratory design helped determine the study's issue, better understand the variable and finally develop and validate the "SMA" scale.

After analyzing the relevant research, many themes emerged, which served as the basis for conducting semi-structured interviews with the individuals in question. The themes that were found were helpful in the process of preparing an interview structure. This structure consisted of open-ended questions posed to the respondents, such as the amount of time spent on social media websites, the frequency with which they use social media and other similar topics. The primary purpose of this research was to investigate the pertinent aspects of the addiction to social media. This procedure was carried out by reviewing the relevant literature and conducting respondent interviews. "Salience," "Conflict," "Mood Modification," "Relapse," "Tolerance," and "Withdrawal" were the primary dimensions of SMA that were identified. The literature review, along with extracts from the interview, allowed the development of the preliminary instrument.

The development of the questionnaire that assisted in obtaining the information from the participants regarding their connection to SMA was helpful. The data obtained was then examined. The sample unit for this study comprises university students since past research has demonstrated that students are a good representation of the overall population in terms of various characteristics. In March of 2021, the pre-testing part of the research was carried out, and in April of the same year, the exploratory study was carried out. October of 2021 was the month during which the validation research was finally conducted. On the other hand, for this research study, the students who participated came from various Indian institutions located in different cities.

A sample size of 390 was selected for the final study (exploratory) that was based on the itemized sampling method (39*10 = 390) (Hair *et al.*, 2010), but 660 questionnaires were distributed out of which 593 (503 functional responses) were received back from subjects. This equates to a response rate of 89.8%, which is considered excellent. In validating the instrument, the sample size was determined to be 390 once again based on the itemized sampling procedure (39 times 10 equals 390), but the questionnaires were sent out to 540 respondents resulting in 473 functional responses.

The following sections describe the methodology in detail.

Evaluation of social media addiction studies
Several instruments of SMA exist in the literature developed over the earlier decades. Some of such measures/scales (Table 1) focus on addictive behavior on social media websites areas.

Amongst the measures mentioned earlier on SMA, "BFAS" is considered the most accurate measure with exceptional psychometric attributes. The study was done in Norway, and the respondents included "Facebook" users. BMAS has also been psychometrically supported in many languages like Italian (Monacis *et al.*, 2017), Persian, English (Andreassen *et al.*, 2016), Portuguese (Pontes *et al.*, 2016) and also in Hong Kong (Yam *et al.*, 2019). "Bergen Social Media Addiction Scale" (BSMAS) was postulated by Andreassen *et al.* (2016), which in essence, measures the general SMA behavior. It also comprises six constructs ("mood modification", "salience", "conflict", "tolerance", "withdrawal" and "relapse") as in the measure of "BFAS". This instrument assesses the users' social media familiarity on a five-point "Likert" scale. Liu and Ma (2018) also developed another SMA instrument validated by them in China. The work was carried out on college students. The scale included six factors, i.e. "preference for online social interaction," "mood alteration," "negative consequence and continued use," "compulsive use and withdrawal," and "salience," and "relapse." The "tolerance" factor was dropped from this study. However, this scale's results have not been generalized until now. In another study conducted in China, Wang (2019) developed a mobile-based "social

Author/s	Approach	Instrument details
Wilson *et al.* (2010)	Social media addiction is a multi-dimensional construct	This scale/measure consisted of "Salience," "Withdrawal," and "Loss of control" factors
Elphinston and Noller (2011)	Social media addiction is a single-dimensional construct	Facebook Intrusion Measure includes eight items
Wolniczak *et al.* (2013)	Social media addiction is a multi-dimensional construct	Facebook Dependence Questionnaire measures eight aspects of addiction, i.e. Satisfaction, worry, time of use, Efforts to reduce it, Concern, and other "Facebook" activities
Turel and Serenko (2012)	Social media addiction is a single-dimensional construct	Social Networking Website Addiction includes five items
	Social media addiction is a multi-dimensional construct	Bergen Facebook Addiction Scale includes six dimensions, i.e. Salience, mood modification, tolerance, withdrawal, conflict, and relapse
Andreassen *et al.* (2016) that	Social media addiction is a multi-dimensional construct	The Bergen Social Media Addiction Scale includes six dimensions, i.e. "tolerance", "mood modification", "salience", "conflict", "relapse" and "withdrawal"
Liu and Ma (2018)	Social media addiction is a multi-dimensional construct	Social media addiction measure (Chinese context) has six constructs, i.e. "Preference for online social interaction" (first factor), "Mood alteration" (second factor), "Negative consequence and continued use" (third factor), "Compulsive use/withdrawal" (fourth factor), "Salience" (fifth factor) and "Relapse" (sixth factor)
Wang (2019)	Mobile social networking service (SNS) addiction scale	Six addiction symptoms are modification, Salience, tolerance, withdrawal, conflict, and relapse

Source(s): Authors Own

networking service" (SNS) addiction instrument which measures respondents' addiction intensity. SNS scale also includes six previously established constructs, i.e. "modification", "salience", "tolerance", "withdrawal", "conflict" and "relapse".

Factors identified based on the literature review
Based on an exhaustive literature review on addictive behavior in an online environment, many factors were discovered that could be adopted in this study to develop a scale on SMA. The topics of interest were searched from the 15th of April 2021 to the 15th of May 2021. The studies from the literature were extracted by the use of specific keywords such as "social media addiction," "Internet addiction," "smartphone addiction," "technological addiction," "gaming addiction," "problematic social media use," "online addiction" and "social network addiction." The process applied for reviewing the literature was discussed in the methodology section involved four steps, i.e. "recognition" (identification), "screening," "qualification," and finally "adoption" (Gough, 2017). The following table (Table 2) shows the factors identified along with source and context.

Study 1: dimension exploration and item generation
Fifty semi-structured interviews were conducted with students from three universities enrolled in different streams. The interviews were then transcribed, and content analysis was

Factors	Addiction context	Definition	Sources
Relapse	Facebook, social media, the Internet, online gaming	The proclivity of a social media user to restore addictive behavior after self-control	Griffiths (1996), Young (1999), Charlton and Danforth (2007), Thadani *et al.* (2016), Andreassen *et al.* (2016), Wang (2019)
Tolerance	Facebook, social media, the Internet, and online gaming	The amount of social media use is needed by the user to realize former effects	Griffiths (1996), Young (1999), Park *et al.* (2001), Kim *et al.* (2003), Thadani *et al.* (2016), Andreassen *et al.* (2016), Wang (2019)
Conflict	Facebook, social media, the Internet, online gaming	The damaging influence of social media on users' lives	Caplan (2003), Kim *et al.* (2003), Charlton and Danforth (2007), Thadani *et al.* (2016), Wang (2019)
Escapism/mood modification/mood regulation	Facebook, social media, the Internet, online gaming	Use social media to escape the world's problems and alter their mood	Davis *et al.* (2002), Lee *et al.* (2012), Wang (2019)
Salience/ Obsession	Facebook, social media, Internet, online gaming	Fixation of users thinking process with the social media	Griffiths (1996), Young (1999), Park *et al.* (2001), Thadani *et al.* (2016), Wilson *et al.* (2010), Andreassen *et al.* (2016), Wang (2019)
Withdrawal	Facebook, social media, Internet, online gaming	Incidence of repulsiveness experienced by a user when the social media access is limited	Griffiths (1996), Young (1999), Park *et al.* (2001), Kim *et al.* (2003), Charlton and Danforth (2007), Thadani *et al.* (2016), Wilson *et al.* (2010), Andreassen *et al.* (2016), Wang (2019)

Source(s): Authors' own

Table 2.
Identification of constructs

carried out using the NVivo software application. The content analysis helped generate more than 30 statements concerning social media addiction. Some of the statements are given below. However, only 20 statements were selected based on expert advice. Some of the statements had to be ignored to avoid duplication and redundancy.

"Some students shared that they often thought and fantasized about social media happenings and activities."

"Some respondents shared that they feel unhappy if they cannot use social media."

"Some students felt that despite knowing about the negative effects of social media, they still cannot help themselves from reducing its usage."

The final 20 statements selected and the 41 statements adopted from different scales resulted in an initial pool of 61 items. These sets of questions were shared with two experts (a psychologist and psychiatrist) and one research expert in the field of SMA. After their comprehensive examination of the instrument from the perspective of scale's clarity, representation and inclusivity, 55 questions were considered adequate concerning their face validity and construct scope. The experts only selected those items that best reflected the characteristics of SMA. The items eliminated by the experts were either accepted or rejected after discussions.

Study 2: exploratory study (refinement)
The questionnaire drafted for the exploratory study included three sections. The first segment included questions on the type of social media used, time spent on social media and frequency of visiting social media every day. The second segment consisted of 39 SMA statements assessed on a 5-point Likert scale. The answers on a 5-point Likert scale ranged from 1 (strongly agree) to 5 (strongly disagree)—the third section comprises questions concerning the respondents' demographics.

An online survey method was used for the pilot study, and 571 responses were received from the 15th of May, 2021, to the 30th of June, 2021. However, only 503 responses were complete and functional. The respondents were targeted from different universities in India. The following table (Table 3) shows the respondent's profile.

The sample adequacy in the exploratory study was fulfilled as the sample size was 503, which was more than nine times the number of statements (55) in the initial instrument (Hair *et al.*, 1998). In order to refine the instrument, the coefficient of the item-total correlation was initially computed for 55 items of SMA, and any values lower than 0.5 were deleted (Nunnally, 1978). Sixteen items with an item-total correlation value less than 0.5 were deleted from the instrument. Thus, only 39 items left were used to explore the underlying construct/factor structure of SMA.

EFA (exploratory factor analysis) was performed on the data (Hair *et al.*, 2006). The extraction technique/method used in EFA was the principal component analysis (Nunnally, 1978), and the varimax rotation technique (Kaiser Normalization) was the rotation method employed in the data. The norm for calculating the number of study constructs was the value of Eigenvalue greater than unity, and the percentage of cumulative variance explained greater than 50%. During the first EFA, 13 items were removed from the 39 items as they were cross-loading with the other factors. One item was removed from Factor 1, two items were removed from Factor 2, two were removed from Factor 3, three were removed from Factor 4, and five were removed from Factor 6. EFA was run the second time on the data set with 26 items remaining, and the results are below. Each item was dropped from Factor 2, Factor 3, Factor 4 and Factor 6. At last, EFA was performed for the third time on the leftover 22 items and all the items loaded on the six-factor with cumulative variance explained 83.7% (Table 4).

Variable	Group	Exploratory $N = 503(\%)$	Validation $N = 473(\%)$
Gender	Male	299 (59.4%)	272 (57.5%)
	Female	204 (40.6%)	201 (42.4%)
Age groups (Years)	18–23	369 (73.9%)	351 (74.2%)
	24–30	125 (24.9%)	114 (24.1%)
	More than 30	9 (1.8%)	8 (1.7%)
Residence	Urban	263 (52.3%)	258 (54.5%)
	Rural	240 (47.7%)	215 (45.5%)
Highest level of qualification	Pursuing graduation	125 (24.9%)	113 (23.9%)
	Pursuing post-graduation	333 (66.2)	316 (66.8%)
	Others	45 (8.9%)	44 (9.3%)
Most used social media	Facebook	166 (33%)	154 (32.6%)
	Instagram	107 (21.3%)	101 (21.4%)
	YouTube	112 (22.3%)	100 (21.1%)
	Pinterest	46 (9.1%)	46 (9.7%)
	Twitter	72 (14.3%)	72 (15.2%)
Time spent on social media	Less than 15 min	70 (13.9%)	70 (14.8%)
	15–30 min	101 (20.1%)	91 (19.2%)
	30 minutes-1 hour	173 (34.4%)	171 (36.2%)
	1–2 h	97 (19.3%)	94 (19.9%)
	2–3 h	38 (7.6%)	23 (4.9%)
	More than 3 h	24 (4.8%)	24 (5.1%)
Frequency of visiting social media websites in a day	1–3 times a day	134 (26.6%)	139 (29.4%)
	4–6 times a day	206 (41.0%)	179 (37.8%)
	7–9 times a day	112 (22.3%)	109 (23.0%)
	More than nine times a day	51 (10.1%)	46 (9.7%)

Source(s): Authors' own

Table 3.
Sample description: exploratory and validation sample

Finalization of the scale and CFA (measurement model)
To validate the acquired structure, the final instrument comprised of 6 factors (22 items) was subsequently administered to a new sample of 550 students from another city. The sample sizes in EFA and confirmatory factor analysis (CFA) in the final study are almost comparable in size. Before performing CFA in the final study, procedures of data cleaning involving detecting missing responses, outliers and unengaged responses were performed. Normality was evaluated for all six factors by assessing the variables' mean values and skewness scores and kurtosis. The values for skewness and kurtosis lie within the acceptable range of ± 1.96.

Measurement model. Thus, CFA was performed on the second sample of 473 functional responses using AMOS 23.0 to validate the six factors extracted from EFA. The method used for model estimation was the maximum likelihood. The values of standardized loadings for the construct ranged from 0.701 to 0.976 (significant at the P-value = 0.001). The value of Chi-square was 654.4 and 187 as the degrees of freedom. The obtained value for Cmin/df was 3.5 (less than 5). Moreover, the goodness of model fit indices were also assessed (Table 5) which were within the moderate levels. The values for other indices like Root mean square error of approximation (RMSEA) – 0.07; Tucker-Lewis index (TLI) – 0.944, Normed fit index (NFI) – 0.938 and Comparative fit index (CFI) – 0.954 also fulfill the normal criterion which suggests a sound fit for the model (Hu and Bentler, 1998).

S.No	Factor	Items	Statements
1	**Salience**	SAL1	I spent a lot of time thinking about social media or the planned use of social media
2		SAL2	I thought a lot about what has happened on social media recently
3		SAL3	I sometimes think about quitting my social engagements in order to be on social media
4		SAL4	I often fantasize being on social media when I am offline
5	**Tolerance**	TOL1	I spent more time on social media than initially intended
6		TOL2	I felt an urge to use social media more and more
7		TOL3	I felt sad if I spent less time on social media
8		TOL4	I often look to my next session on social media
9	**Mood**	MM1	I used social media in order to forget about personal problems
10	**modification**	MM2	I used social media to reduce feelings of guilt, anxiety, helplessness and depression
11		MM3	I find the time spent on social media exciting
12	**Relapse**	REL1	I experienced that others have told me to reduce my use of social media but I have not listened to them
13		REL2	I tried to cut down on the use of social media without success
14		REL3	I decided to use social media less frequently, but not managed to do so
15		REL4	When I am working I search for excuses to use social media
16	**Withdrawal**	WD1	I become restless or troubled if I have been prohibited from using social media
17		WD2	I become irritable if I have been prohibited from using social media
18		WD3	I feel disturbed if social media network is slow or unavailable
19	**Conflict**	CO1	I give less priority to hobbies, leisure activities, and exercise because of social media
20		CO2	I feel having less control over my life due to social media use
21		CO3	I feel physically less active due to use of social media
22		CO4	Social media use has made it difficult for me to manage my life

Source(s): Authors' own

Index		Test value	Cut off value/Range
Absolute fit index	Chi-square	654.4; $p = 0.000$	<0.05
	Degrees of freedom	187	
	Cmin/df(normed chi-square)	3.5	1 < Cmin/df < 5
	RMSEA	0.07	<0.08 means good fit
	GFI	0.890	≥0.8 means satisfactory fit
Incremental fit index	CFI	0.954	≥0.8 means satisfactory fit
	NFI	0.938	≥0.8 means satisfactory fit
	TLI	0.944	≥0.8 means satisfactory fit

Source(s): Authors' own

Therefore, the whole measurement model (Figure 1) was considered as robust and established as adequate.

Convergent validity
For all six constructs of SMA (See Table 6), AVE (average variance extracted) is greater than 0.50 (Gefen *et al.*, 2000). The values for SRW (standardized regression weights) are
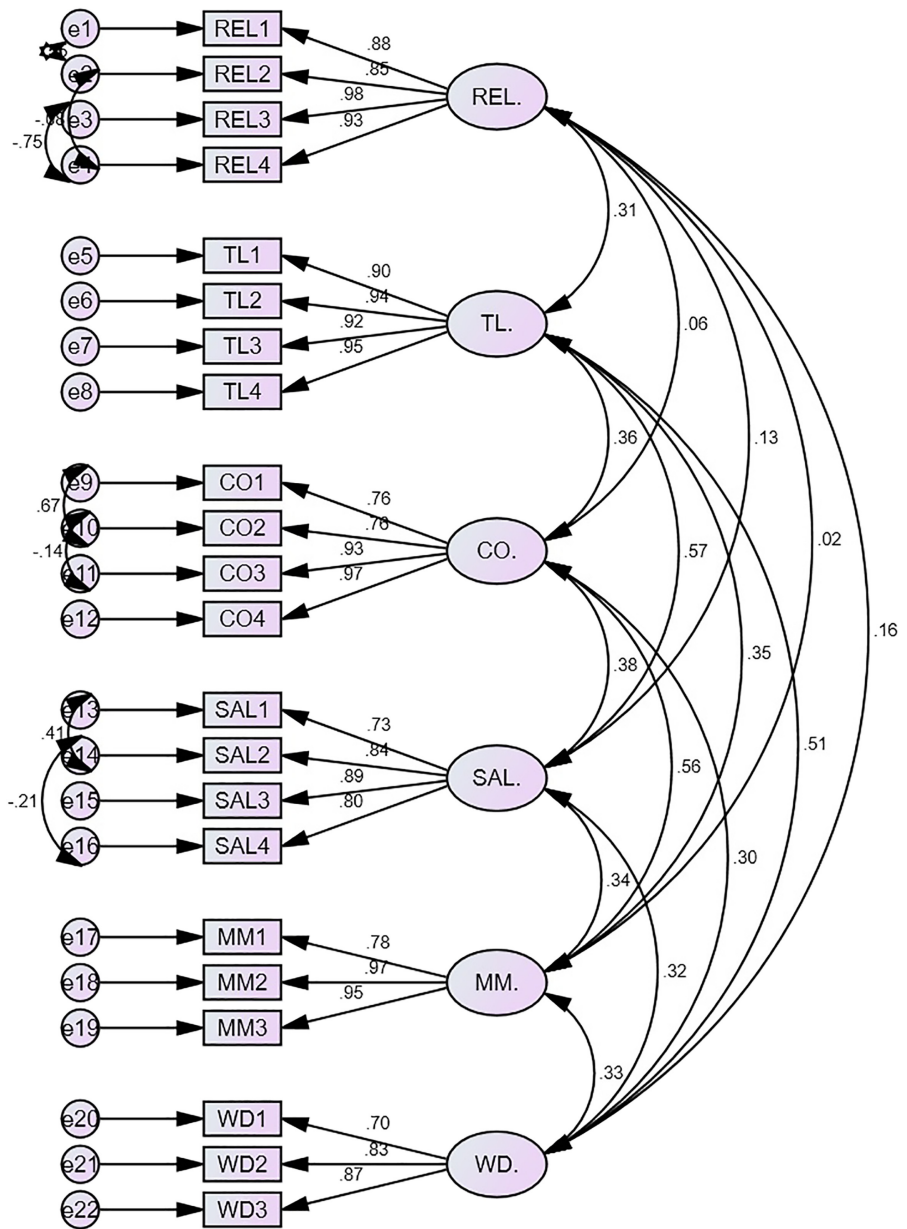
Figure 1.
Measurement model

Source(s): Authors own

more than 0.7 (Hair *et al.*, 2010) and the values for CR (composite reliability) of all six factors are above 0.7 (Hair *et al.*, 2010). Consequently, all the required conditions for ascertaining the convergent validity are fulfilled, which means that the model is considered to have an excellent convergent validity.

	CR	AVE	MM	REL	TL	CO	SAL	WD
MM	0.930	0.817	*0.904*					
REL	0.951	0.828	0.018	*0.910*				
TL	0.962	0.863	0.348	0.307	*0.929*			
CO	0.917	0.738	0.559	0.056	0.360	*0.859*		
SAL	0.888	0.665	0.345	0.129	0.566	0.375	*0.816*	
WD	0.845	0.647	0.332	0.161	0.509	0.295	0.323	*0.805*

Note(s): TL – tolerance; SAL – salience; WD – withdrawal; MM – mood modification; CO – conflict; REL – reliance, CR – composite reliability, AVE – average variance extracted
The values in the diagonal of the above matrix are the square root of the AVE
Source(s): Authors' own

Table 6.
Convergent and discriminant validity

Discriminant validity
As shown in Table 6, the AVE scores for all the six constructs were greater than their squared inter-factor correlations. Therefore, this means that each factor is distinctive and also independent. This means discriminant validity offers support for the reality that SMA is a six-dimensional construct.

Criterion validity
The third kind of validity that is connected to criteria is the kind that is based on hypothesized links between theoretic causes and effects of the test construct. In this study, the association between "social media addiction" and three constructs, i.e. "preference for online social interaction" "fear of missing out (FOMO)" and "continuous use" has been tested. In this work FOMO was measured with 5-items (Błachnio and Przepiorka, 2018; Przybylski *et al.*, 2013); "continuous use" was measured with 5-items (Liu and Ma, 2018; Pontes and Griffiths, 2015) and "preference for online social interaction" (Caplan, 2003; Liu and Ma, 2018) was measured with 4-items. Table 7 shows the correlation analysis which signifies that the total scores of SMA were significantly and positively related to "preference for online social interaction" ($r = 0.48$ $p < 0.05$), "fear of missing out (FOMO)" ($r = 0.52$ $p < 0.05$) and "continuous use" ($r = 0.48$ $p < 0.52$).

Final instrument
Table 8 below shows the final set of items obtained after exploratory and validation studies conducted in order to explore the six factors of SMA. The total numbers of items in the final instrument are 21. Relapse is the first factor represented by 4 items, tolerance is the second factor represented by 4 items, conflict is the third factor represented by 4 items, Salience is the fourth factor represented by 3 items, Mood Modification is the fifth factor represented by 3 items and withdrawal is the sixth factor represented by 3 items.

SMA	OS	FROM	CU
	0.481[**]	0.523[**]	0.525[**]

Note(s): SMA – social media addiction; OS – "preference for online social interaction", FOMO – "fear of missing out ", CU-"continuous use"
[**]$p < 0.01$

Table 7.
Association between total scores of "SMA" and three constructs, i.e. "OS", "FOMO" and "CU"

S.No	Factor	Items	Statements
1	**Relapse**	REL1	I experienced that others have told me to reduce my use of social media but I have not listened to them
2		REL2	I tried to cut down on the use of social media without success
3		REL3	I decided to use social media less frequently, but not managed to do so
4		REL4	When I am working I search for excuses to use social media
5	**Tolerance**	TOL1	I spent more time on social media than initially intended
6		TOL2	I felt an urge to use social media more and more
7		TOL3	I felt sad if I spent less time on social media
8		TOL4	I often look to my next session on social media
9	**Conflict**	CT1	I give less priority to hobbies, leisure activities, and exercise because of social media
10		CT2	I feel having less control over my life due to social media use
11		CT3	I feel physically less active due to use of social media
12		CT4	Social media use has made it difficult for me to manage my life
13	**Salience**	SAL1	I spent a lot of time thinking about social media or planned use of social media
14		SAL2	I thought a lot about what has happened on social media recently
15		SAL3	I sometimes think about quitting my social engagements in order to be on social media
16		SAL4	
17	**Mood**	MM1	I used social media in order to forget about personal problems
18	**modification**	MM2	I used social media to reduce feelings of guilt, anxiety, helplessness and depression
19		MM3	I find the time spent on social media exciting
20	**Withdrawal**	WD1	I become restless or troubled if I have been prohibited from using Social Media
21		WD2	I become irritable if I have been prohibited from using Social Media
22		WD3	I feel disturbed if social media network is slow or unavailable

Source(s): Authors' own

Findings

The exploratory research aims to develop an instrument for measuring SMA in the Indian Territory and then evaluate its psychometric characteristic by targeting a sample of young Indian individuals. The final refined instrument of SMA developed in this work consists of 22 items. Initially, themes of SMA were identified from the literature and by conducting 50 structured interviews of the subjects. After that, a 55-item instrument was formulated to assess the multi-dimensional factors of SMA. The data set revealed six factors by conducting EFA on a sample size of 503 responses, and 55 items were reduced to just 22 items. The scale demonstrated good values for internal consistency, as shown by Cronbach alpha scores that were more than 0.7.

Furthermore, after EFA, CFA was run on another sample with 473 functional responses to validate the scale. The scale's factor structure during CFA demonstrated acceptable convergent and discriminant validity. Moreover, the values for model fit indices were also acceptable, suggesting that the measure was both valid and reliable and can be used for future studies.

Discussions

The potency of the results is quite strong as it is derived from both qualitative and quantitative analysis. The findings from the study suggest that SMA is a multi-dimensional construct that corroborates the results of former studies (Wang, 2019). But, this work has

produced a measure with asymmetrical constructs concerning the number of items (Table 5). Therefore, this work contrasts with the research carried out by Andreassen *et al.* (2012), which developed an equal number of items for each of the six constructs. However, another study conducted by Wang (2019) also produced a scale with an unequal number of items in each construct; thus, the present work shows some similarity to that work. "Relapse," "Tolerance," "Conflict," and "Salience" were represented by four items each, and "Mood Modification" and "Withdrawal" were only represented by three items each. The reason could be attributed to a different cultural context and research methodology adopted for formulating the SMA measure.

Moreover, the "tolerance" dimension in the study by Liu and Ma (2018) disappeared from the final scale, which was not the case with the current study. The possible reason for its elimination by Liu and Ma (2018) was that the "tolerance" dimension varies with the social media platform and might disappear on some platforms. However, the authors argued that such assumptions must be further tested. Therefore, this study relates to most SMA studies (Wang, 2019) and not the study done by Liu and Ma (2018). Moreover, the six constructs of SMA are related to each other (Kang *et al.*, 2013). Any enjoyable occurrence (mood modification) from social media leads users to get attached to social networks (Salience).

Consequently, users utilize them more habitually (tolerance); thus, other facets of their lives get impeded (Conflict). But, when constraints are enforced on their usage, users often get apprehensive and disturbed (withdrawal), which impels them to use such networks again (relapse).

Regarding the study's reliability and validity, every associated index was found to be good. FOMO is the fundamental human need for need fulfillment, and people who do not get enough of their psychological needs met may be more likely to use social media frequently, even when they are in situations where it is inappropriate (Przybylski *et al.*, 2013; Sultan, 2021). It is fair to predict that people who experience high levels of FOMO would seek more extraordinary social relationships (Przybylski *et al.*, 2013) and that these people will utilize social media to increase their feeling of connectivity and self-presentation by sharing and exposing personal information on their accounts (Law, 2020; Sultan, 2021). This work has thus, substantiated the association between FOMO and SMA. Previous research has shown that when an individual considers that she or he is more relaxed, in virtual interactivity, in stark contrast to the typical person-to-person societal contact, they prefer to engage in virtual interactivity (Caplan, 2003). This preference for online social interactivity leads to more social media usage (Moretta and Buodo, 2018), eventually leading to SMA (Liu and Ma, 2018). The current findings, therefore, provide credence to the hypothesis that SMA is associated with a preference for online social interactivity.

Similarly, this work suggests that "continuous use" of social media is strongly associated with SMA. Our findings were consistent with previous studies showing an association between online addiction and "continuous use" (Przepiorka *et al.*, 2016). The current findings suggest the interconnections between addiction to social media, continuous use, preference for online social interactivity and FOMO. The research work findings are both considerable and apparent. These work findings could be further refined using other superior and diverse research means/techniques.

Implications
This work has complemented the scholar community with a distinctive insight into SMA, especially in the Indian context. The results and findings from this study present a unique perspective on the multi-dimensional construct of SMA. The work results can be of great importance to academicians as they will further reinforce their perception of SMA amongst social media users in India and other developing nations. Much productivity is lost due to the unwarranted time spent on social media. By better understanding the dimensions of SMA, one can limit one's time on such networks. These findings can also guide stakeholders such as

government, businesses, etc., to comprehend the factors driving SMA amongst their workers. They can essentially design guidelines keeping in view its factors to reduce employees' dependence on social media networks. Parents often complain about their children getting attached to different social media platforms. This work may also help them better understand this online addiction and guide them in controlling the addictive behavior amongst their children. SMA scale can also be utilized effectively in many realistic settings to help scholars, academicians and medical experts to acquire information concerning respondents" addictive behaviors. Furthermore, as the SMA scale is associated with behavioral and material addictions, any substantial intercession concerning SMA can also be used in treating behavioral and material addictions (Andreassen, 2015; Kuss and Griffiths, 2011).

Limitations and directions for future research

Samples in the study were chiefly collected from internet-savvy individual users from considerably bigger cities; therefore, any generalizations should be made with prudence. Hence, more studies must be conducted with samples across smaller towns/cities to comprehend the intensity and disparities in SMA. SMA has been found to vary across different user segments. Thus, it can be worth exploring such user segments based on various constructs associated with SMA and then, accordingly, profile them concerning the social media consumption patterns and various demographic variables. Furthermore, the measure does not specify any cut-off points to distinguish between addictive behavior and non-addictive one. Only the composition, internal scale consistency and validity are reported. As a result, additional studies need to describe its test-retest consistency.

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