



## Social Media Disorder Scale: Structure, Reliability and Validity in Indian Context

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**Abstract:** India is a country that has seen a notable increase in the amount of time its citizens spend on the Internet. One of the primary drivers of internet usage is the widespread adoption of social media platforms. When there is compulsive and unhealthy use of those platforms, it is termed Social Media Disorder (SMD), which has far-reaching implications. However, a valid tool to measure this issue still needs to be created in India. The study aimed to determine the reliability and validity of the Social Media Disorder Scale (SMDS), initially developed in the Netherlands. The developers used the diagnostic criteria of DSM-5 Internet Gaming Disorder since both have the same overarching construct of internet addiction. The nine-dimensional 27-item scale was put through a rigorous validation process while being administered among 552 adolescents in five districts and two states of India. The data collection lasted for three months between March - May, 2024. Construct validity of SMDS was assessed with Exploratory Factor Analysis (first subsample n=280) and Confirmatory Factor Analysis (second subsample n=272) using SPSS and AMOS software, respectively. The nine dimensions and 27 items were retained, yielding an internal consistency Cronbach's alpha of 0.945. This comprehensive validation process has ensured and provided strong evidence that the scale can be utilized in the Indian context to assess SMD.

### Introduction

In the current digital era, the Internet has completely changed the way we interact, acquire information, and do business. Its ubiquitous use has significantly impacted social interactions, education, and entertainment, among other areas of our lives (Bhattacharya and Sharma, 2007; Manjunatha, 2013). India, a country that is developing rapidly, has seen a notable increase in the amount of time its citizens spend on the Internet. This has far-reaching implications for them, especially youngsters (Fusilier and Durlabhji, 2005; Menon et al., 2018; Mohanty et al., 2021; Nath et al., 2016). The expansion of telecommunications infrastructure, the growing demand for online services, and the growing availability of reasonably priced smartphones contribute to India's internet boom (Donner, 2015; Gnanasambandam et al.,

2012; West, 2015). According to the Internet and Mobile Association of India (IAMAI), India had approximately 821 million internet users as of mid-2023 (55% of its population), which was 759 million (52%) and 692 million (48%) in 2022 and 2021 respectively. These statistics make India one of the largest online markets globally. The data also showcased that 90% of internet users used it daily and spent approximately 1.5 hours (*Kantar\_iamai\_Report\_20\_2023*).

One of the primary drivers of internet usage in India is the widespread adoption of social media platforms. The word 'Social Media' refers to the collection of applications where people share, interact, express, and participate, such as Facebook, Twitter, WhatsApp, LinkedIn, YouTube, and many others (Matheson, 2018). It has grown trendy and is now an essential part of many



Indians' daily lives, especially for the younger generation. It enables users to connect and share experiences with diverse communities (Gruzd and Haythornthwaite, 2013; Luttrell, 2021; Mills, 2011). IAMAI declared the usage of social media to be the third highest activity done on the Internet (70%), only to follow communication (76%) and OTT platforms (86%) by narrow margins. According to a report by Digital 2023: India, January 2023, the country had approximately 467 million active social media users, accounting for nearly 33% of its total population (*Digital 2023: India — DataReportal – Global Digital Insights*). This staggering number highlights the significant role social media plays in the lives of Indians, particularly among adolescents, whom surveys consistently show that among the population, they are the ones who are hooked on it (Kuss and Griffiths, 2017; Lenhart et al., 2009).

There are several advantages to the growth of social media and the Internet (Kumar et al., 2016; Sabate et al., 2014; Wagner et al., 2017). Access to a wealth of information, educational resources, opportunities for self-expression, and creativity are reported as few of them (Baccarella et al., 2018). Many people use social media for job hunting, learning new things, entertainment, and innovation (Beaman et al., 2021; Cheng et al., 2020). However, their excessive and unregulated use has also raised concerns regarding problematic use, cyberbullying, and the potential negative impact on mental health (Giumetti and Kowalski, 2022; Sampasa-Kanyinga and Hamilton, 2015). Social media addicts sometimes spend too many hours a day on it, become overly preoccupied with it, and have uncontrollable cravings to use the platform (Andreassen and Pallesen, 2014). For instance, some people become so engrossed in Instagram that they become upset when they cannot use it at work. Such abuse is often referred to as 'Social Media Addiction' (Hou et al., 2019; Hussain and Starcevic, 2020). Consequently, addictive or problematic use of social media can impair users' psychosocial functioning and well-being and cause symptoms such as depression and anxiety (Hussain and Griffiths, 2019; Ponnusamy et al., 2020; Lin et al., 2016). Another study by the National Institute of Mental Health and Neurosciences (NIMHANS) found that excessive social media use among adolescents was associated with low self-esteem, envy, feeling unproductive, anxiety, and depression (*NIMHANS-Bulletin\_08-01-2021-Issue-18.Pdf*). Pruthi et al. (2018) revealed that social media addicts are 1.6 times more likely than non-addicts to experience psychological problems such as anger, irritability, stress, anxiety, tension, etc., similar to findings by Subba et al. (2013). In the study, the likelihood of behavioral

alterations was 2.63 times higher among social media addicts than among non-addicts. It was shown that the former had more significant behavioural abnormalities, such as irregular eating patterns, poor cleanliness, and disturbed sleep (similar to Malviya et al., 2014 and Masthi et al., 2015). In addition to psychological problems, social media addicts had 2.21 times higher rates of physical symptoms than non-addicts. The symptoms observed among the people with an addiction were backache, neck pain, shoulder pain, headache, wrist pain, myopia, strain of eyes, neck problems, etc. (similar to Hosen et al., 2021; Masthi et al., 2015, 2018; Pruthi, 2017; Turkistani et al., 2021). A scholar claims that overreliance on technology has led to an impoverishment of social skills, leaving individuals unable to engage in meaningful conversations because such skills are being sacrificed for constant connection, resulting in short-term attention and a decreased ability to retain information (Turkle, 2016). Individuals have come to be described as 'alone together'- always connected via technology but isolated.

### Social Media Disorder (SMD)

People appear more addicted to specific online activities than to the Internet (Griffiths and Szabo, 2014). However, a few of these activities seem to trigger more significant obsessive tendencies than others, such as gaming and social media (Rumpf et al., 2011; Valkenburg and Peter, 2011; Van Rooij et al., 2010). Researchers have recently become interested in social media addiction, also known as Social Media Disorder-SMD (Van den Eijnden et al., 2016), excessive social media usage (Griffiths et al., 2015; Kuss and Griffiths, 2011), problematic social media use (Lee and Cheung, 2014; Meena et al., 2012; Van den Eijnden et al., 2016) and compulsive social media use (Aladwani and Almarzouq, 2016; Cock et al., 2014). There are numerous definitions of this term one such is the overuse of social media, unfulfilled desires to use over time, overlooking activities at home, school, or other places due to excessive use, experiencing physical and emotional problems if social media use is ceased or minimized, and using social media as an escape from a negative mood (Andreassen et al., 2016; Griffiths et al., 2014; Kuss and Griffiths, 2011; Van den Eijnden et al., 2016). Another popular definition for the term SMD refers to the compulsive and unhealthy use of those platforms. Similar to internet addiction, namely Internet Gaming Disorder (IGD), and other kinds of digital media misuse, SMD is a proposed diagnosis associated with excessive use of social media (Kuss and Griffiths, 2017; Van den Eijnden et al., 2016). A study undertaken in China, which

involved around 2,620 students, showed that 24% of the participants were addicted to social media (Cao and Su, 2007). Another study by Pruthvi et al., 2018, revealed an even higher prevalence of social media addiction, i.e., 36.9% among Indian students, and was seen to be causing health issues. Likewise, Wang et al. (2018) disclosed that 29.5% of students to be addicted to social media.

As of right now, IGD is the only disorder that is classified as strongly related to and a part of Problematic Internet Usage/Internet addiction in both the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Classification of Diseases (ICD-11). While gaming disorder (GD) is classified as a clinical diagnosis in the ICD-11, Internet Gaming Disorder (IGD) is a diagnosis found in Section III of the DSM-5. The current DSM and ICD do not yet cover other kinds of PIU, such as problematic use of social media (e.g., Facebook, Instagram, WhatsApp, YouTube, TikTok, Twitter). An increasing reservoir of research suggests otherwise, despite the DSM-5's absence of including social media addiction, which may give the idea that social media addiction is not an actual mental illness (Pantic, 2014; Ryan et al., 2014). However, research suggests that obsessive social media use is becoming a more common mental health issue, especially among adolescent users (van Rooij et al., 2013).

### A Dearth of Measurement Tools

While the Internet and social media offer numerous benefits, their excessive and unregulated use is seen to have detrimental effects on mental and physical well-being. Despite the negative consequences, there are still challenges with the availability of concrete definitions and wholesome measurement tools in the field of Internet addiction research and specifically SMD, making it difficult to research how common this kind of disordered behavior is, which in turn prevents essential advancements in the realm of addiction research. A practical and reliable tool is essential for measuring SMD as it may assist in identifying those who are at risk and offer the right kind of preventive therapies. The magnitude and impact of SMD on people and society can be better understood by researchers, mental health practitioners, and policymakers with the help of one such reliable diagnostic tool. Therefore, by tackling this emerging dilemma of SMD, we can lessen the possible negative effects of excessive social media use and promote a more sensible and balanced use.

### Review of Literature

An investigation by Moitra and Madan (2022) showed that teenagers in India use their devices for academic

purposes only 35% of the time, and they spend the remaining 65% on social media for entertainment. In fact, in a study conducted by O'Keeffe et al., it was discovered that using social media excessively by adolescents increased their risk of internet addiction, cyberbullying, sleep issues, and decreased in-person interactions (O'Keeffe and Clarke-Pearson, 2011). Al-Menayes discovered that poor academic performance and sleeplessness were caused by using social networking websites for extended periods (Al-Menayes, 2015). With all this being said, research on addiction to social media currently needs to catch up. While the subject of social media addiction is relatively new, with the first studies emerging after 2010, the research on game addiction has a long track record spanning back to before online games were introduced (e.g., Shotton, 1989). In addition, as stated earlier, a dearth of tools are available to measure SMD, compared to the several approved tools available to measure game addiction. (e.g., Griffiths et al., 2015; Lemmens et al., 2009; Van Rooij et al., 2010).

The field of social media addiction is distinguished by a multitude of assessment tools that target specific types of obsessive social media use, such as addiction to Facebook (Ryan et al., 2014), addiction to Twitter (Said et al., 2014), and addiction to social network sites (Griffiths et al., 2014). There are two issues with the fragmentation of social media research using specific tools to address particular types of social media addiction. First, new platforms frequently replace older ones in the social media environment, or the latter changes quickly as the former is expanded to include new interactive features. As a result, tools that target particular types of social media addiction may quickly become out of date. Second, research data comparability is hampered, and further fragmentation of the field is encouraged by the inclusion of slightly diverse criteria for operationalizing social media addiction in current measures (Van den Eijnden et al., 2016). Therefore, it is essential to have a general measure of SMD in order to make the necessary developments in the field of social media addiction.

A few tools are available to measure SMD, and they are discussed here. One of the most popular scales for assessing SMD is the Bergen Social Media Addiction Scale (BSMAS). It was designed and validated by Andreassen et al. (2016) and uses criteria that are based on the essential elements of behavioural addiction, including salience, mood modulation, tolerance, withdrawal, conflict, and relapse. The psychometric qualities of the BSMAS have been well-researched and verified across a range of groups and languages (Bányai

et al., 2017). However, its disregard for the unique characteristics of social media platforms has drawn criticism from several researchers (Griffiths et al., 2014). However, another scale, the Social Media Addiction Scale (SMAS) by Deniz and Tutgun-ünal (2015), has four factors, which include occupation, mood modification, relapse, and conflict. There are 41 items within these four factors. When used in preliminary research, the scale demonstrated good validity and reliability (Monacis et al., 2017). However, it might not

more comprehensive than other existing scales. Two versions of these scales exist- 27 items and 9 items, both holding a good internal consistency. The nine-item version has been validated among adolescents in 44 countries (Boer et al., 2022), as well as in China (Fung, 2019), Turkey (Savci et al., 2017), and the Netherlands (Boer et al., 2022), indicating that it is valid for measuring problematic social media usage in adolescents. Nevertheless, it has been discovered that the 27-item scale—which comprises three items for each of the nine

**Table 1. List of Colleges/Universities.**

Sl. No.	Name of the College/ University	Name of the state
1	Fakir Mohan Autonomous College	Odisha
2	Kuntala Kumari Sabat Women's College	Odisha
3	Nilgiri College	Odisha
4	Dinakrushna College	Odisha
5	Balashore Mahila College	Odisha
6	Remuna College	Odisha
7	Nilgiri Women College	Odisha
8	Fakir Mohan University	Odisha
9	Ramadevi Women's University	Odisha
10	Berhampur University	Odisha
11	Education College	West Bengal
12	Adamas University	West Bengal

be as valuable for routine screening or research due to its length and complexity. Savci and Griffiths (2021) developed the Social Media Craving Scale (SMCS) to measure the need or craving to utilise social media. This five-item unidimensional measure has shown good psychometric qualities. It is crucial to remember that self-report measures should not be the only method used to assess SMD, as some researchers have contended that craving alone may not be adequate to capture the entire spectrum of symptoms linked to the disorder (Griffiths, 2012). The Social Networking Website Addiction Scale by Turel and Serenko (2012) is similar to this, but it comes with its shortcomings.

A wholesome scale present is the Social Media Disorder Scale (SMDS) developed by Van den Eijnden et al. (2016). Originally comprised of nine factors, this scale was designed to assess the extent of SMD based on the criteria for Internet Gaming Disorder proposed in the DSM-5. The SMDS has shown good reliability and validity in various studies and has been adopted here to be validated in the Indian context since it has a distinct diagnostic cut-off point to differentiate between highly engaged, non-disordered social media users and disordered (i.e., addicted) users. Additionally, research revealed that it was more in line with the clinical definition of behavioural addiction (Van den Eijnden et al., 2016). Because of this, the SMDS seems to be far

DSM-5 criteria—is more detailed and precise than the 9-item scale in characterizing the behaviours associated with social media addiction. Therefore, analyzing the validity of the SMD 27-item scale in the Indian context is worthwhile, where not many other scales to measure the same construct are available.

## Materials and Methods

### Study Participants and Study Area

The study encompassed a total of 552 adolescent participants who were purposively selected across 12 higher education institutions (Table 1) in three districts such as Balasore, Berhampur, and Khordha in Odisha, and two districts such as North 24 Parganas and Murshidabad in West Bengal, India

This diverse geographic participant spread within two states and five districts allowed for a broader representation of the target population. The use of smartphones and internet penetration has increased significantly in both these states in recent years, especially among adolescents. These states provide appropriate contexts for researching social media disorders because of technical advancements' rise in social media adoption. These regions' higher educational institutions serve a broad spectrum of students, including those from different socioeconomic backgrounds. Due to its potential to capture a diverse range of social media

experiences and behaviours, this setting enhances the study.

adequate test-retest reliability, and acceptable sensitivity and specificity were all displayed by the scale.

**Table 2. Demographic Characteristics of Study Participants (N = 552).**

Characteristics	Category	Frequency	Percentage
Gender	Boys	88	16%
	Girls	464	84%
Age	17-18 Years	74	14%
	19-20 Years	178	32%
	21 Years and above	300	54%
Higher Education Stream	Science	152	27%
	Arts	374	68%
	Commerce	26	5%
Most Used Social Media Platform	WhatsApp	198	36%
	Instagram	192	35%
	YouTube	44	8%
	Facebook	112	20%
	Twitter	6	1%
Daily Internet Usage	<4 hours	50	9%
	5-8 hours	28	5%
	9-12 hours	380	69%
	>12 hours	94	17%
Primary Device Used for Social Media	Android phone	300	54%
	Tablet	136	25%
	Laptop	116	21%

### Inclusion and Exclusion Criteria

The 552 participants were carefully selected based on inclusion and exclusion criteria to ensure relevance to the research objectives.

#### Inclusion criteria

1. Adolescents who are using social media for a minimum of one year
2. Adolescents must have atleast one active social media account

#### Exclusion criteria

1. Not a permanent resident of India

These criteria ensured that the chosen participants had sufficient exposure and experience with social media platforms within the Indian context, thus making their responses pertinent to this study.

### Details of the Original Scale Under Validation

The 27-item SMDS (Table 3) has nine dimensions: Preoccupation, Tolerance, Withdrawal, Persistence, Escape, Problems, Deception, Displacement, and Conflict. Each of these nine dimensions has three items that measure the construct. This score ranged from 0 to 27 (yes = 1, no = 0), with higher scores denoting more serious social media addiction. The original authors examined the scale's dimensional structure in two samples, and the results demonstrated strong internal consistency with a Cronbach's alpha of 0.90 in the first sample and 0.92 in the second. Also, strong structural validity, strong criterion and convergent validity,

### Data Collection Procedure

The data collection lasted for three months between March-May, 2024. Before this, the scale was verified and approved for data collection by the ethical and educational departments of the investigator's University. The scale questionnaire was prepared using Google Forms while initially introducing each of the investigators and explaining the purpose of the survey. Before taking the survey, informed consent was obtained for all 560 samples by clearly describing the process. Instructions about the rating for each question were provided, and they were encouraged to respond with the utmost sincerity. It consisted of two sections- A) Demographic details of participants and social media usage and B) Social Media Disorder Scale. On average, each administration lasted about 15 minutes. After cleaning, the final sample size obtained was 552.

### Statistical Analysis Applied

The data analysis began by determining the suitability of the data for factor analysis via Kaiser- Meyer- Olkin (KMO) Test and Bartlett's Test of Sphericity (BTS). The former test measures the sampling adequacy (Hutcheson and Sofroniou, 1999), and the latter tests the hypothesis that the correlation matrix is an identity matrix, which would ultimately indicate that the variables are unrelated (Tabachnick and Fidell, 2007). Following this, to explore the underlying psychometric structure among each of the 27 items in the social media disorder scale, an

**Table 3. The Original 27 item Social Media Disorder Scale by Van den Eijnden et al., 2016.**

Dimension No.	Name of the Dimension	Items
1	Preoccupation During the past year, have you.....	...Often found it difficult not to look at messages on social media when you were doing something else (e.g., school work)?
		...regularly found that you can't think of anything else but the moment that you will be able to use social media again? *
		...often sat waiting until something happens on social media again?
2	Tolerance During the past year, have you ...	...felt the need to use social media more and more often?
		...felt the need to check messages on social media more and more often?
		...regularly felt dissatisfied because you wanted to spend more time on social media?*
3	Withdrawal During the past year, have you...	...often felt tense or restless if you weren't able to look at your messages on social media?
		...regularly felt angry or frustrated if you weren't able to use social media?
		...often felt bad when you could not use social media?*
4	Persistence During the past year, have you...	...tried to reduce your use of social media, but failed?
		...tried to spend less time on social media. But failed?
		...been unable to stop using social media, even though others told you that you really should?
5	Escape During the past year, have you...	...regularly used social media to take your mind off your problems?
		...often used social media so you didn't have to think about unpleasant things?
		...often used social media to escape from negative feelings? *
6	Problems During the past year, have you...	...often not paid attention at school, while doing homework or at work because you were using social media?
		...regularly not had enough sleep because you were using social media too late at night?
		...regularly had arguments with others because of your social media use? *
7	Deception During the past year, have you...	...regularly lied to your parents or friends about the amount of time you spend on social media? *
		...regularly hidden your social media use from others?
		...often used social media secretly?
8	Displacement During the past year, have you...	...regularly devoted no attention to people around you (e.g. family or friends) because you wanted to use social media?
		...regularly had no interest in hobbies or other activities because you would rather use social media?
		...regularly neglected other activities (e.g. hobbies, sport) because you wanted to use social media?*
9	Conflict During the past year, have you.	Did you have serious problems at school or work because you were spending too much time on social media?
		...had serious conflict with your parent(s) and sibling(s) because of your social media use? *
		... jeopardize or lose an important friendship or relationship because you were spending too much time on social media?

Exploratory Factor Analysis (EFA) was performed on the first sample (n=280). Principal component analysis with varimax rotation was widely recommended in scale validation procedures (Costello and Osborne, 2019). Subsequently, the factor structure obtained through the EFA process was further tested with Confirmatory Factor Analysis (CFA) on the second sample (n=272) to ensure

whether this structure was consistent with the data. Not ending here, the scale under validation was then explored for its reliability statistics. The analysis utilized SPSS V23 and AMOS after examining inappropriate values and removing the outliers and incomplete forms.

**Results and Discussion**

**Exploratory Factor Analysis (EFA)**

Churchill (1979) asserts that factor analysis can be used to verify whether the number of conceptualised dimensions can be experimentally validated. The foundation of factor analysis is the hypothesis that some measurable and observable variables may be reduced to simpler latent variables that are unobservable but have a similar variance (Bartholomew et al., 2011). Such unobservable components are essentially hypothetical ideas used to describe variables rather than being directly measured (Cattell, 1973). Factor analysis is the preferred

adequate. High values ranging from 0.7 to 1.0 suggest that factor analysis is suitable. Values less than 0.7 suggest that factor analysis might not be suitable and is considered a mediocre value. The results of KMO and Bartlett’s test of Sphericity are as follows:

**Table 4. KMO and Bartlett’s Test of Sphericity.**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.750
Bartlett's Test of Sphericity	Approx. Chi-Square	3843.41
	df	351
	Sig.	0.000

**Table 5. Total Variance Explained.**

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.030	18.631	18.631	2.717	10.063	10.063
2	2.913	10.789	29.419	2.455	9.094	19.156
3	2.605	9.647	39.067	2.379	8.810	27.967
4	2.238	8.289	47.356	2.313	8.568	36.535
5	2.176	8.060	55.416	2.309	8.551	45.086
6	1.836	6.800	62.216	2.249	8.329	53.415
7	1.580	5.853	68.069	2.129	7.887	61.301
8	1.213	4.492	72.561	2.037	7.543	68.844
9	1.009	3.739	76.299	2.013	7.455	76.299
10	0.585	2.165	78.464			
11	0.555	2.057	80.521			
12	0.530	1.963	82.484			
13	0.495	1.834	84.319			
14	0.476	1.764	86.082			
15	0.428	1.584	87.667			
16	0.420	1.556	89.223			
17	0.398	1.475	90.698			
18	0.367	1.361	92.059			
19	0.337	1.249	93.307			
20	0.319	1.182	94.490			
21	0.296	1.097	95.587			
22	0.281	1.040	96.627			
23	0.256	.948	97.574			
24	0.220	0.815	98.389			
25	0.202	0.750	99.139			
26	0.185	0.686	99.825			
27	0.047	0.175	100.000			

**Extraction Method:** Principal Component Analysis.

approach for assessing self-reporting surveys (Bryant et al., 1999). The following are the fundamental statistics related to factor analysis. Bartlett’s sphericity test was employed to investigate the hypothesis that the variables in the population were uncorrelated, i.e., that the population correlation matrix is an identity matrix (as stated in the methodology section). An index called the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was used to assess whether factor analysis was

The KMO measure verified the sampling adequacy for the analysis by yielding a value of 0.750, falling into the acceptable range to conduct a factor analysis as per Tabachnick and Fidell (2007) and is in the ‘middling’ value as per Kaiser (1974) which is still considered adequate. Bartlett's test of sphericity  $\chi^2(351) = 3843.411$ ,  $p < 0.001$ , indicated that correlations between items were sufficiently significant for factor analysis. It proves that the variance is homogenous and significant (Table 4).

**Table 6. Rotated Component Matrix.**

	Component								
	1	2	3	4	5	6	7	8	9
Problems1	0.973								
Problems2	0.950								
Problems3	0.892								
Escape1		0.855							
Escape2		0.835							
Escape3		0.786							
Preoccupation1			0.822						
Preoccupation2			0.816						
Preoccupation3			0.800						
Displacement1				0.899					
Displacement2				0.899					
Displacement3				0.814					
Tolerance1					0.867				
Tolerance2					0.852				
Tolerance3					0.832				
Deception1						0.877			
Deception2						0.870			
Deception3						0.825			
Conflict1							0.857		
Conflict2							0.827		
Conflict3							0.821		
Persistence1								0.821	
Persistence2								0.807	
Persistence3								0.786	
Withdrawal1									0.870
Withdrawal2									0.741
Withdrawal3									0.712
<b>Extraction Method:</b> Principal Component Analysis.									
<b>Rotation Method:</b> Varimax with Kaiser Normalization.									

The total variance explained is crucial for determining the number of dimensions that need to be retained for further analysis. In Table 5, we notice that the analysis has extracted nine components with eigenvalues greater than 1, which is favorable as per Kaiser (1965). These nine components together explain 76.299% of the total variance obtained in the data. As explained, the first component accounts for 18.631%, the second 10.789%, and the remaining contribute progressively less to this total variance. The rotated sums of squared loadings revealed a more evenly distributed variance explained among the factors ranging from 10.06% to 7.45%.

As the subsequent step in the analysis, EFA (n=280) was employed as a Rotated Component Matrix using Principal component analysis as the extraction method and Varimax with Kaiser normalization as the rotation

method for the underlying factor structure. The rotation technique is an orthogonal technique based on the assumption that the elements are uncorrelated. The variance of the squared loadings for each factor is maximised using this strategy. Principal Component Analysis (PCA) was applied to extract factors. Table 6 demonstrates a nine-factor structure, and all of the factor loadings are high (>0.7), demonstrating a strong correlation between the factors and the items. According to Hair et al. (2010), each item is deemed satisfactory when item loadings are more significant than 0.70, which indicates strong construct validity. Additionally, no significant cross-loadings (loadings > 0.3 for multiple factors) exist, suggesting that the variables have excellent discriminant validity. Therefore, all 27 items were retained and added to the construct underlying the factor.

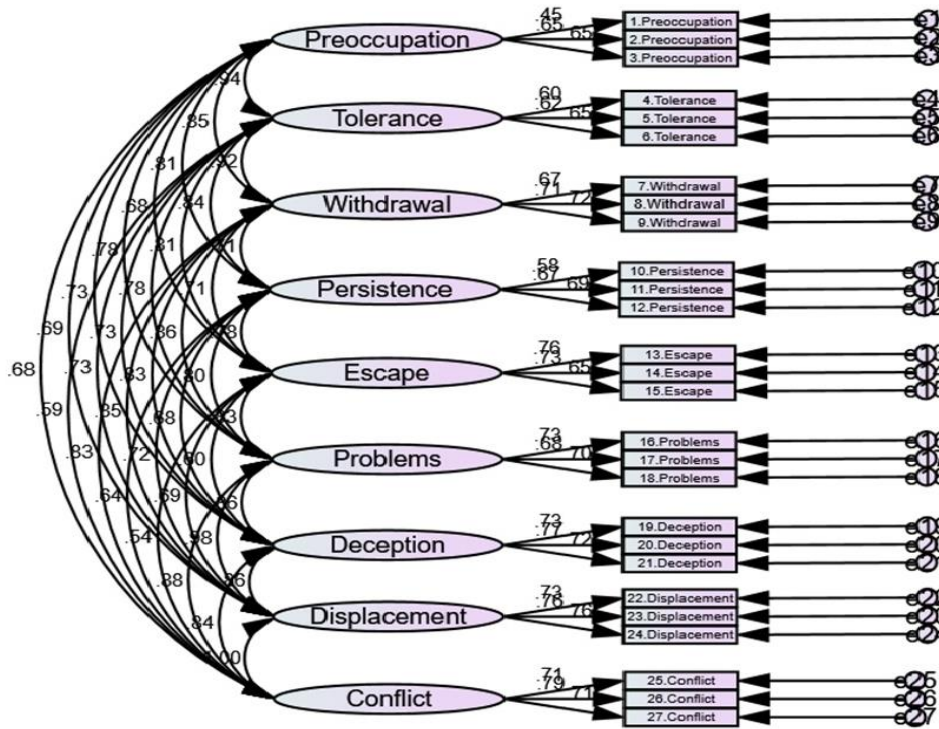


**Confirmatory Factor Analysis (CFA)**

CFA was initiated in AMOS software with the second half of the sample, i.e., 272 respondents. It is a statistical application intended to validate the scale's discriminant and convergent validity after it passes through EFA. Figure 1 shows that the standardized factor loadings range from 0.45 to 0.77. Thus, strong correlations between the items and the corresponding factors indicate good convergent validity (Hair et al., 2010). The CFA confirms the EFA's nine-component structure, which has three elements for each factor. The congruence between the EFA and CFA scores strengthens the scale's construct validity.

**Table 7. The Fitness Estimates of the Model.**

Measures	Result
P value	0.000
Minimum Discrepancy Function by Degrees of Freedom divided (CMIN/DF)	1.843
Root Mean Square Residual (RMR)	0.069
Root Mean Square Error of Approximation (RMSEA)	0.056
Goodness of Fit Index (GFI)	0.875
Adjusted Goodness of Fit Index (AGFI)	0.836
Parsimonious Comparative Fit Index (PCFI)	0.762
Comparative Fit Index (CFI)	0.928



**Figure 1. The Factor Structure of the Model with 27 items.**

Finally, the nine-factor 27 items were retained, and the correlated CFA model was found to hold good fitness indices and thereby fulfilled the cut-off values. This comprises of the p-value 0.000, which is highly significant (<0.05), and CMIN/DF ( $X^2/pdf$ ) is 1.843 (below 3), which is indicative of a good fit between the hypothetical model and the sample here (Kline, 2023). RMR shows 0.069 (less than 0.08) and also falls into the acceptable model fit (Hu and Bentler, 1999). Other indices such as RMSEA= 0.056 (less than 0.08), GFI = 0.875 (less than 0.9), PCFI=0.762 (less than 0.8), and lastly, the CFI =0.928 (more than 0.9) (Hu and Bentler, 1999) which are all indicative of a good model-data fit in general (Ding and Ng, 2008).

**Table 8. Reliability Quotients.**

Dimension	Cronbach's Alpha (Dimension Wise)	Cronbach's Alpha (Total 27 items)
Preoccupation	0.602	0.945
Tolerance	0.681	
Withdrawal	0.754	
Persistence	0.643	
Escape	0.760	
Problems	0.746	
Deception	0.794	
Displacement	0.795	
Conflict	0.811	

## Conclusion and Implications

The present study aimed to validate the Social Media Disorder scale by Van den Eijnden et al. (2016) in the Indian context, focussing on a sample of 552 adolescents recruited across five districts and two states. The investigators have established the scale's psychometric properties through rigorous statistical analysis, such as EFA, CFA, and reliability testing. The EFA, conducted on the first subsample (n=280), revealed a clear nine-factor structure aligning with social media disorder's theoretical underpinnings. The clean factor structure obtained with high loadings and zero cross-loadings suggests excellent construct validity and demonstrates that each item effectively gauged distinct aspects of the disorder.

The CFA performed with the second subsample (n=272) corroborated the nine-factor structure retained in the EFA. The model's fitness estimates were also reasonable, as per the benchmarks. Following this, all nine factors and 27 items were retained, and the reliability analysis revealed an excellent internal consistency of 0.945. This underscores the robustness of the SMD scale in the Indian context. This comprehensive validation process has ensured and provided strong evidence that the scale can be utilized in the Indian context to assess SMD.

From a research standpoint, it offers a culturally relevant instrument for examining SMD in India, facilitating more precise evaluations and cross-cultural comparisons. Future research examining the prevalence, correlates, and effects of social media disorder among Indian adolescents can be built upon this validated measure. It also provides practitioners a trustworthy tool for screening and evaluating the disorder in clinical and educational contexts. Early detection of such problematic social media use can facilitate timely interventions and support for at-risk individuals. Furthermore, the scale's multidimensional design, comprising nine unique factors, enables a detailed comprehension of a person's unique pattern of problematic social media use, which can guide the development of focused intervention measures.

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## Conflict of Interest

The authors declare that there is no conflict of interest

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