

# **Analysing Components of Behavioural Addiction: A Study of Technology and Social Media Usage Among Indian Students**

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## **Abstract**

The cross-sectional study explored behavioural addiction linked to technology and social media among Indian students. It involved responses from 446 Indian students, investigating their technology and social media usage patterns, motivations, and psychological factors and assessing SMAS (Social Media Addiction Scale). It also examined the relationships between factors and addiction. The findings showed that female students exhibited higher moderate addiction levels than males, and those aged 18-22 were more prone to mild addiction. Internet use was primarily driven by accessibility and communication needs. The models revealed that addiction status and behavioural addiction constructs were influenced by application and website usage, social media engagement, internet usage duration, and addiction severity. The SMAS distribution differed across genders and addiction statuses. The study discovered moderate social networking addiction among Indian students and its link to social media use. It offers insights for tailored interventions and preventive strategies against technology and social media addiction. Nevertheless, further research considering cultural factors is needed to develop culturally sensitive interventions for Indian students dealing with technology addiction.

**Keywords:** Addiction scale; Behavioural components; Indian students; Social media addiction, Social Media use; Social Media platforms.

## **1. Introduction**

Addiction is described as a "chronic disease of brain reward, motivation, memory, and related circuitry" by the ASAM (2011). Addiction means the inability to stop using, problems with behavioural control, a failure to detect problems with behaviour and interpersonal connections and dysfunctional emotional reactions. Addiction is typically thought of concerning drug usage. Cheng et al. (2021) research worldwide and conduct studies to determine how widespread social media addiction is a big concern.

The social media addiction rises with the growth of Instagram followers. Griffiths (2010) and Kuss and Griffiths (2011) made significant contributions to the field. Social media addiction involves excessive use, causing negative impacts on daily life, relationships, and mental health. It shares characteristics with other addictions, leading to anxiety and depression. Fournier et al. (2023) questioned whether identified

components genuinely assess addiction features. Allahverdi (2022) studied social media addiction in students at various university levels, and Aral and Kecelioglu (2023) explored its effects on musicians during the COVID-19 pandemic.

Millions of individuals, especially college students in India, use social media daily for communication, entertainment, and academics. However, prolonged and frequent use of social media has the potential to result in addiction, negatively impacting psychological and physiological well-being. Studies in India have reported high social media addiction rates among college students.

In 2019, AIIMS found that over 25% of Delhi's college students were addicted to social media. A 2020 study by NIMHANS revealed that over 20% of Indian college students faced social media addiction.

Ozimek et al. (2023) developed "the Social Media Activity Questionnaire (SMAQ) to distinguish between active and passive social media use". Achmad et al. (2023) explored how social media affected the lifestyles of young students in Bandung, reporting favourable impacts. Azizi et al. (2019) examined Iranian students' social media use and academic achievement, noting negative associations. Social media addiction, especially among college students, can lead to social isolation, sleep disruptions, mental health issues, and harm to relationships and daily activities, affecting psycho-physiological well-being. Malik et al. (2023) explored the association of "psychological distress, social media addiction, fear of missing out (FoMO)", and boredom proneness. Caratiquit and Caratiquit (2023) investigated the association between social media addiction, academic performance, and success in remote studying. Chanpen et al. (2022) used the "Social-Media Addiction Screening Scale (S-MASS) to identify factors related to social media addiction". Kurunç and Şahin (2023) examined social media addiction and vanity among students at universities of Istanbul. Lastly, Suhud et al. (2023) compared two research models exploring how social media addiction impacts narcissism, self-respect, and tourism addiction.

The study's main purpose within this framework is to focus on the present Indian students. The study analyses the patterns, motivations, and psychological elements linked to excessive technology and social media use. In pursuit of the study's primary goal, the following research questions were examined:

- Do behavioural "addiction components (salience, mood modification, tolerance, withdrawal, conflict, and relapse)" affect technology and social media use among Indian students?
- What are the patterns, motivations, and psychological factors associated with technology and social media use among Indian students?
- Is there a significant association between various technology, social media use factors, and Addiction among Indian students?

- How valid is the SMAS in identifying addiction status among Indian students?
- To what extent is the SMAS sensitive to gender differences in social media addiction among Indian students?

## **2. Research Objectives**

The study's objective is "Analysing Components of Behavioural Addiction: A Study of Technology and Social Media Usage Among Indian Students".

### **2.1 The general objectives of the study are:**

- To examine and understand the diverse aspects "(including salience, mood alteration, tolerance, withdrawal, conflict, and relapse)" of behavioural addiction associated with technology and social media usage among Indian students
- The study explores the patterns, motivations, and psychological factors associated with technology and social media use, focusing on Indian students.
- The proposed model explored the link between technology and social media use factors and student addiction.
- To assess the validity of the SMAS in identifying addiction status among students.
- To evaluate the sensitivity of the SMAS to gender differences in social media addiction among students.

## **3. Theoretical Background and Literature Review**

The term "behavioural addiction" describes the compulsive and excessive engagement in particular behaviours, notwithstanding unfavourable outcomes. The study by Ergün et al. (2023) delved into the "correlations between social media addiction and stress, as well as social media addiction and anxiety, utilising both internet addiction and phubbing as explanatory factors". Interestingly, it was found that only internet addiction could explain "the association of social media addiction and depression". Griffiths (2013) contributed significantly to this discussion by identifying six key components characterising addictive behaviour: "salience, tolerance, mood modification, relapse, withdrawal, and conflict". Griffiths argued that a behaviour qualifies as an

addiction if it exhibits all six elements. While several studies have explored the components of behavioural addiction related to technology and social media use among various populations, limited research has specifically focused on Indian students. Reviewing the existing literature reveals some crucial findings and trends in this field. Jabeen et al. (2023) investigated how "the use of social media platforms (SMPs) may negatively affect university student's academic performance (AP), a phenomenon known as the dark side of social media (DoSM)".

There is a clear need for further investigation into the components of addiction related to the use of technology and social media, especially in Indian students. Understanding these components can support prevention and intervention strategies to address the growing concern of technology addiction and promote healthier technology use habits within this population.

### **3.1 Literature Review**

The review contributes towards identifying the behaviour of students that could contribute to an addictive process.

Zhao (2021) investigated social media usage patterns' impact on addiction and well-being. The study found that entertainment usage tends to cause addiction, while social use enhances it, with all groups acknowledging its negative effects on well-being. Dumitrescu et al. (2023) conducted a social media literature review, resulting in health issues and therapeutic interventions. Symptoms included concentration issues, poor academics, "insomnia, altered self-perception, low self-esteem, anxiety, and sadness". Prevention should consider behavioural risk factors, and treatment should focus on controlled use and relapse prevention. Kengadaran and Anusha (2022) assessed "social media use among the general population, revealing signs of social media depression and addiction". It displayed a combination of favourable and unfavourable aspects impacts on daily life and academic performance. Li Cho et al. (2023) examined factors associated with social media addiction.

They found weaker associations with perceptions of inauthentic content and highlighted surveillance and socialisation gratifications as predictors of addiction. Yilmaz and Aşman Kayl (2020) studied societal attitudes towards substance addiction. They found that participants' substance use influenced their attitudes and behaviours towards addicts, emphasising the importance of holistic social service interventions to combat stigma and exclusion. Social media platforms are conduits for the rapid spread of false information, posing risks and negative effects on people's decisions and viewpoints-

Achmad et al. (2023) examined social media's impact on young students' lifestyles in Bandung, finding a positive influence and underscoring the importance of educating adolescents on responsible social media use. Doan et al. (2022) identified the incidence of social media addiction among Vietnamese individuals and its links to popular social networking sites, highlighting associations with FOMO and stress due to neglect from online friends.

Ozimek et al. (2023) introduced the Social Media Activity Questionnaire (SMAQ) to assess Social Media Use (SMU), revealing associations between active SMU and Facebook activity, along with stress, despair, and anxiety. Jabeen et al. (2023) explored how social media platforms (SMPs) may negatively affect university students' academic performance (AP), using the S-O-B-C framework to explain mechanisms. Their findings highlighted the influence of students' self-presentations, loneliness, and demotivation from social comparison on cognitive overload, addiction, and poor academic performance. Bayraktar and Çelik (2023) and Demirciolu and Göncü Köse (2021) investigated the "mediating roles of attachment styles, rejection sensitivity, and Dark Triad personality traits in the relationship between relationship happiness and social media Addiction".

Allahverdi (2022) examined "perceived social media addiction differences across students in various university years in Kuwait". Although there were variations between university years, they did not yield significant findings. Meknes

(2023) conducted a quantitative study to determine the degree of social media addiction among Moroccan adolescent students. The results revealed variations in social media addiction based on academic streams but no significant differences based on gender. Tutgun Ünal (2020) compared social media addiction between college students in Turkey and South Korea, revealing differences in addiction levels, emotional support from social media, and conflict dimension addiction. Bayraktar and Çelik (2023) investigated how university students' self-worth and attachment styles relate to social media addiction, uncovering correlations between self-worth domains and addiction levels, particularly in anxious/ambivalent attachment.

Kalita (2023) investigated the correlation "between university students' use of social media" and their experience of depression, revealing a significant positive association between depression and excessive social media use. Mousa (2023) assessed "the effectiveness of cognitive-behavioural therapy in addressing social media addiction among university students", revealing no notable distinctions between control and experimental groups. Collates (2023) investigated the link between college students' self-esteem and social media addiction, discovering an inverse relationship between addiction levels and self-esteem.

Caratiquit and Caratiquit (2023) delved into the connection "between social media addiction and academic achievement, mediated by academic procrastination". Their research uncovered a robust link between addiction, procrastination, and academic success. Yilmaz and Erduran (2023) investigated the "role of life satisfaction as a mediator between COVID-19 anxiety and social media addiction". Their findings illuminated the intricate interplay of these factors. In a study by Mindajao (2023), the interplay between social media addiction and educational achievement among 9th and 10th-grade students in science subjects was compared. The research found no substantial correlation between addiction and academic performance. Zhuang et al. (2023) scrutinised the sequential mediation effects of "fatigue and sleep quality in the relationship between social

media addiction and academic engagement among college students". Their study underscored the significance of addressing fatigue and sleep quality to enhance academic engagement in students grappling with social media addiction. "Studies have delved into the intricate relationship between social media addiction and" psychological factors. Some of these studies reveal the detrimental effects on mental health, linking it to increased stress, anxiety, and depression (Ergün et al., 2023). Sleep quality has emerged as a concern, with excessive social media use negatively impacting it (Sümen & Evgin, 2021). Social media addiction positively correlated with conceit, with variations based on gender, followers, and daily usage (Kurunç & Ahin, 2023).

Furthermore, social media addiction was linked to decisional procrastination among employees, raising concerns about its impact on productivity (Kocak, 2023). Cognitive flexibility "played a crucial role in mediating and moderating the link between social media addiction" and phubbing behaviour (Tanhan et al., 2023). Cyberbullying, another important dimension, demonstrated gender differences and connections to psychological motivations and mental health outcomes (Lim Lee et al., 2023). "Item Response Theory (IRT) analysis was utilised to analyse the psychometric characteristics of the Bergen SMAS (BSMAS) and examine factors like age and gender contributing to addiction risk to understand social media addiction more comprehensively" (Zarate et al., 2023).

These studies collectively contributed to understanding the complex nature of social media addiction and its far-reaching consequences for mental health and overall well-being, emphasising the need for further research and interventions in the digital age.

### **3.2 Summary of Literature Review and Research Gap**

After a thorough literature review, two key research gaps are identified:

- Evidence Gap: Specific conclusions about student populations are challenging because research often focuses on general

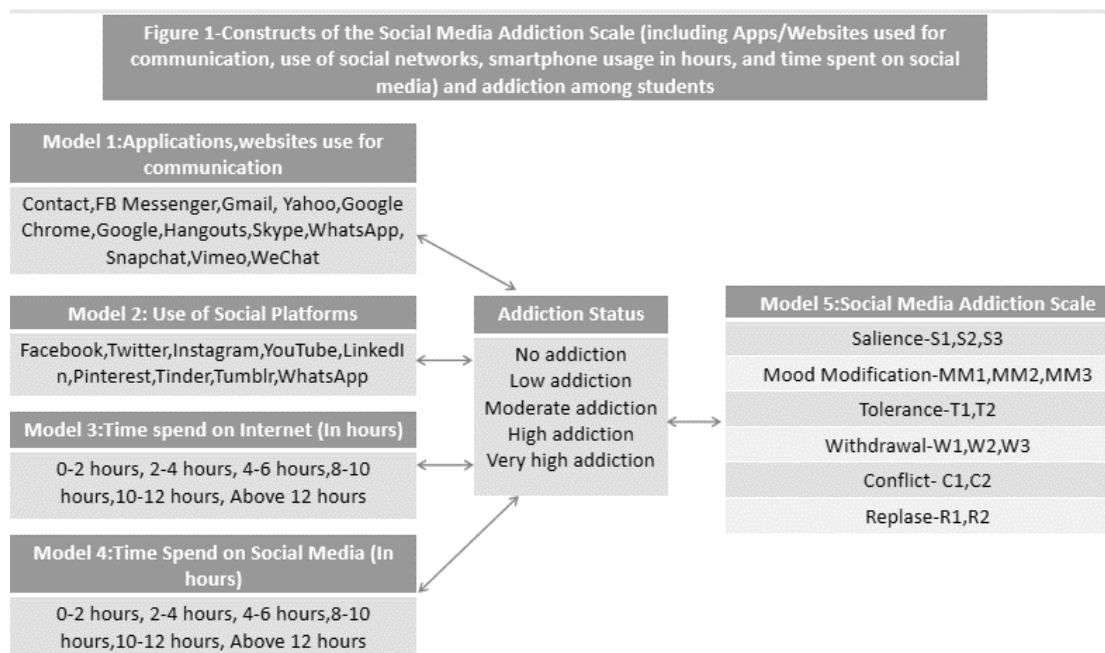
internet addiction or encompasses participants across various age groups. Existing research predominantly hails from Western nations, limiting insights into cultural influences on addictive behaviours among Indian students.

➤ **Theoretical Gap:** The study addresses this by proposing conceptual models to understand technology and social media addiction among Indian students. There is a notable lack of emphasis on identifying protective factors against addiction in this context.

#### 4. Proposed Model

The proposed model is adapted from Griffiths' (2013) component model of addiction. He outlines six key components (S-Salience, T-Tolerance, MM-Mood Modification, R-Relapse, W-Withdrawal, and C-conflict) that might be

used to characterise an addictive behaviour (Griffiths (2013)). Salience refers to the prominence of substance use in an individual's thoughts and desires. Tolerance is necessary for higher quantities of the substance to attain the intended or desired outcome. Mood modification refers to using substances to alter one's emotional state. Relapse, withdrawal, and conflict are key elements in understanding addictive behaviours within this model. The study model was built utilising the literature review results and validated using data on all students (No addicts, Low addicts, Moderate addicts, High addicts and very high addicts). The model 1 to 5 proposed to investigate the null hypotheses (H1-H5). The analysed results will help indicate that specific social media addiction constructs may not strongly predict addiction in the student population. The present study proposed a conceptual framework



**Figure 1: Proposed Research Model: The Conceptual Framework**

#### 5. Data and Methodology

The abovementioned paradigm states that the research was quantitative, and deductive reasoning (positivist paradigm) was employed, moving from general to specific (e.g., to prove the hypotheses). The present study's paradigm is its research methodology, and the analysis is quantitative. The study was conducted to

investigate and understand the various common "components (salience, mood modification, tolerance, withdrawal, conflict and relapse" (Griffiths (2013)) of addiction related to technology and social media use among Indian students accountable for this problem. This study is based on the positivism paradigm, as eight hypotheses were taken to validate the "SMAS and to prove the relationship between

addiction and the accountable factors". (Griffiths (2010); Kuss and Griffiths (2011); Griffiths (2013).

### **5.1 Construct Development**

The questionnaire is based on preceding studies. Fifteen statements "components (salience, mood modification, tolerance, withdrawal, conflict and relapse)" of behavioural addiction related to technology and social media use, i.e., S1-S3, MM1-MM3, T1-T2, W1-W3, C1-C2 and R1-R2 (Figure-1) developed to assess the SMAS.

### **5.2 Research Design**

The study aims to investigate behavioural addiction components linked to technology and social media use among Indian students during the 2022-23 academic year. Data were gathered through Google Forms distributed to Indian students, resulting in 446 valid responses. A preliminary pilot study involving 25 students aided in refining the final questionnaire using Google Forms. A multi-stage sampling technique was employed to collect the samples. Initially, universities and affiliated colleges across various Indian cities were identified. Subsequently, faculty mediators helped identify students based on gender, age, education, smartphone ownership, internet and social media usage hours, and communication and social networking platforms. Finally, Google Forms were distributed using purposive and selective sampling methods.

### **5.3 Validity Test**

The validity of the questionnaire was assessed by conducting bivariate correlations on all items. The significance level (2-tailed) for all items was less than 0.05. Therefore, at a significance level of 0.05, the critical value for Pearson's 'r' with degrees of freedom (446-2) was determined to be 0.08, which indicates statistical significance, confirming the validity of the questions in the questionnaire.

### **5.4 Reliability Test**

The combined reliability of alpha Cronbach's score of 70 items is 0.731. As per alpha Cronbach's reliability score, any reliability score above 0.6 can be accepted. So, the reliability of the data is excellent.

### **5.5 Discriminant Test**

Figure 1 shows all the construct S1-S3, MM1-MM3, T1-T2, W1-W3, C1-C2 and R1-R2 Avg Variances > Avg. R Square. Hence, Discriminant Validity was established.

### **5.6 Normality Test**

The normality of the sample data was assessed through the Shapiro-Wilk and Kolmogorov-Smirnov tests. Since the p-value for all factors was less than 0.05, it indicated that the sample data set did not follow a normal distribution; in other words, the data exhibited skewness. Consequently, a non-parametric test was employed.

### **SMAS**

The SMAS includes 15 items, assessed through a 5-point Likert scale. These items aimed to measure addiction to social media. Composite scores were computed from the Likert ratings and were then used to categorise individuals into different addiction levels.

### **6. Data Analysis**

Data analysed are presented in three following sections:- 1) Students' descriptive statistics, 2) Addiction status associated with technology Use, 3) Hypotheses Testing (Association between factors addiction and constructs of SMAS) of behavioural addiction and its sensitivity to gender differences and addiction status among students.

6.1 Descriptive Statistics and Addiction Status

Table 1: Descriptive Statistics and Addiction Status

Addiction Status	Characteristics	No addiction	Low addiction	Moderate addiction	High addiction	Very high addiction	Total
<b>Gender</b>	<b>Male</b>	19	67	92	42	6	226
	<b>%</b>	8.00	29.00	40.00	18.00	3.00	100.00
	<b>Female</b>	12	78	100	25	5	220
	<b>%</b>	6.00	35.00	46.00	11.00	2.00	100.00
<b>Age</b>	<b>18-22 Years</b>	16	76	101	23	5	221
	<b>23-27 Years</b>	8	36	53	26	2	125
	<b>28-32 Years</b>	5	13	13	8	2	41
	<b>33-37 Years</b>	0	4	8	1	0	13
	<b>37 Years &amp; Above</b>	3	16	18	8	1	46
<b>Education</b>	<b>Professional/Vocational Training</b>	18	56	91	23	4	192
	<b>Bachelor's Degree</b>	9	70	71	32	5	187
	<b>Master's Degree</b>	0	3	12	3	0	18
	<b>Doctorate</b>	5	14	11	5	0	35
	<b>No Answer</b>	0	2	8	3	1	14
<b>Smartphone Ownership</b>	1	30	136	170	62	7	405
	2	1	7	20	4	2	34
	3	1	2	3	0	1	7
<b>Total</b>		<b>32</b>	<b>145</b>	<b>193</b>	<b>66</b>	<b>10</b>	<b>446</b>

Table 1 summarises respondent demographics, including gender (226 males, 220 females), prevalent age groups (18-22 years being the most common), education levels (with a significant portion in professional/vocational training and bachelor's programs), and smartphone ownership (91% owning at least one smartphone). Table 1 offers an analysis of addiction status among Indian students. The

data indicates that a significant portion of both male and female students falls into the category of moderate addiction, with 40% of males and 46% of females exhibiting this level of addiction. The second-highest frequency is observed in the low addiction category, with 29% of males and 35% of females falling into this group. A smaller percentage, 3% of males and 2% females, are highly addicted.

The table further breaks down addiction status by different age groups. Students aged 18-22 and 23-27 show the highest frequencies of moderate addiction. The 28-32 age group exhibits moderate and low addiction frequencies, while the 33-37 age group primarily demonstrates mild addiction. Students aged 37 and above also display a substantial frequency of moderate addiction.

The table also explores addiction status based on students' educational levels. Professional/vocational training students show the highest frequency of moderate addiction, followed by bachelor's degree students. Students pursuing Master's degrees exhibit a notable frequency of mild addiction, while those in doctorate programs primarily display low addiction tendencies.

Lastly, the table highlights the addiction status concerning students' smartphone ownership. It reveals that a significant number of students, 170 in total, are moderately addicted to smartphones, while 136 students fall into the low addiction category. Notably, students owning three smartphones tend to have a higher likelihood of moderate addiction.

**7. Hypothesis Testing**

**7.1 The Proposed Model:**

Models 1 to 5 were developed to examine the null hypotheses (H1-H5), as:-

**Model 1:** H1: Null Hypothesis: There is no association between Apps or Websites used for communication and Addiction groups for students.

Alternate Hypothesis: There is an association between Apps or Websites used for communication and Addiction groups for students.

**Model 2:** H2: Null Hypothesis: There is no association between using social networks and addiction for students.

Alternate Hypothesis: There is an association between the social networks use and addiction for students.

**Model 3:** H3: Null Hypothesis: There is no association between all the constructs of the SMAS and Addiction for students.

Alternate Hypothesis: There is an association between all the SMAS constructs and addiction for students.

**Model 4:** H4: Null Hypothesis: There is no association between addiction and time spent by students on the Internet (In hours)

Alternate Hypothesis: There is an association between addiction and time spent by students on the Internet (In hours)

**Model 5:** H5: Null Hypothesis: There is no association between addiction and time spent by students on social media (In hours).

Alternate Hypothesis: There is an association between addiction and time spent by students on social media (In hours).

The hypotheses were tested through five different multiple-regression analyses. Hypotheses H1, H2, H3, H4, and H5 were tested.

**Table 2: Model 1 to Model 5 tested through Multi Regression Test**

Model	Hypothesis	Regression Weights	Beta Coefficient	R <sup>2</sup>	R	F	t-value	p-value	Analysis	Results
1	H1	Contact-Addiction	0.063	0.013	0.113	0.622	1.265	0.207	R=0.113, β=0.063, P>0.05, F	Accepted

									(0.622)=0.207	
		FB Messenger-Addiction	-0.015				-0.274	0.784	R=0.113, $\beta$ =0.015, P>0.05, F (0.622)=0.784	Accepted
		Gmail, Yahoo-Addiction	0.037				0.668	0.505	R=0.113, $\beta$ =0.037, P>0.05, F (0.622)=0.505	Accepted
		Google Chrome-Addiction	0.043				0.84	0.424	R=0.113, $\beta$ =0.043, P>0.05, F (0.622)=0.424	Accepted
		Google Hang Out-Addiction	0.006				0.11	0.921	R=0.113, $\beta$ =0.006, P>0.05, F (0.622)=0.921	Accepted
		Skype-Addiction	-0.067				-1.068	0.286	R=0.113, $\beta$ =0.067, P>0.05, F (0.622)=0.286	Accepted
		Whatsapp-Addiction	0.006				0.131	0.896	R=0.113, $\beta$ =0.006, P>0.05, F (0.622)=0.896	Accepted
		Snapchat-Addiction	-0.022				-0.444	0.657	R=0.113, $\beta$ =0.022, P>0.05, F (0.622)=0.657	Accepted
		Vimeo-Addiction	0.048				0.869	0.386	R=0.0113, $\beta$ =0.048, P>0.05, F (0.622)=0.386	Accepted
<b>Model</b>	<b>Hypothesis</b>	<b>Regression Weights</b>	<b>Beta Coefficient</b>	<b>R2</b>	<b>R</b>	<b>F</b>	<b>t-value</b>	<b>p-value</b>	<b>Analysis</b>	<b>Results</b>
2	H2	Facebook-Addiction	-0.033	0.027	0.165	1.225	-0.636	0.525	R=0.165, $\beta$ =0.033, P>0.05, F (1.225)=0.525	Accepted
		Twitter-Addiction	0.02				0.365	0.715	R=0.165, $\beta$ =0.020, P>0.05, F (1.225)=0.715	Accepted
		Instagram-Addiction	0.101				1.999	0.046	R=0.165, $\beta$ =0.101, P<0.05, F (1.225)=0.046	Rejected

		YouTube - Addiction	-0.038				-0.72	0.471	R=0.165, $\beta$ =-0.038, P>0.05, F(1.225)=0.471	Accepted
		LinkedIn - Addiction	0.061				1.173	0.241	R=0.165, $\beta$ =0.061, P>0.05, F(1.225)=0.241	Accepted
		Pinterest - Addiction	-0.009				-0.176	0.86	R=0.165, $\beta$ =-0.009, P>0.05, F(1.225)=0.860	Accepted
		Tinder-Addiction	-0.073				-1.319	0.188	R=0.165, $\beta$ =-0.073, P>0.05, F(1.225)=0.188	Accepted
		Tumblr-Addiction	0.048				0.866	0.387	R=0.165, $\beta$ =0.048, P>0.05, F(1.225)=0.387	Accepted
		WhatsApp-Addiction	0.065				1.295	0.196	R=0.165, $\beta$ =0.065, P>0.05, F(1.225)=0.196	Accepted
		Any other-Addiction	0.066				1.371	0.171	R=0.165, $\beta$ =0.066, P>0.05, F(1.225)=0.171	Accepted
<b>Model</b>	<b>Hypothesis</b>	<b>Regression Weights</b>	<b>Beta Coefficient</b>	<b>R2</b>	<b>R</b>	<b>F</b>	<b>t-value</b>	<b>p-value</b>	<b>Analysis</b>	<b>Results</b>
3	H3	Addiction-Use of the Internet (in hours)	0.187	0.035	0.187	16.086	4.011	0.000	R=0.187, $\beta$ =0.187, P<0.05, F(16.086)=0.000	Rejected
<b>Model</b>	<b>Hypothesis</b>	<b>Regression Weights</b>	<b>Beta Coefficient</b>	<b>R2</b>	<b>R</b>	<b>F</b>	<b>t-value</b>	<b>p-value</b>	<b>Analysis</b>	<b>Results</b>
4	H4	Addiction-Use of social media (in hours)	0.144	0.021	0.144	9.346	3.057	0.002	R=0.144, $\beta$ =-0.144, P<0.05, F(9.346)=0.002	Rejected
<b>Model</b>	<b>Hypothesis</b>	<b>Regression Weights</b>	<b>Beta Coefficient</b>	<b>R2</b>	<b>R</b>	<b>F</b>	<b>t-value</b>	<b>p-value</b>	<b>Analysis</b>	<b>Results</b>

5	H5	S1-Addiction	0.136	0.861	0.928	178.295	5.113	0	R=0.928, $\beta$ =0.136, P<0.05, F(178.295)=0.000	Rejected
		S2-Addiction	0.069				2.398	0.017	R=0.928, $\beta$ =0.069, P<0.05, F(178.295)=0.017	Rejected
		S3-Addiction	0.106				3.924	0	R=0.928, $\beta$ =0.106, P<0.05, F(178.295)=0.000	Rejected
		MM1-Addiction	0.052				2.104	0.036	R=0.928, $\beta$ =0.052, P<0.05, F(178.295)=0.036	Rejected
		MM2-Addiction	0.071				2.801	0.005	R=0.928, $\beta$ =0.071, P<0.05, F(178.295)=0.005	Rejected
		MM3-Addiction	0.107				4.334	0	R=0.928, $\beta$ =0.107, P<0.05, F(178.295)=0.000	Rejected
		T1-Addiction	0.11				3.919	0	R=0.928, $\beta$ =0.110, P<0.05, F(178.295)=0.000	Rejected
		T2-Addiction	0.133				4.271	0	R=0.928, $\beta$ =0.133, P<0.05, F(178.295)=0.000	Rejected
		W1-Addiction	0.087				2.746	0.006	R=0.928, $\beta$ =0.087, P<0.05, F(178.295)=0.006	Rejected
		W2-Addiction	0.017				0.569	0.57	R=0.928, $\beta$ =0.017, P>0.05, F(178.295)=0.570	Accepted

		W3-Addiction	0.091			2.826	0.005	R=0.928, $\beta=0.091$ , $P<0.05$ , $F(178.295)=0.005$	Rejected
		C1-Addiction	0.137			4.203	0	R=0.928, $\beta=0.137$ , $P<0.05$ , $F(178.295)=0.000$	Rejected
		C2-Addiction	0.135			5.009	0	R=0.928, $\beta=0.135$ , $P<0.05$ , $F(178.295)=0.000$	Rejected
		R1-Addiction	-0.02			-0.653	0.514	R=0.928, $\beta=-0.02$ , $P<0.05$ , $F(178.295)=0.514$	Accepted
		R2-Addiction	-0.025			-0.889	0.375	R=0.928, $\beta=-0.025$ , $P>0.05$ , $F(178.295)=0.375$	Accepted

**For Model 5: a. Dependent Variable: Addiction status**

**For Model 5: b. Predictors: (Constant), S1:I find it essential to check social media feeds every 10-15 minutes, S2:I constantly open SNS with social media notifications, S3:I watch SNS before the study and engage it too longer than I intend to, MM1:I find my studies boring and feel the pressure, MM2:I do not get fun, happiness with family, friends and play Physical games, MM3:I feel relaxed when I am on SNS, T1:I spend more time on SNS and skip eating, exercising and studying continuously, T2:I spend long hours on SNS to keep satisfied, W1:I feel unhappy when I stay away from SNS, W2:I feel frustrated interacting with people when I am not with SNS, W3:I feel difficult to get back to my studies when I do not have SNS, C1:I deprive myself of sleep because I want to be long with SNS, C2:I find it difficult to retain what I have learned and forget quickly, R1:I Feel anxiety and low esteem while I try to cut my SNS usage, R2:I failed to cut time using SNS, which increased the prospect of fail in exams.**

In Model 1, 'Addiction' was regressed on 9 independent variables. In Model 2, 'Addiction' was regressed on 10 independent variables. In Model 3, 'Use of the Internet (in hours)' was regressed on 1 independent variable. In Model 4, 'Use of social media (in hours)' was regressed on 1 independent variable. In Model 5, 'Addiction' was regressed on 15 independent variables.

**Note: -**

➤ If the predictors are insignificant to addiction status, the null hypothesis is accepted, suggesting no significant association between the predictors and addiction status.

➤ If the predictors are substantial with addiction status, the null hypothesis is rejected, which indicates a significant association between the predictors and addiction status.

Based on the results in Table 2, Model 1 indicated that all regression weights had p-values greater than the 0.05 significance level. Consequently, the null hypothesis is accepted, implying no significant association between using Apps or Websites for communication and addiction among students.

In Model 2, the null hypothesis was rejected for the regression weight (Instagramaddiction) as the p-value was less than the 0.05 significance

level. The result indicates an association between the use of Instagram and addiction status for students. However, for the regression weights of Facebook-Addiction, Twitter-Addiction, YouTube-Addiction, LinkedIn-Addiction, Pinterest-Addiction, Tinder-Addiction, Tumblr-Addiction, WhatsApp-Addiction, and any other platform-Addiction, the p-values were greater than the 0.05 level of significance. Therefore, the null hypothesis is accepted, suggesting no significant association exists between the use of Facebook, Twitter, YouTube, LinkedIn, Pinterest, Tinder, Tumblr, WhatsApp, or any other platform with addiction status among study participants.

In Model 3, the null hypothesis is accepted for regression weights W2-Addiction, R1-Addiction, and R2-Addiction, indicating an association between "I feel frustrated interacting with people when I am not with SNS," "I feel anxiety and low esteem while I try to cut my SNS usage," and "I failed to cut time using SNS, which increased the prospect of failing in exams" with addiction status of students. However, the null hypothesis is rejected for regression weights S1-Addiction, S2-Addiction, S3-Addiction, MM1-Addiction, MM2-Addiction, MM3-Addiction, T1-Addiction, T2-Addiction, W1-Addiction, W3-Addiction, C1-Addiction, and C2-Addiction,

indicating no significant association between these variables and addiction status.

In Model 4, the null hypothesis is rejected as the regression weight for addiction to the internet (in ours) has a p-value less than the 0.05 level of significance, which indicates an association between addiction and the time students spend online.

In Model 5, the null hypothesis is rejected as the regression weight for the addiction issue of social media (in hours) has a p-value less than the 0.05 significance level, which indicates an association between addiction and students' time on social media platforms.

### 7.2 SMAS Across Categories of Male and Female Students

H6: Null Hypothesis: The distribution of all the constructs of the SMAS is the same across categories of Male and Female Students

Alternate Hypothesis: The distribution of all the SMAS constructs differs across categories of Male and female Students.

The Independent Samples Mann Whitney U Test was utilised to analyse the data, and the following findings were observed:

**Table 3: Hypothesis Test Summary-Independent Samples Mann Whitney U Test**

S.No	Null Hypothesis	categories of	Significance	Decision
1	The distribution of S1:I find it essential to check social media feeds every 10-15 minutes is the same across	Male	0.728	Accepted
		Female	0.570	Accepted
2	The distribution of S2:I constantly open SNS with social media notifications is the same across	Male	0.772	Accepted
		Female	0.877	Accepted
3	The distribution of S3:I watched SNS before the study and engaged it for longer than I intended to is the same across	Male	0.500	Accepted
		Female	0.653	Accepted
4	The distribution of MM1:I find my studies boring and feel the pressure is the same across	Male	0.218	Accepted
		Female	0.425	Accepted
5	The distribution of MM2:I do not get fun, happiness with family, friends and play Physical games is the same across	Male	0.672	Accepted
		Female	0.923	Accepted
6	The distribution of MM3:I feel relaxed when I am on SNS, the same across	Male	0.076	Accepted
		Female	0.187	Accepted
7	The distribution of T1:I spend more time on SNS	Male	0.700	Accepted

	and skip eating, exercising and studying continuously is the same across	Female	0.934	Accepted
8	The distribution of T2:I spend long hours on SNS to stay satisfied is the same across	Male	0.088	Accepted
		Female	0.193	Accepted
9	The distribution of W1:I feel unhappy when I stay away from SNS is the same across	Male	0.511	Accepted
		Female	0.787	Accepted
10	The distribution of W2:I feel frustrated interacting with people when I am not with SNS is the same across	Male	0.115	Accepted
		Female	0.223	Accepted
11	The distribution of W3:I find it difficult to get back to my studies when I do not have SNS is the same across	Male	0.503	Accepted
		Female	0.705	Accepted
12	The distribution of C1:I deprives me of sleep because I want to be long with SNS is the same across categories of Male	Male	0.118	Accepted
		Female	0.239	Accepted
13	The distribution of C2:I find it difficult to retain what I have learned and forget quickly is the same across categories of Male	Male	0.668	Accepted
		Female	0.981	Accepted
14	The distribution of R1:I Feel anxiety and low esteem while I try to cut my SNS usage is the same across categories of Male	Male	0.182	Accepted
		Female	0.342	Accepted
15	The distribution of R2:I failed to cut time using SNS, which increased the prospect of failing in exams is the same across categories of Male	Male	0.226	Accepted
		Female	0.395	Accepted
<b>Note-Asymptotic significance is displayed. The significance level is 0.05</b>				

Based on the results shown in Table 3, the p-value for all 15 SMAS constructs is greater than the 0.05 significance level. Thus, the null hypothesis is accepted, indicating that the distribution of all the constructs "(salience, mood modification, tolerance, withdrawal, conflict and relapse)" of the SMAS is similar across categories of male and female students Griffiths (2013).

### 7.3 SMAS across categories of addiction status

H7: Null Hypothesis: The distribution of all the constructs of the SMAS is the same across categories of addiction status of students.

Alternate Hypothesis: The distribution of all the SMAS constructs is not the same across students' addiction status categories.

The Independent Samples Kruskal Wallis Test. The summary of findings is as follows:

**Table 4: Hypothesis Test Summary-Independent Samples Kruskal Wallis Test**

S.No.	Null Hypothesis	Significance	Decision
1	The distribution of S1:I find it essential to check social media feeds every 10-15 minutes is the same across categories of Addiction Status	0.000	Reject
2	The distribution of S2:I constantly open SNS with social media notifications is the same across categories of Addiction Status	0.000	
3	The distribution of S3:I watched SNS before the study and engaged it for longer than I intended to is the same across	0.000	Reject

	categories of Addiction Status		
4	The distribution of MM1:I find my studies boring and feel the pressure is the same across categories of Addiction Status	0.000	Reject
5	The distribution of MM2:I do not get fun, happiness with family, friends and play Physical games is the same across categories of Addiction Status	0.000	Reject
6	The distribution of MM3:I feel relaxed when I am on SNS is the same across categories of Addiction Status	0.000	Reject
7	The distribution of T1:I spend more time on SNS and skip eating, exercising and studying continuously is the same across categories of Addiction Status	0.000	Reject
8	The distribution of T2:I spend long hours on SNS to stay satisfied is the same across categories of Addiction Status	0.000	Reject
9	The distribution of W1:I feel unhappy when I stay away from SNS is the same across categories of Addiction Status	0.000	Reject
10	The distribution of W2:I feel frustrated interacting with people when I am not with SNS is the same across categories of Addiction Status	0.000	Reject
11	The distribution of W3:I find it difficult to get back to my studies when I do not have SNS is the same across categories of Addiction Status	0.000	Reject
12	The distribution of C1:I deprive myself of sleep because I want to be long with SNS is the same across categories of Addiction Status	0.000	Reject
13	The distribution of C2:I find it difficult to retain what I have learned and forget quickly is the same across categories of Addiction Status.	0.000	Reject
14	The distribution of R1:I Feel anxiety and low esteem while I try to cut my SNS usage is the same across categories of Addiction Status	0.000	Reject
15	The distribution of R2:I failed to cut time using SNS, which increased the prospect of failing in exams, is the same across categories of Addiction Status	0.000	Reject
<b>Note-Asymptotic significance is displayed. The significance level is 0.05</b>			

The findings from Table 4 indicate that the p-value is less than the predetermined significance level of 0.05 for all 15 SMAS constructs. Therefore, we reject the null hypothesis, suggesting that the distribution of the SMAS constructs differs across students' addiction status categories.

## 8. Findings and Discussion

In addressing the objectives, the study contributes to an ongoing theoretical and methodological understanding of the "components (salience, mood modification, tolerance, withdrawal, conflict, and relapse)" of behavioural addiction related to use of

technology and social media among Indian students(Griffiths, 2013).The literature review proposed a conceptual model to understand behavioural addiction to technology and social media use among Indian students. Seven (7) hypotheses were developed based on research questions and objectives.

The study found:

Female students exhibit a higher level of moderate addiction compared to male students.Potential reasons for this gender difference could be related to differences in social media usage patterns, coping mechanisms, and psychological vulnerabilities

among female students. A similar study was conducted by Azizi et al. (2019) and found that male Iranian students have higher social networking addiction levels than females.

The group of 18-22-year-olds shows the highest frequency of moderate addiction compared to other age groups due to increased peer influence, developmental transitions, and heightened vulnerability to social pressures during emerging adulthood. Zarate et al. (2023) studied BSMAS psychometric characteristics, prevalence, age, and gender risk factors.

All students doing Professional/Vocational Training, Bachelor's Degree, Master's Degree show the highest frequency of moderate addiction, but those doing doctorate show the highest frequency of low addiction. The higher frequency of moderate addiction among students pursuing professional/vocational training, bachelor's degrees, and Master's degrees could be attributed to the increased academic and career-related stressors. In comparison, the frequency of low addiction among students pursuing doctorate degrees may be due to their higher levels of motivation, self-discipline, and commitment to

research.(Mindajao, 2023) is to compare "the impact of social media addiction on students' academic performance and find a link between average internet usage and the social media addiction of students".

Students with one smartphone are moderate to low addicted due to reduced accessibility and potential limitations on their overall smartphone usage and engagement with social media platforms.

The chi-square test results indicate that both male and female students share similar motivations for smartphone usage, which helps to examine the use of technology with gender differences. Gender-related differences were not statistically different.

For male and female students, significant associations were found between motivation and "accessibility," "portability," "plethora of functions," "ease of operations," "connectedness," "user interface," "design," "music and video player," "navigation," and "data security." All these factors play a role in influencing their motivation to use smartphones.

Figure 2-Constructs of the Social Media Addiction Scale (including Apps/Websites used for communication, use of social networks, smartphone usage in hours, and time spent on social media) and addiction among students

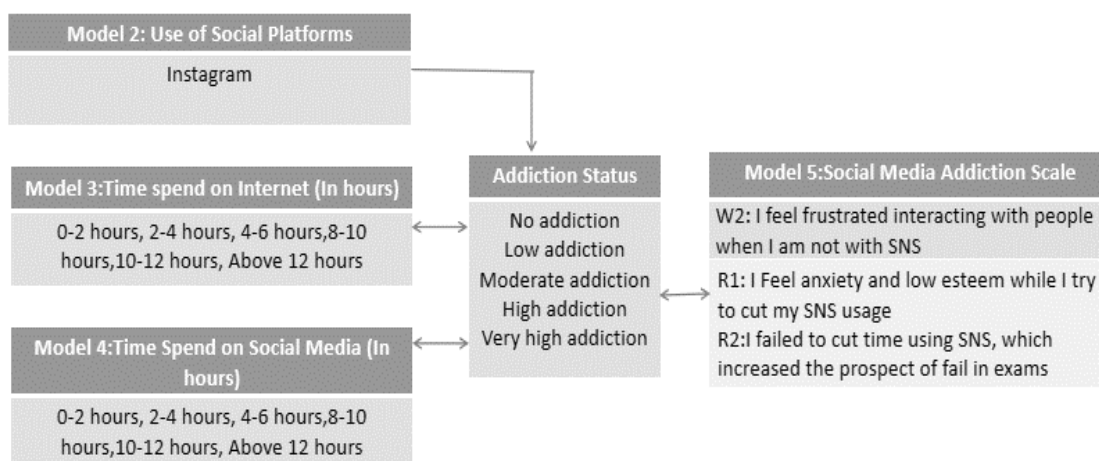


Figure 2: Adjusted Model -Constructs of the SMAS

In Model 1, the analysis suggests that the use of Apps or Websites for communication is not significantly associated with addictive behaviours among students, implying that these

platforms do not contribute significantly to addiction development in this student population.

Model 2 reveals an association between Instagram usage and addiction status among students. This connection can be attributed to the addictive features of Instagram, including constant social interaction, engaging content, and reinforcement through likes and comments. Targeted interventions addressing these aspects are essential to tackle this issue.

Model 3 uncovers associations between addiction and psychological factors such as frustration when not using social media, anxiety related to reducing usage, and fear of exams due to excessive social media use. These findings highlight the psychological dependence on social media, FOMO, and the impact on academic and social aspects.

In Model 4, the link between addiction and the time spent on the internet is explained by the potential for excessive internet use to lead to addictive behaviours, such as neglecting responsibilities and experiencing withdrawal symptoms.

Model 5 highlights the addictive nature of social media, which leads to excessive use and adverse effects on overall health, emphasising the need to address this issue comprehensively.

The Mann-Whitney U test suggests no significant gender difference in addiction tendencies among students, aligning with Azizi et al. (2019) findings that both male and female students exhibit moderate addiction levels.

The Kruskal-Wallis test indicates that addiction tendencies differ across addiction status categories of students. This discrepancy may be attributed to varying levels of engagement, dependence, and harmful effects connected through social media use among individuals with different addiction statuses.

In summary, these findings emphasise the significance of understanding the multifaceted factors contributing to addiction among students, encompassing psychological, behavioural, and platform-specific elements. This knowledge is crucial for developing effective intervention and prevention strategies in addressing social media addiction in the

student population. Further, it can be suggested that approaches encouraging healthier social media usage among young individuals offer direction for digital literacy education and provide insights for policymakers on regulatory measures and mental health interventions (Tater and John, 2023).

## **9. Theoretical Implications and Managerial Implications**

**9.1** The Theoretical Implications that can arise from this study are:

- **Understanding behavioural addiction:** The study examines technology and social media addiction among Indian students, revealing the complex nature of behavioural addiction within a specific population context.
- **Identification of key components:** The study identifies key "components (salience, mood modification, tolerance, withdrawal, conflict, and relapse)" of behavioural Addiction among Indian students by constructing a SMAS.
- **Cross-cultural perspectives:** The study examines technology and social media addiction among Indian students, shaping addictive behaviours and comparing and contrasting addiction patterns in societies.
- **Role of technology in addiction:** The study explores the addictive potential of technology and social media use, revealing features that facilitate addictive behaviours like "mood modification, Withdrawal, Relapse, Tolerance, Conflict and Salience".
- **Implications for interventions and policy:** Understanding addiction components and determinants can guide evidence-based interventions targeting risk factors and promote healthy technology use.

**9.2** The managerial implications that can arise from the study are:

- **Informing educational institutions:** This study will provide valuable insights into understanding Indian students' technology and social media addiction, enabling awareness programs, campaigns, and interventions.
- **Designing intervention programs:** The Study identifies factors affecting Indian students' technology and social media addiction, guiding intervention programs to prevent,

manage, and enhance self-regulation skills, digital literacy, and healthy technology habits.

➤ Supporting mental health services: The study supports educational institutions by fulfilling the need for mental health support services. It also helps to collaborate with mental health professionals to offer counselling services and guidance to supportive groups.

➤ Parental involvement and guidance: The study emphasises the significance of parental involvement in addressing technology and social media addiction among Indian students. Schools should collaborate with parents to raise awareness, provide resources, and promote healthy technology habits within families. This can include workshops, seminars, and parent-teacher interactions to develop understanding with the knowledge and skills to support their children in developing responsible technology use behaviours.

## **10. Limitations and Direction of Future Research**

### **10.1 Limitation**

➤ The study on behavioural Addiction among Indian students explores technology and social media use, but it has limitations.

➤ The investigation based on 446 respondents may not be enough to generalise the outcome.

➤ The study uses self-report measures to assess technology and social media addiction, but potential biases like social desirability and recall may affect data accuracy.

➤ The study may use a cross-sectional design, limiting causality; longitudinal or experimental designs provide stronger evidence for understanding technology and social media addiction dynamics over time.

➤ The study may use existing or new scales to measure technology and social media addiction components, but these may not fully capture addiction's complexity or align with established theoretical frameworks.

➤ The study examines technology and social media addiction in the Indian cultural

context but may not apply to other contexts due to cultural variations.

➤ The Study limitations require further research to understand technology and social media addiction among Indian students.

### **10.2 Direction for Future Studies**

➤ The study paved the way for future research on addiction.

➤ Longitudinal studies examine Indian students' addiction trajectory, identify risk factors, and understand the long-term consequences of technology and social media use.

➤ Comparative studies explore Indian students' technology and social media addiction patterns, examining cultural dimensions, regional variations, and societal norms for moderating behaviours.

➤ Explore gender differences in technology and social media addiction among Indian students, examining societal expectations, norms, and socialisation processes.

➤ Explore parental influence in preventing and managing technology and social media addiction among Indian students, focusing on monitoring strategies, communication, and modelling healthy technology use.

➤ Explore Indian students' academic performance, addiction, study habits, time management, and concentration, and identify strategies for balancing technology use and academic responsibilities.

➤ Examine digital detox programs' effectiveness in reducing technology and social media addiction among Indian students, evaluate short-term and long-term effects, and identify factors for successful change.

The Study ideas enhance Indian students' understanding of technology and social media addiction, inform evidence-based interventions, and promote digital well-being.

## **11. Conclusion**

The study effectively addresses its research questions and objectives by investigating the components of behavioural addiction related to technology and social media use among Indian students. It explores various aspects, including

usage patterns, motivations, and psychological factors, shedding light on the relationship between these factors and addiction. Adapting the Smart Phone Addiction Scale from Griffiths (2013) adds credibility to the research. One noteworthy finding is the gender difference in smartphone addiction, with females exhibiting higher levels of moderate addiction than male students. The age group of 18-22 also appears to be more prone to moderate addiction. However, male and female students show similar motivations for using smartphones, with communication and information acquisition being common activities. The study highlights the role of excessive internet and social media use in fostering addictive behaviour, affecting students' academic goals. The identified addictive traits, such as Mood Modification, Withdrawal, Replacement, and Tolerance, emphasise the need for interventions to manage technology use among students.

The research models 1 to 5 show that factors such as communication app usage, social media platform engagement, internet time, and social media time impact students' addiction status. This addiction, in turn, significantly influences behavioural addiction "components like salience, mood alteration, tolerance, withdrawal, conflict, and relapse" in Indian students. Future research can focus on tailored interventions to mitigate excessive-tech and social media use, emphasising time management and addressing specific addiction components in this population. This study forms a valuable foundation for understanding and addressing social media addiction among Indian students."

**Supplementary Information:** Supplementary materials of the study are available online at <https://osf.io/m8ekz/>.

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**Data availability:** The data of this study is openly available in OSF at <https://osf.io/m8ekz/>.

**Code availability:** The code for this study's analyses (SPSS File) is available in OSF at <https://osf.io/rck8a>.

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**Informed Consent:** All participants were informed about this research online, and the identity of any participant is not disclosed anywhere in the research.

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