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Research Article

Impact of Social Media User Anxieties, Privacy and Security Issues, and Self-Regulation on User Behavior

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ABSTRACT

This research studies social media user fears, privacy and security concerns, and their effect on social media behaviour. It also studies the role of self-control on social media behaviour. The study is conducted in three stages; initially, four research constructs of user fears, privacy and security concerns, self-control, and social media behaviour were developed;-and tested for validity and reliability using Confirmatory Factor Analysis (CFA). Then, hypothetical relations affecting user behaviour are tested with Structural Equation Modelling (SEM). Lastly, mediation analysis is conducted to study the role of self-control on user behaviour due to user fears and privacy-security concerns. Analysis shows that self-control plays a vital mediation role in social media behaviour. Further, gender and usage frequency have a controlling relationship between user fear, self-control, and self-control with user behaviour. Social media users tend to self-control their behaviour due to social media fears and privacy-security concerns. User fears lead to the user's self-control tendency to affect their behaviour.

Similarly, privacy and security perceptions lead to self-control, which affects social media behaviour. Social media firms should understand users' self-controlling behaviour, fears, and privacy-security concerns and develop security solutions to resolve them. This research is different in that it statistically confirms the self-controlling behaviour of users of social media applications.

Keywords: Privacy and security, Self-control, Social media, Social media metrics, User behavior, and User fears.

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INTRODUCTION

Social media is a tool that has transformed our daily activities and relationships, both personally and professionally. Popular social networking sites like Facebook, Twitter, and LinkedIn have emerged as a form of formal and informal communication. Users spend long hours on these platforms viewing, reading, commenting and connecting with other users.[1]

User fear of missing out or being judged can lead to overuse of social media as a person faces peer pressures to maintain a positive online presence. Privacy and security concerns also lead to users being cautious while posting and connecting with others, affecting their use of social media. User self-controlling tendencies also influence social media behavior. Individuals having strong self-control are likely to use social media in a balanced and responsible manner. In contrast, those with weaker self-control are likely to become addicted to social media and experience negative consequences.

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The capacity to share information across social networks, location sharing and the emergence of information-sharing behaviors among users increase the likelihood of exposure to potentially personal data. New technologies for distributed communication are necessary to combat dominant social media platforms because these system control vast amounts of user data, conduct intensive surveillance and permit frequent misuse. A primary goal should be preserving the capabilities of worldwide network connections alongside quick information access without allowing platforms that specifically exploit their users' most damaging impulses. We must confront the enormous challenge by fighting the existing system's weaknesses to establish a privacy-oriented future approach or risk losing it.[2] Social media presents a high security and privacy risk as technology advances and eager users strive to communicate with each other. Overall, user behavior on social media is influenced by a complex interplay of psychological, social and personal factors varying from person to person.

LITERATURE REVIEW

Social Media User Behavior

Cultural, social and personal factors influence human behavior. Family members, peers, friends and other members of society

influence human social media behavior. Literature shows that the objectives of social media usage vary from person to person. People have a perception of time spent by others on social media;[3] these perceptions drive them towards increased social media.

Teenagers spend long hours on social media[4] four, and usage varies across genders; it also has some link with psychological well-being. Research shows that during COVID-19 lockdowns, people consumed more digital media before bedtime; still, this shift had no impact on their sleep patterns. In those days of confinement, people spent long hours in bed and woke up late; they still reported worse sleep quality. This behavior was counterintuitive, given changes in sleep schedule. Sleep-related difficulties are more significant for people with greater levels of depression, anxiety and stress, and it is linked to a sense of time. Celline *et al*.,[5] looked at how the Italian restriction measures affected people's daily routines, including digital media usage, sleep-wake cycles and the perception of time. Organizations are concerned about excessive usage and dependency of employees on social media; such excessive use may affect productivity.

A study was conducted by Cao and Yu in 2019[6] to explore the mechanisms that underlie the consequences of numerous extreme social media usage habits on efficiencies. The study suggests three distinct characteristics of excessive social media use: extremely social, hedonic and cognitive attitudes. These three factors affect performance and are connected to interpersonal conflict and technical stress. There is research on the root causes of social media exhaustion and overuse. One of the primary motivations for using social media is to prevent boredom. A study by Whelan *et al*.,[7] to determine the relationship between social media excess and exhaustion and boredom shows a significant relationship between a propensity for boredom and information and communication overload associated with social media tiredness.

The systematic review by Keles *et al*.,[8] suggests a relationship between teenage social media use and mental health issues that lead to depression. According to this study, risk factors such as time spent on social media platforms, frequent message checking and addictive usage result in sadness, anxiety and psychological discomfort. The relationship between social media[9] usage and psychological health is unfavorable but weak. Considering social media's positive and negative effects on well-being, the literature suggests further study on confounding factors.

If used effectively, social media can be an effective medium of communication. A study by Ansari and Khan[10] discusses the impact of social media on collaborative learning activities such as peer learning, educator instructions and knowledge-sharing behavior. Online communication between teachers and students plays a vital role in students' academic progress. According to this study, online social media encourages collaborative learning among students and motivates them to be dynamic, innovative and research-focused.

Social media can strengthen real-world events, affecting how people perceive and enjoy themselves. According to Berezan *et al*.,[11] when people are young, remarkable events significantly impact their perceptions; as they age, even extraordinary experiences have less impact. The behavioral drivers of social media usage across generations are varied. Ageing itself affects an individual's definitions of pleasure and virtual happiness. People within the generation share experiences and motives that make them similar in certain respects. Social media becomes an experiential reality through which people pursue virtual happiness, as it helps satisfy their self-determination.

Social Media Privacy and Security

Although social media platforms are comprehensive, varied and source of knowledge, they face critical security and trust challenges. There is extensive research on the privacy and security models, protocols, mechanisms and algorithms on social media content and user security concerns. However, more research is expected on consumer perception of social media security and privacy. A study by Z. Zhang and Gupta[12] assessed social media networks' current condition of trustworthiness and security, paying particular attention to the sophistication and diversity of cyber-attacks and associated intelligence applications.

Literature reports that risks associated with social networking sites might result in financial loss. Loss can take various negative forms[13] like harassment, job loss, reputation harm, a worsened career outlook, data or network damage, unintentional content change, intellectual property theft, loss of revenue or income and loss of productivity. The authors suggest future research on user knowledge of social networking sites' security precautions and privacy regulations. User awareness of networking sites' safeguards and rules affects their perception of susceptibility to cyber-security attacks and anxiety.[14]

The study conducted by Chung *et al*.,[15] on the behavior of social media users in protecting their privacy or revealing information considering concerns of information privacy found that customers should be in command of their privacy and self-discloser. After looking into privacy concerns, perceived privacy controls and consumer calibration factors, the study showed that user confidence in the platform impacts how much information users share. The industry must work to safeguard user privacy and develop robust defense mechanisms to build user confidence. Further studies on moderating and control factors,[16] like personality, socioeconomic position and gender, can shed more light on user security behavior. Governments play an essential role in the privacy and security of social media. Security measures imposed[17] by the local Government, such as changes in regulatory laws, may significantly impact how trust and privacy issues appear.

While the rising popularity of social media has many positive effects on society, it also has privacy and security concerns. Zhao and Zhao[18] assessed social media platforms for security and vulnerability. These authors evaluated the security and vulnerability of 50 social media platforms. According to the findings, the majority of social media websites are (a) Merely posting privacy and security policies, but only a tiny percentage clarified on implementation; (b) keeping network information accessible to the general public through internet searches, making users exposed to cyber intrusion; and (c) were protected by firewalls, filters, or port closures, with a small number of open ports being detected, indicating that they still need to be improved.

Self-Control

Repetitive, compulsive behavior is an addiction with detrimental personal and societal effects. The study by Ali *et al.*,[19] explores how social interaction anxiety affects social media compulsivity. Social learning theory can explain self-control; social learning is[20] a process of learning through the behavior of others. This process entails the learner's exterior engagement with their social, cultural, or physical environment, which results in an internal psychological process that aids decision-making.

Digital technology is a paradigm shift in business communication and transactions.[21] Social networking tools, search engine marketing, big data analytics and digital financial transactions can grow businesses internationally.[22] Nevertheless, due to the transnational nature of social media as a tool[23] as a means of communication, users are likely to share and trade sensitive information. Numerous studies have highlighted the security and privacy implications of sharing information, but a detailed study on such behavior is required.

Public conversation has recently shifted to technology's negative aspects, particularly the dysfunctional effects (symptoms of addiction) of excessive social media usage. Recent studies show that while habit does predict usage, it does not immediately predict symptoms of addiction.[24] The fundamental discovery is that self-control functions as an indirect preventative limiting force. At the same time, obsessive passion is the direct driving force in the dual system that accounts for social media addiction-like symptoms.

Self-control is a valuable strategy for excessive users to reduce the potential harm to their well-being as worries about problematic social media usage grow. This finding by Zahrai *et al.*,[25] explains why subsequent research has focused on the impulsive actions of heavy social media users and the usage of dual-system theories. However, most of the self-report methods used in the research design of the chosen publications explore the impulsive nature of self-control failures, which might lead to inconsistent results and inadequate theoretical support for self-control therapies.

User Fears

End users may create security and privacy issues because of their negligence, carelessness, or lack of understanding of potential hazards. Even unintended actions and reluctance can affect privacy and security. Cybercriminals frequently rely on users' ignorance of security issues or negligence to steal their data or get unauthorized access to their social media or bank accounts.[26]

Social engineering is tricking others into divulging personal information like social security numbers or access codes. Social engineers use psychological tactics[23] to encourage victims to click a link or visit a malicious website; these assaults typically prey on their emotions, habits, or trust. These assaults are usually targeted at certain human flaws, making them vulnerable. Users should understand the value of information and how to use internet security tools and ideas.

Although past research emphasizes the significance of consumer trust, perceived risk, privacy invasion and privacy anxiety in online contexts, the specific role of negative emotions, such as consumers' fear of online identity theft, in online consumer behavior needs attention. One unwanted side effect of the growth of e-commerce is the development of cybercrime, which increases consumer anxiety about online identity theft. Hille *et al.*,[27] have developed and validated a fear of online theft scale to assess variations in customer tendency to have unfavorable feelings while purchasing online, particularly the worry that someone else would misuse their personal information.

While there is much current research on social network privacy, information security-related topics still need exploration. The link between online victimization and user behavior and perceptions of personal information security on social networking sites is experimentally examined by Saridakis *et al.*,[28] They conclude that social networking services should offer sufficient security mechanisms to secure user information. Another important thing is user awareness in the context of social technology, which is crucial for preventing victimization.

Increased social media has changed social norms and shifted interpersonal interactions from the real world to the virtual one. Unfortunately, this pervasive communication can be misused for activities like cyberbullying. Lowry *et al.*,[29] discuss how information technology promotes or discourages cyberbullying and the social factors influencing the tendency to cyberbully. The authors have suggested a model for cyberbullying. Anonymity is one of the main reasons for cyberbullying on social media. Even though online games reduce stress and help improve cognitive development, games like the deadly "Blue Whale Challenge" tend to self-harm children. The depressed psychology of the targeted innocent youngsters leads to forceful isolation from their social environment due to maintaining the difficulties' secrecy.

The severe consequences of the game on teens and the ethical issues are discussed in the research by Mukhra *et al.*,[30] The

authors suggest immediate government action to ban such challenges and for internet regulators to promote the responsible use of social networking services.

Conceptual Model

Even though there is extensive research on social media user behavior, current literature has limited discussion on the predictive role of users' social media fears and privacy-security concerns with their behavior. In order to address this research gap, we study how users' social media fears and privacy-security concerns affect their behavior. Furthermore, it also studies the role self-control plays in this relationship. Predictive hypotheses are captured in the hypothesized research model (Figure 1) using a series of hypotheses.

H1: Social media fear perception has a direct effect on users' self-control of social media.

H2: Social media privacy and security concerns have a direct effect on users' self-control of social media.

H3: Self-control of social media has a direct effect on social media user behavior.

H4: The relationship between social media fear perception and user behavior is mediated by self-control.

H5: The relationship between social media privacy and security concerns with user behavior is mediated by self-control.

Construct Development

The proposed hypothetical model consists of four constructs: fears, privacy-security, self-control and social media user behavior, developed based on literature but modified for context. Since there were revisions in wording, the validity and reliability of constructs were carried out. Quantitative data was collected using a three-part demographic, behavioral and attitudinal questionnaire. The instrument used the Likert scale (1) strongly disagree to (7) strongly agree is used for attitude measurement. A statistician and a researcher validated the instrument for direction and statistical appropriateness of responses. The final instrument included 19 attitudinal items, five for social media user behavior, self-control, privacy, and security. The construct of user fears had four initial items, but one was deleted during CFA. The self-control scale is adapted from the work of Tangney *et al.*,[31] and the construct for social media behavior is adopted from Lu *et al.*[32] Data was collected from Dec 2023 to Jan 2023 using a quota sampling technique, categorized based on age, gender, and income group. A sample size of 500 frequent users of social media applications such as Facebook, Instagram, LinkedIn, Snapchat, Twitter, WhatsApp and others was approached using an electronic form; 428 responded with completed questionnaires. Since the population under this study was individual social media users, the demographic profile is used for the sample frame (Table 1a). The behavioral profile of the respondents (Table 1b) shows that every social media user generally has 3.5 accounts.

Behavioral analyses (Figure 2) of respondents show that having and using a social media account are altogether different behaviors. While WhatsApp is the most common (27%), most frequently used (38%) social media account, Facebook is the second most common (22%) but third most frequently used account. While Instagram is the third most common (18%) account and the second most frequently used (22%) account, LinkedIn is the fourth most common (14%) and fourth most frequently used account. Twitter is the second least common (10%) and least used (5%) of the top six accounts. WhatsApp (89%) has the highest usage rate, followed by Instagram (78%), Facebook (56%), Snapchat (47%), LinkedIn (39%) and Twitter (31%).

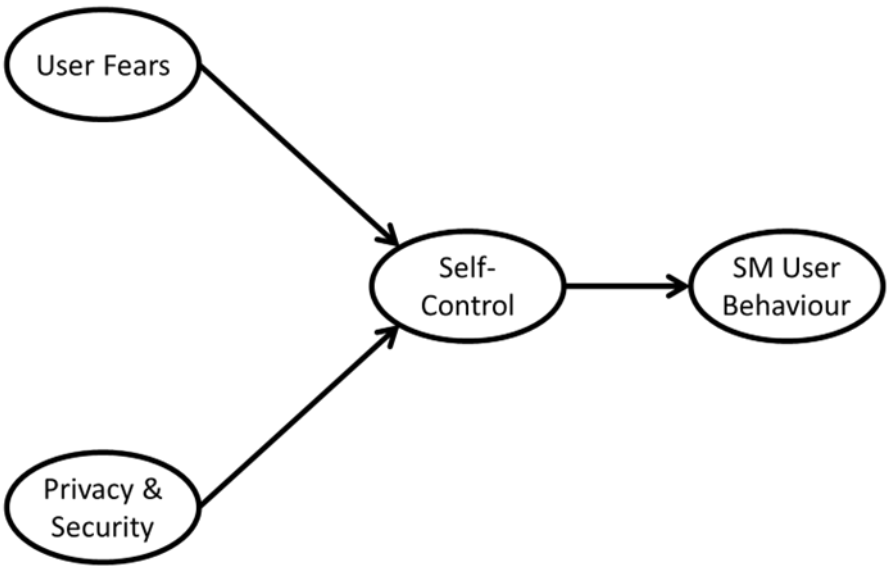

Figure 1: Hypothesized Research Model.

Table 1: Profile of Respondents a. Demographic b. Behavioral.

Age group in year	Count	Percent	Usage frequency	Count	Percent	
15 to 18	16	4	Every Hour	72	17	
18 to 24	148	35	Daily	328	77	
25 to 30	124	29	Every other day	12	3	
30 to 60	98	23	Every 2 days	16	4	
Above 60	42	10	Total	428	100	
	428	100				
Gender			**Have Social media ac. (Multi choice)**	**Count**	**Percent**	
Male	230	54	Facebook	326	22	
Female	198	46	WhatsApp	400	27	
	428	100	LinkedIn	206	14	
			Instagram	268	18	
			Snapchat	118	8	
			Twitter	148	10	
			Others	28	2	
				1494	100	
Employment			**Go to device (Multiple selection)**			
Full time emp.	220	51	Mobile	426	79	
Self-emp/ Business	18	4	Laptop	98	18	
Home maker	28	7	Desktop	14	3	
Student	162	38		538	100	
Total	428	100				
			Frequent use (Multi choice)	**Count**	**Percent**	**Usage**
			Facebook	184	20	56%
			WhatsApp	356	38	89%
			LinkedIn	80	9	39%
			Instagram	208	22	78%
			Snapchat	56	6	47%
			Twitter	46	5	31%
			Others	10	1	36%
				940	100	

This study involved two steps: first, Confirmatory Factor Analysis (CFA) to develop and statistically test the validity and reliability of five constructs; second, Structural Equation Modeling (SEM) for hypothesized model testing. We used IBM SPSS version 23 and IBM AMOS version 25 for data analysis.

METHODOLOGY

Structural Equation Approach, also known as analysis of covariance structures or causal modelling, includes techniques such as general linear model and standard factor analysis. SEM is a simultaneous analysis of relationships among constructs and related variables. SEM is a functional confirmatory analysis for model testing wherein simultaneous equations represent regressions and are then solved for the consistency of predictive relationships. Estimates and confidence intervals of these relationships indicate the adequacy of goodness-of-fit statistics. Since the pattern of relationships is decided a priori, the basic foundation of SEM is inferential. The main strength of SEM is its ability to incorporate observed and latent (unobserved) variables. SEM also strengthens from analyzing non-experimental data in social sciences and marketing. Since there is no better alternative method for assessing multivariate methods, the SEM approach is considered suitable for this study.[33]

Latent variables are those theoretical constructs that cannot be directly measured but are operationalized using well-defined manifest variables. We developed 19 indicator variables for four latent structures: user fears, privacy-security, self-control and

social media behavior. Three hypothetical regressions and a correlation are designed based on the literature review.

Model testing used the maximum likelihood method for CFA and SEM, minimization history, standardized estimation, squared multiple correlations, factor score weights, modification indices and outlier analysis. Since Mahalanobis d-squared distance did not indicate any significant outlier breakout pattern (Figure 3), the whole dataset was analyzed without any row deletion. The final CFA Model (Figure 4) has 22 fixed and 14 free weights and 22 variances. All scores of kurtosis (-0.157 to 4.539) are in the accepted range of ±7, indicating acceptable normality. However, the multivariate critical ratio of 28.490 exceeds the accepted value of 5. Achieving multivariate statistical normality is considered to be challenging to achieve.

FINDINGS AND RESULTS

Confirmatory Factor Analysis (CFA)

SEM model has two exogenous latent constructs, user fears and privacy-security, and two endogenous latent constructs, self-control, and social media user behavior. All four constructs are tested statistically using CFA. CFA, also called a measurement model, is appropriate when an a priori relationship between constructs is postulated and SEM is proposed for hypothesis testing. The CFA approach focuses on the linkages between observed indicators and underlying latent constructs. CFA is concerned with the significance of regression weights between latent constructs and observed indicators.

Exploratory modifications to improve goodness of fit and other relevant model fits followed CFA. After five iterations of modifications the final model fit structure was achieved, as shown in Table 2. The CMIN/df indicate the ratio of minimum discrepancy to model degrees of freedom. The value of less than 3 shows acceptable fit. The value of Root Mean Square of Approximation (RMSEA) indicates as the badness of fit. RMSEA is the difference between the model and initial covariance matrix. The RMSEA value from 0.05 to 0.05 is considered as acceptable fit. Comparative Fit Index (CFI) compares the final hypothesized model with the baseline model. CFI value of above 0.95 is considered as acceptable fit. PNFI and PCFI are parsimony adjusted fits, these measures put penalties to heavier models and favors simpler model. Value above 0.5 are considered as acceptable fit. Finally, Goodness of Fit Index (GFI) indicates fitness of the model over observed covariance matrix. The value above 0.9 is acceptable GFI value.

Details of modification iterations are listed in Table 2 and shown in Figure 4. Since the wordings of the scale 'data protection and data security' (PNS3) and 'Government role in privacy and security' (PNS4) are closely related; in the 1st iteration error terms (e33 and e34) related to construct Privacy and Security were correlated. In the 2nd iteration error terms (e34 and e35) related to privacy and security were correlated for similarity of meaning. In the 3rd to 4th iteration error terms (e21, e24 and e25) belonging to self-control were correlated. In 5th iteration error terms (e33 and e35) related to privacy and security were correlated. During the process CMIN/df score improved from initial 1.920 to 1.614.

Estimates of all regression weights, covariance, and variances are acceptable at a level of significance of 0.05.

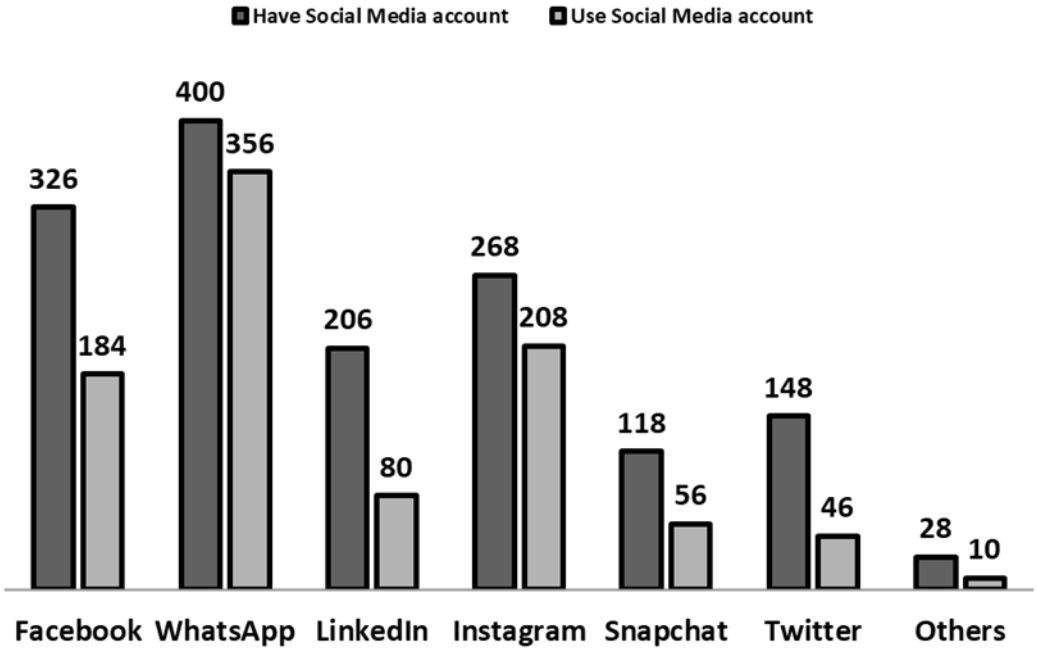

Figure 2: Social Media User Behavioral Analysis.

Table 2: Modification Iterations.

Iter.	Correlation	Construct	Item	Question	CMIN/df Improvement Initial: 1.920
1st	e33 to e34	Privacy-Security	PNS3	I think that being familiar with data protection and data security is important while using social media.	1.787
		Privacy-Security	PNS4	I think Government should have very strong privacy and security measures on social media.	
2nd	e34 to e35	Privacy-Security	PNS4	I think Government should have very strong privacy and security measures on social media.	1.734
		Privacy-Security	PNS5	If the terms and conditions are not provided, we intent to find and read the privacy details.	
3rd	e21 to e23	Self-Control	SC3	I feel social media can be used as the tool for communication.	1.687
		Self-Control	SC5	I am aware of the fraudulent links which circulate around to theft the data.	
4th	e24 to e25	Self-Control	SC1	I think people should be educated about the social media usage.	1.654
		Self-Control	SC2	In general, we should be concerned about the security on the social media and internet.	
5th	e33 to e35	Privacy-Security	PNS3	I think that being familiar with data protection and data security is important while using social media.	1.614
		Privacy-Security	PNS5	If the terms and conditions are not provided, we intent to find and read the privacy details.	

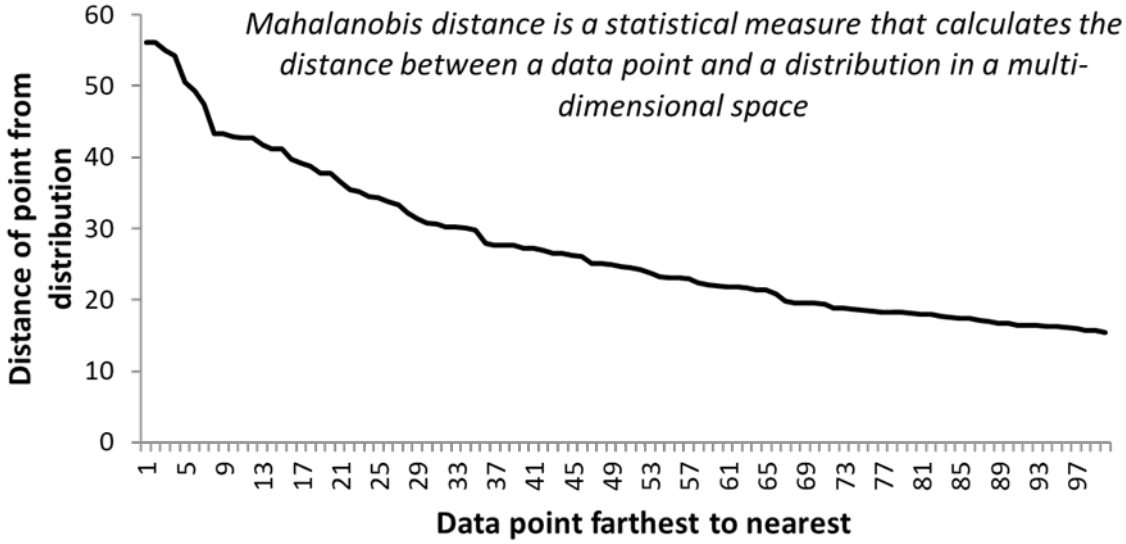

Figure 3: Mahalanobis d-squared Distance.

Validity and Reliability

Since there were major revisions in indicator questions, the validity and reliability testing of constructs is carried out. Partial Least Square-Structural Equation Modeling (PLS-SEM) approach is used for Validity and Reliability. SmartPLS output shows that all constructs (Table 4) reported acceptable internal reliability on Cronbach's alpha (0.672 to 0.875), and composite reliability (0.677 to 0.905). All Average Variance Explained (AVE) scores are above threshold limit of 0.5. Discriminant validity using Fornell and Larcker criteria as well as Heterotrait-Monotrait (HTMT) ratio are in acceptable range. In addition, directions of regression weights indicate the nomological validity of the measures. In future studies, construct-wise indicators should be revised to improve discriminant validity and AVE.

Table 3: Confirmatory Factor Analysis fit indices (IBM AMOS).

Fit indices	Value	Acceptance criteria[45]	Result
CMIN/DF	1.614	< 3.0 for good fit	Acceptable fit
RMSEA	0.054	< 0.05 for good fit < 0.08 for reasonable fit	Acceptable fit
CFI	0.954	> 0.95 for good fit	Acceptable fit
PNFI	0.731	> 0.5 for good fit	Acceptable fit
PCFI	0.785	> 0.5 for good fit	Acceptable fit
GFI	0.903	> 0.9 for adequate fit	Acceptable fit

Table 4: Validity Reliability Analysis (SmartPLS).

	Internal Reliability (Cronbach's alpha)	Average Variance Explained	Composite Reliability (rho_a)	Discriminant Validity (Fornell and Larcker)	Discriminant Validity (Heterotrait-Monotrait Ratio)	Nomological validity
Privacy-Security	0.875	0.671	0.905	Significant	Significant	Acceptable
User Fears	0.672	0.603	0.677	Significant	Significant	Acceptable
Self-Control	0.825	0.591	0.845	Significant	Significant	Acceptable
Social Media user behavior	0.766	0.516	0.776	Significant	Significant	Acceptable

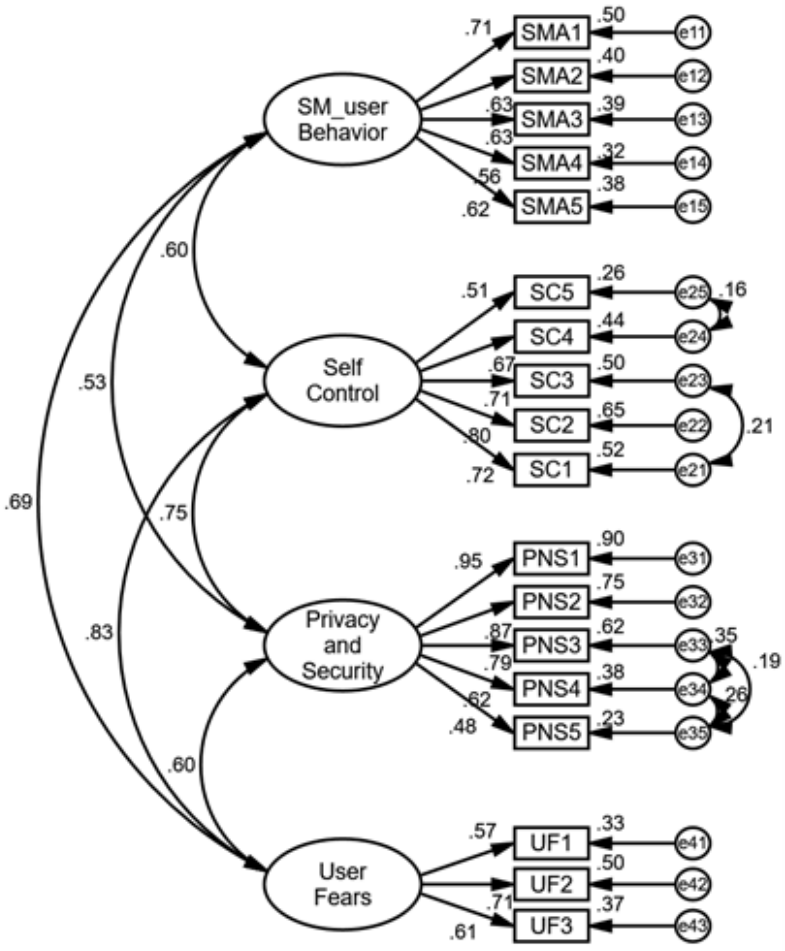

Figure 4: Confirmatory Factor Analysis (IBM AMOS).

Table 5: Indicator Construct Significance.

Indictor		Construct	Estimate	Significance
PNS1	<---	Privacy and Security	0.946	< 0.05
PNS2	<---	Privacy and Security	0.868	< 0.05
PNS3	<---	Privacy and Security	0.79	< 0.05
PNS4	<---	Privacy and Security	0.619	< 0.05
PNS5	<---	Privacy and Security	0.484	< 0.05
SC1	<---	Self-control	0.724	< 0.05
SC2	<---	Self-control	0.804	< 0.05
SC3	<---	Self-control	0.707	< 0.05
SC4	<---	Self-control	0.667	< 0.05
SC5	<---	Self-control	0.509	< 0.05
SMA1	<---	SM user Behaviour	0.707	< 0.05
SMA2	<---	SM user Behaviour	0.631	< 0.05
SMA3	<---	SM user Behaviour	0.628	< 0.05
SMA4	<---	SM user Behaviour	0.561	< 0.05
SMA5	<---	SM user Behaviour	0.617	< 0.05
UF1	<---	User Fears	0.575	< 0.05
UF2	<---	User Fears	0.71	< 0.05
UF3	<---	User Fears	0.607	< 0.05

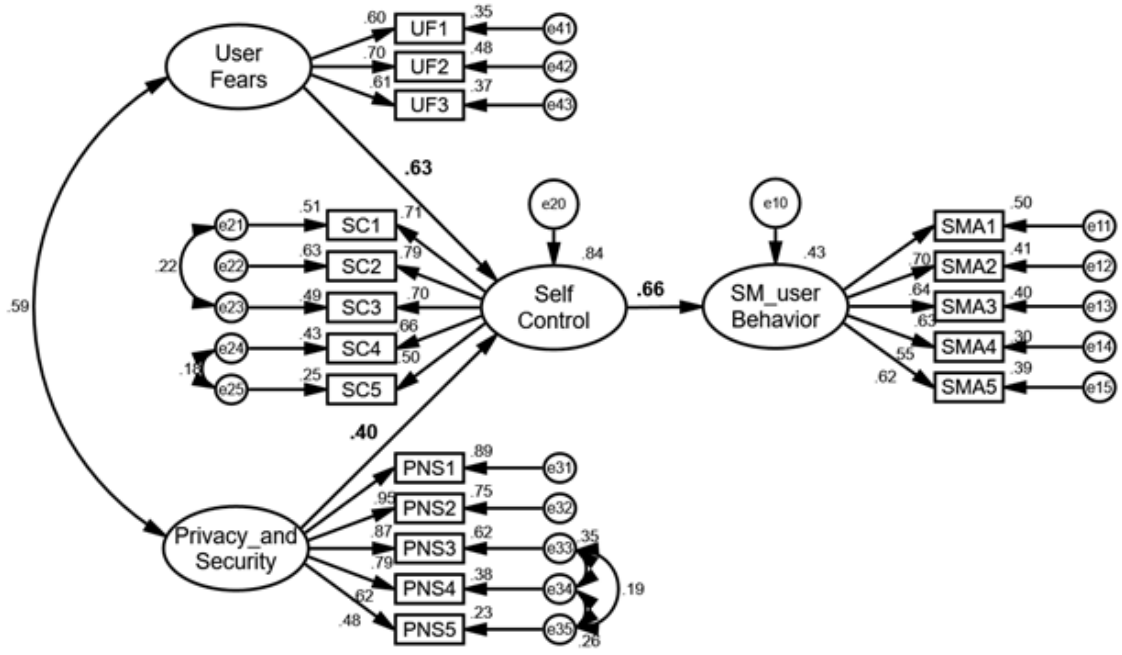

Figure 5: SEM Hypotheses Testing (IBM AMOS).

Structural Equation Modeling (SEM)

CFA is followed by hypotheses testing of the predictive relationship between user fears with self-control, privacy and security perception on self-control, and self-control on user behavior. All three hypothesized relationships and other estimates are acceptable at the significance level of 0.05 (Figure 5).

For consistency, similar modifications used for CFA are also used for SEM analysis. Since user fears and privacy-security concerns are theoretically related, they are considered correlated.

All variances, covariances, and regression weights are significant. Table 5 shows relationships between indicators to construct are all significant. Estimated regression weights range from minimum

of 0.509 (SC5 to Self-Control) to maximum of (0.946 (PNS1 to Privacy and Security), all in the acceptable range.

All final SEM fit indices in Table 7 are acceptable, indicating good model-to-data fit. Thus, simultaneous hypotheses H_1, H_2, and H_3 between user fears, privacy and security, self-control, and social media user behavior cannot be rejected statistically.

H1: Social media fear perception has direct effect on users' self-control of social media.

Significance of the structural equation model from user fears to self-control indicate user fears leads to increased self-control. Fear perception of the user makes the user conscious leading to increased self-control tendencies by the user. At standardized regression weight of 0.625 the effect of user fear on the self-control is stronger than effect of privacy and security concern (0.396). Thus, indicating importance of user fear in self-control (Table 6, Figure 5).

H2: Social media privacy and security concerns have direct effect on users' self-control of social media.

The predictive positive relationship of social media privacy and security concerns on self-control is also significant. The standardized regression weight of 0.396 indicate importance of privacy and security concerns on social media user's self-control tendency (Table 6, Figure 5).

H3: Self-control of social media has direct effect on social media user behavior.

Finally, self-control has significant positive relationship with social media user behavior with 0.655 standardized regression weight. Self-control plays the most important role in social media user behavior. The construct of self-control is significant effect of user fears and privacy-security concerns (Table 6, Figure 5).

Mediation analysis of self-control

Considering user perception of social media fears and privacy-security concerns, it was imperative to study the mediation role of self-control on social media user behavior. The mediation role of self-control is studied, and direct and indirect effects are compared to capture the importance of user self-control in the model relationships (Figure 6).

H4: Relationship between social media fear perception with user behavior is mediated by self-control.

Sense of self-control plays a significant role in social media user behavior (Figure 6a). Self-control significantly reduces the indirect effect of fear of social media on behavior (0.409). In the absence of self-control, user fear significantly affects behavior (Figure 6c), indicating the importance of self-control in social media behavior.

H5: Relationship between social media privacy and security concerns with user behavior is mediated by self-control.

On the contrary, the direct relationship between privacy and security on user behavior is not significant (p-value 0.107), strongly emphasizing the role of self-control in handling user privacy and security concerns. Thus, alternative hypotheses H5 cannot be accepted, signaling privacy and security concerns does not affect user behavior directly but through self-control as mediating the relationship.

Control Variable Analysis: Age-group, Gender, and Social Media Frequency

H6: The control variable age-group, gender and usage frequency have statistically significant effect on social media self-control and user behavior.

Table 6: Hypothesis testing (IBM AMOS).

Hypothesis	From	To	Estimate	Significance
H_1	User Fears	Self-Control	0.625	< 0.05
H_2	Privacy and Security	Self-Control	0.396	< 0.05
H_3	Self-Control	Social Media User Behavior	0.655	< 0.05

Table 7: SEM Fit Indices (IBM AMOS).

Fit indices	Value	Acceptance criteria[45]	Result
CMIN/DF	1.614	< 3.0 for good fit	Acceptable fit
RMSEA	0.054	< 0.05 for good fit < 0.08 for reasonable fit	Acceptable fit
CFI	0.954	> 0.95 for good fit	Acceptable fit
PNFI	0.731	> 0.5 for good fit	Acceptable fit
PCFI	0.785	> 0.5 for good fit	Acceptable fit
GFI	0.903	> 0.9 for adequate fit	Acceptable fit

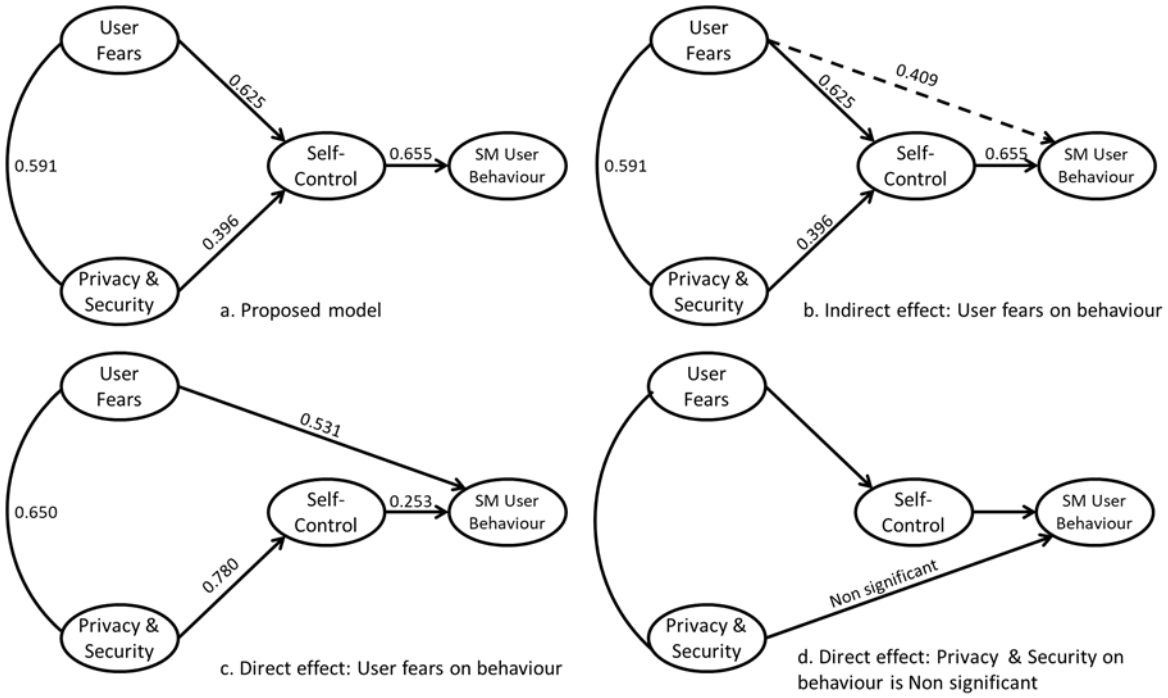

Figure 6: Mediation role of self-control on user behavior (IBM AMOS).

Table 8: Control Variable Analysis: Age-group, Gender and Usage frequency (SmartPLS).

Control variable	To	P values	Significance
Age Group	Self-Control	0.628	Not Significant
Age Group	Social Media User Behavior	0.885	Not Significant
Gender	Self-Control	0.369	Not Significant
Gender	Social Media User Behavior	0.39	Not Significant
Usage Frequency	Self-Control	0.87	Not Significant
Usage Frequency	Social Media User Behavior	0.004	Significant

Complexity of social media users may further be studied on control variables: user age-group, gender, and usage frequency. To investigate this research-question the hypothesized model is studied for control variable analysis using PLS SEM. SmartPLS data analysis is used to identify significance of control variables: age-group, gender and usage frequency on social media self-control and user behavior.

Three control variables are studies for their effect on the hypothesized model. The first age-group as shown in Table 8 is not a significant control variable for any of the relationships in the model. There is no significant evidence to justify role of age-group controlling endogenous constructs self-control as well as user behavior. Second, the gender is also not a significant variable controlling self-control as well as user behavior. Third, the usage frequency has no significant control on self-control.

Finally, usage frequency has a significant controlling effect (p-value 0.006) on user behavior. Predictive relationship of self-control to user-behavior significantly reduces with increasing usage-frequency. Users with higher usage frequency are less able to improve user-behavior with self-control. And users with low usage frequency are more able to improve user behavior with self-control (Table 8, Figure 7).

DISCUSSION AND IMPLICATIONS

Since social media has become central to human communication, it is essential to understand social media user behavior. We study users' reactions to fears and concerns about social media. Specifically, this research investigates how social media users modify their behaviors as a reaction to their perception of social media fears and privacy-security concerns.

The works presented in literature review, describe different factors and antecedents affecting internet and social media engagement, digital wellbeing, and self-regulation. Several predictors of internet addiction amongst college students include stress, self-control, pleasure, anxiety, self-efficacy, and social support.[34] Using an endpoint and peak model,[35] stated that there is a non-linear relationship between social media addiction and the two variables-neuroticism and entertainment. In forming

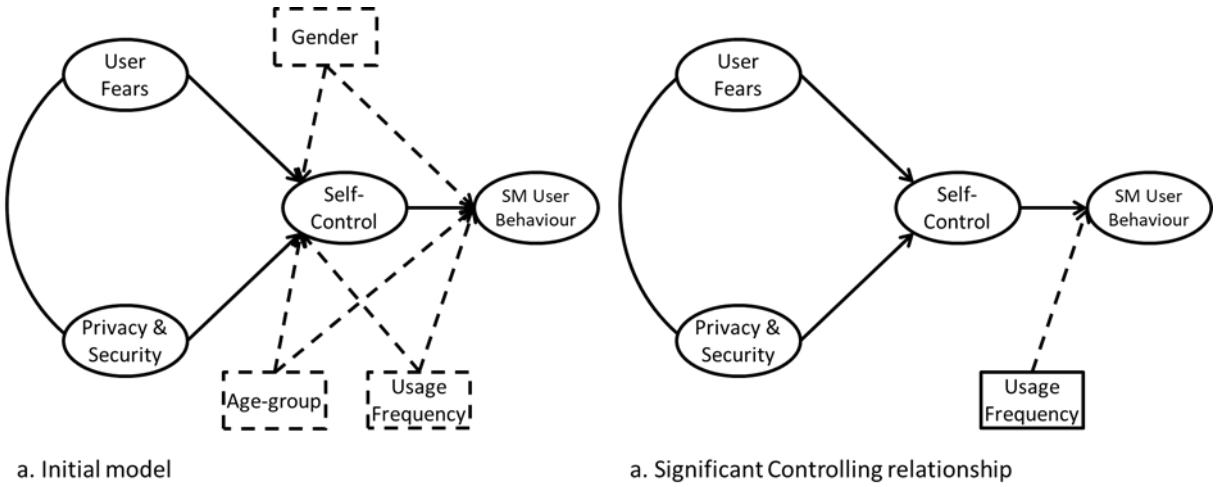

Figure 7: Control Variable Analysis.

an approach to technology and society,[36] emphasize maintaining an active youth voice, very engaging in creating critical thinking about societal reflection with the toolkit. Research by Marciano *et al.*,[37] for online well-being identified the experience that is problematic in contrast to the well-being effect. Sahranc and Duc Urhun[38] revealed that self-monitoring was influential in the prediction of social media addiction level among students; a higher level being exhibited by non-working students. Favini *et al.*,[39] showed that self-regulation intervention program can reduce students' smartphone or social media addiction at schools. Last, in efficiency perspective, dual system theory by Osatuyi and Turel[40] emphasis that SNS addiction symptoms reflect reflexive habits as well as self-regulative reflection. Altogether, these breakouts provide OSF-directed extensive ways to controlling digital health and overindulgence.

User reacts to these fears and concerns by controlling their activities on social media. Social media fears and concerns affect user behavior and create a significant mediating force of self-control at the interplay of this relationship. Self-control behavior is a mediating force acting on the user and can decrease the negative effect on their well-being.

The complex and multi-dimensional relationship between fear of social media, the privacy and security concerns, the self-control tendencies and social media user behavior is explained by this study. We have found new insights into social media user behavior and their reactions to fears and privacy-security concerns. Literature suggests social media users engage in excess use out of fear of missing out (FOMA). FOMO is a psychophysiological phenomenon that influence the actions. This fear is out of acute worry of social experience, feedback seeking behavior, forcing user to constantly check the social media device. The constant urge often ends up in compulsive behavior. Another reason of user fear is the fear of judgment, the tendency of self-approval. The constant efforts in creating the content and posting it online and then seeking approvals from other users in terms of likes and comments and to project desirable image leads to user fears. The constant feedback seeking behavior creates mental pressures on the users. Further the pressure to stay upbeat and cheerful online adds to the worries of the users. The strife to project a perfect outlook adds to the user fears. In worst situation it may lead to anxiety and depression.

Another equally important factor in interplay with user fears in privacy and security concerns. Users are increasing facing efforts to breach their privacy and security of their social media accounts. The data being collected at the social media often ends up in the hands of hackers and spammers. It may further lead to financial frauds and breach of personal of privacy, harassment, job loss, reputation harms, worsened career outlook, data or network damage, loss of revenue.

The interplay between these two factors: user fears and privacy-security concerns is self-regulation tendencies of the users. Self-control is a strong mediator of user behavior. Users with high self-control abilities can control their behavior significantly. They are better equipped to handle the temptation of usage. Users with low self-control may not be able to resist the impulsive behavior effectively. This the two forces of user-fears and privacy-security concerns have further effect of user's self-control tendencies. This research shows that the two correlated (0.591) concepts; the user-fears (0.625) and the privacy-security concerns (0.396) are the largest contributor to self-control tendencies. Further, this research shows that the self-control tendencies have direct effect (0.655) on user behavior of social media. Next, the mediation analysis highlights importance of self-control in the user behavior. While user-fear affect user behavior directly (0.531) as well as through self-control as a mediator (0.655); privacy-security cannot directly deal with user-behavior, it is mediated only through self-control. Lastly, usage-frequency is a controlling force of the user-behavior. Users with high usage-frequency find it less manageable to adjust their

behavior compared to the ones with low usage-frequency. Users with low usage frequency are better able to handle their behavior.

Important findings in control variable analysis are, 1) neither the gender nor age-group have significant control relationship in the model, and 2) usage frequency does not have significant control relationship with self-control, 3) however usage-frequency is a significant controlling variable of user behavior.

The finding aligns with the concept of self-control proposed by Zahrai *et al*.,[41] where authors observed that user actions go beyond the traditional Theory of Planned Behavior (TPB). They propose an emerging theory of compulsive or impulsive non-planned behavior, wherein self-control results from user reflections instead of impulsions. They suggest that user self-control is a reflective reaction to possible non-planned behavior of excess social media use.

Worldwide, the time spent on social media and messaging services has increased from an average of 90 minutes per day in 2012 to 147 min in 2022.[42] There is ample literature explaining the non-planned, impulsive use of social media. Literature reports self-control failure leading to excessive, addictive use affecting social media user well-being, a stage wherein users even feel guilty about their habit and neglect their life values.[41] This research furthers the conceptual development of past literature and statistically tests the role of self-control in social media. Past literature conceptually proposes an act of user self-control; we statistically confirm the same effect. Self-control failure leads to impulsive user behavior, the conflict between well-being and feel-better, failure to monitor one's actions, and failure of strength and energy resources. Self-control is the capacity to avoid temptations of impulsive behavior, which may be regretted later.[43] Similar behavior of social anxiety-a fear situation of self-judgment, depression, and stress-a persistent feeling of sadness and loss of interest, addiction-a compulsive habit, and object and romantic attachment-an emotional connection with a mobile phone is reported in the literature.[44]

This paper contributes by statistically confirming the role of self-control in social media usage; self-control results from user fears such as goal conflicts, failure to monitor oneself, and loss of method to regulate oneself. Further usage-frequency has a significant controlling relationship with social media user behavior. High usage frequency users are less able to improve their behavior with self-control; and low usage frequency users are more able to improve their behavior with self-control.

While we have studied user fears and privacy-security, future studies should involve other factors affecting user behavior mediated through self-control. Further longitudinal studies in the topic should be conducted to generalize the concept of role of user self-control in a social media setting. A revised instrument to improve discriminant validity is suggested. Social networks should understand users' behavior, their act of self-control, and take steps to alleviate user fears and privacy-security concerns.

CONCLUSION

This quantitative study investigates the effect of user fears and privacy-security concerns on social media behavior and the role of self-control in this relationship. Confirmatory Factor Analysis, validity and reliability testing, and Structural Equation Modeling explain the relationship. The analysis found that self-control plays the role of mediator in this relationship. Further the usage-frequency has significant controlling relationship with social media user behavior. While in the presence of self-control, the effect of user fear on behavior significantly decreases; without self-control, social media users are not able to handle privacy and security concerns at all. Further, the study suggests a significant relationship between user self-control and behavior. The study improves conceptual understanding of self-control and its mediating role in relationships of user-fear and privacy-security concerns on social media behavior. The relationship brings clarity in the complex social media user-behavior.

The findings are essential for social media research and social network companies. Future research should study other factors affecting social media user behavior and the role of self-control in those relationships.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Appendix A: Questionnaire **The following questionnaire is based on a self-control scale developed by Tangney.**

	Social Media User Behavior[32]
SMA1	I use social media to know about others' posts and comments, listen and watch.
SMA2	I use social media to post content, interact and comment.
SMA3	I use social media to send important information.
SMA4	I use social media to write about interests or experiences.
SMA5	I use social media to share content and topics of my interest.
	Self-Control[31]
SC1	Considering safety, I avoid social media temptation.
SC2	I never allow myself to lose control while using social media.
SC3	On social media, I maintain self-discipline.
SC4	On social media, I do not get carried away.
SC5	On social media, I think before I act.
	Privacy and Security
PNS1	I think we should be aware of the security of social media networks.
PNS2	We should be aware of privacy and data security issues while using social media.
PNS3	Being familiar with data protection and data security is important while using social media.
PNS4	The Government should have extreme privacy and security measures on social media.
PNS5	We should find and read the details if the terms and conditions are not provided.
	User Fears
UF1	In general, we should be aware of identity theft on social media.[27]
UF2	In general, we should be concerned about cyber victimization.[28]
UF3	In general, we should be careful about cyberbullying.[29]
	Deleted
delete1	I am worried about viruses or Trojans on my computer/ mobile while using social media.