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Moderated Mediating Effect of Behavioral Psychology on Generation Z's Selfie-Posting Behavior: A Two-Stage Analytical Approach

Sanjoy Kumar Roy

City University, Bangladesh

Shamsun Arefin

University of Dhaka, Bangladesh

Md. Rahat Khan

Army Institute of Business Administration (Army IBA), Savar, Dhaka, Bangladesh;
Jagannath University, Dhaka, Bangladesh

ABSTRACT

The purpose of this study was to investigate the mediating and moderating effects of body appreciation and exhibitionism on the relationships between self-esteem, narcissism, and Selfie-Posting Behavior (SPB), as well as on the moderating effect of attitude towards selfies (ATS) from the Generation Z perspective. The research comprised 414 samples through convenience sampling. The empirical data were analyzed using a hybrid SEM-artificial neural network (SEM-ANN) approach. The sensitivity analysis outcomes discovered that body appreciation has the most considerable effect on the SPB, with 89.18% normalized importance, followed by narcissism (87.02%), exhibitionism (72.66%), and self-esteem (48.95%). Body appreciation and exhibitionism independently and sequentially mediated the relationships between self-esteem and SPB, as well as narcissism and SPB. In addition, attitude moderated the relationship between exhibitionism and SPB but not the relationship between body appreciation and SPB. The study results emphasize the importance of recognizing the moderating mechanisms that affect the mediated pathways between self-esteem and SPB, as well as between

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mritojonmajoy@gmail.com, shamsun@du.ac.bd,
rahat@aibasavar.edu.bd

narcissism and SPB. Based on these findings, the study outlined several applicable ramifications for educators, professionals, service providers, designers, and developers.

KEYWORDS

self-esteem, narcissism, body appreciation, exhibitionism, behavioral psychology, Generation Z

Introduction

Every person is unique. This premise rationalizes the conduct of persons and their actions or decision-making process. Various elements, such as family, education, social circle, political climate, cultural influences, and society, significantly influence individuals' development and shape their conduct. Community members have diverse roles shaped by their common interests and shared feelings, reflecting their unique personalities. Nevertheless, irrespective of the factors above, a shared feature is defined equally—each individual is a customer (Verma et al., 2021). The advent of contemporary social media technology has expanded the range of choices available to users for disseminating personal data. Users enhance their social media presence by providing additional details to favorably, discerningly, and appealingly present themselves. They hope to receive validation, recognition, approval, and admiration from the wider audience (Arpaci et al., 2023).

The impact of behavioral psychology extends beyond an individual's character and influences the behaviors they engage in daily (Hossain & Khan, 2021; Khan et al., 2024). Behavioral psychology is a fundamental aspect of determining professional activity and consumer behavior (Pervin & Khan, 2024). Recently, the concept of Generation Z (Gen-Z) has brought increased attention to behavioral psychology and various aspects of individual development in public discourse (Chaturvedi et al., 2020). Being one of the largest cohorts, Gen-Z individuals can alter prevailing societal beliefs and are well-versed in and up-to-date with technology (Bejan, 2023). In addition, they prioritize their psychology by actively engaging in social sites, which reflects their behavioral intention. The increasing prevalence of mobile phones and the widespread adoption of wireless technologies has resulted in innovative commercial phenomena (Khan & Roy, 2023a). In contemporary society, individuals' daily routines are significantly characterized by capturing photographs and disseminating them on social networking sites (SNSs). Hence, scholars exhibit more interest in behavioral psychology concerning the Selfie-Posting Behavior (SPB) of Generation Z. Selfie-sharing remains a nascent behavioral concern (Ansari & Azhar, 2022). An intriguing question arises regarding the widespread practice of sharing self-portraits on social networking sites (SNSs) and the increasing academic curiosity surrounding the selfie phenomenon: what are the causes and mechanisms that drive this behavior?

Earlier behavioral psychology research on SPBs focused on such phenomena as personality traits (Barry et al., 2017; Qiu et al., 2015), seeking peer acknowledgment (Chua & Chang, 2016), attracting attention, communication, and entertainment (Kim &

Chock, 2017), social self-esteem (Bodroža et al., 2022), between adults (Fardouly et al., 2018), teenagers (Tiggemann & Slater, 2014), and cultural settings (Ansari & Azhar, 2022; Arpaci et al., 2023). Therefore, there is a lack of generation-based research on the selected context. In addition, most of the behavioral psychology of SPB research used structural equation modeling (SEM) techniques as an analyzing tool. To bridge the gap in the existing literature, the study aimed to investigate the role of body appreciation and exhibitionism in mediating the relationship between self-esteem and SPB, as well as narcissism and SPB. Additionally, the study examined the moderating role of attitude towards selfies (ATS). Data was collected from 414 Gen-Z individuals using a hybrid SEM-artificial neural network (SEM-ANN) approach. Structural equation modeling exclusively addresses linear relationships. Artificial Neural Networks (ANN) handle both linear and non-linear interactions and verify the outcomes of Partial Least Squares Structural Equation Modeling (PLS-SEM). The following sections will provide an explanation of the relevant literature, the methodologies and procedures used, the analysis and empirical data obtained, a discussion of the findings, the implications of the study, and concluding remarks.

Literature Review

Behavioral Psychology and Generation Z

Generation Z has experienced distinct circumstances during their upbringing compared to previous generations. Despite recent entrants into the workforce, Gen-Z individuals have already garnered opinions and distinctive features. Gen-Z is the most current, culturally varied, and largest generation ever recorded. They reside in a realm characterized by constant updating and can assimilate information at a swifter pace than preceding generations. Gen-Z is born between the mid-1990s and 2010 (Ameen et al., 2023; Pervin & Khan, 2022). With a population of over two billion individuals, Gen-Z is the largest generation cohort. They have witnessed a greater magnitude of transformation throughout their lifespan than those who came before them. They are not mere representatives of the future but actively shape and bring it into existence. Comprising 18% of the global population, they are projected to assume global leadership within two decades (Chen et al., 2023). Several individuals, among the most senior in age, have completed their college education and are now entering the labor market, where they are generating their financial resources (Dadić et al., 2022).

The primary characteristic of this demographic is its expansion during the Great Recession amidst the crisis of terrorism and global warming. It is categorized as worldwide, technological, visually appealing, and societal (Subawa et al., 2020). This generation is characterized by their high level of education, extensive network of connections, and advanced sophistication. They uphold the values of diversity, fairness, and non-discrimination within society and the media. The current generation exhibits strong optimism and is highly motivated by their aspirations. Gen-Z prioritizes self-actualization, rewarding employment, and a positive work environment (Munsch, 2021). Gen-Z can be behaviorally characterized by excessive production,

interconnectedness, and virtual experiences. Their psychology pursues material wealth, immediate profits, gratification, and a lifestyle centered around consumerism. They reside in an interconnected realm that enables them to exchange messages and communicate globally with a single click effortlessly (Dadić et al., 2022). Technology's remarkable advancement has provided them access to the entire planet. They can find out and discover practically everything. Encountering unfamiliar individuals, traditions, behaviors, diverse societies, perspectives, journeys, and revelations—all made easily accessible by the abundance of knowledge and the convenience of technology (Ameen et al., 2023). By identifying the capabilities and virtues of this generation, they possess a higher tolerance, solidarity, openness, and willingness to embrace diversity than their predecessors. Accessing the internet provides a solid basis for cultivating empathy for others, comprehending a diverse and inclusive society, and disseminating various viewpoints (Salleh et al., 2017). This study closely adheres to the behavioral psychology viewpoint of Selfie-Posting Behavior (SPB) to understand Gen Z's psychological views.

Self-Esteem (SEE) and Selfie-Posting Behavior (SPB)

Self-esteem assesses an individual's perception of their value or degree of satisfaction (Shin et al., 2017). It is the overarching sense that one is adequate in and of oneself. It also encompasses acceptance, friendliness, and honesty with oneself and others. High self-esteem strongly indicates satisfaction with life, body, and others (Körner & Schütz, 2023). According to a recent study by Ansari and Azhar (2022), self-esteem improves when users share and interpret information on social media following their current emotions, mental state, and worldview. Also, young people's SNS use substantially and indirectly impacts their interpersonal self-esteem and well-being (Körner & Schütz, 2023). Individuals with higher levels of self-esteem were more likely to use SNS to disseminate information and interact with friends and acquaintances. Positive compliments on social media boost a person's social support network, self-esteem, body appreciation, and happiness while decreasing their feelings of loneliness and dissatisfaction (Ansari & Azhar, 2022). On the other hand, receiving criticism can lead to lower self-esteem and enjoyment, feelings of inferiority, shame, and lack of self-assurance (Fox & Rooney, 2015). Therefore, the study proposed the following hypothesis:

Hypothesis 1 (H1): Self-esteem is significantly correlated with body appreciation (H1a), exhibitionism (H1b), and SPB (H1c).

Narcissism (NAM) and Selfie-Posting Behavior (SPB)

Narcissism is a personality trait characterized by an inflated sense of self-importance and an unrealistically favorable appraisal of one's social standing and physical attractiveness. Narcissists are more prone to use SNSs to promote themselves because they want to feel good about themselves from the attention they receive (Körner & Schütz, 2023). Narcissistic people with high narcissism exhibit SPB more frequently, and the egocentric self-regulatory processing framework explains this

phenomenon better (Morf & Rhodewalt, 2001). The framework demonstrates that narcissists manage their conduct to receive affirmation from others. Choosing attractive selfies and sharing them on social media platforms could be a form of self-control, which narcissists use to achieve their self-regulatory goals, namely, further positively increasing their sense of self-posting view (McCain et al., 2016).

Consequently, people with more excellent narcissism scores are the ones who share the most selfies on social media. As shown by prior empirical research, a positive correlation exists between narcissism and SPB (Ansari & Azhar, 2022; Wang et al., 2020). Thus, the study proposed the next hypothesis:

Hypothesis 2 (H2): Narcissism is significantly correlated with body appreciation (H2a), exhibitionism (H2b), and SPB (H2c).

Body Appreciation (BOA), Exhibitionism (EXM), and Selfie-Posting Behavior (SPB)

Body appreciation encompasses the act of accepting, cultivating good attitudes towards, and demonstrating appreciation for one's physical form while rejecting the notion that media-driven beauty ideals represent the sole definition of human attractiveness. Levine and Smolak (2016) also argue that a positive self-image is a buffer against low self-esteem. Body appreciation is essential to positive body image and can protect against negative body image (Körner & Schütz, 2023). It is related to overall appearance and is focused on the "body" in general. It is favorably correlated with positive assessments of physical attractiveness (Tylka & Wood-Barcalow, 2015). Earlier studies found that people with higher levels of body appreciation had a more positive body image because they were less likely to internalize the media's hyper-stylized definitions of beauty (Körner & Schütz, 2023; Tylka & Wood-Barcalow, 2015). Basing on that, the following hypothesis is proposed:

Hypothesis 3 (H3): Body appreciation correlates significantly with exhibitionism (H3a) and SPB (H3b).

Narcissists tend to have positive self-views of their body attractiveness. They place a high value on physical appearance and tend to be overconfident in their beauty. Narcissism and self-esteem have been shown to have a favorable relationship with body appreciation (Körner & Schütz, 2023). A positive correlation between narcissism and physical attractiveness has been consistently found in meta-analyses (Holtzman & Strube, 2010). Again, body appreciation is significantly associated with self-disclosure or exhibitionism and SNS's body display (Chan & Tsang, 2014). Users of SNSs (e.g., Facebook¹) express a higher level of body image acceptance and are also more likely to engage in extensive body exposure online (Chan & Tsang, 2014). In the context of SPB, it has been shown that sharing one's images online correlates with a more positive body appreciation (Körner &

¹ Facebook™ is a trademark of Facebook Inc., registered in the U.S. and other countries. По решению Роскомнадзора, социальная сеть Facebook в России признана экстремистской организацией и заблокирована.

Schütz, 2023). These results demonstrate that those who appreciate their physical appearance are likelier to share selfies online. Based on these arguments, the study hypothesized that the degree of body appreciation would mediate the motivations behind the behavior of uploading selfies online:

Hypothesis 4 (H4): Body appreciation mediates the relationship between self-esteem, SPB (H4a), narcissism and SPB (H4b).

Exhibitionism is identified as one of the underlying motivations for exposing personal information over the Internet. Exhibitionism refers to the psychological phenomenon when individuals desire or want to attract the attention of others by publicly revealing and discussing intimate details of their personal lives (Ansari & Azhar, 2022). Similarly, earlier research demonstrated that users are inclined to share their positive and attractive self-images on social media to generate a favorable impression (Murray, 2015; Yang et al., 2021). People who ranked higher on exhibitionism were more likely to take and post selfies and quickly update their status. Furthermore, those with high exhibitionism are inclined to self-disclose, publish, and share more information. They are more likely to get the attention and appreciation of their peers and other people (Yang et al., 2021). Regarding this, the hypothesis is proposed:

Hypothesis 5 (H5): Exhibitionism is significantly correlated with SPB.

Many researchers have concluded that narcissism and high self-esteem are at the root of the selfie phenomenon (Ansari & Azhar, 2022; Wang et al., 2020). Multiple studies have looked into the correlation between selfie-taking and a wide range of personality traits, for example, such as narcissism, hyperactivity, preoccupation, body appreciation, desire for connection, social support, body satisfaction, self-image, perfectionism (e.g., Ansari & Azhar, 2022; Jain et al., 2021). These results reveal that selfie-takers and those seeking the perfect selfie are egocentric and fixated (Richa et al., 2021). These behaviors help them to feel attractive about their body. This way, body appreciation leads them to show exhibitionism, forwarding them to SPB. So, exhibitionism would mediate the association between self-esteem and SPB, narcissism and SPB:

Hypothesis 6 (H6): Exhibitionism mediates the relationship between self-esteem and SPB (H6a), narcissism and SPB (H6b), and body appreciation and SPB (H6c).

Fox & Rooney (2015) argued that men identifying narcissism and self-esteem as their most prevalent personality traits are more likely to engage in exhibitionism and selfie-posting activity. Selfie-posting favors people's actions, although social display is linked to emotions of superiority and adulation (Seidman, 2015; Weiser, 2015). Based on these discussions, the study hypothesized that the degree of exhibitionism would act as a mediator for the motivations that lie behind the behavior of uploading selfies online. Therefore, the research proposed the following hypotheses:

Hypothesis 7 (H7): Body appreciation and exhibitionism serially mediate the relationship between self-esteem and SPB.

Hypothesis 8 (H8): Body appreciation and exhibitionism serially mediate the relationship between narcissism and SPB.

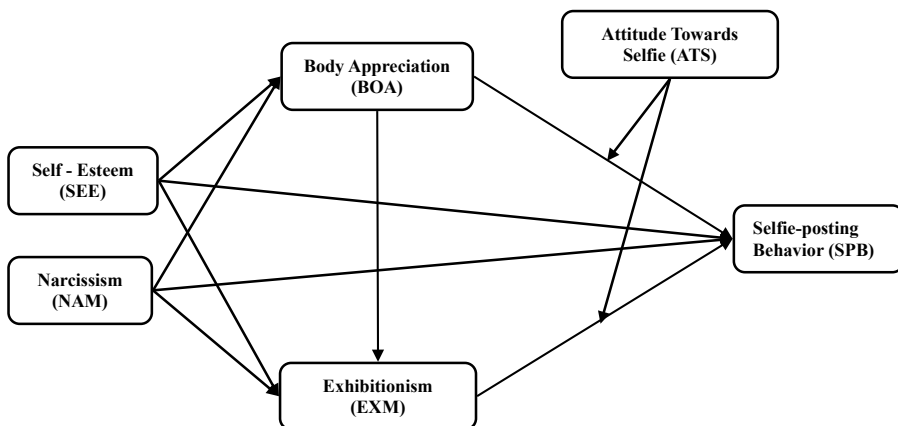
Attitude Toward Selfie (ATS) as a Moderator

An individual's attitude can be described as the individual's favorable or unfavorable judgment of executing a specific behavior. As a result, the attitude might be the driving force behind the conduct that constitutes external self-regulation. Many studies have revealed that positive attitudes significantly influence individuals' intention to do a target behavior in various circumstances (Khan & Sharma, 2020; Khan et al., 2022; Roy, 2023b, 2023d; Wang et al., 2020). A favorable attitude toward SPB is positively and substantially associated with the desire to share selfies on SNSs (Lee & Sung, 2016). In addition, a more positive outlook on SPB is associated with a higher likelihood that the individual will follow through on their desire to share selfies on SNSs (Kim et al., 2016). As a result, the relationship between body appreciation and SPB, as well as exhibitionism and SPB, may be moderated by ATS. Therefore, the research proposed the following hypothesis:

Hypothesis 9 (H9): ATS moderates the relationship between body appreciation and SPB (**H9a**) and exhibitionism and SPB (**H9b**).

Based on the developed hypotheses, a proposed research model can be created (Figure 1).

Figure 1
Proposed Research Model



Note. Source: developed by the authors.

Method

Participants

The target population of this study consists of Gen-Z, who currently reside in Dhaka City, Bangladesh. Gen-Z comprises the largest demographic of social media users, resulting in a proliferation of selfies during this era (Ansari & Azhar, 2022). Therefore, the study considers them within this age limit. This homogeneous sample will facilitate a more profound comprehension of the behavior of posting selfies. Gen-Z commonly engages in this practice in Bangladesh. Individuals use cell phones to capture and distribute photographs on the Internet on platforms like Facebook² or Instagram³. Therefore, Gen-Z, who posted selfies throughout the previous week on social media, were surveyed. The study applied convenience sampling and personal interviews to collect data (Al Ahad & Khan, 2020; Roy & Ahmed, 2016). The information for this study was gathered with a structured questionnaire that the participants were free to administer to themselves. Five hundred respondents (who belong to Gen-Z) were requested to participate in the survey, and 432 completed and correctly returned questionnaires. After taking out the unfinished questionnaires, the final sample comprised 414 undergraduates.

This investigation used the G*power software, version 3.1.9.4, to determine the smallest possible sample size (Faul et al., 2009). It employed .05 effect size, .95 statistical power (two-tailed test), .05 error probability, *t*-tests (in test family), linear multiple regression (in statistical test), and four predictors to estimate the required minimum sample size (Roy, 2023e). The software estimated that the minimum sample was 262. Due to this, the responses collected for the study were adequate for statistical analysis.

Measures

The study has included six constructs: self-esteem (SEE), narcissism (NAM), body appreciation (BOA), exhibitionism (EXM), attitude towards selfies (ATS), and selfie-posting behavior (SPB). Constructs' indicators were derived from earlier research. Several questions were transformed to ensure they were pertinent to the study's setting. All the items were made up in English. This study used a seven-point Likert scale, where 1 = *strongly disagree* and 7 = *completely agree* (Khan & Roy, 2023b; Roy et al., 2023).

Demographic Profile

Table 1 displays the descriptive statistics for the study sample. Male undergraduates comprise the majority (55.30%), while females comprise the remainder (44.70%). The average age of the respondents was 22.62 years (standard deviation: 1.35 years). The

² Facebook™ is a trademark of Facebook Inc., registered in the U.S. and other countries. По решению Роскомнадзора, социальная сеть Facebook в России признана экстремистской организацией и заблокирована.

³ Instagram™ is a trademark of Instagram Inc., registered in the US and other countries. По решению Роскомнадзора, социальная сеть Instagram полностью заблокирована в России как экстремистская организация.

average years of Facebook⁴ use was 4.85 years. Most respondents (52.70%) take one selfie daily.

Table 1
Respondents' Profile

Variables	Categories	Frequency	Percent
Gender	Male	229	55.30
	Female	185	44.70
Selfie-taking per day	1	218	52.70
	2	103	24.90
	3	61	14.70
	4 or more	32	7.70
	Mean (SD)	Minimum	Maximum
Age (years)	22.62 (1.35)	19	27
Facebook ⁴ using years	4.85 (1.84)	2	10

Note. Source: developed by the authors.

Data Analysis and Results

This study has employed a two-phase analytical approach to testing the suggested model, combining an artificial neural network (ANN) with partial least squares-structural equation modeling (PLS-SEM) (Hair et al., 2021). A bootstrapping procedure with 5,000 iterations was carried out to determine the constructs' significance. For this, the authors have checked the weights and path coefficients of the constructs (Al Ahad et al., 2020; Roy, 2023c). The study employed a two-step process that adhered to the PLS-SEM guidelines to analyze the results. The measurement model was analyzed in the first step, and the structural model was computed in the second step. The combined SEM-ANN approach enables the detection and analysis of linear and non-linear associations among the variables, enhancing the comprehension of factors influencing SPB. The collected data were analyzed using two statistical software, IBM SPSS (Version 22) and SmartPLS (Version 3.3.5).

Normality Test

The study employed a web-based calculator (Zhang & Yuan, 2018) to examine the information for multivariate normality by adopting Mardia's (1970) test. An essential requirement for more precise model prediction is multivariate normality. Multivariate skewness ($\beta = 518.3395$, $p < .001$) and multivariate kurtosis ($\beta = 2723.1846$, $p < .001$) revealed multivariate non-normality. PLS-SEM excels at handling non-normal data (Hair et al., 2021). It is another justification for using PLS-SEM.

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Measurement Model Assessment

The measurement items and their associated factor loadings (λ) are presented in Table 2. All the λ values are more than the threshold value of .70, except NAM12 and NAM13; these values are close to the threshold value (Hair et al., 2021; Roy, 2022). For internal consistency, composite reliability (CR) and Cronbach’s alpha (α) values must be greater than .70. The study results showed that these values are higher than the expected value. Again, the research has examined average variance extracted (AVE) values for convergent validity. All the AVE values exceed the cut-off value of .50 (Roy, 2023a). Hence, the work achieved convergent validity. The study also assessed the validity of the discriminant. The study used the Heterotrait–Monotrait ratio (HTMT) and Fornell–Larcker criterion to test the validity of the discriminant. The HTMT results were under the recommended threshold of .85 (Kline, 2016; Roy, 2023e). Therefore, both convergent and discriminant validity have been achieved for this investigation. The results are presented in Tables 2 and 3, respectively.

Table 2
Measurement Model Results

Factors	Items	Sources	λ	α	CR	AVE
Attitude Towards Selfie (ATS)	ATS1: I think selfie-posting is pleasant		.853	.930	.943	.673
	ATS2: I think selfie-posting is enjoyable		.845			
	ATS3: I think selfie-posting is valuable		.832			
	ATS4: I think selfie-posting is beneficial	Lee & Sung, 2016	.832			
	ATS5: I think selfie-posting is good		.859			
	ATS6: I think selfie-posting is essential		.770			
	ATS7: I think selfie-posting is helpful		.805			
	ATS8: I think selfie-posting is satisfactory		.762			
BOA1: I respect my body			.823			
Body Appreciation (BOA)	BOA2: I feel good about my body		.790			
	BOA3: I feel that my body has at least some good qualities		.814			
	BOA4: I take a positive attitude towards my body		.818			
	BOA5: I am attentive to my body’s needs	Tylka & Wood-Barcalow, 2015	.816			
	BOA6: I feel love for my body.		.775			
	BOA7: I appreciate the different and unique characteristics of my body		.819			
	BOA8: My behavior reveals my positive attitude toward my body		.815			
	BOA9: I am comfortable in my body		.809			
	BOA10: I feel beautiful even if I am different from media images of celebrities		.824			

Table 2 Continued

Factors	Items	Sources	λ	α	CR	AVE
Exhibitionism (EXM)	EXM1: I post selfies online to gain others' attention		.885	.902	.931	.772
	EXM2: I post selfies because my selfies make me cool among my peers	Ansari & Azhar, 2022;	.900			
	EXM3: I post selfies to gain fame	Hollenbaugh & Ferris, 2014	.885			
	EXM4: I post selfies because I like it when people see me		.844			
Narcissism (NAM)	NAM1: I like having authority over other people		.812	.942	.949	.591
	NAM2: I have a strong will to power		.799			
	NAM3: People always seem to recognize my authority		.796			
	NAM4: I am a born leader		.766			
	NAM5: I know that I am a good person because everybody keeps telling me so		.720			
	NAM6: I like to show off my body		.797			
	NAM7: I like to look at my body	Gentile et al., 2013	.733			
	NAM8: I will usually show off if I get the chance		.835			
	NAM9: I like to look at myself in the mirror		.784			
	NAM10: I find it easy to manipulate people		.766			
	NAM11: I insist on getting the respect that is due to me		.794			
	NAM12: I expect a great deal from other people		.693			
	NAM13: I will never be satisfied until I get all I deserve		.682			
Self-Esteem (SEE)	SEE1: My selfie possesses several commendable attributes		.905	.915	.940	.796
	SEE2: I feel that I am a person of worth or value	Ansari & Azhar, 2022	.909			
	SEE3: I can do things just like everyone else		.880			
	SEE4: On the whole, I am satisfied with my selfie		.875			
Selfie-Posting Behavior (SPB)	SPB1: I post selfies on social media		.923	.949	.961	.830
	SPB2: I enjoy posting selfies on social media		.912			
	SPB3: I think using social media to post selfies is a good idea	Ansari & Azhar, 2022	.912			
	SPB4: I encourage my peers/friends to post selfies on social media		.918			
	SPB5: I help my peers/friends to post selfies on social media		.889			

Note. λ = Factor loadings, α = Cronbach's alpha, CR = Composite reliability, AVE = Average variance extracted. Source: developed by the authors.

Table 3
Discriminant Validity Results
Fornell–Larcker results

	ATS	BOA	EXM	NAM	SEE	SPB
ATS	.820					
BOA	.639	.810				
EXM	.640	.678	.879			
NAM	.701	.745	.653	.769		
SEE	.680	.704	.673	.731	.892	
SPB	.738	.800	.784	.803	.772	.911

HTMT results

	ATS	BOA	EXM	NAM	SEE	SPB
ATS						
BOA	.680					
EXM	.699	.735				
NAM	.747	.789	.706			
SEE	.735	.758	.741	.786		
SPB	.783	.846	.847	.848	.829	

Note. The square roots of the AVEs are shown in italics and boldface on the diagonals of the preceding table. The off-diagonal values indicate the intercorrelations between the different factors. ATS = Attitude towards selfie, BOA = Body appreciation, EXM = Exhibitionism, NAM = Narcissism, SEE = Self-esteem, and SPB = Selfie-Posting Behavior. Source: developed by the authors.

Structural Model Assessment

In this stage, the study has evaluated the structural model to confirm the hypothesized link. The research analyzed the variance inflation factors (VIF) to verify that there was no multi-collinearity issue. The cut-off value for VIF value is 5 (Roy, 2023b). The findings indicated that the VIF values for all the variables (SEE = 2.806, NAM = 3.096, BOA = 2.805, EXM = 2.316, and ATS = 2.381) are less than the cut-off value. So, collinearity was not a concern. In this work, PLS-SEM approaches were utilized to assess the impact of the predictor constructs on SPB. To evaluate the outcomes of the structural model, the authors first determined the importance of the path coefficient (β), then calculated the coefficient of determination (R^2), and last determined the predictive relevance (Q^2). Table 4 presents the findings from the evaluation of the structural model. The findings showed that both the direct and indirect hypotheses were significant. The outcomes confirmed that SEE was positively and significantly correlated with BOA ($\beta = .344, p < .001$), EXM ($\beta = .311, p < .01$), and SPB ($\beta = .151,$

$p < .01$) and supported the hypotheses H1a, H1b, and H1c. Again, there was a significant and positive association between NAM and BOA ($\beta = .493, p < .001$), EXM ($\beta = .189, p < .05$), and SPB ($\beta = .225, p < .01$) and supported the hypotheses H2a, H2b, and H2c. Additionally, BOA significantly influenced EXM ($\beta = .319, p < .001$) and SPB ($\beta = .252, p < .001$) and supported the hypotheses H3a and H3b. Finally, hypothesis H5 was endorsed as the direct path between EXM and SPB was significant ($\beta = .276, p < .001$) (See Figure 2). EXM has the highest impact on SPB among these independent constructs since $\beta = .276, p < .001$.

Table 4
Structural Equation Model's Results

H	Relationships	β	t-value	p-value	95% BC-CIs	Decisions
Direct paths						
H1a	SEE→BOA	.344	6.608	.000	[.299; .400]	Significant
H1b	SEE→EXM	.311	4.688	.001	[.241; .361]	Significant
H1c	SEE→SPB	.151	3.800	.003	[.115; .166]	Significant
H2a	NAM→BOA	.493	8.014	.000	[.394; .570]	Significant
H2b	NAM→EXM	.189	2.411	.037	[.124; .318]	Significant
H2c	NAM→SPB	.225	4.770	.001	[.179; .279]	Significant
H3a	BOA→EXM	.319	5.195	.000	[.223; .385]	Significant
H3b	BOA→SPB	.252	7.241	.000	[.201; .298]	Significant
H5	EXM→SPB	.276	6.834	.000	[.185; .300]	Significant
Indirect paths						
H4a	SEE→BOA→SPB	.087	3.933	.003	[.065; .117]	Significant
H4b	NAM→BOA→SPB	.125	5.918	.000	[.091; .147]	Significant
H6a	SEE→EXM→SPB	.086	3.411	.007	[.056; .105]	Significant
H6b	NAM→EXM→SPB	.052	2.520	.030	[.026; .078]	Significant
H6c	BOA→EXM→SPB	.088	4.718	.001	[.065; .100]	Significant
H7	SEE→BOA→EXM→SPB	.030	3.501	.006	[.027; .028]	Significant
H8	NAM→BOA→EXM→SPB	.043	4.370	.001	[.029; .055]	Significant
Moderation paths						
H9a	ATS*BOA→SPB	-.061	1.930	.082	[-.117; .052]	Insignificant
H9b	ATS*EXM→SPB	.061	2.644	.025	[.024; .095]	Significant

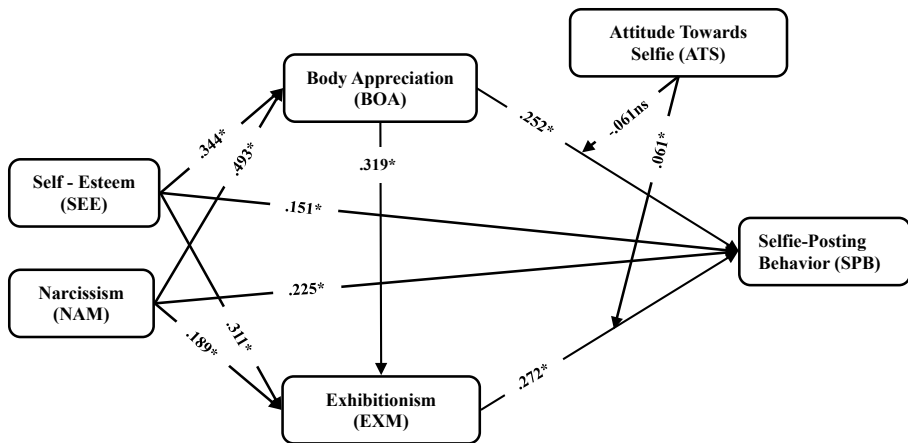
Note. ATS = attitude towards selfie, BOA = Body appreciation, EXM = Exhibitionism, NAM = Narcissism, SEE = Self-esteem, SPB = Selfie-Posting Behavior, and BC-CIs = Bias corrected confidence intervals. Source: developed by the authors.

Mediation Analysis

Following the recommendation made by Rungtusanatham et al. (2014), the study evaluated the mediation effect using the transmittal method. A bootstrapping method was utilized to calculate the 95% bias-corrected confidence intervals of the indirect impact, and 5,000 subsamples were used (Hair et al., 2021). The research applied the decision tree to classify mediation (Nitzl et al., 2016). The bootstrapping results revealed that each of the indirect factors has a significant impact on the outcome. The results of the mediation analysis are presented in Table 4. The outcomes of the mediation analysis showed that BOA mediates the relationship between SEE and SPB ($\beta = .087, p < .01$), NAM and SPB ($\beta = .125, p < .001$). So, the hypotheses H4a and H4b were supported. Again, EXM also mediates the association between SEE and SPB ($\beta = .086, p < .01$); NAM and SPB ($\beta = .052, p < .05$); BOA and SPB ($\beta = .088, p < .01$) and supported the hypotheses H6a, H6b, and H6c. Finally, the results revealed that BOA and EXM serially mediate the relationships between SEE and SPB ($\beta = .030, p < .01$) and NAM and SPB ($\beta = .043, p < .01$). So, the serial mediation hypotheses H7 and H8 were supported. Since all the direct hypotheses were supported, the mediations were partial.

Figure 2

Results of the Structural Model



Note. * $p < .05$, ns = non-significant. Source: developed by the authors.

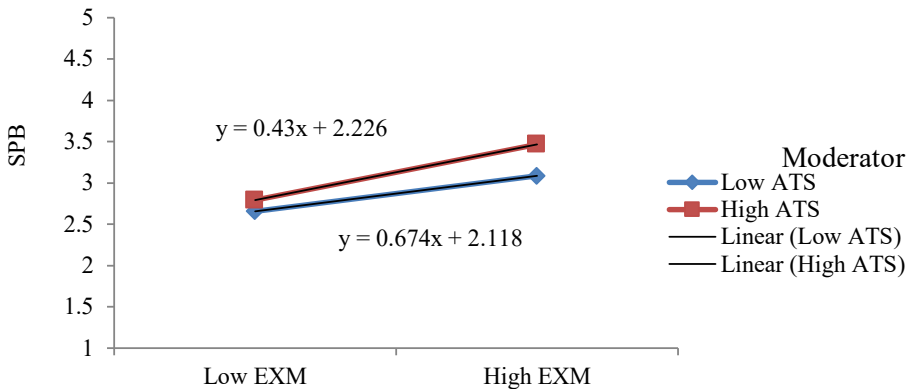
Moderation Analysis

The study hypothesized that ATS would be a moderator in the current investigation to investigate the moderating effect. According to the results of the moderation analysis, the link between EXM and SPB ($\beta = .061, p < .05$) was moderated by ATS. So, hypothesis H9b was supported. From Figure 3, it was seen that at the high level of ATS, the curve was much steeper than at the low level. So, at the low level of EXM, the impact of ATS was low, but at the high level of EXM, the impact was high. It indicated

that ATS contributed to the growth of the positive association between EXM and SPB. The other moderation hypothesis (H9a) was found insignificant ($\beta = -.061, p > .05$). Results are presented in Table 4.

Figure 3

Moderation Effects of ATS



Note. ATS = Attitude towards selfie, EXM = Exhibitionism, SPB = Selfie-Posting Behavior. Source: developed by the authors.

Assessment of the Explanatory Power

The study calculated the R^2 and Q^2 values to evaluate the structural model's predictive power. The R^2 value for the SPB was .818. Therefore, all the independent variables (SEE, NAM, BOA, and EXM) explained 81.8% of the variation of SPB. Again, SEE, NAM, and BOA explained 54.9% of the variation of EXM. Furthermore, SEE and NAM presented 61.0% of the variation of BOA. As a result, the model possesses a powerful potential for explanation. Evaluation of the predictive relevance was carried out using the Stone–Geisser Q^2 (Roy, 2023e). The Q^2 value greater than 0 indicates good predictive relevance. The Q^2 scores were more than 0 for BOA (.390), EXM (.414), and SPB (.674), signifying the outstanding predictive relevance of the model (Chin et al., 2020).

Artificial Neural Network (ANN) Results

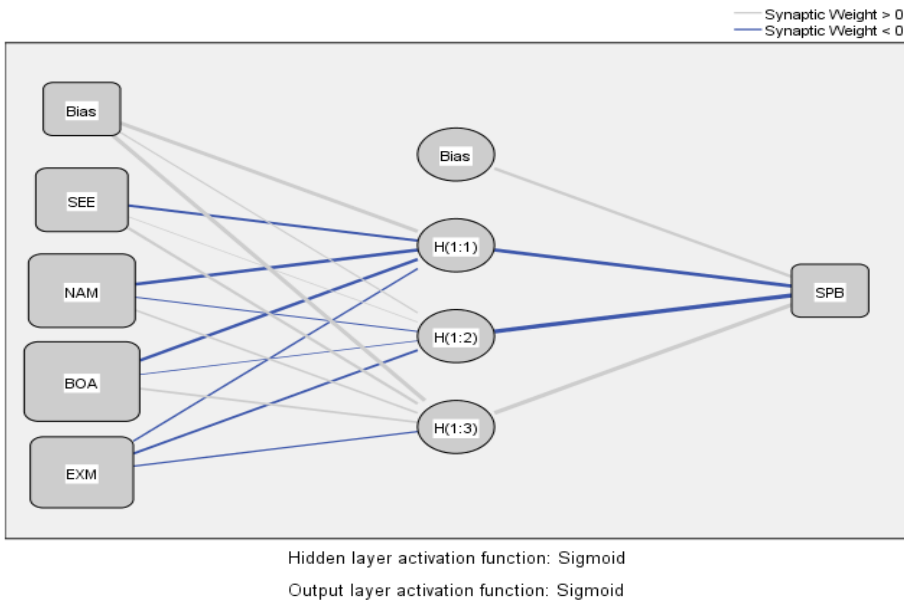
In the initial stage, PLS-SEM was used to test the correlations and determine the variables influencing Gen-Z's SPB. In the second stage, the ANN technique was used to rank the variables affecting the SPB. ANNs typically consist of three layers: the input layer, the hidden layer, and the output layer. The activation function establishes the connection between each layer in a neural network. The sigmoid function is a frequently employed activation function in ANN. It is favored due to its ability to compress the initial data at upper and lower extremes. The backpropagation neural network operates under the supervision of a learning algorithm. This technique is frequently employed in ANNs (Chiang et al., 2006).

Neural Network (NN) Validation

An NN model was performed utilizing SPSS (Version 22) software. The present study employed the widely utilized feed-forward backpropagation multilayer training approach. The multilayer perceptron and sigmoid activation techniques were used to implement the input and hidden nodes. The phenomenon of overfitting is a significant concern in the context of ANNs. The present study employed a 10-fold cross-validation methodology to mitigate this issue. The research on NN computing nodes does not provide any available heuristic (Chong, 2013). The present investigation employed a training dataset comprising 90% of the available data points, with the remaining 10% reserved for testing purposes (Roy, 2023c). According to the research framework, the ANN evaluation only used a single model for its analysis. The input layer of the ANN model consisted of neurons labeled as SEE, NAM, BOA, and EXM, while the output layer included the neuron labeled as SPB (Figure 4). The present study utilized the widely accepted Root Mean Square Error (RMSE) metric to validate the ANN assessment outcomes (Chong, 2013). The RMSE served as a metric for both training and testing errors. Table 5 presents the RMSE evaluation. The mean RMSE values for the training and testing procedures were .053 and .051, respectively, indicating a relatively low error level. Therefore, the research declared that the predictive algorithm is a perfect fit, and the results of the ANN analysis can be relied upon entirely (Chong, 2013).

Figure 4

Architecture of Neural Network



Note. ATS = attitude towards selfie, BOA = Body appreciation, EXM = Exhibitionism, NAM = Narcissism, SEE = Self-esteem, SPB = Selfie-Posting Behavior. Source: developed by the authors.

Table 5
Root Mean Square Error (RMSE) Assessment

Training		Testing		Total Sample
<i>N</i>	RMSE	<i>N</i>	RMSE	
370	.051	44	.052	414
372	.050	42	.051	414
371	.056	43	.044	414
360	.050	54	.049	414
362	.056	52	.047	414
375	.051	39	.059	414
369	.052	45	.058	414
373	.054	41	.052	414
366	.061	48	.049	414
375	.051	39	.045	414
Mean	.053		.051	
SD	.003		.005	

Note. Source: developed by the authors.

Sensitivity Analysis

Sensitivity analysis within a model involves identifying the fluctuations in the dependent variable due to modifications made to the independent variables. The current investigation involved the computation of the mean importance of SEE, NAM, BOA, and EXM as independent factors for forecasting the dependent factor SPB. Table 6 displays the outcomes of the sensitivity evaluation. According to the findings, the variable BOA holds the highest level of influence as an independent variable in predicting SPB because it has the highest normalized importance of 89.18%. Then, it was followed by NAM (87.02%), EXM (72.66%), and SEE (48.95%). Based on the ANN analysis, it can be inferred that the variable BOA holds the highest degree of influence in predicting Gen-Z's SPB.

Table 6
Sensitivity Assessment

Neural network	SEE	NAM	BOA	EXM
1	.145	.247	.207	.400
2	.113	.345	.375	.167
3	.193	.360	.253	.193
4	.198	.337	.282	.183
5	.168	.231	.337	.264
6	.143	.298	.283	.276

Table 6 Continued

Neural network	SEE	NAM	BOA	EXM
7	.177	.299	.278	.246
8	.162	.274	.327	.236
9	.215	.240	.366	.178
10	.132	.289	.287	.293
Average Importance	.165	.292	.300	.244
Normalized Importance	48.95%	87.02%	89.18%	72.66%

Note. SEE = Self-esteem, NAM = Narcissism, BOA = Body appreciation, and EXM = Exhibitionism. Source: developed by the authors.

Discussion

Previous investigations have extensively documented the positive association of self-esteem and narcissism with SPB (Ansari & Azhar, 2022; Arpaci et al., 2023). However, the exploration of the mediation and moderation strategies that underlie this association has been predominantly limited (Wang et al., 2020). Limited studies have investigated mediation or moderation analysis with a single mediator or moderator (Ansari & Azhar, 2022). The current investigation developed a moderated mediation framework featuring two mediators and one moderator. The objective was to investigate the potential indirect association between self-esteem and narcissism with SPB via body appreciation and exhibitionism. Once again, it examined whether the relationship between body appreciation and SPB and exhibitionism and SPB was subject to moderation by ATS. The results of this research contributed to a better comprehension of how self-esteem and narcissism are connected to SPB.

This research endeavor explored the direct and positive correlation of self-esteem and narcissism with body appreciation, exhibitionism, and SPB (H1a–H2c), body appreciation and exhibitionism and SPB (H3a–H3b), and exhibitionism and SPB (H5). The findings of this study provide evidence in favor of all the aforementioned direct hypotheses. The findings suggest that self-esteem and narcissism significantly and positively correlated with body appreciation, exhibitionism, and SPB. As a result, respondents with higher levels of self-esteem and narcissism have a positive feeling about their bodies, and this feeling encourages them to engage in more exhibitionism and SPB as a means to seek attention, acclaim, and validation from others. Similarly, getting positive feedback from their peers and friends increases their self-esteem and motivates them to post selfies. These observations enhance our understanding of the impact of self-esteem and narcissism on SPB. Previous research also revealed a noteworthy correlation among these variables (Ansari & Azhar, 2022; Arpaci et al., 2023; Chowdhury & Roy, 2015). The study’s findings have substantiated the correlation between body appreciation, exhibitionism, and SPB, signifying that body appreciation is a precursor to exhibitionism and SPB. Prior research has confirmed the

existence of these associations (Ansari & Azhar, 2022; Wang et al., 2020). Youngsters who are satisfied with their body appearance are more likely to show exhibitionism tendencies and highly engage in SPB. In addition, undergraduates who want to get attention or fame from other people are involved in posting selfies. So, the findings of the present investigation indicate that self-esteem, narcissism, body appreciation, and exhibitionism are influential factors in forecasting SPB.

The research revealed that body appreciation mediates the link between self-esteem and SPB and narcissism and SPB, supporting the study's proposed hypotheses. In previous research on SPB, personality psychologists focused primarily on the influence of a personality characteristic (such as narcissism) on this behavior (Sorokowska et al., 2016; Weiser, 2015). At the same time, the primary concern of other investigators was the function of body image (Ridgway & Clayton, 2016; Wagner et al., 2016). The two areas of study, namely personality traits and body image characteristics, have undergone separate development with little to no integration. As a result, the possible correlation between the two has been overlooked. The current study creatively combined self-esteem, narcissism, and body appreciation to explore SPB and evaluated the mediating role of body appreciation in the link between self-esteem, narcissism, and SPB in light of the relationship between body image and personality traits (Allen & Walter, 2016; Fortes et al., 2015). The proposed mediation model posits a potential explanation for the heightened frequency of selfie-posting on SNSs among individuals with narcissistic tendencies and high self-esteem. Specifically, the model suggests that such individuals experience a sense of body appreciation, which may contribute to their increased propensity for sharing self-portraits on SNSs.

Once again, the findings of the study corroborated the research assumptions, showing that exhibitionism mediates the connection between self-esteem and SPB, narcissism and SPB, and body appreciation and SPB. These results are consistent with earlier research (Ansari & Azhar, 2022; Kim & Chock, 2017). The findings suggest that those with higher levels of narcissism and self-esteem also tend to share more selfies on social media platforms using the exhibitionism approach. According to the mediated findings, such people may be more inclined to share self-portraits on SNSs because they feel compelled to do so. Finally, the mediation analysis revealed that body appreciation and exhibitionism sequentially mediate the relationship between self-esteem and SPB and narcissism and SPB. The findings widened our understanding of how Gen-Z behave while sharing selfies online. It implies that body appreciation and exhibitionism play a significant role in augmenting Gen-Z's SPB. The mediation analysis findings indicate that self-esteem and narcissism's impact on SPB was highly conveyed through body appreciation and exhibitionism rather than only through direct effects.

Moreover, it is noteworthy to delineate the two phases in the mediation framework. The initial phase of the mediation procedure aligns with the characterization of self-esteem and narcissism, whereby individuals with narcissistic tendencies tend to possess an excessively favorable self-perception, particularly concerning their physical attributes (Ansari & Azhar, 2022; Wang et al., 2020). Furthermore, this discovery provides backing for the hypothesis that individuals with narcissistic traits (self-esteem

and narcissism) exhibit a more favorable perception of their physical appearance, aligning with prior investigations (Ansari & Azhar, 2022; Lipowska & Lipowski, 2015). The results of the subsequent phase of the mediation procedure align with previous research indicating that higher levels of body appreciation and exhibitionism are positively associated with a greater frequency of online self-presentation, such as posting selfies (Wang et al., 2020). The potential predictive function of body appreciation and exhibitionism regarding SPB can be elucidated by the influence of intrapersonal processes on interpersonal self-regulatory strategies, as outlined in the dynamic self-regulatory processing theory of narcissism (Morf & Rhodewalt, 2001). The internal assessment of one's cognitive and affective state regarding one's body visuals directly impacts one's interpersonal self-regulatory approach, which involves posting selfies on SNSs. It has been observed that individuals with elevated levels of both body appreciation and exhibitionism are more likely to participate in self-presentational behaviors (for example, SPB) to enhance their sense of self-views.

As hypothesized, the moderation effect of ATS on the relationship between exhibitionism and SPB was supported. The joint impact of exhibitionism and ATS, both intrapersonal functions, on SPB, can elucidate the influence of attitude as a moderator. Respondents with higher levels of exhibitionism exhibit a greater propensity to post selfies on SNSs. Integrating ATS can potentially augment the predictive capacity of exhibitionism concerning SPB. Individuals with positive ATS may perceive such conduct as advantageous, profitable, and valuable to their SPB. In addition, people experience feelings of pleasure and contentment when sharing selfies on social networking sites (Lee & Sung, 2016).

Consequently, individuals who experience contentment with their physical appearance and possess a favorable inclination towards self-display are more likely to engage in SPB when they receive positive feedback. However, the moderating influence of ATS on the association between body appreciation and SPB is statistically non-significant. Prior research has indicated that the influence of body satisfaction on SPB is moderated by ATS (Wang et al., 2020). One possible explanation for the lack of significant findings could be that youngsters with a positive body appreciation may not require additional motivation to post selfies. They are confident in their appearance and enjoy exhibiting it by posting exposing selfies on social media.

All independent variables of the SPB were deemed statistically significant; however, their order of importance concerning the SPB remains unclear. As a result, ANN modeling was utilized in the research to determine the order of importance of the SPB determinants. The ANN technique can evaluate whether non-compensatory decision-making processes follow a linear or non-linear pattern. In contrast to the findings of the PLS-SEM analysis, which indicated that exhibitionism was the most reliable SPB contributor, the outcomes of the ANN analysis demonstrated that body appreciation was the most critical factor in SPB prediction. This finding diverges from previous investigations, which identified narcissism as the primary predictor of SPB (Ansari & Azhar, 2022; Wang et al., 2020). As a result, ANN was advantageous to apply in comparison to other statistical techniques that are extensively utilized. So, when youngsters feel good about their body appearance and are satisfied with themselves,

it motivates them to post more selfies online. Again, if they find positive feedback about their body from their social partners, it highly influences them to engage in SPB. Therefore, the findings above carry significant implications for theoretical frameworks, research endeavors, and practical implementations.

Implications of the Research

Theoretical Implications

This study makes significant theoretical contributions by incorporating a comprehensive modeling approach to examine the direct and indirect associations between self-esteem, narcissism, body appreciation, and exhibitionism with SPB from Gen-Z perspectives. Several studies have tried to achieve this task individually, but none have done so in combination. PLS-SEM in SPB was a common explanatory technique utilized in empirical investigations (Ansari & Azhar, 2022; Wang et al., 2020). The study also examined the underlying mechanism behind youngsters' tendency to post selfies and identified the critical predictors of SPB. Therefore, the study provides a noteworthy addition to the body of knowledge by clarifying the interdependent nature of these pivotal constructs. It expands the range of behavioral and psychological research areas. It also enhances our comprehension of the psychological components of human conduct and validates the current body of knowledge. These findings support the dynamic self-regulatory processing model for narcissism in the SNSs (Morf & Rhodewalt, 2001). The correlation between self-esteem and narcissism and SPB suggests that sharing self-portraits on SNSs can serve as an effective self-regulatory tactic for individuals with narcissistic tendencies to enhance their self-views. Furthermore, the impact of intrapersonal processes on interpersonal interactions is supported by the moderating effect of ATS and the mediating effects of body appreciation and exhibitionism. As a result, the moderated mediation model exhibits a greater depth of concept and offers enhanced predictive capability compared to a direct association between predictors and SPB.

Practical Implications

The current investigation yielded several practical implications that can be drawn from its findings. The study results revealed that all the independent factors significantly correlated with SPB. The results indicate that youngsters with higher levels of self-esteem and narcissism tend to post selfies to seek praise and approval from others. So, youngsters with lower self-esteem may use selfie-posting to enhance their self-worth and increase self-awareness. They may use this awareness to reflect on themselves and grow personally. They can also practice self-help techniques to improve their interpersonal skills and self-esteem.

Furthermore, by using the study results, mental health practitioners and organizations can help narcissistic persons address their underlying emotional needs and self-esteem difficulties. They apply these results to raise the self-esteem of those with low self-esteem. Once more, exhibitionism can occasionally be a symptom of underlying mental health problems. These findings provide options and aid for anyone

struggling with similar issues. Again, professionals can assist Gen-Z in displaying exhibitionist tendencies, understanding the underlying causes of their behavior, creating healthy coping mechanisms, and cultivating a positive body image. In addition to addressing any problems with negative self-image, therapeutic interventions can assist people in developing a positive body image and sense of self. Promoting body appreciation can help youngsters in creating a more positive body image. Thus, depending on the results, professionals can work with people to develop a sense of self-worth and self-esteem. Educational institutions and community organizations can implement media literacy initiatives that educate youngsters and future generations about the possible repercussions of using social media to get positive reinforcement. This knowledge may aid in developing a more critical understanding in the minds of young people regarding the effects of their online behavior (posting selfies) on their self-esteem and body image, as well as the significance of body positivity and unattainable beauty standards. In addition, marketing strategists, social media professionals, designers, developers, and industry experts may design their products and services to meet the self-esteem and exhibitionism of their target audience. It means that they must consider how their offerings will satisfy the needs and desires of consumers in terms of what they are searching for. They can tailor their strategies to appeal to individuals with narcissistic tendencies who may be more inclined to respond positively to their products (e.g., smartphones and webcams). Once again, they can create features and algorithms based on the study's findings to encourage better online activity.

Conclusion, Limitations, and Future Directions

The study sought to investigate the specific roles of body appreciation and exhibitionism in mediating the relationship between self-esteem and sexualized body presentation, as well as the association between narcissism and SPB. Additionally, the study attempted to explore the moderating effect of attitude towards selfies (ATS) on these relationships from the perspective of Gen-Z youngsters. Like other studies, the study has several limitations. The study was limited to Gen-Z youngsters, with a majority of male participants. It could potentially hinder the generalizability of the study's findings and make it difficult to assess the impact of gender on the relationships being studied. It is recommended that forthcoming investigations integrate samples that exhibit greater diversity and enhanced representativeness. This work is the first to use linear and non-linear models to investigate the connections between SPB parameters. This work tests and validates the suggested model using a two-stage analytical procedure. In the first step, PLS-SEM was utilized to examine the link and determine how self-esteem, narcissism, body appreciation, and exhibitionism affected SPB. The second stage involved ranking the important antecedents and validating the PLS-SEM outcome using ANN. Due to its superior performance over conventional statistical techniques (for example, PLS-SEM) in identifying linear and non-linear correlations, the research employed an ANN. ANN effectively ensured the validity of the constructs and determined that body appreciation is the most significant predictor of the SPB. The

present study suggests a more reliable and predictive framework that can overcome the fundamental constraints of the existing model and forecast the users' SPB. The current investigation is confined to a singular cultural milieu and has not accounted for cross-cultural contrasts; hence, future research should incorporate more cross-cultural analyses. The conclusions drawn in the present inquiry were derived from cross-sectional data. Subsequent research initiatives should employ longitudinal or experimental methodologies to obtain additional empirical support regarding the causal relationship between predictors and Selfie-Posting Behavior. The present investigation utilized body appreciation and exhibitionism as mediating factors and attitude towards selfies as moderating variables. Subsequent research endeavors may consider integrating alternative mediator variables, such as extraversion, or moderator variables, such as personality trait variables. Further research may utilize a combination of methodologies, including surveys and content assessments, to more precisely determine the associations between various forms of selfie habits and motives. More investigation may also be conducted to analyze the impact of selfie usage on self-concept.

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