

# The Relationship Between Personality Traits and Phubbing in Generation Z Students: The Mediating Role of Fear of Missing Out (FoMO)

Somayeh. Ashrafi<sup>1</sup>, Mohammad. Mohammadipour<sup>2\*</sup>, Mahmoud. Jajarmi<sup>1</sup>

<sup>1</sup> Department of Psychology, Bojnourd Branch, Islamic Azad University, Bojnourd, Iran

<sup>2</sup> Department of Psychology, Quchan Branch, Islamic Azad University, Quchan, Iran

\* Corresponding author email address: mmohammadipour@iauu.ac.ir

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## ABSTRACT

**Objective:** The present study aimed to investigate the mediating role of Fear of Missing Out (FoMO) in the relationship between personality traits and phubbing.

**Methods and Materials:** This research was a cross-sectional study and examined the fit of a structural equation modeling (SEM) framework, analyzing correlations and relationships among variables within a causal model. The statistical population included all Generation Z students (born between 1997 and 2012) enrolled at Islamic Azad University branches in Tehran during the first half of 2024. A total of 556 participants were selected using multi-stage cluster sampling. Data collection tools included the Generic Scale of Phubbing (Chotpitayasunondh & Douglas, 2018), the NEO Five-Factor Personality Inventory (Costa & McCrae, 1985), and the Fear of Missing Out Scale (Przybylski et al., 2013).

**Findings:** The results indicated that the direct path coefficient between the personality traits of conscientiousness ( $\beta = -0.354$ ,  $p = .001$ ) and extraversion ( $\beta = -0.134$ ,  $p = .001$ ) with phubbing was negative and significant. In contrast, the direct path coefficient between neuroticism and phubbing ( $\beta = 0.290$ ,  $p = .001$ ) was positive and significant. Additionally, the path coefficient between FoMO and phubbing ( $\beta = 0.219$ ,  $p = .001$ ) was positive and significant. The indirect path between conscientiousness and phubbing through FoMO ( $\beta = -0.045$ ,  $p = .001$ ), as well as the indirect path between neuroticism and phubbing through FoMO ( $\beta = 0.085$ ,  $p = .001$ ), were also significant.

**Conclusion:** It was concluded that Fear of Missing Out negatively mediates the relationship between conscientiousness and phubbing, and positively mediates the relationship between neuroticism and phubbing in Generation Z students. It is recommended that educational programs be designed to raise students' awareness regarding the negative impacts of FoMO and phubbing.

**Keywords:** Personality traits, phubbing, fear of missing out (FoMO).

## 1. Introduction

Generation Z students (born between 1997 and 2012) exhibit distinct characteristics shaped by the significant advancements in social media (Wajdi et al., 2024). The trajectory of social media development among Generation Z from 2022 to 2025 reflects their deep behavioral integration with digital platforms (Angelique et al., 2025). This generation utilizes social media for activity, community-building, and entertainment (Tungga et al., 2025). Generation Z demonstrates high levels of smartphone dependency, which exacerbates phubbing. Phubbing (the act of ignoring others to focus on smartphones) is prevalent among Generation Z students due to their excessive reliance on mobile phones (Field, 2024; Meinanto et al., 2022). This behavior negatively affects social interactions, leading to diminished interpersonal communication and emotional connection (Magfiroh et al., 2024). Phubbing is also associated with academic procrastination, poor time management, and weakened peer relationships, which can intensify feelings of loneliness and depression (Winarna, 2024). Furthermore, it contributes to sleep disturbances and psychological distress, ultimately affecting overall well-being (Ayala et al., 2025). The prevalence of phubbing among Generation Z students is largely due to their dependence on digital devices and social media platforms (Putri & Chatamallah, 2024). Studies indicate that Generation Z exhibits the highest level of phubbing compared to other generations, which is significantly correlated with smartphone addiction and fear of missing out (FoMO) (Lauw & Jannah, 2024). Research has shown that 80.2% of Generation Z individuals admit to engaging in phubbing, while 91.3% report having been victims of phubbing behaviors (Hidayat & Rahmijai, 2024).

The personality traits of Generation Z students significantly influence their use of social networks, often leading to phubbing. Traits such as neuroticism and extraversion are associated with excessive social media use, driven by fear of missing out and social anxiety, which can lead to mental health issues like stress, depression, and emotional exhaustion (Yüksel et al., 2025). Studies show that individuals high in neuroticism are more likely to engage in phubbing as a coping mechanism for emotional instability, whereas conscientious individuals display less tendency toward phubbing due to their self-discipline and organizational behavior (Chi et al., 2022; Duradoni et al., 2023). Additionally, agreeableness and openness to experience influence social media fatigue, where users feel

overwhelmed by constant connectivity and negative interactions (Sarwar et al., 2025). These traits also exacerbate interpersonal challenges, as excessive use of social media undermines the quality of face-to-face interactions and increases feelings of loneliness (Brazil & Rys, 2020). Moreover, problematic social media behaviors—such as passive browsing and compulsive checking—amplify negative emotional experiences (Sao et al., 2024).

Using a mediating variable is essential to uncover the mechanisms or pathways through which the independent variable (personality trait) affects the dependent variable (phubbing). Mediators provide a deeper understanding of causal relationships by identifying indirect effects that may otherwise remain hidden (Alroubaie & Doghri, 2024). Mediating variables also enhance the accuracy of models by deconstructing causal paths, which is especially useful in complex systems involving multiple interacting variables (Garver, 2024). In this context, research highlights the mediating role of fear of missing out (FoMO) in the relationship between personality traits and phubbing behavior, particularly among Generation Z students. FoMO is a prevalent phenomenon among Generation Z students, emerging from their extensive use of social media and digital platforms. It is characterized by the anxiety of missing out on experiences, leading to compulsive social media engagement (Chakrabarti, 2024). This behavior is often intensified by online content and social media trends that pressure individuals to remain constantly updated and connected (Fransiati et al., 2024). FoMO is not only a psychological challenge but also a defining feature of Generation Z's digital lifestyle, distinguishing them from previous generations (Yulya et al., 2022). The negative consequences of FoMO are profound, affecting mental health, financial stability, and social relationships. FoMO is associated with heightened anxiety, concentration difficulties, and dependency on social validation via social media (Royantara et al., 2025). Socially, it diminishes real-life interactions and reinforces feelings of loneliness and dissatisfaction (Fransiati et al., 2024).

Research on the relationship between FoMO and personality traits with phubbing underscores its importance in understanding Generation Z's digital behaviors and sheds light on the underlying psychological mechanisms of these interactions. Studies show that neuroticism and extraversion are strongly associated with FoMO (Akat et al., 2023; Chi et al., 2022). Additionally, FoMO amplifies traits such as narcissism, prompting individuals to prioritize smartphone

use over face-to-face interactions (Duradoni et al., 2023; Gao et al., 2023). Systematic reviews and meta-analyses further confirm a strong positive relationship between FoMO and phubbing (Ansari et al., 2024). However, limitations in previous studies include small sample sizes, narrow geographic focus, and a lack of examination of moderating factors. Despite these findings, gaps remain in understanding the broader interactive impact of diverse personality traits and FoMO on phubbing across various populations. For example, studies often concentrate on specific demographics such as adolescents, which limits generalizability (Nagar, 2024; Taj et al., 2025). These gaps underscore the need for more comprehensive research to develop targeted interventions that can reduce phubbing and its associated psychological and social consequences. Therefore, this study aims to answer the following questions: Is there a relationship between personality traits and phubbing? Is there a relationship between fear of missing out and phubbing? And does fear of missing out mediate the relationship between personality traits and phubbing?

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study was a cross-sectional research project. It employed structural equation modeling (SEM) to examine model fit, correlations, and relationships among variables within a causal framework. The statistical population consisted of all Generation Z students (born between 1997 and 2012) enrolled in Islamic Azad University branches located in Tehran during the first half of 2024. According to Kline (2010) and Loehlin (2004), for SEM, a sample size below 100 is considered inadequate and over 200 is preferred. To meet SEM requirements, the sample size should be at least 20 times the number of observed variables (Ghasemi, 2012). Given the 10 observed variables in this study and a ratio of 25 participants per variable, and considering potential incomplete or invalid responses, a target sample size of 600 participants was determined.

Using multi-stage cluster sampling, six branches of Islamic Azad University in Tehran (Science and Research, Central Tehran, North Tehran, South Tehran, East Tehran, and West Tehran) were selected as the primary clusters. Verbal informed consent was obtained from participants after providing explanations regarding the study's objectives. Participation was completely voluntary. Inclusion criteria were: being aged between 12 and 29 years, providing informed consent, and being currently enrolled in one of the

specified university branches. Exclusion criteria included being under 12 or over 29 years old, or refusal to participate. After preliminary screening and removing incomplete, invalid, or missing data, 556 completed questionnaires were included in the final analysis.

### 2.2. Measures

#### 2.2.1. Phubbing

This 15-item scale was developed by Chotpitayasunondh and Douglas (2018), comprising subdimensions of nomophobia, interpersonal conflict, self-isolation, and acknowledgment of phubbing behavior. It uses a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater phubbing behavior. Chotpitayasunondh et al. (2018) reported a Cronbach's alpha of 0.93 for the full scale and 0.84, 0.87, 0.83, and 0.82 for the respective subscales (Chotpitayasunondh & Douglas, 2018). In the Iranian context, Hassan Esfahani et al. (2021) reported good reliability and validity for the scale, with Cronbach's alpha coefficients of 0.87 for the full scale and 0.82 (nomophobia), 0.79 (interpersonal conflict), 0.87 (self-isolation), and 0.75 (phubbing acknowledgment) (Hassan Esfahani et al., 2021). In the present study, Cronbach's alpha was 0.88 for the overall scale, and 0.75, 0.81, 0.88, and 0.68 for the subscales respectively.

#### 2.2.2. Personality

The short 60-item form of the revised NEO Personality Inventory (NEO-PI-R) was designed by Costa and McCrae (1985) to quickly assess the five major dimensions of personality: Neuroticism (N), Extraversion (E), Openness to Experience (O), Conscientiousness (C), and Agreeableness (A). McCrae and Costa administered this scale to 208 American college students with a three-month interval, reporting test-retest reliability coefficients ranging from 0.74 to 0.89 with a mean of 0.81. High concurrent validity was also reported with other instruments such as the Myers-Briggs, Guilford-Zimmerman, the Minnesota Multiphasic Personality Inventory (MMPI), and the California Psychological Inventory-Revised (Costa & McCrae, 1999). In Iran, Atashrouz, Pakdaman, and Asgari (2008) reported Cronbach's alpha coefficients of 0.74 (Neuroticism), 0.55 (Extraversion), 0.27 (Openness), 0.38 (Conscientiousness), and 0.77 (Agreeableness) (Atashrouz et al., 2008). In the current study, Cronbach's alpha values for Neuroticism, Extraversion, Openness, Agreeableness, and

Conscientiousness were 0.73, 0.77, 0.58, 0.79, and 0.83 respectively.

### 2.2.3. Fear of Missing Out

The 10-item FoMO scale developed by Przybylski et al. (2013) measures individuals' fear of missing out on valuable experiences with friends and colleagues. It is scored on a 5-point Likert scale, with higher scores indicating greater levels of FoMO (Przybylski et al., 2013). The questionnaire was translated from English to Persian by Bayrami et al. (2019) and reviewed by 10 faculty members to ensure content accuracy and clarity. It has been validated in the Iranian population, with a reported Cronbach's alpha of 0.87 (Bayrami et al., 2019). In the present study, the Cronbach's alpha for this scale was 0.85.

### 2.3. Data Analysis

Data analysis in this study was conducted using Structural Equation Modeling (SEM) via AMOS version 26.0, employing the Maximum Likelihood (ML) estimation method. Initially, descriptive statistics including means, standard deviations, skewness, and kurtosis were calculated to assess univariate normality. Multivariate normality was examined using Mahalanobis distance, and multicollinearity

was evaluated through Variance Inflation Factor (VIF) and tolerance values. The measurement model's fit was assessed using standard fit indices such as the chi-square/degrees of freedom ratio ( $\chi^2/df$ ), Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), and Root Mean Square Error of Approximation (RMSEA). Path analysis was performed to evaluate the direct and indirect effects of personality traits on phubbing through fear of missing out (FoMO), and the significance of path coefficients was tested at the 0.05 and 0.01 levels.

## 3. Findings and Results

In the present study, 421 female students (75.7%) and 135 male students (24.3%) participated, with a mean age of 21.60 years and a standard deviation of 2.75 (age range: 18 to 29 years). Among the students, 52 (9.3%) were enrolled in associate degree programs, 388 (69.8%) in undergraduate programs, and 116 (20.9%) in master's or doctoral programs. Table 1 presents the means, standard deviations, and correlation coefficients among personality traits (neuroticism, extraversion, openness, agreeableness, and conscientiousness), fear of missing out (FoMO), and phubbing.

**Table 1**

*Means, Standard Deviations, and Correlation Matrix of Study Variables*

Research Variables	1	2	3	4	5	6	7
1. Personality Traits – Neuroticism	-						
2. Personality Traits – Extraversion	-0.30	-					
3. Personality Traits – Openness	-0.01	0.11	-				
4. Personality Traits – Agreeableness	-0.09	0.04	0.10	-			
5. Personality Traits – Conscientiousness	-0.42	0.10	0.02	0.16	-		
6. Fear of Missing Out (FoMO)	0.48	-0.07	-0.01	-0.04	-0.37	-	
7. Phubbing	0.58	-0.26	-0.09	-0.08	-0.44	0.36	-
Mean	27.67	26.31	22.63	29.24	25.23	27.46	43.82
Standard Deviation	7.56	6.04	4.80	5.92	6.87	7.60	9.13

Table 1 shows the correlation coefficients among research variables, which aligned with theoretical expectations. To assess the assumption of univariate normality, skewness and kurtosis for each variable were

examined. For multicollinearity, Variance Inflation Factor (VIF) and tolerance coefficients were assessed. The results are displayed in Table 2.

**Table 2***Assessment of Normality and Multicollinearity Assumptions*

Variable	Skewness	Kurtosis	Tolerance	VIF
Personality Traits – Neuroticism	0.03	-0.34	0.51	1.95
Personality Traits – Extraversion	0.01	-1.29	0.86	1.16
Personality Traits – Openness	0.08	-0.99	0.93	1.08
Personality Traits – Agreeableness	-0.16	-0.21	0.94	1.07
Personality Traits – Conscientiousness	-0.48	-0.62	0.62	1.63
Fear of Missing Out (FoMO)	0.18	-0.50	0.62	1.61
Phubbing	0.16	-0.57	-	-

As shown in Table 2, skewness and kurtosis values for all variables fall within the  $\pm 2$  range, indicating the assumption of univariate normality is met (Kline, 2016). Tolerance values are above 0.10 and all VIF values are below 10, confirming the absence of multicollinearity among predictor variables. According to Myers et al. (2006), tolerance values below 0.10 and VIF values above 10 indicate multicollinearity issues, which were not found in this study.

To assess the assumption of multivariate normality, Mahalanobis distance values were analyzed. Skewness and kurtosis values related to Mahalanobis distances were 0.81 and 0.54, respectively, indicating that the assumption of multivariate normality was also satisfied. Finally, to evaluate the assumption of homogeneity of variances, a scatter plot of standardized error variances was examined, and results indicated that this assumption was also met.

After confirming the statistical assumptions, model fit was assessed based on the collected data. Path analysis was conducted using AMOS version 26.0 with the Maximum Likelihood (ML) estimation method. The hypothesized

model posited that personality traits, mediated by fear of missing out, are related to phubbing among Generation Z students.

As illustrated in the figure, the model included seven observed variables. Accordingly, the number of known parameters was 28, calculated using the formula  $(v)(v+1)/2$ . Similarly, there were 28 unknown parameters: 7 variances, 11 path coefficients, and 10 covariances. This resulted in zero degrees of freedom ( $df = 28 - 28 = 0$ ), characterizing the model as "just-identified." In a just-identified model, parameters are estimable but model fit indices are not computed because perfect fit is assumed by default.

Upon further evaluation, it was found that the path coefficients between openness and agreeableness with both FoMO and phubbing, as well as the path between extraversion and FoMO, were nonsignificant. These five paths were removed, which increased the degrees of freedom to 5. Table 3 presents the model fit indices after these modifications.

**Table 3***Model Fit Indices After Modification*

Fit Index	Model Value	Cut-off Value
Chi-Square ( $\chi^2$ )	12.73	-
Degrees of Freedom (df)	5	-
$\chi^2/df$	2.55	< 3.00
GFI	0.994	> 0.90
AGFI	0.964	> 0.85
CFI	0.990	> 0.90
RMSEA	0.053	< 0.08

Based on the results in Table 3, the revised model achieved acceptable fit indices. Table 4 presents the path coefficients between the variables.



**Table 4**

*Direct and Indirect Path Coefficients Among Research Variables in the Structural Model*

Path Coefficients	b	S.E.	$\beta$	p
Conscientiousness → Fear of Missing Out	-0.259	0.051	-0.207	.001
Neuroticism → Fear of Missing Out	0.445	0.047	0.390	.001
Fear of Missing Out → Phubbing	0.229	0.039	0.219	.001
Conscientiousness → Phubbing (Direct Effect)	-0.463	0.050	-0.354	.001
Extraversion → Phubbing (Direct Effect)	-0.202	0.049	-0.134	.001
Neuroticism → Phubbing (Direct Effect)	0.345	0.048	0.290	.001
Conscientiousness → Phubbing (Indirect Effect via FoMO)	-0.059	0.015	-0.045	.001
Neuroticism → Phubbing (Indirect Effect via FoMO)	0.102	0.020	0.085	.001

Table 4 demonstrates that the direct path coefficients between the personality traits of conscientiousness ( $\beta = -0.354, p = .001$ ) and extraversion ( $\beta = -0.134, p = .001$ ) with phubbing are negative and significant. Conversely, the direct path coefficient between neuroticism and phubbing is positive and significant ( $\beta = 0.290, p = .001$ ). The path from fear of missing out (FoMO) to phubbing is also positive and significant ( $\beta = 0.219, p = .001$ ).

Moreover, the indirect path from conscientiousness to phubbing via FoMO is negative and significant ( $\beta = -0.045$ ,

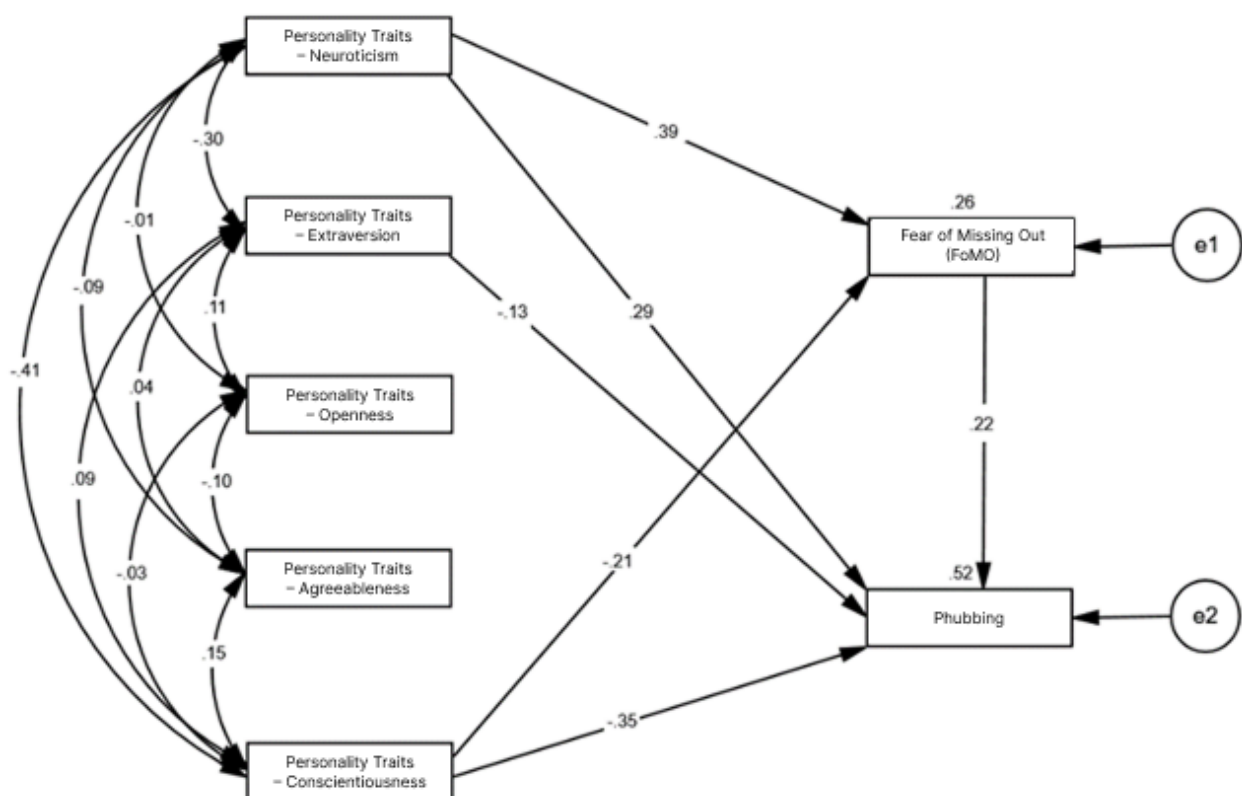
$p = .001$ ), while the indirect path from neuroticism to phubbing via FoMO is positive and significant ( $\beta = 0.085, p = .001$ ).

Based on these findings, it was concluded that FoMO mediates the relationship between conscientiousness and phubbing negatively, and mediates the relationship between neuroticism and phubbing positively and significantly among Generation Z students.

Figure 1 displays the standardized structural model parameters.

**Figure 1**

*Standardized Parameters in the Structural Model*



The figure shows that the coefficient of determination ( $R^2$ ) for the dependent variable phubbing is 0.52. This indicates that personality traits and fear of missing out together explain 52% of the variance in phubbing among Generation Z students.

#### 4. Discussion and Conclusion

This study aimed to examine the relationship between personality traits and phubbing, with the mediating role of fear of missing out (FoMO), among Generation Z students. The findings revealed that conscientiousness and extraversion were negatively and significantly associated with phubbing. In essence, Generation Z students with conscientious and extroverted personality traits were less inclined toward phubbing behavior. Several studies support these results and reinforce the hypothesis of a negative association. Research shows that conscientious individuals—characterized by discipline and responsibility—are less likely to engage in phubbing due to their ability to prioritize interpersonal interactions over smartphone use (Suhendriani & Nugroho, 2022). Similarly, extroverts, who value face-to-face communication and social interaction, tend to exhibit lower levels of phubbing because their personality motivates them to focus on real-world interactions instead of digital distractions (Duradoni et al., 2023). However, some studies report contradictory findings regarding extraversion. Although extroverts generally prefer direct social interaction, their high engagement with social media may occasionally result in phubbing behaviors (Field, 2024; Sanjaya, 2022). Overall, conscientiousness consistently demonstrates a negative relationship with phubbing, whereas the effects of extraversion may vary depending on contextual and situational factors. Conscientious individuals typically exhibit high self-control, orderliness, and a strong sense of responsibility. These traits enhance their ability to manage time and prioritize tasks, making them less likely to excessively use smartphones in social settings. Therefore, conscientiousness may negatively correlate with phubbing due to a greater emphasis on in-person interaction and respect for others.

The findings also showed that neuroticism had a positive and significant relationship with phubbing. Among Generation Z students, those high in neuroticism—characterized by emotional instability and heightened sensitivity to stress—were consistently more likely to engage in phubbing. Individuals with high levels of

neuroticism often use smartphones as a coping mechanism to manage anxiety and avoid face-to-face interactions, which exacerbates phubbing behavior (Khuzaiyah, 2024). Additionally, research indicates that neurotic individuals are more prone to problematic smartphone use and FoMO, both of which mediate the relationship between neuroticism and phubbing. For instance, studies have shown that neuroticism significantly predicts phubbing in university students, with FoMO acting as a psychological trigger that reinforces this behavior (Anggrainy et al., 2024). Due to their heightened sensitivity to stress and anxiety, neurotic individuals frequently rely on smartphones to escape unpleasant social situations or reduce tension, thus engaging in more phubbing behavior. This supports the rationale that neuroticism, as a personality trait, drives individuals toward behaviors that disrupt face-to-face social interaction and increase smartphone dependence.

The findings also demonstrated a positive and significant relationship between fear of missing out and phubbing. This indicates that individuals experiencing FoMO are more likely to engage in phubbing behaviors. Numerous studies confirm the positive association between FoMO and phubbing. Research shows that individuals with high levels of FoMO are more likely to use phubbing as a coping strategy to maintain connection and avoid feelings of exclusion (Ansari et al., 2024; Nagar, 2024). FoMO acts as a psychological driver, promoting smartphone use and diminishing the quality of face-to-face interactions, directly contributing to phubbing behavior (Albalá-Genol et al., 2025; Wahyu & Suhesty, 2025). Additionally, FoMO mediates the relationship between psychosocial factors—such as relative deprivation and loneliness—and phubbing. This suggests that individuals who feel excluded or marginalized are more vulnerable to phubbing due to their heightened need for social validation through digital platforms (Anjum et al., 2024). People experiencing FoMO tend to engage in frequent smartphone and social media use in pursuit of social connection and approval. This behavior causes them to neglect in-person interactions and engage in phubbing. Such individuals often use smartphones to reduce social anxiety and maintain online relationships (Ansari et al., 2024). These findings are consistent with the rationale that FoMO, as a psychological factor, prompts behaviors that reduce real-world interaction and amplify digital dependency.

Moreover, the results indicated that fear of missing out negatively mediated the relationship between conscientiousness and phubbing. This means that FoMO, as

a mediating factor, weakens the effect of conscientiousness on phubbing behavior. While few studies have explored FoMO's mediating role in this specific relationship, they provide valuable insight. Research suggests that conscientious individuals, characterized by personal discipline and responsibility, are less likely to engage in maladaptive smartphone use because they prioritize interpersonal communication (Arzan et al., 2019). However, FoMO may act as a psychological stimulus that influences this relationship. For example, even highly conscientious individuals may experience FoMO, which can partially mediate their phubbing behavior (Akat et al., 2023). Conscientiousness may buffer the impact of FoMO, resulting in a negative mediation effect. In other words, conscientious individuals, even if they experience FoMO, still exhibit lower levels of phubbing behavior due to high self-regulation and their capacity to manage social anxiety (Ansari et al., 2024; Nagar, 2024). This hypothesis is based on the reasoning that conscientiousness, as a positive personality trait, mitigates the adverse effects of FoMO and prevents phubbing.

Additionally, the results indicated that fear of missing out positively and significantly mediated the relationship between neuroticism and phubbing among Generation Z students. This suggests that FoMO, as a psychological factor, strengthens the link between neuroticism and phubbing behavior. This hypothesis is supported by prior research. Studies show that neuroticism, marked by emotional instability and anxiety, is strongly associated with phubbing, as individuals high in neuroticism often turn to smartphones to manage stress and avoid social discomfort (Royantara et al., 2025). Research further demonstrates that people with high neuroticism are more susceptible to experiencing FoMO, which contributes to compulsive smartphone use and phubbing behaviors (Akat et al., 2023; Wahyu & Suhesty, 2025; Wajdi et al., 2024). Due to their heightened vulnerability to stress and anxiety, neurotic individuals are more likely to engage in phubbing. They frequently use smartphones as a coping mechanism to alleviate social tension and escape uncomfortable scenarios, thereby linking neuroticism directly to phubbing behavior (Ansari et al., 2024). FoMO serves as a mediating factor that reinforces this relationship. Because neurotic individuals are highly sensitive to social exclusion, they are more likely to experience FoMO. This fear prompts them to frequently check social media and maintain online connections, thereby intensifying phubbing behavior (Anggrainy et al., 2024). This hypothesis is grounded in the logic that neuroticism, as

a personality trait, predisposes individuals to behaviors that reduce real-life social engagement and foster digital dependence, with FoMO acting as a positive mediator.

## 5. Limitations & Suggestions

Despite providing valuable findings, this study on the mediating role of FoMO in the relationship between personality traits and phubbing among Generation Z students has several limitations that must be considered when interpreting the results. First, the cross-sectional design of the study prevents the establishment of causal relationships among variables. Second, the sample consisted solely of Generation Z university students, which may limit the generalizability of the findings to other populations, especially given cultural and social differences in smartphone use. Additionally, using self-report instruments to measure personality traits, FoMO, and phubbing may introduce response bias. Future research should employ longitudinal designs to examine the causal relationships among these variables and assess the long-term effects of FoMO and personality traits on phubbing. Expanding the sample to include non-student populations and exploring cultural and social differences could enhance the generalizability of the findings. Practically, it is recommended to develop educational programs aimed at increasing student awareness of the negative impacts of FoMO and phubbing, and to foster mindfulness and self-compassion skills, as these may serve as protective factors against FoMO and phubbing behavior. Furthermore, the development of digital tools to support time management and reduce smartphone dependency could help improve face-to-face social interactions among Generation Z students.

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## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.



## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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## Authors' Contributions

All authors equally contributed to this article.

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