JOURNAL OF INTERDISCIPLINARY PERSPECTIVES

ISSN Print: 2984-8288, ISSN Online: 2984-8385
Vol. 3 No. 10, pp. 433-440, October 2025

Moderating Effect of Smartphone Use Between Loneliness and Bedtime Procrastination Among Adolescents

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Date received: August 15, 2025
Date revised: September 10, 2025
Date accepted: September 19, 2025

Originality: 99%
Grammarly Score: 99%
Similarity: 1%

Recommended citation:
Pucyutan, J. (2025). Moderating effect of smartphone use between loneliness and bedtime procrastination among adolescents. *Journal of Interdisciplinary Perspectives*, *3*(10), 433-440. https://doi.org/10.69569/jip.2025.632

Abstract. This study investigated whether smartphone use moderated the relationship between loneliness and bedtime procrastination among adolescents. Using a quantitative research design, data were gathered from 202 students aged 12 to 19 in public and private schools in Tanauan City, Batangas, through simple random sampling. Standardized tools were utilized: the De Jong Gierveld Loneliness Scale for emotional (α = .67 to .74) and social loneliness (α = .70 to .73), the Bedtime Procrastination Scale (α = .92), and the Smartphone Use Scale (α = .71). Statistical methods such as mean, standard deviation, Pearson correlation, and moderation analysis using Hayes' Process Macro were employed to analyze the data. The results showed that the respondents experienced both emotional and social loneliness, alongside a slightly elevated level of bedtime procrastination and moderate smartphone use. A significant relationship was found between social loneliness and emotional loneliness and bedtime procrastination, with r-values of .311 and .321, respectively, and p-values of .000, indicating a low but positive correlation. This suggested that higher levels of loneliness were associated with increased bedtime procrastination among adolescents. However, smartphone use was not found to significantly moderate this relationship, as indicated by the results of the moderation analysis [B = -0.021, F(1, 198) = 30.454, p = 0.726]. Thus, the effect of loneliness on bedtime procrastination remained consistent regardless of the level of smartphone use. These results suggest that interventions targeting adolescents' emotional and social well-being, by fostering meaningful social connections, promoting self-regulation, and encouraging balanced smartphone use, may be more effective in reducing bedtime procrastination than strategies focused solely on technology use. Based on these findings, a program was proposed to help reduce feelings of loneliness, manage bedtime procrastination, and encourage healthier smartphone habits among adolescents.

Keywords: Adolescents; Bedtime procrastination; Loneliness; Moderation; Smartphone use

1.0 Introduction

In the current digital age, smartphones have become indispensable in daily life, shaping how individuals access information, manage tasks, and communicate. From waking up to going to bed, these devices have revolutionized modern routines by offering instant access to resources and global connectivity. According to Azizi et al. (2024), the number of smartphone users worldwide was projected to range from 4.9 to 7.1 billion in 2024, with expectations to reach 7.8 billion by 2028. With 78% of individuals aged 10 and older owning mobile phones by 2023, smartphones have also met a fundamental human need: connection. Humans are inherently social beings, and the drive for emotional support and belonging is powerful in adolescents, who are the main

users of such technology (Varga & Kotrla Topić, 2022, as cited in Merkas et al., 2024). However, the widespread use of smartphones does not guarantee emotional fulfillment. The World Health Organization (2023, as cited in Hemberg et al., 2024) identified loneliness as a pressing public health issue globally. In the Philippines, this trend is particularly alarming. Chia and Promchertchoo (2024) reported that despite being digitally connected, many young Filipinos feel increasingly lonely. The country was ranked as the second most lonely worldwide and the loneliest in Southeast Asia, according to a Meta-Gallup survey. Similarly, the Global School-Based Health Survey highlighted that the proportion of adolescents aged 13 to 17 who reported feeling lonely most or all of the time rose from 19.4% in 2015 to 24.2% in 2019. Smartphone use, while central to modern adolescent life, can become problematic. As Chan et al. (2023) noted, smartphones have become so embedded in daily routines that many find it difficult to function without them. Filipino adolescents, in particular, face increasing challenges related to smartphone dependence, with studies by Buctot et al. (2020, 2021) showing that 62.6% exhibited signs of overuse. A related issue is bedtime procrastination, the voluntary delay of going to bed despite the absence of external obstacles. This is troubling in the Philippine context, where the 2016 Healthy Living Index Survey reported that 46% of Filipinos suffer from insufficient sleep, with 32% sleeping less than six hours per night, placing the country among the most sleep-deprived globally (Casaclang et al., 2023). These issues tie directly to the United Nations' Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-Being) and SDG 12 (Responsible Consumption and Production). Addressing how smartphone use influences loneliness and sleep can contribute to better mental and physical health while promoting responsible technology use.

In response to these global and local concerns, the study sought to address three key gaps in the literature: methodological, empirical, and spatial. Methodologically, prior research has often examined loneliness, bedtime procrastination, and smartphone use in isolation or through mediation models. However, no study to date has integrated these three variables within a moderation framework. Empirically, while their separate associations have been documented, limited evidence exists on how smartphone use may influence or alter the relationship between loneliness and bedtime procrastination. Spatially, much of the existing research has been conducted in Western contexts, leaving the Philippine setting underexplored despite its distinct cultural and social dynamics that may shape these patterns differently. Addressing these gaps allows the study to extend theoretical understanding of the interplay among loneliness, bedtime procrastination, and smartphone use, while also generating contextually relevant insights that may inform both future research and practical interventions. This study, therefore, sought to examine the relationship between loneliness and bedtime procrastination among Filipino adolescents and determine whether smartphone use significantly moderates that relationship.

2.0 Methodology

2.1 Research Design

This study utilized quantitative research, which tests theories by measuring variables and analyzing numerical data statistically (Creswell, 2014, as cited in Barella et al., 2024). Supporting evidence-based decision-making (Lim, 2024), the design incorporated moderation analysis to assess how a third variable shaped the relationship between two constructs (Hair et al., 2022), yielding a clearer view of their interconnections.

2.2 Participants and Sampling Technique

Simple random sampling was employed to reduce bias and ensure representativeness. The respondents must be adolescents aged 12–19 years old in any public or private school in Tanauan City, Batangas. The sample size was computed using G*Power, and the actual number exceeded this threshold, yielding 202 respondents. Post hoc analysis indicated a statistical power of 0.99 for a 0.15 effect size ($\alpha = 0.05$) in a linear multiple regression with three predictors, confirming the strength and reliability of the results.

2.3 Research Instrument

Three adopted questionnaires, previously developed and validated in similar studies, were used for data collection. The first instrument was the 6-item short version of the 11-item De Jong Gierveld Loneliness Scale, developed by De Jong Gierveld, Kamphuis, and Van Tilburg in the early 1980s. While both versions can function as unidimensional measures, they were designed with Weiss's (1973) distinction between social and emotional loneliness in mind. The 6-item version retained the ability to assess overall, emotional, and social loneliness, showing α values of .70–.76 overall, .67–.74 for emotional, and .70–.73 for social loneliness. Correlations with the 11-item scale were high ($r = .93–.95$), with subscale correlations above .88 and .93. Confirmatory factor analysis

confirmed the two distinct but related dimensions. The scale used three responses—yes, more or less, and no—with specific scoring for negatively (items 1–3) and positively (items 4–6) worded items (Gierveld & Van Tilburg, 1999, 2006, as cited in Kenny et al., 2023). Bedtime procrastination was measured using the 9-item Bedtime Procrastination Scale by Kroese et al. (2014). It demonstrated excellent reliability (α = .92) and used a 5-point response scale from 1 (never) to 5 (always), with items 2, 3, 7, and 9 reverse scored. Exploratory factor analysis revealed a single-factor structure (eigenvalue = 5.57), supporting its construct validity (Kroese et al., 2014, as cited in Xu et al., 2024). Smartphone use was assessed with the 30-item Smartphone Use Scale (SUS) by Mukherjee and Dasgupta (2020), scored from 5 ("Always") to 1 ("Never"). Designed for teenagers and young adults, it identifies problematic use to aid in early intervention. Reliability testing showed α = .712, and concurrent validity with the Smartphone Addiction Scale yielded r = .76 (Mukherjee & Dasgupta, 2020).

2.4 Data Gathering Procedure

The researcher initiated data collection by submitting a formal letter to school heads requesting permission to conduct the study, outlining its purpose, procedures, informed-consent process, and target respondents. Upon approval and preparation, data gathering commenced after obtaining informed consent. For respondents aged 12–17, parental or guardian consent was secured prior to participation. Respondents then completed the De Jong Gierveld Loneliness Scale, the Bedtime Procrastination Scale, and the Smartphone Use Scale, either online via Google Forms or through a pen-and-paper version for those with limited technological access. Collected data were scored, documented, and analyzed.

2.5 Data Analysis Procedure

To examine the relationships among variables, the study employed a three-step statistical analysis: descriptive statistics, correlational analysis, and moderation analysis. Descriptive statistics were used to summarize the data through measures such as means and standard deviations, providing a clear overview of central tendency and variability (Blbas, 2024). Pearson's r was then calculated to determine the degree of association between variables (Janse et al., 2021). Finally, moderation analysis was carried out using Hayes' Process Macro for SPSS, a bootstrapping-based tool that estimates the influence of a moderator on the independent–dependent variable link, yielding coefficients, significance levels, and model fit indicators (Hayes, 2013; Abu-Bader & Jones, 2021).

2.6 Ethical Considerations

Ethical standards were strictly observed to uphold research integrity, protect respondents' rights, and foster trust. Informed consent was obtained from all respondents, with additional parental or guardian consent secured for minors aged 12–17 to ensure their welfare. Participation was entirely voluntary, and respondents retained the right to withdraw at any time without consequence. Confidentiality and privacy were rigorously maintained, with all personal information and responses kept secure and used solely for research purposes. The researcher prioritized the physical, emotional, and psychological well-being of respondents, implementing measures to respect their dignity and rights. The research process was continuously monitored to address any concerns or discomfort, providing necessary support when required. Above all, no harm was inflicted on respondents, particularly minors, and their well-being was placed above any potential benefits of the findings.

3.0 Results and Discussion

3.1 Level of Loneliness Among Adolescents in Terms of Emotional Loneliness and Social Loneliness

Table 1. *Level of Loneliness Among Adolescents in Terms of Emotional Loneliness*

Indicators in Terms of Emotional Loneliness	$\bar{X}$	SD	VI
1. I experience a general sense of emptiness.	0.81	0.396	ML
2. I miss having people around me.	0.85	0.361	ML
3. I often feel rejected.	0.72	0.451	ML
General Assessment	**0.79**	**0.289**	**ML**

Legend: 1.00 – 0.50 Yes (Y)/ Most Lonely (ML) 0.00 – 0.49 No (N)/ Least Lonely (LL)

Filipino adolescents were generally assessed as Most Lonely (M = 0.79), with "I miss having people around me" scoring highest (0.85) and "I often feel rejected" lowest (0.72). This indicates a strong need for emotional closeness alongside feelings of exclusion and fear of rejection, which hinder the formation of meaningful relationships. The findings align with Russell's (1996, as cited in Xu et al., 2024) view of loneliness as a subjective state of unmet relational needs, and Giordano et al.'s (2025) observation that negative self-perceptions reinforce

isolation. Consistent with Weiss's Social Needs Perspective, results suggest that emotional loneliness stems from the absence of deep, supportive bonds rather than mere lack of social contact (Díaz-Mardomingo et al., 2023).

Table 2. *Level of Loneliness Among Adolescents in Terms of Social Loneliness*

Indicators in Terms of Social Loneliness	$\bar{X}$	SD	VI
1. There are plenty of people I can rely on when I have problems. (R)	0.56	0.497	ML
2. There are many people I can trust completely. (R)	0.66	0.474	ML
3. There are enough people I feel close to. (R)	0.39	0.488	LL
General Assessment	**0.54**	**0.376**	**ML**

Legend: 1.00 – 0.50 Yes (Y)/ Most Lonely (ML) 0.00 – 0.49 No (N)/ Least Lonely (LL)

The Social Loneliness of Filipino adolescents was rated as the Most Lonely (M = 0.54). "There are many people I can trust completely" had the highest mean (0.66, Most Lonely), while "There are enough people I feel close to" had the lowest (0.39, Least Lonely). This indicates significant social loneliness, mainly from a lack of people they can trust completely, despite having individuals they feel close to. Trust, essential for strong connections, is absent, leaving specific needs unmet. While surrounded by peers, adolescents may still feel disconnected due to a lack of confidence in their reliability. The lower mean for closeness suggests they maintain familiarity and connectedness, indicating they are not entirely socially detached. This finding aligns with Verity et al. (2022), who linked adolescent loneliness to negative self-perceptions and difficulty trusting peers, showing that unresolved trust issues can persist despite friendships. It contrasts with Qualter et al. (2013, 2015, as cited in Barreto et al., 2020), who associated loneliness with unstable networks during transitions. Here, respondents still perceive having enough close contacts, suggesting stability and a protective network. Consistent with Weiss's Social Needs Perspective, which defines social loneliness as disconnection from a larger network, limited trust may reflect the perception of not belonging to a dependable wider group, contributing to their social loneliness despite having some close ties (Malli et al., 2023).

3.2 Level of Bedtime Procrastination Among Adolescents

Filipino adolescents scored Slightly High in bedtime procrastination (M = 3.24). The highest-rated behavior was, "Often, I am still doing other things when it is time to go to bed" (M = 3.81, High), while the lowest was, "If it is time to turn off the lights at night, I do it immediately" (M = 2.34, Low). These results suggest that many adolescents remain occupied with various activities past their intended bedtime, reflecting a present-focused orientation. However, once they decide to sleep, they generally follow through, indicating intentional rather than impulsive decision-making. These findings align with Herzog-Krzywoszanska et al. (2024), who noted that future-focused individuals are less prone to procrastination. The tendency of these adolescents to prioritize present activities over future consequences supports this, indicating a lack of awareness of long-term effects. This also supports Oliveira et al. (2023), who described bedtime procrastination as intentional delay. While adolescents show present-focused tendencies, they also display deliberate control when choosing to sleep. The findings also echo Kroese et al. (2014, as cited in Xu et al., 2024), who defined bedtime procrastination as voluntarily delaying sleep in the absence of external constraints. In this case, the tendency appears to stem from internal, present-focused motivations.

Table 3. *Level of Bedtime Procrastination Among Adolescents*

Indicators in Terms of Level of Bedtime Procrastination	$\bar{X}$	SD	VI
1. I go to bed later than I had intended.	3.32	1.017	SH
2. I go to bed early if I have to get up early in the morning. (R)	2.82	1.200	SH
3. If it is time to turn off the lights at night, I do it immediately. (R)	2.34	1.295	L
4. Often, I am still doing other things when it is time to go to bed.	3.81	1.149	H
5. I easily get distracted by things when I actually would like to go to bed.	3.57	1.105	H
6. I do not go to bed on time.	3.39	1.266	SH
7. I have a regular bedtime which I keep to. (R)	3.14	1.144	SH
8. I want to go to bed on time, but I do not.	3.38	1.208	SH
9. I can easily stop with my activities when it is time to go to bed. (R)	3.40	1.239	H
General Assessment	**3.24**	**0.680**	**SH**

Legend: 4.20 – 5.00 Almost Always/ Very High (VH) 2.60 – 3.39 Neutral/ Slightly High (SH) 1.00 – 1.79 Rarely/ Very Low (VL)
3.40 – 4.19 Frequently/ High (H) 1.80 – 2.59 Rarely/ Low (L)

3.3 Level of Smartphone Use Among Adolescents

Smartphone use among Filipino adolescents had an overall composite mean of 3.15, verbally interpreted as

Sometimes. The highest-rated behavior was "I put my phone on silent or vibration mode when I am supposed to switch it off" (M = 3.97, Frequently), while the lowest was "I spend a major part of my pocket money on my smartphone every month" (M = 1.87, Rarely). These results suggest that adolescents occasionally use smartphones, with a notable tendency to keep devices accessible by silencing rather than turning them off—possibly reflecting attachment to the device or fear of missing out (FOMO) (Haibo et al., 2021). Limited spending on smartphones may be due to financial dependence on parents or guardians, restricting investment in paid features or services. The study's finding of occasional smartphone use among Filipino adolescents aligns with prior literature. Varga and Kotrla Topić (2022, as cited in Merkas et al., 2024) identified smartphones as the preferred devices for staying connected and for entertainment, consistent with the observed tendency to keep phones on silent or vibration mode rather than turning them off.

Table 4. *Level of Smartphone Use among Adolescents*

Indicators in Terms of Level of Smartphone Use		$\bar{X}$	SD	VI
1.	I fiddle with my smartphone without realizing.	2.94	0.998	S
2.	I do not try to use my smartphone in places where it is prohibited.	3.56	1.171	F
3.	My fingers often feel sore due to texting.	1.88	1.082	R
4.	I use my smartphone for more than 10 hours each day.	3.01	1.291	S
5.	My friends and family have commented on my excessive phone usage.	3.08	1.203	S
6.	I feel nervous when my smartphone is not with me.	3.25	1.385	S
7.	I keep my smartphone with me when I study.	3.39	1.104	S
8.	I take my smartphone with me to the toilet.	3.18	1.383	S
9.	My ideal gift to receive would be a higher model of a smartphone.	2.86	1.382	S
10.	I sleep with my smartphone switched on next to me.	2.49	1.397	R
11.	I avoid going to places where I cannot use my smartphone.	2.31	1.145	R
12.	I put my phone on silent or vibration mode when I am supposed to switch it off.	3.97	1.384	F
13.	My smartphone is my constant companion.	3.60	1.164	F
14.	I have had accidents while using my smartphone.	2.04	1.158	R
15.	I use my smartphone to avoid people I am uncomfortable around.	3.62	1.356	F
16.	I am entirely dependent on my smartphone.	3.02	1.215	S
17.	I do not use my smartphone when I am with friends or family.	3.04	1.033	S
18.	My smartphone is my most important possession.	3.19	1.322	S
19.	I do not feel lonely when my smartphone is with me.	3.59	1.291	F
20.	I feel more comfortable talking over the phone than face-to-face.	2.95	1.320	S
21.	I reach for my phone first thing in the morning.	3.69	1.240	F
22.	I use the internet from my smartphone even when I have access to a computer.	3.20	1.320	R
23.	I spend a significant part of my pocket money on my smartphone every month.	1.87	1.082	R
24.	I can concentrate better when my smartphone is not with me.	3.33	1.043	S
25.	I go through old messages and photos on my smartphone when I am bored.	3.88	1.238	D
26.	I keep checking my phone for notifications.	3.62	1.288	D
27.	I find my phone cumbersome to carry around.	2.82	0.978	S
28.	I use my smartphone as an escape from my problems.	3.82	1.159	F
29.	I feel more comfortable talking face-to-face than texting.	3.47	1.230	F
30.	It is not easy to imagine everyday life without my smartphone.	3.42	1.351	F
General Assessment		**3.15**	**0.543**	**S**

Legend: 4.20 – 5.00 Almost (A) | 2.60 – 3.39 Sometimes (S) | 1.00 – 1.79 Never (N)
3.40 – 4.19 Frequently (F) | 1.80 – 2.59 Rarely (R)

Similarly, Dadas (2021) reported that adolescents primarily spend on internet-related services rather than the devices themselves, supporting the finding that they rarely allocate significant portions of their pocket money to smartphones. While Buctot et al. (2020) reported high smartphone addiction rates, the present results indicate moderate use. Chan et al. (2023) emphasized the central role of smartphones in daily life. However, they cautioned about excessive use, consistent with Casey and Caudle (2013, as cited in Zhang et al., 2021) and Billieux et al. (2015, as cited in Spiratos & Ratanasiripong, 2023), who highlighted risks of dependency due to poor self-regulation. The results also reflect Mukherjee and Dasgupta's (2020) conceptual framework, where keeping smartphones on silent or vibration rather than turning them off indicates a desire to remain connected and potential problematic use. Although significant monetary investment was lacking, frequent accessibility behaviors may signal early signs of dependency.

3.4 Test of Significant Relationship

Based on the findings, there was a significant relationship between loneliness and bedtime procrastination. Table 4 shows that the r values (.311 to .321) indicated a low positive correlation, with probability values (.000) lower than the significance level (P<0.05), leading to the rejection of the null hypothesis. Loneliness plays a slight role in influencing bedtime procrastination among Filipino adolescents, with higher loneliness linked to a slight increase in delaying sleep, possibly as a coping mechanism. These results align with previous studies. Feneberg et al. (2022, as cited in Shi et al., 2024) noted that loneliness can lead to dwelling on isolation at night, contributing to delayed sleep. Hemberg et al. (2022) found that socially lonely adolescents often seek interaction late in the day. Baumeister et al. (2007, as cited in Xu et al., 2024) stated that negative emotions like loneliness foster procrastination, supported by Xu et al. (2024) among Chinese students. Trost and Hast (2024) reported similar findings in Germany, linking loneliness to bedtime procrastination and reduced sleep quality. These studies support that loneliness, though modest in effect, contributes to bedtime procrastination.

Table 4. *Test of Significant Relationship Between the Level of Loneliness and the Level of Bedtime Procrastination Among Adolescents*

Level of Loneliness	Level of Bedtime Procrastination	r value	P value	Remarks	Decision
Emotional Loneliness	Bedtime Procrastination	.321**	.000	Significant	Reject H_o
Social Loneliness		.311**	.000	Significant	Reject H_o

**Correlational at the level 0.01 *Correlational at the level 0.05(Two-tailed)

3.5 Test of Moderation

Smartphone use did not significantly moderate the relationship between loneliness and bedtime procrastination among adolescents. As shown in Table 5, the moderation analysis using Hayes Process Macro indicated no significant moderation [B=-0.021, F(1,198)=30.454, p-value=0.726], thus the null hypothesis was retained. This suggests that, regardless of smartphone use duration, the link between loneliness and bedtime procrastination remains unchanged. Other factors may influence bedtime procrastination, making smartphone use less impactful than expected. Zhang et al. (2020) found that loneliness and depression increased smartphone use among college students, but smartphone use did not predict later changes in emotional states. Similarly, Orben and Przybylski (2020), using data from 11,884 adolescents, found only a small adverse effect of device use on sleep duration and no significant effect on bedtime or total sleep, supporting the present study's conclusion. Contrastingly, Meng et al. (2024) reported that excessive smartphone use heightened loneliness, reduced positive affect, and impaired emotional regulation, potentially worsening bedtime procrastination. Chen et al. (2023) also identified a bidirectional link between problematic smartphone use and bedtime procrastination, with self-control mediating the relationship, creating a reinforcing cycle for those with low self-regulation.

Table 5. *Test of Moderation of Smartphone Use on the Relationship Between Loneliness and Bedtime Procrastination Among Adolescents*

Moderator	B	T	R^2-Change	F	p-value
Smartphone Use	-.021	-.351	0.305	30.454	0.726

IV: Loneliness, **DV**: Bedtime Procrastination, df1=1, df2=198.

Possible reasons for the lack of moderation include the diverse activities done on smartphones, not all involving social connection, and the fact that some devices are not internet-enabled. Smartphone effects on bedtime procrastination may also depend on timing; some use phones earlier in the evening and put them away before bed, while others use them until sleep. Since most studies measure total use, such timing differences remain unaccounted for, obscuring potential moderating effects.

4.0 Conclusion

Based on the study's findings, it can be concluded that Filipino adolescents experience significant emotional and social loneliness, characterized by a longing for connection, a fear of rejection, and difficulties in forming deep, trusting relationships, all of which contribute to a sense of isolation. Despite this, adolescents often remain engaged in various activities even when it is already time to go to bed, reflecting a present-oriented way of thinking; however, once they consciously decide to end the day, they typically follow through without delay, demonstrating intentional decision-making and awareness of their planned bedtime. Smartphone use among Filipino adolescents was found to be moderate, with many keeping their phones on silent or vibration mode to limit distractions while remaining accessible. However, they do not allocate substantial portions of their finances to smartphones, suggesting that while phone usage is prioritized, it is not considered a significant financial

investment. The study also revealed a slight positive correlation between loneliness and bedtime procrastination, indicating that higher levels of loneliness are associated with a marginal increase in delaying bedtime. Interestingly, smartphone use was not found to moderate the relationship between loneliness and bedtime procrastination, suggesting that other factors may play a more significant role in influencing these behaviors. Addressing these challenges among Filipino adolescents, therefore, requires a holistic and multidimensional approach. The Sigla't Saya Kabataan (SSK) Wellness Program, which integrates peer support, self-regulation training, and digital mindfulness initiatives, represents a comprehensive strategy to promote adolescents' overall well-being and resilience by fostering meaningful social connections, supporting healthy sleep practices, and advocating responsible smartphone use.

5.0 Contributions of Authors

The author solely contributed to each section.

6.0 Funding

This work received no specific grant from any funding agency.

7.0 Conflict of Interests

The author declares no conflicts of interest in the publication of this paper.

8.0 Acknowledgment

The author extends sincere gratitude to those who made this study possible: Mr. Bernard Christopher A. Catam, research adviser, for his unwavering guidance and support; Dr. Ma. Lorena M. Tagala, research director, for her encouragement and wisdom; Dean Alfredo G. Perez Jr. and Dr. Shielilo R. Amihan, panel and chair, for their insightful feedback; and Dr. Melchor A. Villapando, quantitative analyst, for his expert assistance in data analysis.

9.0 References

Abu-Bader, S., & Jones, T. V. (2021). Statistical mediation analysis using the Sobel test and Hayes SPSS process macro. International Journal of Quantitative and Qualitative Research Methods. Available at SSRN: https://ssrn.com/abstract=3799204

Azizi, A., Emamian, M. H., Hashemi, H., & Fotouhi, A. (2024). Smartphone addiction in Iranian schoolchildren: A population-based study. Scientific Reports, 14. https://doi.org/10.1038/s41598-024-73816-8

Barella, Y., Fergina, A., Mustami, M., Rahman, U., & Alajaili, H. (2024). Quantitative methods in scientific research. Jurnal Pendidikan Sosiologi dan Humaniora, 15, 281. https://doi.org/10.26418/j-psh.v15i1.71528

Barreto, M., Victor, C., Hammond, C., Eccles, A., Richins, M., & Qualter, P. (2020). Loneliness around the world: Age, gender, and cultural differences in loneliness. Personality and Individual Differences, 169, 110066. https://doi.org/10.1016/j.paid.2020.110066

Blbas, H. (2024). Descriptive statistics. IntechOpen. https://doi.org/10.5772/intechopen.1002179

Buctot, D., Kim, N., & Kim, J. (2020). Factors associated with smartphone addiction prevalence and its predictive capacity for health-related quality of life among Filipino adolescents. Children and Youth Services Review, 110, 104758. https://doi.org/10.1016/j.childyouth.2020.104758

Buctot, D., Kim, N., & Kim, S. -H. (2021). Personal profiles, family environment, patterns of smartphone use, nomophobia, and smartphone addiction across low, average, and high perceived academic performance levels among high school students in the Philippines. International Journal of Environmental Research and Public Health, 18(10), 5219. https://doi.org/10.3390/ijerph18105219

Casaclang, R., Manahan, J., Pineda, D. C., Villaflor, N., & Damirson, A. (2023). Wake up or stay up?: The correlation of sleep quality and task workload to academic performance of UST graduate and undergraduate students during the COVID-19 pandemic. 2220–2230. https://doi.org/10.46254/AN13.20230591

Chan, S., Yeo, K. J., & Handayani, L. (2023). Types of smartphone usage and problematic smartphone use among adolescents: A review of the literature. International Journal of Evaluation and Research in Education (IJERE), 12(2), 563. https://doi.org/10.11591/ijere.v12i2.22909

Chen, S., Liao, J., Wang, X., Wei, M., & Liu, Y. (2023). Bidirectional relations between problematic smartphone use and bedtime procrastination among Chinese university students: Self-control as a mediator. Sleep Medicine, 112, 53–62. https://doi.org/10.1016/j.sleep.2023.09.033

Chia, L., & Promchertchoo, P. (2024). Gen Z Filipinos are the loneliest youths in Southeast Asia, struggling despite being digitally connected. Channel News Asia. https://tinyurl.com/3kur27fp

Dadas, A. (2021). Study of behavior of students towards usage of smartphone in management institutes with reference to pune city. Human Resource Management, 6.

Díaz-Mardomingo, M. C., Utrera, L., Baliyan, S., García-Herranz, S., Suárez Falcón, J. C., Rodríguez, R., Sampedro Piquero, P., Valencia, A., & Venero, C. (2023). Sex-related differences in the associations between diurnal cortisol pattern and social and emotional loneliness in older adults. Frontiers in Psychology, 14. https://doi.org/10.3389/fpsyg.2023.1199405

Giordano, F., Calaresi, D., Saladino, V., & Verrastro, V. (2025). Perception of loneliness in adolescence: Role of maladaptive personality traits and trauma-related symptomatology. Brain Sciences, 15(1), 86. https://doi.org/10.3390/brainsci15010086

Haibo, Y., Liu, B., & Fang, J. (2021). Stress and problematic smartphone use severity: Smartphone use frequency and fear of missing out as mediators. Frontiers in Psychiatry, 12, 659288. https://doi.org/10.3389/fpsyt.2021.659288

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM) (3rd ed.). Sage.

Hemberg, J., Östman, L., Korzhina, Y., Groundstroem, H., Nyström, L., & Nyman-Kurkiala, P. (2022). Loneliness as experienced by adolescents and young adults: An explorative qualitative study. International Journal of Adolescence and Youth, 27(1), 362–384. https://doi.org/10.1080/02673843.2022.2109422

Hemberg, J., Sundqvist, A., Korzhina, Y., Östman, L., Gylfe, S., Gädda, F., & Nyman-Kurkiala, P. (2024). Being young in times of uncertainty and isolation: Adolescents' experiences of well-being, health, and loneliness during the COVID-19 pandemic. International Journal of Adolescence and Youth, 29(1). https://doi.org/10.1080/02673843.2024.2302102

Herzog-Krzywoszanska, R., Krzywoszanski, L., & Kargul, B. (2024). General procrastination and bedtime procrastination as serial mediators of the relationship between temporal perspective and sleep outcomes. Scientific Reports, 14, Article 82523. https://doi.org/10.1038/s41598-024-82523-3

Janse, R. J., Hoekstra, T., Jager, K. J., Zoccali, C., Tripepi, G., Dekker, F. W., & van Diepen, M. (2021). Conducting correlation analysis: Important limitations and pitfalls. Clinical Kidney Journal, 14(11), 2332–2337. https://doi.org/10.1093/ckj/sfab085

Kenny, L., Hyland, P., Cloitre, M., & Shevlin, M. (2023). Factor structure of the shortened six-item version of the de Jong Gierveld loneliness scale (DJGLS-6): A systematic review and testing factor models in a nationally representative sample. European Journal of Mental Health, 18, 1–12. https://doi.org/10.5708/EJMH.18.2023.0001

Lim, W. M. (2024). What is quantitative research? An overview and guidelines. Australasian Marketing Journal, 0(0). https://doi.org/10.1177/14413582241264622

Malli, M. A., Ryan, S., Maddison, J., & Kharicha, K. (2023). Experiences and meaning of loneliness beyond age and group identity. Sociology of Health & Illness, 45(1), 70–89. https://doi.org/10.1111/1467-9566.13539

Meng, S., Zhang, Y., Tang, L., Zhang, M., Tang, W., Onyebuchi, N., Han, Y., Han, S., Li, B., Wenxia, T., & Ge, X. (2024). The effects of mobile phone addiction on bedtime procrastination in university students: The masking effect of physical activity and anxiety. BMC Psychology, 12. https://doi.org/10.1186/s40359-024-01899-z

Merkaš, M., Bodrozic Selak, M., & Žulec Ivanković, A. (2024). Problematic smartphone use and communication in families with adolescents. Adolescents, 4, 107–119. https://doi.org/10.3390/adolescents4010008

Mukherjee, S., & Dasgupta, S. (2020). Development and validation of the smartphone use scale. International Journal of Indian Psychology, 8(4), 494–499. https://doi.org/10.25215/0804.061

Oliveira, A., Pereira, B., Rosário, P., & Magalhães, P. (2023). Bedtime procrastination during the second COVID-19 lockdown in Portugal. Sleep Science, 15, 105–111. https://doi.org/10.5935/1984-0063.20220031

Orben, A., & Przybylski, A. K. (2020). Teenage sleep and technology engagement across the week. PeerJ, 8, e8427. https://doi.org/10.7717/peerj.8427
Shi, X., Wu, Y., Cao, F., Wang, X., Du, K., & Zang, S. (2024). The effect of loneliness on interpersonal sensitivity among nursing undergraduates: A chain mediation role of problematic internet use and bedtime procrastination. BMC Nursing, 23, 642. https://doi.org/10.1186/s12912-024-02321-0
Spiratos, K., & Ratanasiripong, P. (2023). Problematic smartphone use among high school students. Journal of School Administration Research and Development, 8(2), 76–86. https://doi.org/10.32674/jsard.v8i2.4893
Trost, S., & Hast, M. (2024). Loneliness and bedtime procrastination: Exploring a model of interconnectedness among young adults in Germany. Journal of Sleep and Sleep Disorder Research, 2, 1–16. https://doi.org/10.14302/issn.2574-4518.jsdr-24-5287
Verity, L., Yang, K., Nowland, R., Shankar, A., Turnbull, M., & Qualter, P. (2022). Loneliness from the adolescent perspective: A qualitative analysis of conversations about loneliness between adolescents and Childline counselors. Journal of Adolescent Research, 39(5), 1413–1443. https://doi.org/10.1177/07435584221111121
Xu, C., Lin, N., Shen, Z., Xie, Z., Xu, D., Fu, J., & Yan, W. (2024). Bedtime procrastination related to loneliness among Chinese university students during the post-pandemic period: A moderated chain mediation model. BMC Public Health, 24. https://doi.org/10.1186/s12889-024-18019-6
Zhang, M., Zhou, H., Yang, H. M., & Wu, A. (2021). The prospective effect of problematic smartphone use and fear of missing out on sleep among Chinese adolescents. Current Psychology, 42(10), 7499–7509. https://doi.org/10.1007/s12144-021-01863-9
Zhang, X. -X., Rost, D. H., Wang, J. -L., & Reynolds, K. J. (2020). Active and passive social networking sites usage and negative emotions: A reciprocal relationship? Journal of Social and Clinical Psychology, 39(3), 195–213.https://doi.org/10.1521/jscp.2020.39.3.195