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Internet Use Effects on Loneliness Through Self-Objectification Among Junior High School Students

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Abstract

The rapid rise of digital technology has increased problematic internet use among adolescents, raising concerns about its impact on loneliness, particularly in non-Western contexts like Indonesia. This study aimed to examine whether self-objectification mediates the relationship between problematic internet use and loneliness among Indonesian junior high school students. A quantitative correlational design was employed, involving 357 students aged 13–15 years from five diverse schools in Central Kalimantan, selected via proportionate stratified random sampling. Data were collected using standardized questionnaires and analyzed with PROCESS Macro Hayes Model 4 with 5,000 bootstrap samples. Findings revealed a significant direct effect of problematic internet use on loneliness, but no significant relationships between problematic internet use and self-objectification or self-objectification and loneliness. The mediation effect of self-objectification was also non-significant. These results suggest that problematic internet use directly contributes to loneliness without self-objectification as a mediator, highlighting the need for digital wellness programs to promote balanced internet use and foster offline social connections among Indonesian adolescents.

Keywords

Adolescents, Internet Use, Loneliness, Self-Objectification.

1. Introduction

The rapid advancement of digital technology has fundamentally transformed childhood experiences in the 21st century, with gadgets becoming increasingly integrated into early childhood development contexts. Early adolescence represents a critical period characterized by rapid neurological, cognitive, and social development, where environmental influences, including digital engagement, can have profound and lasting impacts on a child's trajectory (Wartberg et al., 2021). In Indonesia, online engagement continues to rise annually, with approximately 70.84% of households recorded as using the internet in 2020, up from 70.17% the previous year (Statistics Indonesia, 2021). This widespread digital adoption has reshaped adolescent social interactions, self-perception, and emotional well-being, raising concerns about its psychological consequences, particularly in non-Western contexts like Indonesia (Nesi et al., 2022).

Research has established a strong correlation between loneliness and excessive online behavior. Higher levels of loneliness correspond to greater tendencies toward problematic internet use or digital addiction (Fitriana & Hariyono, 2024). This finding supports theoretical frameworks identifying loneliness as a psychosocial factor driving maladaptive internet engagement, with a reciprocal relationship where loneliness fuels excessive online activity, and uncontrolled digital consumption exacerbates feelings of isolation, particularly among adolescents (Embang et al., 2024). Such dynamics are particularly relevant for Indonesian adolescents, who navigate unique socio-cultural pressures that may amplify the psychological impacts of digital engagement (Kusumastiti, 2024).

The Indonesian context presents distinct challenges in understanding digital behavior among adolescents, shaped by cultural values, educational pressures, and rapid technological adoption. According to Kusumastiti (2024), Indonesian adolescents face intense academic expectations and social conformity pressures, which influence their engagement with digital platforms and subsequent psychological outcomes. These factors create patterns of internet use that may differ from those observed in Western populations, necessitating culturally specific research (Chemnad et al., 2025). Previous studies have primarily focused on the direct relationship between problematic internet use and loneliness, often overlooking potential mediating psychological mechanisms. For instance, Maharani (2023) highlighted the direct link between excessive internet use and emotional distress but did not explore underlying processes like self-objectification. This gap underscores the need for research examining how psychological constructs, such as self-objectification, mediate the internet use-loneliness relationship among Indonesian junior high school students.

This study addresses this research gap by proposing a mediation model that integrates problematic internet use, self-objectification, and loneliness within the Indonesian adolescent context. Building on objectification theory (Fredrickson & Roberts, 1997), it theorizes that excessive internet use may foster self-objectifying behaviors, which in turn exacerbate loneliness by prioritizing appearance-based validation over meaningful social connections. Unlike prior research focusing on older populations or Western settings, this study targets early adolescents (aged 13–15) in Indonesia, where cultural values like modesty and collective harmony intersect with globalized digital influences (Maryufani, 2022). By examining self-objectification as a potential mediator, this research offers a novel theoretical contribution to understanding the psychological pathways linking digital engagement to loneliness.

The present study employs a correlational quantitative approach involving 357 junior high school students, selected using proportional stratified random sampling. Data analysis utilizes PROCESS Macro Hayes Model 4 to examine the mediation

effect. The central research question addresses whether self-objectification mediates the relationship between problematic internet use and loneliness among these students. From a practical perspective, the findings aim to inform targeted interventions for adolescent mental health in digital contexts, building on evidence that structured programs can mitigate the negative effects of excessive internet use (Hugh-Jones et al., 2022). This research seeks to provide a comprehensive understanding of the psychological pathways connecting excessive online engagement with loneliness, contributing to both theoretical and practical advancements in adolescent psychology within Indonesia's unique socio-cultural landscape.

2. Literature Review and Hypothesis Development

2.1. Problematic Internet Use, Self-Objectification, and Loneliness

The theoretical foundation of this research centers on Problematic Internet Use (PIU) Theory, first developed by Young (1996), which refers to phenomena where excessive online engagement disrupts an individual's daily life, encompassing social relationships, academic performance, and emotional well-being. PIU manifests as compulsive behaviors like excessive gaming or social media use, often driven by psychological needs to escape stress or loneliness (Davis et al., 2014). Adolescents are particularly vulnerable due to their developing impulse control and decision-making capacities, with excessive digital engagement affecting dopamine pathways similar to substance addictions (Andrade, 2019; Anderson & Rainie, 2020; AlGerafi et al., 2023). This vulnerability is amplified in Indonesia, where cultural and academic pressures shape unique digital consumption patterns (Kusumaningtyas, 2024).

Self-Objectification Theory, developed by Fredrickson and Roberts (1997), explains how individuals, particularly adolescents, internalize external evaluations of their physical appearance, prioritizing body image over intrinsic qualities. This process intensified by social media's focus on likes and comments, leads to body shame and reduced self-esteem (Cash, 2012; Safitri, 2022). In digital contexts, platforms amplify self-objectification by providing instant feedback on appearance, particularly among Indonesian adolescents exposed to global beauty standards (Kumar et al., 2024; Maryufani, 2022). This phenomenon is critical during early adolescence, a period of identity formation where digital interactions can shift focus from meaningful qualities to external validation (Choukas-Bradley et al., 2022; Pepper, 2023).

Loneliness, as framed by Cognitive Discrepancy Theory, arises from gaps between desired and actual social relationships (Perlman & Peplau, 1981). Perlman and Peplau (1981) highlight that adolescents experiencing excessive internet use may face social isolation, exacerbating loneliness through reduced offline interactions (Chemnad et al., 2025). Research shows that problematic internet use correlates with increased loneliness, as adolescents seek online validation, which can deepen isolation (Singhal & Bhargava, 2024; Dai et al., 2025). Self-objectification may mediate this relationship by fostering appearance-based validation over authentic connections, particularly in Indonesia's competitive educational context (Fathoni & Indrawati, 2022). These interrelationships suggest a complex interplay where problematic internet use influences self-objectification, which in turn may heighten loneliness, warranting further exploration in adolescent populations.

H1: Problematic internet use has a significant effect on self-objectification.

H2: Self-objectification has a significant effect on loneliness.

H3: Problematic internet use has a significant effect on loneliness.

H4: Self-objectification mediates the relationship between problematic internet use and loneliness.

2.2. Research Framework

This study proposes a mediation model to examine how problematic internet use affects loneliness through self-objectification among Indonesian junior high school students, as illustrated in Figure 1. Problematic internet use, characterized by compulsive online behaviors, is hypothesized to increase self-objectification by exposing adolescents to appearance-focused digital content (Nesi et al., 2022). Nesi et al. (2022) emphasize that social media platforms amplify self-objectifying tendencies, which may lead to superficial social interactions and heightened loneliness (He et al., 2020). This model posits that self-objectification, driven by external validation, mediates the relationship between problematic internet use and loneliness, aligning with Cognitive Discrepancy Theory’s focus on relational gaps (Perlman & Peplau, 1981).

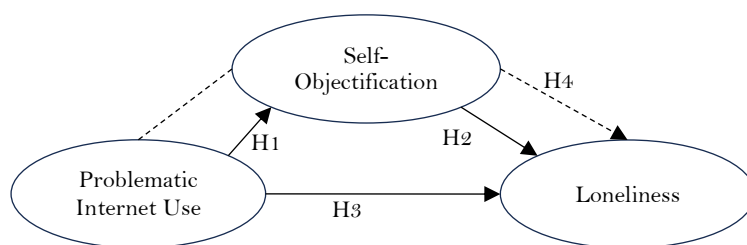


Figure 1. Research Framework

Figure 1 depicts the hypothesized pathways: (a) problematic internet use directly influences self-objectification, (b) self-objectification contributes to loneliness, and (c) problematic internet use directly affects loneliness, with self-objectification as a potential mediator. According to Archer (2022), excessive online engagement can alter self-perceptions, reinforcing objectifying attitudes that isolate adolescents from meaningful relationships. In Indonesia, cultural factors like academic pressure and social conformity may exacerbate these effects, making this framework particularly relevant (Wanniarachchi et al., 2022; Fathoni & Indrawati, 2022). This model integrates adolescent development theories, such as Erikson’s identity formation, to contextualize how digital behaviors shape self-concept and social outcomes during early adolescence (Miller, 2020). The framework guides the study’s hypotheses, testing direct and indirect effects to provide insights into effective interventions for adolescent mental health in digital contexts.

3. Methods

This study adopted a quantitative non-experimental approach with a correlational design to examine relationships between problematic internet use, self-objectification, and loneliness among adolescents without manipulating variables (Creswell & Creswell, 2018). This design suits the exploratory nature of investigating psychological mechanisms in educational settings, where experimental manipulation would be ethically and practically challenging. The cross-sectional data collection allowed for analyzing variable relationships at a single time point, providing insights into correlational patterns and potential mediation effects, despite limitations in establishing causality.

The target population comprised Grade 8 students (aged 13–15 years) in Central Kalimantan, Indonesia, across five diverse schools: public, Islamic-integrated, Islamic boarding, and Muhammadiyah-affiliated institutions. This diversity ensured representation of varied socio-educational backgrounds within Palangka Raya’s

urban context. The sample size of 357 students was determined using Isaac and Michael's table with a 95% confidence level and 5% margin of error, calculated from a population of 5,249 students across 50 schools, ensuring adequate statistical power for mediation analysis (power = 0.80, effect size = 0.15). Proportionate stratified random sampling was employed, with school population size as the stratification criterion, to achieve a representative distribution. The sample (N = 357, M = 14.2 years, SD = 0.76) included 52.7% female and 47.3% male students, reflecting the population's gender balance and aligning with developmental theories highlighting early adolescence as a critical period for identity formation and social influences.

Data collection occurred over three weeks in April and May 2025, using Google Forms to administer standardized questionnaires under researcher supervision. This method ensured efficient data management and consistency across schools, with sessions lasting 30–40 minutes to minimize fatigue and enhance response quality. Ethical clearance was obtained, and informed consent was secured from school administrators and participants, emphasizing voluntary participation and confidentiality. Prior to data collection, a pilot study with 30 respondents validated instrument reliability and construct alignment, following Nunnally and Bernstein (1994). The UCLA Loneliness Scale (18 items, Cronbach's $\alpha = 0.845$) measured feelings of social isolation (e.g., "I feel left out"). The Problematic Internet Use Questionnaire (PIUQ, 18 valid items, Cronbach's $\alpha = 0.872$) assessed compulsive internet behaviors (e.g., "I spend more time online than intended") on a 5-point Likert scale. The Self-Objectification Questionnaire (SOQ, 10 items, Cronbach's $\alpha = 0.813$) evaluated appearance-based self-perception (e.g., valuing physical attractiveness over competence).

Data analysis employed PROCESS Macro Hayes Model 4 with 5,000 bootstrap samples to test mediation effects at a 95% confidence level. Assumption tests confirmed data suitability: Kolmogorov-Smirnov tests verified normality ($p > 0.05$), scatterplots and ANOVA confirmed linearity ($p < 0.05$), Variance Inflation Factor (VIF < 10) and Tolerance (> 0.1) ruled out multicollinearity, and residual plots indicated homoscedasticity. These robust psychometric properties and assumption checks ensured reliable measurement and valid statistical inferences for exploring the hypothesized relationships among problematic internet use, self-objectification, and loneliness.

4. Results

This section presents the findings from the mediation analysis examining the relationship between problematic internet use, self-objectification, and loneliness among 357 middle school students. The analysis employed PROCESS Macro Hayes Model 4 to test the mediating role of self-objectification in the relationship between internet use and loneliness.

Prior to conducting the main analysis, a series of assumption tests were performed to ensure the validity of the mediation analysis results. Normality testing using the Kolmogorov-Smirnov method indicated that the data distribution met normality assumptions for regression analysis. Linearity testing was conducted through scatterplots and ANOVA for linearity, confirming linear relationships between independent variables, dependent variables, and the mediator. Multicollinearity testing examined correlations among independent variables through Variance Inflation Factor (VIF) and Tolerance values. Results showed VIF < 10 and Tolerance > 0.1 for all variables, indicating no serious multicollinearity issues. Heteroscedasticity testing using residual plots revealed relatively homogeneous residual distribution, meeting homoscedasticity requirements for regression analysis.

Analysis was conducted on 357 respondents using PROCESS Macro Hayes Model 4 to test the mediating effect of self-objectification (M) in the relationship between internet use (X) and loneliness (Y). This simple mediation model examined direct and indirect pathways with 95% confidence level using 5,000 bootstrap samples to estimate confidence intervals.

Table 1. Descriptive Statistics and Correlation Matrix

Variable	M	SD	1	2	3	α
Internet Use (X)	45.8	12.3	1.000			0.872
Self-Objectification (M)	37.2	11.4	-0.051	1.000		0.813
Loneliness (Y)	42.6	11.6	0.252**	-0.121	1.000	0.845

Descriptive statistics, presented in Table 1, show the correlation analysis revealed a significant positive correlation between internet use and loneliness ($r = .252, p < .001$), indicating that higher problematic internet use is associated with increased feelings of loneliness. However, correlations between internet use and self-objectification ($r = -.051, p = .338$) and between self-objectification and loneliness ($r = -.121, p = .228$) were not statistically significant.

Table 2. Summary of Regression Models for Mediation Analysis

Outcome	R	R ²	MSE	F	df1	df2	p
Self-Objectification (M)	0.051	0.003	129.612	0.922	1	355	0.338
Loneliness (Y)	0.252	0.064	135.552	12.027	2	354	<0.001

Regression analysis tested the effect of PIU on SO (H1), with results presented in Table 2. The effect was not significant, $F(1, 355) = 0.922, p = .338, R^2 = .003$, with a regression coefficient of $b = -0.063, SE = 0.065, 95\% CI (-0.192, 0.066), t = -0.960, p = .338$. This result fails to support H1, indicating that PIU does not significantly influence self-objectification, with only 0.3% of the variance in SO explained by PIU, suggesting minimal impact in this context. The negative coefficient suggests a slight inverse relationship, but its non-significance limits its interpretive value.

Table 3. Path Coefficients in Mediation Model

Predictor	Outcome	b	SE	t	p	LLCI	ULCI
Internet Use (X)	Self-Objectification (M)	-0.063	0.065	-0.960	0.338	-0.192	0.066
Self-Objectification (M)	Loneliness (Y)	-0.066	0.054	-1.208	0.228	-0.172	0.041
Internet Use (X)	Loneliness (Y)	0.314	0.067	4.686	< 0.001	0.182	0.446

The effect of SO on loneliness (H2) and the direct effect of PIU on loneliness (H3) were tested, with results shown in Table 2 and Table 3. The regression model with PIU and SO as predictors of loneliness was significant, $F(2, 354) = 12.027, p < .001, R^2 = .064$. The direct effect of PIU on loneliness (path c') was significant ($b = 0.314, SE = 0.067, 95\% CI (0.182, 0.446), t = 4.686, p < .001$), supporting H3, indicating that higher PIU significantly increases loneliness, explaining 6.4% of the variance. However, the effect of SO on loneliness (path b) was not significant ($b = -0.066, SE = 0.054, 95\% CI (-0.172, 0.041), t = -1.208, p = .228$), failing to support H2, suggesting that self-objectification does not significantly contribute to loneliness in this sample.

Table 4. Direct and Indirect Effects

Effect Type	Effect	SE/Boot SE	t	p	LLCI	ULCI
Direct Effect (c')						
X → Y	0.314	0.067	4.686	< .001	0.182	0.446
Indirect Effect						
X → M → Y	0.004	0.007*	-	-	-0.006	0.021

Bootstrap SE based on 5,000 bootstrap samples

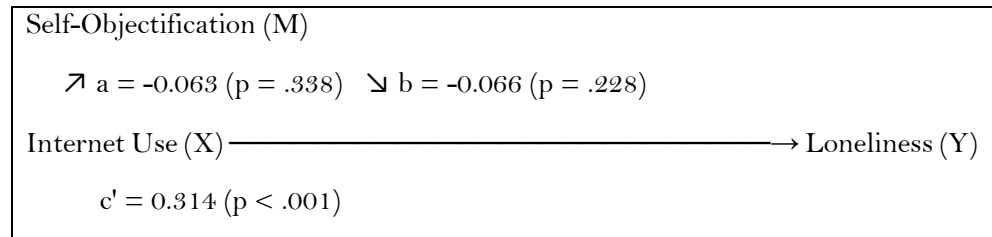


Figure 1. Mediation Model with Path Coefficients

Mediation analysis for H4, which hypothesizes that SO mediates the relationship between PIU and loneliness, is summarized in Table 4 and illustrated in Figure 1. The direct effect of PIU on loneliness remained significant after controlling for SO (b = 0.314, SE = 0.067, 95% CI (0.182, 0.446), p < .001). The indirect effect of PIU on loneliness through SO was not significant (b = 0.004, BootSE = 0.007, 95% CI (-0.006, 0.021)), failing to support H4, as the confidence interval includes zero. Figure 1. Mediation Model with Path Coefficients visually depicts the non-significant paths a (PIU → SO, b = -0.063, p = .338) and b (SO → Loneliness, b = -0.066, p = .228), and the significant path c' (PIU → Loneliness, b = 0.314, p < .001), reinforcing the absence of mediation.

Table 5. ANOVA Results for Regression Models

Model	Source	SS	df	MS	F	p	η ²
Model 1 (X → M)	Regression	119.523	1	119.523	0.922	0.338	0.003
	Residual	46,021.677	355	129.612	-	-	-
	Total	46,141.200	356	-	-	-	-
Model 2 (X, M → Y)	Regression	3,261.289	2	1,630.645	12.027	< 0.001	0.064
	Residual	47,987.211	354	135.552	-	-	-
	Total	51,248.500	356	-	-	-	-

ANOVA results, presented in Table 5, further confirm the regression findings. For Model 1 (PIU → SO), the regression was not significant (F(1, 355) = 0.922, p = .338, η² = .003), indicating that PIU has negligible impact on self-objectification. For Model 2 (PIU, SO → Loneliness), the regression was significant (F(2, 354) = 12.027, p < .001, η² = .064), driven primarily by the direct effect of PIU on loneliness, as SO's contribution was non-significant.

Table 6. Hypothesis Testing Summary

Hypothesis	Statistical Analysis	p-value	Result
H ₁ : Internet use affects self-objectification	$t = -0.960, df = 355$	0.338	Non-significant
H ₂ : Self-objectification affects loneliness	$t = -1.208, df = 354$	0.228	Non-significant
H ₃ : Internet use affects loneliness	$t = 4.686, df = 354$	< 0.001	Significant
H ₄ : Self-objectification mediates X-Y relationship	Bootstrap 95% CI (-0.006; 0.021)	> 0.05	Non-significant

The hypothesis testing summary, shown in Table 6, consolidates the findings. H1 (PIU affects SO) was not supported ($t = -0.960, p = .338$), nor was H2 (SO affects loneliness, $t = -1.208, p = .228$), indicating no significant relationships for these paths. H3 (PIU affects loneliness) was supported ($t = 4.686, p < .001$), confirming a significant positive effect of PIU on loneliness. H4 (SO mediates PIU → Loneliness) was not supported, as the bootstrap 95% CI (-0.006, 0.021) included zero.

Hypothesis testing revealed that three of the four proposed hypotheses were not statistically supported. The first hypothesis stating that internet use affects self-objectification was rejected based on t-test results with a value of -0.960 and p-value of 0.338. Similarly, the second hypothesis proposing that self-objectification affects loneliness was also rejected with a t-value of -1.208 and p-value of 0.228. However, the third hypothesis stating that internet use affects loneliness was significantly supported with a t-value of 4.686 and p-value less than 0.001, indicating that higher internet use is associated with increased levels of loneliness experienced by individuals.

Mediation analysis using the bootstrap method with 95% confidence intervals showed that self-objectification does not serve as a mediator in the relationship between internet use and loneliness, as demonstrated by the confidence interval ranging from -0.006 to 0.021 which includes zero. This finding indicates that although internet use has a direct effect on loneliness levels, the mechanism of this influence does not operate through self-objectification as an intermediary variable, but rather through a direct pathway or through other mediator variables not examined in this study.

5. Discussion

This study investigated the relationships between problematic internet use (PIU), self-objectification, and loneliness among 357 Indonesian junior high school students, finding a significant direct effect of PIU on loneliness but no mediating role for self-objectification. These findings align partially with prior research, such as Nesi et al. (2022), who identified a robust link between excessive social media use and loneliness among adolescents due to diminished offline social interactions. The significant direct effect ($b = 0.314, p < .001$) supports the notion that PIU, characterized by compulsive online behaviors, exacerbates feelings of isolation, consistent with Cognitive Discrepancy Theory, which posits that loneliness arises from gaps between desired and actual social connections (Perlman & Peplau, 1981). However, the non-significant correlations between PIU and self-objectification ($r = -.051, p = .338$) and self-objectification and loneliness ($r = -.121, p = .228$) contrast with studies like Choukas-Bradley et al. (2022), who found that social media-driven self-objectification contributes to negative psychological outcomes in Western adolescents. This discrepancy may reflect the unique socio-cultural context of Indonesian adolescents, where collectivist values and academic pressures may prioritize different psychological mechanisms.

The absence of a mediating effect of self-objectification challenges Objectification Theory's applicability in this context (Fredrickson & Roberts, 1997), which suggests that appearance-focused self-perception mediates the impact of digital engagement on mental health. The non-significant mediation ($b = 0.004$, 95% CI $(-0.006, 0.021)$) indicates that self-objectification may not be a primary mechanism linking PIU to loneliness among Indonesian adolescents. Chemnad et al. (2025) suggest that cultural factors, such as modesty norms in Middle Eastern and Asian contexts, may weaken the role of self-objectification compared to Western settings, where appearance-based validation is more pronounced. This study's findings align with this perspective, as Indonesian adolescents may prioritize academic performance or social conformity over appearance, reducing self-objectification's relevance (Kusumaningtyas, 2024). Alternatively, other mediators, such as social comparison or fear of missing out (FOMO), may better explain the PIU-loneliness relationship, as these factors are prevalent in digital environments and linked to loneliness in adolescents (Singhal & Bhargava, 2024; Kumar et al., 2024). These alternative pathways warrant further exploration to understand the mechanisms driving loneliness in this population.

The significant direct effect of PIU on loneliness underscores the need to address excessive digital engagement in Indonesia's educational context. The findings suggest that prolonged online activities, such as gaming or social media use, may displace meaningful offline interactions, leading to increased isolation (Wanniarachchi et al., 2022). This is particularly relevant for Indonesian adolescents, who face intense academic pressures that may drive escapist online behaviors, as noted by Fathoni and Indrawati (2022). Unlike Western studies, where self-objectification is a prominent mediator, the Indonesian context highlights direct pathways, possibly influenced by cultural values emphasizing collectivism and academic achievement over individual appearance. This cultural divergence, also observed by Maryufani (2022) in the context of national identity formation on social media, suggests that interventions must be tailored to Indonesia's unique socio-cultural landscape to effectively address loneliness.

These findings have practical implications for educators, counselors, and policymakers in Indonesia. Schools can implement digital wellness programs to promote balanced internet use, incorporating time management workshops to limit excessive online engagement. Social skills training can foster offline connections, addressing loneliness directly, while parental guidance programs can educate families on monitoring digital habits. Additionally, integrating digital citizenship curricula can equip adolescents with strategies to navigate online environments responsibly, reducing the risk of compulsive use. These interventions should be culturally sensitive, acknowledging Indonesia's collectivist values and academic pressures. Future research could explore longitudinal designs to establish causality or investigate alternative mediators like social comparison or cyberbullying, which may better explain the PIU-loneliness link in this context.

6. Conclusion

This study examined the relationships between problematic internet use (PIU), self-objectification (SO), and loneliness among 357 Indonesian junior high school students, finding that PIU significantly predicts loneliness ($b = 0.314$, $p < .001$), supporting H3. However, no significant relationships were found between PIU and SO (H1: $b = -0.063$, $p = .338$) or SO and loneliness (H2: $b = -0.066$, $p = .228$), and SO did not mediate the PIU-loneliness relationship (H4: $b = 0.004$, 95% CI $(-0.006, 0.021)$). These findings indicate that excessive internet use directly contributes to feelings of isolation among Indonesian adolescents, but self-objectification does not play a significant role in this dynamic. This aligns with Cognitive Discrepancy Theory, which suggests loneliness stems from unmet social needs, potentially

exacerbated by compulsive online behaviors. The results highlight the importance of addressing problematic digital engagement in adolescent populations, particularly in Indonesia's unique socio-cultural context.

The findings offer practical implications for educators and policymakers in Indonesia, suggesting the implementation of digital wellness programs to promote balanced internet use and social skills training to foster offline connections (Hugh-Jones et al., 2022). However, the study's cross-sectional design limits causal inferences, and the sample, drawn from Central Kalimantan, may not generalize to other Indonesian regions with diverse cultural norms. Future research should employ longitudinal designs to establish causality and explore alternative mediators, such as social comparison or fear of missing out, which may better explain the PIU-loneliness link (Kumar et al., 2024). Additionally, expanding the sample to include rural and urban populations across Indonesia could enhance generalizability and provide deeper insights into cultural influences on digital behavior and adolescent mental health.

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Ethical approval was obtained for this study. The manuscript represents original work and has not been previously published, nor is it under consideration by another journal.

Data Disclosure Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.



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