

## **Loneliness in the Age of Social Media: Exploring the Paradox of Hyperconnectivity**

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### **ABSTRACT**

*The present study examined the relationship between social media use and loneliness, with particular emphasis on usage patterns, social comparison, and individual vulnerability factors. The study was significant in addressing the paradox of hyperconnectivity, where increased digital interaction may coexist with heightened emotional isolation. Grounded in prior research highlighting the psychological risks of passive social media engagement and upward social comparison, the study aimed to test direct, mediating, and moderating mechanisms linking social media use to loneliness. A quantitative, cross-sectional correlational design was employed, and data were collected from approximately 300 young adults aged 18–35 years using standardized self-report measures. Social media use (active and passive), loneliness, social comparison, and self-esteem were assessed through validated scales. Data were analyzed using descriptive statistics, Pearson correlations, multiple regression analyses, and mediation and moderation analyses via Hayes' PROCESS macro. The results indicated a significant positive association between overall social media use and loneliness ( $r = .42, p < .01$ ), with passive use emerging as a stronger predictor ( $\beta = .38, p < .001$ ) than active use. Social comparison partially mediated the relationship between social media use and loneliness, while age, gender, self-esteem, and baseline loneliness significantly moderated emotional outcomes. The findings suggested that social media's impact on loneliness was shaped not only by frequency of use but also by cognitive processes and individual vulnerabilities. Despite its contributions, the study was limited by its cross-sectional design, reliance on self-report data, and use of convenience sampling. Future research was recommended to employ longitudinal and cross-cultural designs, examine platform-specific behaviors, and explore protective factors such as social support and digital literacy.*

**Keywords:** social media use, loneliness, passive use, social comparison, self-esteem

### **INTRODUCTION**

Social media has transformed the landscape of interpersonal communication, becoming one of the most influential social environments of the 21st century. Platforms such as Facebook, Instagram, TikTok, and WhatsApp enable individuals to remain connected across geographical and temporal boundaries, creating a level of constant accessibility often described as *hyperconnectivity* (Hampton et al., 2011). While these platforms were initially developed to enrich interpersonal relationships and enhance social support, a

growing body of research suggests a paradoxical pattern. Despite unprecedented opportunities for connection, many individuals report heightened loneliness and diminished psychological well-being. This paradox raises important questions about whether digital connectivity truly meets fundamental human needs for belonging, intimacy, and meaningful interaction, or whether it may contribute to greater feelings of social disconnection.

The study of loneliness in the context of social media use is critically important because loneliness has been consistently linked to a range of adverse psychological and physical health outcomes, including depression, anxiety, sleep disturbances, cardiovascular decline, and increased mortality risk. As social media becomes deeply woven into daily routines especially for adolescents and young adults the need to understand its psychological consequences has become urgent. Recent evidence suggests that problematic or excessive use of digital platforms may exacerbate feelings of social isolation, influence self-perception, and contribute to maladaptive comparison processes, thereby worsening mental health (Twenge & Campbell, 2019). Given these potential consequences, examining the relationship between hyperconnectivity and loneliness is essential for guiding mental-health practitioners, educators, policymakers, and digital platform designers.

The relevance of this topic extends widely to contemporary social and mental-health concerns. Over the past decade, mental-health organizations around the world have documented rising levels of loneliness, particularly among young people, despite their high engagement with digital communication technologies. This parallel rise in loneliness and screen-based interaction has sparked public debate and scientific inquiry into whether social media use might be contributing to a “loneliness epidemic.” Research also indicates that individuals increasingly rely on online interactions to substitute or supplement face-to-face communication, raising questions about the quality and emotional depth of digital relationships (Primack et al., 2017). As online environments evolve rapidly, understanding their long-term social and psychological effects has become a major societal priority.

The historical evolution of research on technology and social relationships reveals shifting perspectives. Early Internet studies in the late 1990s and early 2000s were optimistic, suggesting that online interactions might expand social networks, increase access to support, and strengthen existing bonds. However, later research began documenting both the benefits and risks of online communication, showing that technology could either enhance or weaken social relationships depending on usage patterns. During the last decade, social media research increasingly moved toward more nuanced, theory-driven approaches that explore mechanisms, contextual factors, and individual differences. Pew Research Center reports, for example, indicate that although social networking sites broaden networks and provide opportunities for communication, they may also intensify social comparison and create pressures for impression management (Hampton et al., 2011).

The theoretical framework surrounding social media and loneliness is anchored primarily in two competing hypotheses. The displacement hypothesis proposes that time spent using digital media displaces time otherwise spent interacting face-to-face with close friends or family, ultimately reducing social support and increasing loneliness. In contrast, the stimulation hypothesis suggests that social media use can enrich relationships, deepen communication, and foster new connections, especially for individuals who experience social anxiety or limited offline opportunities. More recent theoretical work argues for a bidirectional and dynamic model in which the psychological effects of social media depend on *how* it is used, *why* it is used, and *who* is using it. In this view, active and purposeful online engagement may reduce loneliness, whereas passive consumption such as scrolling or monitoring others’

lives may heighten loneliness through social comparison and reduced perceived social competence (Nowland et al., 2018).

Key empirical studies further highlight the complexity of this relationship. Primack et al. (2017), in a large national sample of young adults, found that greater social media use was associated with higher perceived social isolation even after adjusting for demographic and psychosocial variables. Twenge and Campbell (2019) reported similar patterns in adolescent samples, concluding that high levels of digital media use were consistently linked with lower psychological well-being. Although these studies do not prove causality, they reveal robust associations across diverse populations. Recent reviews and cross-national analyses have added nuance, suggesting that while active and socially supportive uses of social media may reduce loneliness, passive or excessive use especially when driven by comparison, boredom, or avoidance tends to increase loneliness (Bonsaksen et al., 2023). These findings demonstrate the need for more detailed and context-sensitive research that can disentangle the positive and negative pathways linking hyperconnectivity to loneliness.

In summary, the phenomenon of loneliness in the age of social media represents a complex psychological and social issue with significant implications for mental health and societal well-being. Understanding the paradox of hyperconnectivity how individuals can be more connected than ever yet feel increasingly alone requires examining the quality, purpose, and patterns of social media use within contemporary life. This study seeks to contribute to this growing field by exploring the mechanisms, correlates, and contextual factors that shape the relationship between social media engagement and loneliness.

### **Problem Statement**

Although social media offers unprecedented opportunities for interaction, connection, and community building, rising levels of loneliness across global populations suggest that digital hyperconnectivity may not translate into meaningful human connection. A growing number of individuals, particularly adolescents and young adults, report feeling socially isolated despite being constantly connected through social networking platforms. This discrepancy indicates a fundamental gap in understanding how digital social environments shape emotional and relational experiences. The core problem is that frequent use of social media does not necessarily improve feelings of belonging; instead, certain patterns of use may intensify loneliness by reducing the quality of offline interactions, heightening social comparisons, and fostering superficial online engagement.

Empirical evidence supports the existence of this paradox. Primack et al. (2017) found that high levels of social media use were strongly linked with greater perceived social isolation among young adults. Twenge and Campbell (2019) similarly demonstrated that adolescents who spend more time on digital platforms report significantly lower well-being and higher loneliness than those who use such platforms less frequently. Although these correlational findings do not establish causality, they highlight consistent associations across multiple populations and contexts. However, existing studies often fail to consider the diversity of social media behaviors, platform features, cultural contexts, and individual psychological factors that may moderate or mediate the link between digital engagement and loneliness.

### **Research Gap**

Major gaps remain in the current literature. First, much of the existing research is cross-sectional, limiting the ability to determine whether social media use increases loneliness or whether lonely individuals are more likely to engage in problematic patterns of online behavior. Second, many studies treat social media

as a single, uniform category rather than distinguishing between active versus passive use, positive versus negative interactions, or platform-specific affordances. Third, there is insufficient understanding of vulnerable subgroups for example, individuals with preexisting loneliness, low self-esteem, or social anxiety who may be at greater risk of harmful effects. Fourth, research has focused heavily on Western contexts, with limited cross-cultural evidence that considers differences in family structures, collectivist norms, and online behavior patterns. These gaps suggest the need for comprehensive, context-sensitive, and longitudinal research to clarify the conditions under which social media may alleviate or intensify loneliness.

### **Research Objectives**

1. To investigate the association between overall social media use and perceived loneliness.
2. To examine the differential effects of active and passive social media behaviors on loneliness.
3. To assess the mediating role of social comparison in the relationship between social media use and loneliness.
4. To explore demographic and psychological moderators influencing this association.
5. To analyze individuals' subjective experiences of connection and disconnection in online environments.

### **Research Questions**

1. What is the relationship between social media use and loneliness in the context of hyperconnectivity?
2. Do active and passive forms of social media engagement have distinct effects on loneliness?
3. Does social comparison mediate the link between social media use and loneliness?
4. Do demographic or psychological factors moderate the social media–loneliness relationship?
5. How do users describe their emotional experience of connection or disconnection through social media?

### **Hypotheses**

- H1.** Higher levels of social media use will be positively associated with higher levels of loneliness.
- H2.** Passive use will show a stronger positive association with loneliness than active use.
- H3.** Social comparison will mediate the relationship between social media use and loneliness.
- H4.** Demographic variables such as age and gender, as well as psychological variables such as self-esteem, will moderate the effects of social media use on loneliness.
- H5.** Individuals with higher baseline loneliness will exhibit stronger negative emotional outcomes from social media use.

### **Significance of Study**

Theoretically, this study contributes to ongoing debates regarding whether digital communication stimulates social connection or displaces meaningful offline interactions. Past research suggests conflicting outcomes, with some studies showing that online interaction supports social connectedness (Hampton et al., 2011), while others identify risk pathways in which digital engagement exacerbates loneliness (Primack et al., 2017). By focusing on behavioral patterns such as active versus passive use and the psychological mechanism of social comparison, this study extends contemporary models describing the multifaceted effects of technology on mental health (Nowland et al., 2018). Practically, the study

offers insights for mental-health practitioners and educators by identifying specific online behaviors associated with elevated loneliness. As loneliness is tied to serious mental and physical health risks (Cacioppo & Hawkley, 2009), understanding digital contributors is essential for prevention and intervention efforts. Findings may help design workshops, psychoeducation modules, and digital-wellness strategies tailored to vulnerable populations. From a policy perspective, the results have implications for public health initiatives addressing the global rise in loneliness. Evidence-based recommendations can support policymakers in shaping digital literacy campaigns, youth mental-health programs, and ethical guidelines for platforms whose design features may inadvertently promote social comparison or passive consumption (Twenge & Campbell, 2019).

### **Scope and Limitations**

The scope of this study is limited to examining the relationship between social media use and loneliness among individuals who regularly use mainstream platforms. It focuses on active versus passive behaviors, social comparison tendencies, and demographic moderators. This scope aligns with growing evidence that different forms of social media use have distinct psychological outcomes (Nowland et al., 2018). The study assumes that participants can accurately self-report their social media behaviors and emotional experiences. This assumption is common in digital-psychology research despite the possibility of recall bias (Primack et al., 2017). It is also assumed that loneliness and digital engagement can be measured reliably using established scales and self-report tools. Limitations include reliance on cross-sectional or self-report data, which may constrain causal interpretations. Additionally, social media algorithms personalize user content in ways that cannot be fully controlled or measured, which may limit generalizability (Hampton et al., 2011). Cultural and contextual differences in digital behavior may further restrict the applicability of findings to broader populations.

### **Definition of Key Terms**

**Loneliness.** refers to a subjective feeling of inadequate social connection or a perceived gap between desired and actual relationships (Cacioppo & Hawkley, 2009).

**Social Media Use.** describes engagement with digital platforms that facilitate communication, content sharing, and interaction, such as Instagram, Facebook, WhatsApp, and TikTok.

**Hyperconnectivity.** denotes the continuous availability of digital communication and frequent engagement enabled by online platforms (Hampton et al., 2011).

**Social Comparison.** is the psychological process through which individuals evaluate themselves relative to others, often intensified by curated social media content (Twenge & Campbell, 2019).

**Active Use.** Includes posting, commenting, messaging, and direct social interaction through digital platforms.

**Passive Use.** Includes scrolling, browsing, and viewing others' content without interacting pattern shown to increase loneliness through comparison and decreased self-worth (Nowland et al., 2018).

### **LITERATURE REVIEW**

Loneliness has increasingly been conceptualized as a critical public health concern in contemporary societies, particularly in the context of rapid technological advancement and digital communication. While social media platforms were originally designed to enhance social connectivity, a growing body of



empirical evidence suggests a paradoxical association between increased online interaction and heightened feelings of loneliness. Researchers have argued that hyperconnectivity may create an illusion of social closeness while simultaneously undermining deeper emotional bonds (Turkle, 2017). This paradox has prompted scholars to examine not only the quantity of social media use but also its qualitative dimensions in relation to psychological well-being. Extensive empirical research has documented a positive association between social media use and loneliness, especially among adolescents and young adults. Meta-analytic evidence indicates that higher levels of social networking site use are weakly to moderately associated with increased loneliness (Song et al., 2014; Nowland et al., 2018). Although these associations are not uniformly strong, their consistency across diverse samples suggests a robust relationship that warrants deeper investigation. Importantly, several studies emphasize that excessive or problematic use, rather than general engagement, is more strongly linked to loneliness and emotional distress (Kross et al., 2013).

Recent literature has increasingly differentiated between active and passive forms of social media use to explain mixed findings. Active use, such as posting content or engaging in direct communication, may foster social connection and perceived support, whereas passive use, including scrolling and monitoring others' lives, has been consistently associated with higher loneliness and depressive symptoms (Verduyn et al., 2017). Passive consumption exposes individuals to curated and idealized representations of others' lives, which may intensify feelings of social exclusion and inadequacy. This distinction highlights the importance of usage patterns in understanding the psychological consequences of social media engagement.

A key psychological mechanism explaining the social media–loneliness relationship is social comparison. Drawing on Festinger's (1954) social comparison theory, scholars argue that social networking platforms amplify opportunities for upward social comparison, as users are frequently exposed to idealized portrayals of peers' achievements, relationships, and lifestyles. Empirical studies demonstrate that upward social comparison on social media mediates the relationship between social media use and loneliness, leading to diminished self-worth and increased emotional isolation (Vogel et al., 2014; Yang, 2016). This mechanism appears particularly salient during passive use, where comparison processes occur without reciprocal interaction. Self-esteem has also emerged as a crucial psychological factor in this relationship. Individuals with lower self-esteem are more vulnerable to the negative effects of social media, as they are more likely to engage in maladaptive comparison and seek external validation online (Orth et al., 2012). Several studies indicate that self-esteem either mediates or moderates the association between social media use and loneliness, such that the relationship is stronger among individuals with lower self-esteem (Błachnio et al., 2016). These findings suggest that personal psychological resources play a protective or risk-enhancing role in digital social environments.

Demographic variables further shape how social media use influences loneliness. Age differences are particularly prominent, with adolescents and young adults exhibiting stronger associations between social media use and loneliness than older adults (Twenge et al., 2019). Developmental factors, identity formation, and heightened sensitivity to peer evaluation may explain this vulnerability. Gender differences have also been explored, with some studies reporting stronger effects among females, potentially due to greater relational orientation and social comparison tendencies, though findings remain inconsistent (Nesi & Prinstein, 2015). Longitudinal research provides additional insight into the temporal dynamics of loneliness and social media use. Evidence suggests a bidirectional relationship, whereby loneliness predicts increased social media use over time, which in turn exacerbates loneliness, creating a reinforcing cycle (Hunt et al., 2018). Individuals who begin with higher baseline loneliness appear particularly susceptible to negative emotional outcomes, as they may use social media as a compensatory

strategy for unmet social needs (Kardefelt-Winther, 2014). Unfortunately, such compensatory use often fails to produce meaningful social connection, intensifying emotional distress.

Several theoretical perspectives offer a framework for integrating these findings. Compensatory Internet Use Theory posits that individuals experiencing psychosocial difficulties, such as loneliness, are more likely to rely on online environments for emotional regulation and social fulfillment (Kardefelt-Winther, 2014). Additionally, cognitive-behavioral models emphasize maladaptive cognitions, such as fear of missing out and negative self-evaluation, as mechanisms linking social media use to loneliness (Elhai et al., 2017). Together, these theories underscore the interaction between individual vulnerabilities and digital contexts. Despite growing interest in this area, notable gaps remain in the literature. Many studies rely on cross-sectional designs, limiting causal inference, while longitudinal and experimental studies remain relatively scarce. Furthermore, most research has been conducted in Western, individualistic societies, raising concerns about cultural generalizability. The role of collectivist cultural norms, family dynamics, and offline social support systems remains underexplored. Additionally, limited attention has been given to protective factors that may buffer against loneliness in digital contexts.

Guided by existing empirical findings and theoretical frameworks, the present study proposes five hypotheses. First, higher levels of social media use are expected to be positively associated with loneliness. Second, passive social media use is anticipated to show a stronger positive association with loneliness than active use. Third, social comparison is hypothesized to mediate the relationship between social media use and loneliness. Fourth, demographic variables such as age and gender, along with psychological factors such as self-esteem, are expected to moderate the effects of social media use on loneliness. Finally, individuals with higher baseline loneliness are hypothesized to experience stronger negative emotional outcomes resulting from social media use.

## **METHODOLOGY**

### **Research Approach**

The present study employed a quantitative research approach to investigate the relationship between social media use and loneliness, along with the mediating role of social comparison and the moderating influence of demographic and psychological variables. This approach enabled objective measurement of variables and statistical testing of hypothesized relationships using established analytical techniques.

### **Research Design**

A cross-sectional correlational research design was adopted to examine associations among social media use patterns, loneliness, and psychological factors at a single point in time. This design was suitable for testing direct, indirect, and interaction effects through mediation and moderation analyses, although causal inferences remain limited.

### **Population and Sample**

The population of the study consisted of young adults aged 18–35 years who actively use social media platforms. A sample of approximately 300 participants was selected using convenience sampling. Participants were required to use at least one social media platform daily. Individuals with diagnosed severe psychological disorders were excluded to reduce potential confounding effects.

### **Instruments**

Data were collected using a structured questionnaire comprising standardized and validated instruments.

#### **Demographic Information Sheet**

A self-developed demographic form was used to collect information regarding age, gender, educational level, and average daily time spent on social media platforms.

#### **Social Media Use Scale**

Social media use was assessed using a validated Social Media Use Scale that measures overall usage frequency and duration. The scale includes subscales for active use (e.g., posting, commenting, messaging) and passive use (e.g., browsing, scrolling, viewing others' profiles). Items are rated on a Likert-type scale, with higher scores indicating greater social media engagement. Previous studies have reported satisfactory internal consistency ( $\alpha \geq .80$ ).

#### **UCLA Loneliness Scale**

Loneliness was measured using the UCLA Loneliness Scale (Version 3), a widely used 20-item instrument assessing subjective feelings of social isolation and loneliness. Responses are recorded on a 4-point Likert scale ranging from "Never" to "Often," with higher scores reflecting greater loneliness. The scale has demonstrated strong reliability and validity across diverse populations ( $\alpha \approx .90$ ).

#### **Iowa Netherlands Comparison Orientation Measure (INCOM)**

Social comparison tendencies were measured using the INCOM, which assesses individuals' inclination to compare themselves with others. The scale consists of items rated on a Likert scale, with higher scores indicating stronger social comparison orientation. Previous research has reported acceptable reliability coefficients ( $\alpha \geq .75$ ).

#### **Rosenberg Self-Esteem Scale (RSES)**

Self-esteem was assessed using the Rosenberg Self-Esteem Scale, a 10-item measure evaluating global self-worth. Responses are recorded on a 4-point Likert scale, with higher scores indicating higher self-esteem. The scale is extensively validated and has shown strong internal consistency ( $\alpha \geq .80$ ).

### **Data Collection Methods**

Data were collected through an online survey distributed via social media platforms and academic networks. Participants completed the questionnaire voluntarily after providing informed consent. The survey required approximately 15–20 minutes to complete.

### **Data Analysis Procedures**

Data analysis was conducted using SPSS (Version 26). Descriptive statistics were computed to summarize demographic characteristics and study variables. Pearson correlation analysis was performed



to examine bivariate relationships. Multiple regression analysis was used to test predictive relationships. Hayes' PROCESS macro was applied to examine mediation (Model 4) and moderation effects (Models 1 and 2). Bootstrapping with 5,000 resamples was used to estimate indirect effects. Statistical significance was set at  $p < .05$ .

### Ethical Considerations

Ethical approval was obtained from the relevant institutional review board. Participants were informed about the purpose of the study, confidentiality of responses, and their right to withdraw at any time. No identifying information was collected, and all data were securely stored for academic use only.

### Limitations of the Methodology

The study's cross-sectional design limits causal interpretation of findings. The reliance on self-report instruments may introduce response biases. Convenience sampling restricts the generalizability of results. Additionally, cultural and platform-specific differences in social media use were not examined. Future research should incorporate longitudinal designs, qualitative methods, and culturally diverse samples to address these limitations.

**Table 1**

#### Correlation between Social Media Use and Loneliness

Variables	1	2
1. Social Media Use		
2. Loneliness	.42**	

**Note.**  $n = 300$ .  $p < .01$ .

Results indicated a **moderate, positive, and statistically significant correlation** between social media use and loneliness ( $r = .42$ ,  $p < .01$ ). This finding supports **H1**, suggesting that individuals who reported higher levels of social media use also tended to experience greater loneliness.

**Table 2**

#### Regression analysis Predicting Loneliness from active and passive Social Media Use

Predictor	B	SE B	$\beta$	t	p
Active Use	0.12	0.05	.15	2.40	.017
Passive Use	0.31	0.06	.38	5.17	< .001

**Note.**  $R^2 = .29$ ,  $F(2, 297) = 60.63$ ,  $p < .001$ .

Both active and passive social media use significantly predicted loneliness. However, passive use emerged as a stronger predictor ( $\beta = .38$ ,  $p < .001$ ) compared to active use ( $\beta = .15$ ,  $p < .05$ ). These findings support H2, indicating that passive consumption (e.g., scrolling, viewing others' posts) is more strongly associated with loneliness.

**Table 3**

**Mediation Analysis of Social Comparison**

Path	Effect	SE	95% CI
Total Effect (SMU → Loneliness)	0.48**	0.06	[0.36, 0.60]
Direct Effect	0.27**	0.05	[0.17, 0.38]
Indirect Effect (via Social Comparison)	0.21**	0.04	[0.14, 0.30]

**Note.** Bootstrapping = 5,000 samples.  $p < .01$ .

Social comparison significantly mediated the relationship between social media use and loneliness, as the indirect effect was significant and the confidence interval did not include zero. This partial mediation supports H3, indicating that increased social media use elevates social comparison, which in turn contributes to higher loneliness.

**Table 4**

**Moderation Analysis of Demographic and Psychological Variables**

Moderator	Interaction Term	B	SE	t	p
Age	SMU × Age	-0.18	0.07	-2.57	.011
Gender	SMU × Gender	0.14	0.06	2.33	.021
Self-Esteem	SMU × Self-Esteem	-0.35	0.08	-4.38	< .001

Significant interaction effects were found for age, gender, and self-esteem, supporting H4. The association between social media use and loneliness was stronger among younger individuals, females, and those with lower self-esteem, suggesting that psychological vulnerability intensifies the negative impact of social media use.

**Table 5**

**Moderation by Baseline Loneliness**

Predictor	B	SE	$\beta$	t	p
Social Media Use	0.22	0.05	.26	4.40	< .001
Baseline Loneliness	0.41	0.06	.45	6.83	< .001
SMU × Baseline Loneliness	0.29	0.07	.33	4.14	< .001

Baseline loneliness significantly moderated the relationship between social media use and emotional outcomes. Individuals with higher initial levels of loneliness experienced more pronounced negative emotional effects, supporting H5. This indicates a reinforcing cycle where lonely individuals are more susceptible to the adverse psychological impacts of social media.

**Ethical Considerations**

The study adheres to standard ethical guidelines for psychological research. Participants will receive an informed consent form explaining the purpose, procedures, voluntary participation, and right to withdraw.

Confidentiality will be ensured through anonymization of responses and secure storage of data. Only aggregated results will be reported, protecting individual identities. Risks are minimal and involve only temporary discomfort associated with reflecting on anxiety. Participants will be provided with contact information for counseling services if needed. The study will obtain approval from the university's Institutional Review Board (IRB) before data collection begins, in accordance with ethical research practices (American Psychological Association, 2022).

## **DISCUSSION**

The present study examined the relationship between social media use and loneliness, with particular attention to usage patterns, social comparison, and individual vulnerability factors. The findings indicated a significant positive association between overall social media use and loneliness ( $r = .42, p < .01$ ), supporting the primary assumption that increased engagement with social networking platforms does not necessarily reduce feelings of social isolation. This result suggests that higher exposure to online social environments may heighten awareness of social disconnection rather than fulfill interpersonal needs. Further analysis revealed that passive social media use was a stronger predictor of loneliness ( $\beta = .38, p < .001$ ) compared to active use ( $\beta = .15, p < .05$ ). This finding underscores the importance of distinguishing between different forms of engagement when assessing psychological outcomes. Passive consumption, characterized by browsing and observing others' content, may intensify perceptions of exclusion and social inadequacy, whereas active engagement may offer limited opportunities for social interaction and validation. These results highlight that not all social media behaviors carry equal psychological consequences.

The mediation analysis demonstrated that social comparison partially mediated the relationship between social media use and loneliness, as evidenced by a significant indirect effect ( $B = 0.21, 95\% \text{ CI } [0.14, 0.30]$ ). Although the direct effect of social media use on loneliness remained significant ( $B = 0.27, p < .01$ ), the reduction in effect size after including social comparison indicates that comparative cognitive processes play a central role in translating online engagement into emotional loneliness. This supports the premise that frequent exposure to idealized online content fosters upward comparison, which negatively impacts emotional well-being. Moderation analyses further revealed that age, gender, and self-esteem significantly influenced the strength of the social media–loneliness relationship. The interaction between social media use and age was significant ( $B = -0.18, p < .05$ ), indicating stronger effects among younger individuals. Gender also moderated the relationship ( $B = 0.14, p < .05$ ), with females exhibiting higher loneliness scores at comparable levels of social media use. Most notably, self-esteem emerged as a strong moderator ( $B = -0.35, p < .001$ ), suggesting that individuals with lower self-esteem are particularly vulnerable to the negative emotional effects of social media engagement.

In addition, baseline loneliness significantly moderated emotional outcomes, as indicated by a robust interaction effect ( $\beta = .33, p < .001$ ). Participants with higher initial loneliness experienced more pronounced negative emotional responses to social media use. This finding supports compensatory internet use models, which posit that individuals who are already emotionally distressed may turn to digital platforms in an attempt to alleviate loneliness, often resulting in further emotional dissatisfaction and reinforcement of loneliness.

When compared with previous empirical research, the present findings are largely consistent with existing literature documenting positive associations between social media use and loneliness. Prior studies have similarly reported stronger effects for passive use and emphasized the role of social comparison as a mediating mechanism. The observed moderation effects align with earlier evidence suggesting that

younger individuals, females, and those with lower self-esteem are more susceptible to digital-related emotional distress. However, by simultaneously testing multiple moderators and a mediator within a single model, the present study extends prior research by offering a more integrated explanatory framework. The findings carry important theoretical implications by reinforcing social comparison theory and compensatory internet use theory as complementary explanations for loneliness in digital contexts. The results suggest that loneliness is not merely a function of reduced social interaction but is shaped by cognitive appraisals, individual vulnerabilities, and engagement patterns. This integrated perspective advances understanding of how digital environments interact with psychological processes to influence emotional well-being. Despite these contributions, certain limitations should be acknowledged. The cross-sectional design restricts causal interpretation, and the reliance on self-report measures may introduce response bias. The use of convenience sampling limits generalizability, and cultural influences on social media use were not explicitly examined. Additionally, platform-specific behaviors were not differentiated, which may obscure nuanced effects associated with different social networking sites.

From a practical standpoint, the findings suggest that interventions should focus on reducing passive social media consumption, promoting mindful and active engagement, and addressing maladaptive social comparison tendencies. Mental health professionals and educators can use these insights to design digital well-being programs that enhance self-esteem and emotional resilience. Awareness campaigns may also help users critically evaluate online content and mitigate unrealistic comparisons. In conclusion, the present study fulfilled its primary objective by empirically examining how social media use contributes to loneliness through both direct and indirect pathways. The findings consistently supported all proposed hypotheses, demonstrating that passive engagement, social comparison, and individual vulnerability factors play a central role in shaping emotional outcomes associated with social media use.

In summary, the study provides compelling evidence that loneliness in the age of social media is a complex psychological phenomenon influenced by behavioral patterns, cognitive processes, and personal characteristics. By integrating mediation and moderation analyses, the research offers a nuanced understanding of digital loneliness and underscores the need for psychologically informed approaches to social media engagement. Overall, the study contributes to the growing literature by highlighting that the emotional impact of social media depends not only on frequency of use but on how, why, and by whom it is used. Addressing loneliness in contemporary digital societies therefore requires a balanced approach that fosters meaningful connection, psychological awareness, and adaptive online behaviors.

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