

Social Media Use and Mental Health Among University Students: The Mediating Role of Engagement and Social Comparison

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Editor: Dr. Jose A Rodas, Universidad Espíritu Santo

Received 10/Aug/2025; Accepted 11/Jun/2026; Published 30/Jul/2026

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Abstract: Mental health is a state of well-being that enables individuals to cope with life's demands and work productively. This study investigated the correlations between social media usage time, user engagement, social comparison, and mental health among university students. A total of 172 students from João Pessoa, Brazil, aged 18 to 55 years ($M = 24.2$; $SD = 6.74$), participated in the study. Measures included self-reported time spent on social media, the Iowa-Netherlands Comparison Orientation Measure (INCOM), and the Depression, Anxiety, and Stress Scale (DASS-21). Results revealed a sequential mediation of engagement and social comparison in the relationship between time spent on social media and levels of stress, anxiety, and depression. These findings suggest an underlying psychological mechanism linking social media use to mental health outcomes.

Keywords: Social media, social comparison, mental health

Introduction

Mental health, as defined by the Pan American Health Organization, (2022) refers to a state of well-being in which individuals are able to cope with their abilities, manage everyday challenges, work productively, and contribute to their communities. However, the COVID-19 pandemic had a significant impact on global mental health, leading to increases in anxiety, depression, and other disorders (Pan American Health Organization, 2023). In addition, a notable increase in the use of social media platforms was observed, with multiple studies showing associations between such use and adverse effects on mental health.

For example, Boers et al. (2019a) found that time spent on social media, combined with other screen time, could exacerbate symptoms of anxiety. Similarly, frequent exposure to social media content was associated with in-

creased depressive symptoms in adolescents in the same study (Boers et al., 2019b). Another study by Twenge, Martin, and Campbell (2018) identified a significant relationship between screen time - especially on social media - and poorer psychological well-being in adolescents. Those who spent more than three hours per day on these platforms were more likely to report symptoms of anxiety and loneliness. On the other hand, Zhang et al. (2023) found that social media use among university students was positively associated with psychological and subjective well-being, through increased self-esteem and perceived online social support.

Given this context, the present study aims to explore the relationships among time spent on social media, user engagement, social comparison, and mental health (stress, anxiety, and depression). Furthermore, it seeks to examine the mediating role of engagement and social comparison

in the relationship between usage time and mental health. More specifically, the study evaluates the impact of daily time spent on platforms such as Instagram, Twitter, and Facebook, as well as the extent of social comparison triggered by these interactions, on mental health.

Social Media and Its Impact on Mental Health

Although the internet gained popularity in the late 1990s, it was only in the 21st century that platforms like Facebook, YouTube, Twitter, and Instagram began to take a prominent place (Portugal & de Souza, 2020). Conceptually, social media platforms are virtual environments that enable interactions among individuals—whether or not they have preexisting social ties—who can form closer relationships based on kinship, intimacy, or shared interests and characteristics (Rosado & Tomé, 2015).

Social media offers access to countless people by removing geographic and temporal barriers (Natividade, 2019). By becoming a social media user, individuals not only expose their lives to a virtual audience but also gain constant access to information about others, which encourages self-evaluation (da Silva & Brasil, 2022). In this way, social media contributes to the construction of idealized lifestyles and status models, often disseminated through media, pushing users to aspire to certain aesthetic, personal, social, or professional ideals (Santos & Rodrigues, 2023). These platforms tend to emphasize the positive aspects of users' lives, creating idealized portrayals of personal experiences (Arigo, Bercovitz, Lapitan, & Gular, 2024).

In Brazil, research by Lira et al. (2017) found that accessing Facebook and Instagram more than 10 times per day increased the likelihood of body dissatisfaction in adolescent girls by 6.57 and 4.47 times, respectively. These findings suggest that constant exposure to a large volume of successful personal content from people around the world can lead users to feel that they are not living the life they should be living, resulting in dissatisfaction with their jobs, professional achievements, romantic lives, and financial situations (Menezes, 2012).

The Role of Social Comparison

Understanding mental health in the context of individuals' relationship with social media is essential, as these platforms facilitate social comparison processes that are often unfavorable to the self. This issue is grounded in the theory developed by American social psychologist Leon Festinger in 1954. According to the theory, social comparison is a psychological mechanism that allows individuals to evaluate their attitudes, abilities, and beliefs by comparing themselves to others. Festinger posits that human beings have an intrinsic need to assess their competencies and

opinions by drawing comparisons with individuals who share similarities or are perceived as relevant referents.

In this way, such comparisons help individuals stabilize their subjective evaluations (Carvalho & Leite, 2023), even when objective means of comparison are unavailable. Festinger (1954) suggests that self-evaluation is driven by a fundamental human impulse. Individuals constantly reflect on what they can or cannot do, what they are capable of, what they can achieve, and what talents or abilities they possess. To answer these questions, they seek external information to gain insight into their own self-concept.

This phenomenon operates as a universal mechanism in social relations, capable of inhibiting, facilitating, or intensifying behaviors in specific contexts (Suls & Wheeler, 2020). Social comparison occurs not only at the individual level but also at the group level (Festinger, 1954). The drive for self-evaluation contributes to group formation, as individuals are more likely to affiliate with others whose opinions and abilities are similar, perceiving such groups as more attractive.

This process involves different types of comparison, including upward and downward social comparisons. Upward social comparison occurs when the comparison target is perceived as superior in a particular aspect (Almeida, 2022). This type often has a humiliating nature and is associated with more negative psychological outcomes (Wang et al., 2017). In contrast, downward comparison may not be motivating for the individual, potentially resulting in stagnation or complacency (Myers, 2014). According to Myers, both types of comparison can lead to positive or negative emotions, depending on how individuals interpret the comparative information and the relevance of the target.

Research conducted by Carvalho and Leite (2023) found a positive relationship between social comparison and envy, showing that consumers of tourism services are vulnerable to social comparisons in both physical and virtual environments. As social comparison increases, so does the feeling of envy. The emotional experience of dissatisfaction, coupled with the unpleasant sense of failure and stress, can significantly affect mental health, triggering anxiety and potentially leading to pathological behavior patterns (Menezes, 2012).

A meta-analysis by Yoon et al. (2019) found that frequent use of social media platforms like Facebook is associated with increased depressive symptoms, particularly among young adults. This association appears to be mediated by social comparison and exposure to unrealistic portrayals of life online. Similarly, Zheng et al. (2020) demonstrated that passive social media use increases the likelihood of upward social comparison, which is linked to higher lev-

els of anxiety among young women.

A study conducted by Le Blanc-Brillon et al. (2025) with 413 American or Canadian participants showed that the negative relationship between Facebook use and global self-esteem is fully mediated by exposure to upward social comparisons. That is, the greater the participants' reported use of Facebook, the higher their perceived exposure to upward comparisons, which, in turn, was associated with lower levels of global self-esteem. However, in another study carried out by the same authors with 139 adults recruited through the Amazon Mechanical Turk (MTurk) platform in October 2021, the frequency of Instagram use was found to be a significant positive predictor of both global self-esteem and physical self-esteem.

Although these studies are relevant and relate to social comparison theory (Festinger, 1954), there is a lack of understanding of the role of social network engagement and sequential social comparison in the relationship between usage time and negative emotional states. Unlike the studies presented, which are presented in isolation, the current research proposes an integrated model in which engagement and social comparison are used as a mechanism to explain the time people spend accessing social networks and how this can lead to worse levels of negative emotional states. Thus, the research can contribute by demonstrating that usage time can lead to worse levels of mental health, and that the explanation for this may be a psychological process motivated by engagement and social comparison.

Objectives and Hypotheses

Despite previous findings, there remains a need for a deeper understanding of the underlying mechanisms that explain the role of social media, time of use, and their impact on individuals' mental health. This research is the first to specifically examine the role of social media engagement and social comparison in the relationship between time spent on these platforms and mental health, drawing on Social Comparison Theory (Festinger, 1954) as a theoretical foundation.

We hypothesize that the amount of time people spend on social media affects their mental health, as demonstrated by previous studies (Yoon et al., 2019; Zheng et al., 2020; Boers et al., 2019), and that higher engagement leads individuals to compare themselves more frequently with others, which in turn may result in poorer mental health outcomes.

Method

Participants

The study included a sample of 172 university students aged between 18 and 55 years ($M = 24.2$, $SD = 6.74$). The majority were female (72.1%), self-identified as mixed-race (54.2%), single (50.8%), and Catholic (45.2%). Approximately 32.8% of the participants reported spending most of their time on at least three social media platforms, including Instagram and WhatsApp.

Instruments

Time Spent on Social Media

Participants answered a single item: "What is your average daily time spent on social media?" Responses ranged from 0 = zero hours to 8 = seven hours or more.

Social Media Engagement Questionnaire (QEMS)

Originally developed by Przybylski et al. (2013) and adapted for the Brazilian context by Mariano et al. (2019), this instrument assesses the frequency of daily engagement with social media over a typical week. Participants answered how often they used social media at specific moments (e.g., within 15 minutes after waking up, during breakfast, lunch, dinner, and 15 minutes before going to sleep). Responses were given on an 8-point scale ranging from 1 (No day) to 8 (Every day). The internal consistency was acceptable (Cronbach's $\alpha = .80$; McDonald's $\omega = .81$).

Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999)

This scale evaluates individual differences in the tendency to compare oneself with others in terms of appearance, social status, and other dimensions. It includes 11 self-report items rated on a 7-point Likert scale (1 = Strongly disagree to 7 = Strongly agree). Since the scale was not previously validated in Brazil, we conducted a Principal Component Analysis. The Kaiser-Meyer-Olkin index ($KMO = .81$) and Bartlett's test of sphericity [$\chi^2 (55) = 535$, $p < .001$] indicated the data were suitable for factor analysis. A unidimensional structure was extracted (eigenvalue = 3.78), explaining 34.3% of the variance. Internal consistency was acceptable (Cronbach's $\alpha = .67$; McDonald's $\omega = .73$).

Depression, Anxiety and Stress Scale – Short Form (DASS-21)

This scale, developed by Lovibond and Lovibond (1995) and validated in Brazil by Patias et al. (2016), measures symptoms of depression, anxiety, and stress. It consists of

21 items rated on a 4-point Likert scale from 0 (Did not happen to me this week) to 3 (Happened to me most of the time this week). Reliability was high for all subscales: stress ($\alpha = .87$; $\omega = .87$), anxiety ($\alpha = .87$; $\omega = .87$), and depression ($\alpha = .89$; $\omega = .89$).

Sociodemographic Questionnaire

Participants provided basic demographic information including gender, age, and race/ethnicity. They also identified the social media platform on which they spent the most time.

Procedure

Data were collected using an online questionnaire distributed via Facebook, Instagram, and WhatsApp, following approval by the Research Ethics Committee. All participants confirmed they were over 18 years of age and voluntarily agreed to participate.

Ethical Considerations

All procedures performed in this study involving human participants were in accordance with the ethical standards of the Ethics Committee of the Faculdade Nova Esperança (FACENE) (Protocol No. 6.783.073) and with the 1964 Helsinki declaration and its later amendments. Informed consent was obtained from all individual participants included in the study.

Data Analysis

Descriptive statistics (frequencies, means, standard deviations) were calculated for demographic variables. Bivariate correlations were conducted to examine associations between the scales, and internal consistency was assessed using Cronbach's alpha and McDonald's omega. Conditional process modeling was used to test the sequential mediation effects of social media engagement and social comparison using the SEM module in Jamovi (version 2.3.8). The significance of indirect effects was tested using 5,000 bootstrap samples with 95% confidence intervals (CIs). Indirect effects were considered significant when zero was not within the CI bounds ($p < .05$).

Results

Correlation Analysis

The results revealed significant positive correlations between social media engagement and anxiety ($r = .23$, $p = .001$), stress ($r = .24$, $p < .001$), and social comparison ($r = .25$, $p < .001$), but not with depression. Social comparison was also significantly correlated with depression ($r = .30$, $p < .001$), anxiety ($r = .33$, $p < .001$), and stress ($r = .31$, $p < .001$). Time spent on social media was positively correlated with social media engagement ($r = .45$, $p < .001$), anxiety ($r = .24$, $p < .001$), stress ($r = .17$, $p = .022$), and social comparison ($r = .16$, $p = .031$), but not with depression.

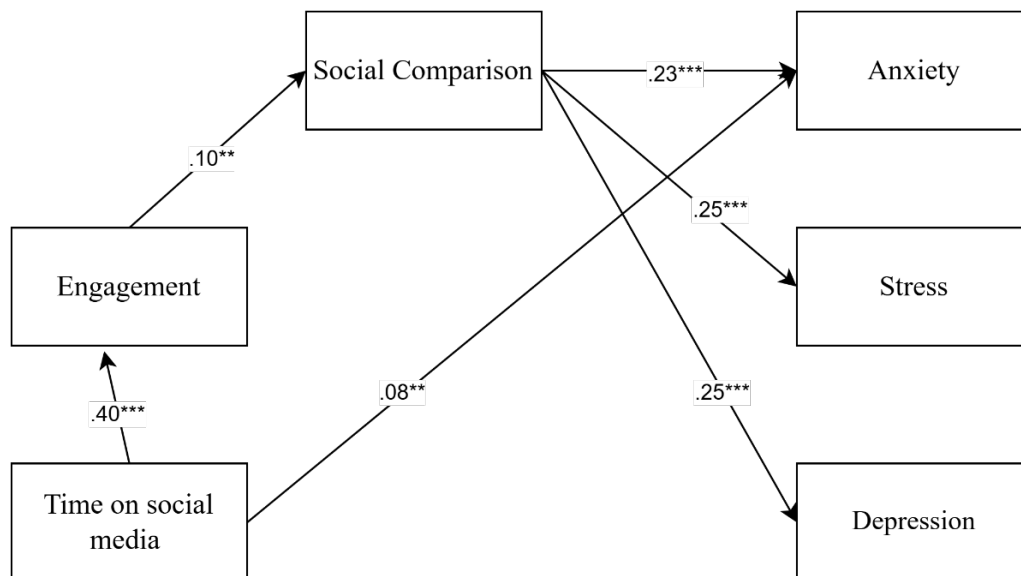


Figure 1: Estimated parameters of the sequential mediation of engagement and social comparison in the relationship between social media use time and stress, depression, and anxiety.

Note. All coefficients are unstandardized. Asterisks indicate significant coefficients: * $p < .05$, ** $p < .001$.

Serial Mediation Analysis

A serial mediation regression model was conducted with depression, stress, and anxiety as outcome variables; social comparison (mediator 1) and engagement (mediator 2) as sequential mediators; and time spent on social media as the predictor.

Results indicated that both engagement and social comparison sequentially mediated the association between time spent on social media and levels of stress (Table 1), anxiety (Table 2), and depression (Table 3). Specifically, greater time spent on social media predicted increased engagement, which subsequently led to higher levels of social comparison. This pathway was significantly associated with elevated stress, anxiety, and depression (Figure 1).

Specifically, we observed a full mediation effect of social media engagement and social comparison in the relationship between time spent on social media and levels of stress and depression. In contrast, a partial mediation was found for anxiety levels, indicating that even in the presence of the mediators, time spent on social media still directly impacts participants' anxiety levels.

Additionally, a simple mediation effect was observed between social media engagement, social comparison, and levels of stress, anxiety, and depression (Table 2). This suggests that, even without considering time spent on social media, social comparison mediates the relationship between engagement and mental health outcomes.

Table 1: Descriptive Statistics and Pearson Correlation Matrix of Variables

Variable	M	SD	1	2	3	4	5	6
1. Engagement	5.03	1.89	—					
2. Depression	0.89	0.75	.11	—				
3. Anxiety	0.76	0.75	.23**	.62***	—			
4. Stress	1.26	0.81	.24***	.67***	.76***	—		
5. Social comparison (SC)	4.47	0.87	.25***	.30***	.33***	.31***	—	
6. Time on social (TRS)	3.01	0.61	.45***	.11	.24***	.17*	.16*	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2: Estimated Parameters for Simple and Serial Mediation Analyses

Effect	Estimate	SE	95% CI	
			Lower	Upper
Stress				
Total Effect	0.06	.03	.00	.12
Direct Effect	.05	.03	-.01	.12
<i>Specific Indirect Effects</i>				
TRS ⇒ Engagement ⇒ SC ⇒ Stress	.01*	.00	.00	.02
Anxiety				
Total Effect	.09***	.02	.03	.14
Direct Effect	.08*	.02	.02	.14
<i>Specific Indirect Effects</i>				
TRS ⇒ Engagement ⇒ SC ⇒ Anxiety	.01*	.00	.00	.01
Engagement ⇒ SC ⇒ Anxiety	.02*	.01	.00	.04
Depression				
Total Effect	.04	.02	-.01	.09
Direct Effect	.05	.03	-.01	.11
<i>Specific Indirect Effects</i>				
TRS ⇒ Engagement ⇒ SC ⇒ Depression	.01*	.00	.00	.02
Engagement ⇒ SC ⇒ Depression	.02*	.01	.00	.05

Note. * $p < .05$, *** $p < .001$.

TRS = Time on social media; SC = Social comparison.

Discussion

The aim of this study was to analyze the relationship between time spent on social media, engagement, social comparison, and symptoms of stress, anxiety, and depression. Two main hypotheses were tested. The first hypothesis proposed that engagement would be positively correlated with social comparison, which in turn would be positively associated with levels of stress, anxiety, and depression. The second hypothesis was that the relationship between time spent on social media and mental health outcomes would be sequentially explained by social media engagement and social comparison.

The study revealed significant correlations among the investigated variables. Social media engagement was positively associated with anxiety and stress, but not with depression. Social comparison showed positive relationships with anxiety, stress, and depression. Time spent on social media was positively related to engagement, anxiety, stress and depression.

Moreover, the present study provided evidence of the serial mediation of social media engagement and social comparison in the relationship between time spent on social media and mental health outcomes. Specifically, the findings supported the initial hypotheses, reflecting how increased engagement with social media content renders individuals more vulnerable to various types of information encountered online, which in turn increases their tendency to engage in social comparison (Yoon et al., 2019; Zheng et al., 2020). This suggests that the more time individuals spend on social media, the more engaged they become with content, making them susceptible to social comparison and consequently experiencing poorer mental health. Indeed, social comparisons can generate dissatisfaction, feelings of failure, and stress, all of which negatively impact mental health (Festinger, 1954).

This research contributes to the literature by expanding the theoretical framework of social comparison theory and its application to social media studies (Festinger, 1954; Yoon et al., 2019; Zheng et al., 2020). Furthermore, to our knowledge, this is one of the first studies to propose an underlying psychological process that explains how time spent on social media affects mental health, particularly by incorporating two sequential mediators. One possible explanation for these results lies, firstly, in the mechanisms of social media platforms, which employ various strategies to capture users' attention. Secondly, the impact of the posts themselves plays a role (Tosun, 2012).

Users encountering diverse posts may engage in upward and downward comparisons: upward comparison occurs when individuals compare themselves to those perceived as better off, while downward comparison occurs when the

comparison target is perceived as worse off. Downward comparisons can enhance subjective well-being by allowing individuals to feel relatively better off (Wills, 1981). Nonetheless, both comparison directions may have negative effects (Twenge, 2019), as upward comparisons can reduce satisfaction and generate envy and resentment (Carvalho & Leite, 2023), while downward comparisons may foster stagnation and complacency (Myers, 2014).

This study has several important implications, including the need to develop interventions aimed at regulating social media use time, especially among adolescents and children. It is also crucial to consider the type of content accessed on these platforms, given that many posts do not accurately reflect individuals' real lives.

Furthermore, although the research confirmed our predictions, it is not without limitations. Initially, the sample was non-probabilistic and convenience-based, consisting exclusively of university students. In this context, it is not possible to make generalizations about the general population. In this sense, caution must be exercised when interpreting the findings. Additionally, the correlational design highlights the importance of considering bidirectional effects and precludes causal inferences.

Future research should employ more diverse and randomized samples to enhance generalizability. Experimental designs are also needed to move beyond correlational methods and obtain more robust evidence. Finally, future studies could explore variables that help understand how to mitigate the negative impact of social media on mental health.

Ethical Considerations

All procedures performed in this study involving human participants were in accordance with the ethical standards of the Ethics Committee of the Faculdade Nova Esperança (FACENE) (Protocol No. 6.783.073) and with the 1964 Helsinki declaration and its later amendments. Informed consent was obtained from all individual participants included in the study.

Authors Contributions

Maria Beatriz Rodrigues Delfino: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Visualization, Writing – original draft, Writing – review & editing. Stephanie Formiga Franklin Vieira: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. Luiz Fernando Oliveira da Silva: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Re-

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Conflict of Interest

We have no conflicts of interest to disclose

Funding

This work was supported by Faculdade Nova Esperança (FACENE).

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