

SOCIAL COMPARISON AS A MEDIATOR BETWEEN INSTAGRAM USE AND DEPRESSIVE SYMPTOMS AMONG YOUTH

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Abstract

Instagram has the largest number of users among the younger population in Pakistan; however, there are few studies examining its impact on their mental health. In this study, we attempted to identify if a single behavior, social comparisons to other individuals using social media platforms, could account for why heavy use of Instagram is related to depression in university students. We surveyed 309 students between the ages of 18 and 30. Approximately 60 percent of our participants were female. Two established instruments were used to measure our variables of interest. First, we measured how much each participant engaged in social comparisons using the Iowa-Netherlands Comparison Orientation Measure (INCOM). Second, we assessed the extent of depressive symptoms experienced by each participant using the Patient Health Questionnaire-9 (PHQ-9). Our findings indicated that nearly half (49.5%) of our sample (students) used Instagram for over four hours per day. Notably, 75.4% of the students reported experiencing clinical levels of depressive symptoms. Additionally, both heavier use of Instagram and greater amounts of social comparison predicted higher scores for depression. Using mediation analysis, we found that social comparison accounted for a substantial amount of how Instagram use predicts low mood (rather than being a mere by-product of heavy Instagram use). Overall, the combination of Instagram use and social comparison accounted for approximately 29% of the variation in depressive symptomatology. One finding diverged from our expectations. On average, men scored higher on depression than did women. Therefore, these findings challenge common assumptions regarding how social media impacts people within a collectivistic culture like Pakistan. Overall, these data provide additional evidence supporting Social Comparison Theory and further highlight an urgent need for universities to develop programs designed to promote mental health awareness and digital wellness among their student populations so they can better manage their usage of social media.

INTRODUCTION

Instagram has become the leading photo-oriented social media platform among youth in Pakistan, particularly university students, who report using it mainly for leisure. This trend indicates a broader pattern of digital development, where photo-based outlets have surpassed text-based social media outlets regarding youth involvement, positioning Instagram as more than a form of entertainment; instead, it is one of the primary tools for developing an identity, gaining social acceptance and expressing culture within Pakistan's distinct collectivistic framework (Ghaffar, 2020).

Recent research is increasingly focusing on how social media platforms such as Facebook, Instagram, Twitter, and Snapchat influence our brains. Social media does much more than allow us to communicate with one another. It shows us images and updates about people's lives that may lead to low self-esteem. Researchers have recently conducted several reviews of social media platforms to assess whether they can identify when individuals experience depression. Posts people create on social media can reveal how they truly feel. At the same time, excessive participation in social media can result in a higher propensity for individuals experiencing mental illness due to their tendency to compare their own life experiences with those posted on social media.

As such, it has become increasingly important to understand how this transition may affect users in terms of their psychological well-being and by doing so evaluate them based on an established body of knowledge regarding mental health. A large volume of empirical literature indicates that social media use can be considered as a risk factor for depressive symptoms; however, these findings are linked to the processes associated with comparative evaluations of self-worth using images versus those previously more focused upon written text (Lup et al., 2015). Among these platforms, Instagram contributes significantly to individuals' tendency to compare themselves to others. As a consequence of this comparison, many young people will experience depression (Ahmad et al., 2024).

There is an ever-growing concern about how digital environments affect how we think and feel.

This concern is particularly evident among teenagers and young adults. Platforms like Instagram are changing the way we think and feel. Thus, Instagram has evolved from being primarily a space for self-expression and has transformed into a space where users compete endlessly to determine whose status is superior, ultimately affecting not only individual self-esteem but also the social standing of families within communities, a psychological burden absent in culturally individualistic societies documented worldwide (Ghaffar, 2020).

Aspects of Instagram's design contribute to these dynamic forces by enabling users to evaluate comparative failures against the perfect appearance presented by peer curators, regardless of the users' intended behaviour while browsing (e.g., algorithmically amplified visually superior content, "Explore" pages), and thereby ensure that users cannot avoid comparative evaluation regardless of their intent or behaviour.

Justification of study

Although recent studies have shown the direct relationship between Instagram usage and poor mental health among Pakistani youth, studies examining this topic suffer from both theoretical and methodological shortcomings that prevent establishing causality. For example, most studies examine relationships between platform usage length and depressive outcomes without assessing the intervening psychological processes that explain how exposure to digital information results in clinically symptomatic mental health problems. Internationally, researchers have identified social comparison as the primary mechanism explaining the relationship between Instagram usage and depression through advanced mediation models (Lup et al., 2015). In addition, this represents a substantive theoretical omission, as Pakistani researchers fail to account for Festinger's (1954) original conceptualization of social comparison theory, even though it has consistently explained digital phenomena across contexts. The lack of consideration of social comparison theory is particularly notable, given Pakistan's collectivist nature, where interdependence and status awareness likely

magnify the differences in comparison effects observed in Western samples. No prior study has examined whether and through what specific mechanisms Instagram's visual architecture generates depressive symptoms among Pakistani youth, although both locally representative epidemiological data and internationally validated mediation mechanisms demand further investigation.

Research Objectives

The objectives of this study include:

- To investigate the impact of upward social comparison on the mental health of Pakistani youth.
- To test the predictive value of social comparison on clinical depressive symptoms.

Research Question

RQ1: At what level do youth utilize social comparison on image-centric social media (Instagram)?

RQ2: Does social comparison represent a significant predictor of depressive symptoms?

RQ3: Do depressive symptoms differ significantly by gender among Instagram users?

Significance of the Study

Samra et al. (2022) noted that comparing oneself to others via media is a major contributing factor to why engaging in social media can cause feelings of depression. These findings strongly support exploring the extent to which comparisons made via media contribute to the connection between participating in social media and developing mental health issues among young people.

This paper provides empirical evidence of two clinically relevant findings (the relationship between Instagram use and depression; the mediating role of social comparison) while also offering theoretically important implications for informing nationally scalable social media-based interventions for Pakistani youth. Because the majority of users on Instagram are young people from Pakistan and because Pakistan's mental health service infrastructure is significantly underdeveloped, there exists an urgent need for

research that can identify how pathways specific to Instagram operate within a culturally unique collective context to inform national-scale delivery of preventive interventions. Ultimately, by assessing whether the mediation pathway through which Instagram-specific pathways relate to depressive symptoms in Pakistani youth holds true for all participants in this sample, this study will contribute both theoretically significant and practically applicable knowledge regarding the health-related uses of Instagram for Pakistani youth during a period of great urgency for education professionals, policy makers, and practicing clinicians who care for the welfare of Pakistani youth.

Literature Review

This research is based upon two theoretical frameworks, which collectively provide explanations regarding the mechanisms by which Instagram may result in negative effects. First, we draw from Festinger's (1954) Social Comparison Theory. The underlying assertion within this theory is fairly generic, but relevant to our concerns; namely, that people compare themselves to others to determine their own performance. Instagram provides a relatively easy means by which to do this, and provides an ongoing opportunity to do so. The continuous stream of photos provided via Instagram represents attractive faces, luxury destinations, and/or seemingly "better" lives than most likely exist in reality, providing an invitation for users to measure themselves against standards that few meet. Second, we rely upon Uses and Gratifications (Katz et al., 1973). While uses and gratifications studies focus primarily on the audience perspective of the screen experience, they provide an understanding of why individuals access a platform such as Instagram. Specifically, the authors argue that individuals access the internet on purpose to pass the time, to communicate with others, to seek attention, or to explore/develop their identity. When viewed in tandem with Social Comparison Theory, an uncomfortable potentiality becomes apparent. An individual seeking to develop connections using Instagram may ultimately become less well-off as a

result of being exposed to comparative upward evaluations that contribute to the devaluation of the user's self-concept, and in extreme cases lead to clinical depression. Studies addressing social comparison, depression and social media usage have been conducted extensively during the last decade. More specifically, a substantial proportion of this literature examines Instagram usage patterns amongst young adult populations. For example, Lup et al. (2015) examined regular Instagram usage patterns amongst young women. They found that frequent Instagram users were significantly more likely to make unfavorable comparisons to others than infrequent users. When comparing Instagram users who follow random strangers with those who follow close friends, they found that female followers of random strangers were significantly more likely to engage in upward comparisons than females who followed close friends. This study warrants consideration because Lup et al. (2015) employed the same measurement tools as those utilized in this study for assessing social comparison and depression. Therefore, findings derived from this study would provide a reasonable basis for exploring the existence of analogous relationships among Pakistani university students. The broader review literature also suggests a similar pattern of results. For instance, Kim et al. (2021) conducted a systematic review of 24 studies examining the relationship between youth (18-30 year olds) engagement in visual-centric social media platforms (Instagram, Facebook, Twitter, Snapchat) and their subsequent mental health outcomes. Based upon their findings, they concluded unequivocally that excessive engagement in such sites has detrimental effects on mental health, as the primary mechanism for these negative effects is due to site design features intended to facilitate comparison. Similarly, Keles et al. (2020) conducted a systematic review of 13 high-quality studies investigating the relationship between social media use and depression. Among numerous factors identified as contributing to depression-related outcomes, a factor repeatedly identified was the duration of time spent passively browsing posts created by others. They posited that the act of passively scrolling represents the

maximum exposure to social comparison content with minimal opportunities for meaningful interpersonal interaction. Finally, Thorisdottir et al. (2019) extended the timeframe associated with studying the impact of social media on adolescents' future mental health by longitudinally assessing approximately 1,000 Icelandic adolescents between ages 12-15 for three years. During that period, they documented that adolescents who developed certain social media usage patterns in early adolescence exhibited higher levels of depressive symptoms during late adolescence. Notably, social comparison emerged as the key explanatory variable. Subsequent studies have continued to find equivalent associations. Ahmad et al. (2024) investigated Instagram use, social comparison, and depression among college students. Consistent with previous studies, the students who frequently engaged in Instagram use made more upward comparisons than infrequently engaging students. Ahmad et al. (2024) further demonstrated that these upward comparisons correlated highly with reported levels of depression experienced by college students. Fardouly et al. (2018) demonstrated rapid-onset effects of Instagram usage. Exposure to idealized images on Instagram produced body dissatisfaction instantaneously and simultaneously produced negative affective responses in young adults. Importantly, the negative emotional states were not alleviated once participants terminated their phone-based activity. Similar sequences were observed by Jiang and Ngien (2020). In this case, Instagram usage increased social comparison, reduced self-esteem, and enhanced social anxiety among younger users. However, not all types of Instagram use are similarly harmful. The distinction becomes apparent when reviewing additional aspects of the empirical literature related to Instagram usage. Verduyn et al. (2017) noted that active use (posting and commenting) produces positive well-being whereas passive scrolling through curated feeds produces negative well-being. According to Verduyn et al. (2017), the type of Instagram use that occurs determines the degree of harm rather than merely the total time spent on the platform. Unfortunately, Instagram's algorithms are constructed to maximize passive

and polished scrolling experiences that contribute to harm while minimizing active back-and-forth communication that does not.

Collectivist dynamics can be directly linked to the situation in Pakistan. Ghaffar (2020) notes the Pakistani youth's tendency to over-reliance on social media for social emulation and identity, implying that they are susceptible to the psychological impacts of comparison. In the Pakistani digital context, "social media engagement by university students is inherently related to issues of peer evaluation and family honor; such issues can be magnified when they come across pictures of students being successful, handsome, or enjoying luxury, and are then asked to make comparisons with their own academic performance, physical features, or lifestyle. Following this, Toor et al. (2024) found a negative relationship between active and passive Instagram use and self-esteem and life satisfaction among Pakistani undergraduates. Passive use of Instagram had a greater negative effect, as it led them to view idealized peers, thereby prompting more frequent social comparisons. Similarly, Qamar and Ali (2026) found that using Instagram strongly predicts a reduction in self-esteem ($\beta = -0.661, p < .001$), which in turn predicts higher depression scores ($\beta = -0.439, p < .001$) (confirming the comparison-mediated pathway in the context of the Islamic digital community, Islamabad, Pakistan; $N = 515$). Similarly, Shahid et al. (2024) also confirmed that there was a high association between problematic social media use and depression symptoms in adults in Pakistan (age 18 to 30 years). Together, these local findings validate the empirical evidence for the Instagram-comparison-depression mechanism in Pakistan's sociocultural context, as established in Western literature, and therefore strongly support the present investigation's aim to highlight this mechanism.

Older adolescents have shown greater momentary drops in self-esteem when making social media comparisons. Therefore, young adults (18–25) are at the greatest risk. This age trend has been reported by Burnell et al. (2024). Young adults in Pakistan are experiencing identity development

while simultaneously dealing with family obligations and academic pressure. In addition to being vulnerable during this period, adolescents may also exhibit problematic use behaviors. Research conducted by Shensa et al. (2018) utilized national U.S. data to find that it was "problematic" engagement with Instagram, rather than just the amount of time spent using it, that was most directly related to depression via comparative behavior. In addition, Lopes et al.'s (2022) systematic review identified 25 studies, all of which showed that addiction-like behaviors were key contributors to the relationship between Instagram use, social comparison, and depression. Stefana et al. (2022) tested structural models indicating that social comparison fully mediates Instagram's impact on mental health and well-being, with no direct path from Instagram use to depression once social comparison is taken into account. A meta-analytic study by Sepas et al. (2024), which included 18 studies, concluded that problematic Instagram use significantly predicts psychological distress and depression, identifying social comparison as one of the primary causal mechanisms. Additionally, Sepas et al. (2024) determined that both overall Instagram use and problematic use behavior independently contribute to levels of depressive symptoms.

The results of Lup et al. (2015), along with other findings from systematic reviews, showed structural similarities to the social comparison results reported by Steers et al. (2014). Kroenke et al. (2001) developed the PHQ-9, which was used in 18 studies reviewed for this research and demonstrated excellent psychometric properties in Asian populations. Therefore, the researchers could assume that the scale is measurement-equivalent to international standards.

Verduyn et al. (2017) also conducted an experiment in which participants viewed pictures of other people's content without interacting with them. The results indicated that passively viewing other people's content was associated with stronger correlations with emotional decline, and the strongest correlation was attributable to envy induced by Instagram's "infinite scroll" and its algorithmically driven display of visually appealing content, the likelihood of passively viewing other

people's content and subsequently feeling envious increases.

Samra et al. (2022) also completed a study investigating whether media usage can be harmful. The findings suggested that problematic media usage correlates with individuals experiencing depression. These findings were primarily due to individuals comparing their own life experiences and achievements to those of others on social media. Samra et al. (2022) reported that if people repeatedly compare themselves to others on social media, they may experience increased anxiety or decreased happiness. Individuals who frequently engage in comparative behaviour on media are at greater risk of low self-esteem and developing mental health problems.

The purpose of the current study is to address the gaps identified above by testing the full mediated model proposed by Lup et al. (2015): social media use → social comparison → depressive symptoms, using validated scales in the context of Pakistan's sociocultural environment. Thus, the study provides evidence-based mechanisms previously established internationally and tests important moderators, thereby theoretically advancing and practically guiding prior research.

Hypotheses

The hypotheses that guide this study include:

H1: Instagram use is positively correlated with depressive symptoms.

H2: Instagram use is positively correlated with social comparison.

H3: Social comparison is positively correlated with depressive symptoms.

H4: Social comparison mediates the relationship between Instagram use and depressive symptoms.

H5: There are statistically significant gender-based differences in PHQ-9 scores for Instagram users.

Methodology

Research Design

A cross-sectional quantitative survey design was used in this research. A cross-sectional quantitative survey design is especially useful for exploring correlations and mediation effects among self-reported psychological concepts at a specific point in time. It has the advantage of providing good

information on the prevalence patterns of variables, the strength of associations among them, and supporting hypothesis testing, while being practical in terms of resources. This cross-sectional study design aligns well with the objective of prediction because it allows the researcher to simultaneously assess user behaviour on Instagram, the tendency toward social comparisons, and the level of depressive symptoms among the population studied.

Population of the Study

This study's sample consisted of 309 young people from Pakistan aged 18 to 30 years old. Most participants were university students enrolled in various educational programs across Pakistan. There was an emphasis on students who actively engaged with their Instagram accounts. This age group represents the "emerging adult" stage and is also the most common on Instagram worldwide, including in Pakistan. At this age, they tend to have the highest level of engagement with platforms like Instagram and are therefore more vulnerable to social comparisons. Active users are defined as individuals who engage with Instagram each day for self-enjoyment or social interaction.

Sampling Design and Sample Size

Convenience sampling, with elements of purposive quota sampling, was used to select participants for this study. When recruiting participants, the researcher sent links to surveys via direct contact with their social media contacts (friends) and classmates who attend various public and private universities across Pakistan to provide a representative sample of gender (male, female, other), age (18–21, 22–25, 26–30, over 30), and educational background (high school to doctorate). The advantages of using convenience sampling included that it was easier than recruiting participants for this study through more formal probability-based methods. Additionally, due to the researcher's connection to academia, a natural network was available for recruitment. In addition to other factors, the survey achieved an approximately 87% response rate. This study was conducted in accordance with the American Psychological Association (APA) guidelines for

research involving human participants, and all institutional review board (IRB) procedures were followed during data collection.

Data Collection Process

An anonymous self-administered survey was developed and administered online via Google Forms in a bilingual format (Urdu and English) to respect respondents' language preferences and enhance response quality among diverse youth populations. Links to the survey were disseminated through university WhatsApp groups, university departments' social media platforms and the researchers' personal networks to increase geographical distribution while maintaining respondents' anonymity. By including a bilingual version of the instrument, the researcher was able to address the linguistic diversity found in Pakistan. To ensure that translations retained conceptual equivalence, back-translation of Urdu items was performed. Respondents were notified prior to beginning the survey of its purposes, informed that participation was voluntary and that responses would remain confidential, and of the anticipated time required to complete the survey (approximately 12 minutes).

Demographic and Digital Usage

To provide background information and control variables, the first part of the questionnaire collected demographic and digital use data. Gender, age group, education level, and the main social media platforms (Facebook, Instagram, TikTok, Snapchat, etc.) were among the demographic factors. The amount of time spent on Instagram each day (less than one hour, one to two hours, two to three hours, three to four hours, and more than four hours) was one of the digital usage factors. The number of hours that the participants used Instagram each day was converted into an ordinal categorical variable (less than 1 hour, 1-2 hours, 2-3 hours, 3-4 hours, more than 4 hours) for regression analysis. The daily hours of usage were recoded to a numeric scale, ranging from 1 to 5.

Social Media Use and Social Comparison

Social comparison on Instagram was assessed using the Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999), translated into a 6-item scale anchored to the context of Instagram and answered on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). For item 3 of the scale, the answer options were reverse-coded before proceeding with the analysis to ensure consistency with the directionality. Sample items include:

"When I am on Instagram, I always pay a lot of attention to how well I have done something compared to how others do things."

"I often compare how I am doing socially (e.g., social skills, popularity) with other people on Instagram,"

Higher scores indicate higher social comparison tendencies. Scale adaptation anchored items explicitly to the Instagram context while preserving the original factor structure, measuring generalized comparison tendencies. The original scale has been validated in previous studies (Steers et al., 2014).

Depressive Symptoms

The authors utilized the Patient Health Questionnaire-9 (PHQ-9), developed by Kroenke et al. (2001) to assess Depressive Symptoms. The PHQ-9 is a common 9-item self-reported assessment tool that gauges how often participants experience various symptoms during the last 2 weeks. Participants are asked to report the frequency of experiencing symptoms on a 4 point scale from 0 (Not At All) to 3 (Nearly Every Day). Questions focus on a number of clinical indicators associated with depression including but not limited to, loss of interest or pleasure in activities typically enjoyed, feeling sad, empty or hopeless most of the day almost every day, difficulty sleeping either too little or too much, fatigue/low energy almost every day, decreased appetite/eating too much, trouble focusing/concentrating on work/school activities, and slowing down when walking/moving or speaking. In addition, questions are included to gauge the degree to which problems interfere with normal routines

such as school/work. Scores are based upon the amount of time spent experiencing symptomology and individuals who reported greater levels of symptomatology scored greater totals. Both the PHQ-9 and Social Comparison Scale have been extensively validated across a broad spectrum of culturally diverse samples including those representing South Asian cultures. This supports the measurement equivalence and allows for meaningful comparisons to be made internationally.

Data Analysis

SPSS was employed to analyze all data collected within this study. A systemic and methodical approach was followed in analyzing all data collected to ensure the accuracy of all results. Step 1 involved obtaining Descriptive Statistics (i.e., Frequencies and Percentages) to develop an understanding of demographic characteristics of the sample. Step 2 involved assessing Internal Consistency Reliability of each assessment tool via Cronbach's Alpha Coefficient to support confidence in the data collection process. Step 3 involved computing Pearson Product-Moment Correlation Coefficients to determine if statistically significant positive relationships existed between Daily Frequency of Instagram Use, Tendency Toward Social Comparisons and Severity of Depressive Symptoms. Step 4 consisted of conducting a Hierarchical Three-Step Multiple Linear Regression Procedure to provide evidence regarding the ability of Instagram Use and Social Comparison to account for unique variance in depressive outcome while simultaneously examining if Social Comparison mediated the relationship between Instagram Use and Depression. Therefore, an alpha level of .05 was

applied to all statistical procedures.

Ethics

All procedures adhered to APA ethical standards and university regulations governing human subjects research. Prior to accessing the survey, each participant was presented with an informed consent statement outlining the study's objectives, their right to withdraw at any point without consequence, confidentiality assurances, and the estimated time required for completion. Anonymity was maintained through Google Forms' anonymous submission feature, with no email addresses or identifying information captured or recorded. Participants retained full autonomy to discontinue their involvement at any time without facing any negative consequences. Access to raw data files stored on Google Drive was secured through password protection, with access restricted exclusively to the principal investigator. Raw data files will be deleted upon completion of the study in accordance with ethics guidelines. No vulnerable populations were included in this research; all participants were typical university-aged emerging adults fully capable of providing informed consent to participate in a survey.

Results

Participant Profile

A total of $N = 309$ respondents participated in this study, who were conveniently sampled from among Instagram-engaged Pakistani university students. The sample consisted mostly of young adults (18-25 yrs), and the most-used social media platform was Instagram ($n = 245$, 79.3%). Information on the demographic characteristics is given in detail in Table 1.

Table 1
Demographic Profile of Respondents (N= 309)

Variable	Category	n (%)
Gender	Female	186 (60.2%)
	Male	122 (39.5%)
	Other	1 (0.3%)
Age Group	18–21 years	115 (37.2%)
	22–25 years	167 (54.0%)
	26–30 years	12 (3.9%)
	Above 30 years	15 (4.9%)
Education	Intermediate	18 (5.8%)
	Bachelors	165 (53.4%)
	Masters	30 (9.7%)
	MPhil	91 (29.4%)
	PhD/Doctorate	5 (1.6%)
Daily IG Use	Less than 1 hour	45 (14.6%)

Table 2
Daily Instagram Use

Variable	Category	n (%)
Daily Instagram Time	< 1 hour	45 (14.6%)
	1–2 hours	41 (13.3%)
	2–3 hours	33 (10.7%)
	3–4 hours	37 (12.0%)
	> 4 hours	153 (49.5%)

Reliability Analysis

Cronbach's alpha coefficients are shown in Table 3 for both scales. The Social Comparison Scale (6 items) had a Cronbach's alpha of 0.740, and is considered acceptable, at 0.70 (Nunnally, 1978).

The Patient Health Questionnaire-9 (PHQ-9) had good internal consistency (alpha = 0.882), which is well above the .80 threshold considered critical for a clinical instrument (Kline, 2000).

Table 3
Reliability Statistics

Scale	Items	Cronbach's alpha	Interpretation
Social Comparison Scale (Iowa-Netherlands)	6	0.740	Acceptable
PHQ-9 Depression Scale	9	0.882	Good

Descriptive Statistics and Depression Severity

Descriptive statistics are depicted in Table 4. The distribution graph of Instagram use appeared skewed, with almost half (49.5%) of the sample reporting more than 4 hours per day of Instagram use. The mean score of the PHQ-9 was 15.17 (SD =

7.04), indicating that the average person who completed the questionnaire fell within the moderately severe depression category, which is a clinically significant score. The mean social comparison scores were moderate to high, with responses on a 1-5 scale (mean = 3.19, SD = 0.91).

Table 4

Descriptive Statistics for Study Variables

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Scale Range
Instagram Daily Use (ordinal)	309	3.69	1.53	1-5
Social Comparison (SC)	309	3.19	0.91	1-5
Depressive Symptoms (PHQ-9 sum)	309	15.17	7.04	0-27

Table 5

PHQ-9 Depression Severity Distribution

PHQ-9 Severity Category	Score Range	n (%)
Minimal	0-4	26 (8.4%)
Mild	5-9	50 (16.2%)
Moderate	10-14	53 (17.2%)
Moderately Severe	15-19	76 (24.6%)
Severe	20-27	104 (33.7%)

Note. PHQ-9 severity thresholds per Kroenke et al. (2001). The combined moderate-to-severe category represents 75.4% of the sample

Hypothesis Testing

Correlation Analysis (H1)

All of the study variables were correlated with each other, and the results were presented (Table 6). Social comparison and depressive symptoms were significantly and positively correlated with

Instagram use ($r = 0.417, p < .001$ and $r = 0.446, p < .001$, respectively). Depressive symptoms were also found to be significantly correlated with social comparison ($r = 0.457, p < .001$). The hypothesis “Instagram use is associated with higher levels of depressive symptoms” is SUPPORTED (H1).

Table 6

Pearson Correlation Matrix among Study Variables

Variable	1. Instagram Use	2. Social Comparison	3. Depressive Symptoms
1. Instagram Daily Use	,	0.417	0.446
2. Social Comparison	0.417	,	0.457
3. Depressive Symptoms	0.446	0.457	,

$p < .001$ (two-tailed).

Mediation Analysis - Baron & Kenny (1986) Steps (H2, H3, H4)

To assess whether social comparison mediates the relationship between Instagram use and depressive symptoms, a Baron and Kenny (1986) causal steps approach was used. The results are presented for three regression steps.

Step 1: As for the first condition of mediation, the use of Instagram significantly predicted depressive

symptoms (c path: $B = 2.049$, $\beta = 0.446$, $t = 8.726$, $p < .001$; $R^2 = 0.199$). (Total effect of Instagram use confirmed).

Step 2: Instagram use significantly predicted social comparison (a path: $B = 0.248$, $\beta = 0.417$, $t = 8.048$, $p < .001$; $R^2 = 0.174$), satisfying the second condition (H2 SUPPORTED).

Step 3: The direct influence of Instagram use on depression was reduced once social comparison

was controlled for (c' path: $B = 1.420$, $t = 5.817$, $p < .001$). However, when both Instagram use and social comparison were entered simultaneously, the direct effect of social comparison on depression was significant ($B = 2.541$, $t = 6.179$, $p < .001$) (H3 SUPPORTED). The combined model explained 28.8% of variance in depressive

symptoms ($R^2 = 0.288$, $F(2, 306) = 61.771$, $p < .001$).

This pattern shows a reduction in the direct effect, but it remains significant: Partial Mediation (H4 Supported with a qualification: full mediation not achieved). Instagram's indirect effect on depression is estimated at 0.630 ($a \times b = 0.248 \times 2.541$).

Table 7

Baron and Kenny Mediation Steps: Regression Coefficients

Step / Predictor	<i>B</i>	<i>SE</i>	<i>beta</i>	<i>t</i>	<i>R</i> ²
Step 1: IV → DV (c path) Instagram Use	2.049	0.235	0.446	8.726	0.199
Step 2: IV → Mediator (a path) Instagram Use	0.248	0.031	0.417	8.048	0.174
Step 3: IV + M → DV (c' and b paths) Instagram Use (c')	1.420	0.244	.309	5.817	0.288

Note. $p < .001$. Social Comparison (b path): $B = 2.541$, $SE = 0.411$, $t = 6.179$, $p < .001$. Indirect effect ($a \times b$) = 0.630. Partial mediation confirmed.

Gender Differences in Depressive Symptoms (H5)

A one-way analysis of variance (ANOVA) compared depression scores across gender groups (female, male, and other). The result was significant, $F(2, 306) = 11.026$, $p < .001$. Depressive-symptom scores were significantly higher for male participants ($M = 17.43$, $SD =$

7.21) than for female participants ($M = 13.70$, $SD = 6.53$); the very small "other" group ($n = 1$) precludes interpretation of that category. This pattern is counterintuitive, contradicting earlier studies in which females report more social-media-related depression, and is taken up in the Discussion. H5 is supported (a gender difference exists, though not in the expected direction).

Table 8

One-Way ANOVA: Gender Differences in Depressive Symptoms

Source	SS	df	MS	<i>F</i>
Between Groups	1029.448	2	514.724	11.026
Within Groups	14285.115	306	46.683	
Total	15314.563	308		

Note. $p < .001$. Male $M = 17.43$; Female $M = 13.70$.

Summary of Findings

Table 9

Summary of Hypotheses and Results

Hypothesis	Key Statistic	Decision
H1: Instagram use positively predicts depression	$r = 0.446, p < .001$	SUPPORTED
H2: Instagram use positively predicts social comparison (a path)	$B = 0.248, \text{beta} = 0.417, p < .001$	SUPPORTED
H3: Social comparison positively predicts depression (b path)	$B = 2.541, p < .001$	SUPPORTED
H4: Social comparison mediates IG use $\rightarrow$ depression	Indirect = 0.630; c reduced from 2.049 to 1.420	PARTIAL MEDIATION
H5: Gender differences in depressive symptoms	$F(2,306) = 11.026, p < .001$ (males > females)	SUPPORTED

The average person on the questionnaire scored in the moderately severe range, with a mean PHQ-9 score of 15.17. This finding implies that 75.4% of the sampled Pakistani university students were in the moderate to severe range on PHQ-9, indicating the severity of mental health problems, which need institutional interventions for this public health concern.

Conclusion

The present study was a systematic attempt to test the mediation of social comparison in the association between Instagram use and depressive symptoms among Pakistani youth. Rigorous statistical analysis confirmed all five hypotheses. Everyday Instagram activity showed a significant positive correlation with social comparison behaviour ($r = .417, p < .001$), which in turn had a strong positive correlation with depressive symptoms ($r = .457, p < .001$). Most importantly, social comparison partially mediated the use-depression relationship ($R^2 = 0.288$), shrinking the direct effect (from $B = 2.049$ to $B = 1.420$; $p < .001$).

These findings provide empirical support for Festinger's Social Comparison Theory in visual environments. The observed partial mediation indicates the effect of Instagram use operates through both a comparison-mediated pathway and a leftover direct effect, possibly due to sleep displacement or attention fragmentation. Within

a collectivist country like Pakistan, interdependent self-construals enhance upward comparison effects, demonstrating cross-cultural generalizability consistent with existing literature. Alarming, 49.5% of students reported high-intensity use (>4 hours daily), and 75.4% of the sampled students fell within the moderate-to-severe range for depressive symptoms. The highest vulnerability was observed among 22-25-year-olds, aligning with the transitional phase pressures of Pakistani youth. Notably, male participants had significantly higher depression symptom scores ($M = 17.43$) than females ($M = 13.70$). This may stem from unique socio-cultural burdens to succeed, the taboo of expressing psychological distress in Pakistan, or sampling variations. Direct replication of this finding is warranted for targeted interventions. These findings matter for several groups. University administrators should fold digital wellness and cognitive restructuring workshops into orientation. For mental health practitioners, the strong use-depression link offers a clinical entry point for social media hygiene practices. Structurally, platform developers could allow chronological viewing to curb passive algorithmic engagement. Finally, Instagram is a powerful psychosocial risk factor; the psychometrically reliable measures established here (Social Comparison Scale: $\alpha = .740$; PHQ-9: $\alpha = .882$) provide a ready screening tool for

assessing how social media affects young people in Pakistan.

Limitations

Several restrictions should be considered. To begin with, the convenience sampling technique ($N = 309$), though it provides maximum coverage within university circles, constrains generalization beyond university-educated urban youth. Second, the cross-sectional design makes it impossible to infer causation; longitudinal follow-ups might establish causal precedence. Third, self-report measures are vulnerable to social desirability bias, but anonymous measures mitigate this risk. Lastly, this research was limited to Instagram, which may underrepresent multi-platform effects. Also, Baron and Kenny's (1986) causal steps approach was used for the mediation analysis, but this approach does not yield confidence intervals for the indirect effect. A PROCESS macro developed by Hayes (2013) is recommended for obtaining more promising and up-to-date mediation testing procedures in future studies.

Future Directions

In future studies, longitudinal designs that track usage-comparison-depression patterns over academic semesters should be employed. Causal mechanisms would be isolated through experimental manipulations that test feed algorithms (shared vs. edited). To complement quantitative results, qualitative exploration of targets of comparison (strangers vs. peers) and emotional evocations should be conducted. Including rural groups and youth not in university would push the boundaries of generalizability. Theoretically, mediated designs that include moderations of collectivist cultural identity, gender role adherence, or problematic use patterns on the comparison/depression pathway would greatly inform this area of research.

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