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From Problematic Social Media Use to Depressive Symptoms Among University Students: A Second-Stage Moderated Mediation Model of Loneliness and Self-Compassion

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Abstract:

This study aimed to examine the relationships between problematic social media use and depressive symptoms among university students, to test the mediating role of loneliness in this relationship, and to test the moderating role of self-compassion in the second stage of mediation (loneliness → depression). The study adopted a quantitative cross-sectional correlational-predictive explanatory design and was applied to a stratified random sample of 3,000 male and female students. Four instruments were used: the Social Media Disorder Test (SMDT) consisting of four items, the De Jong Gierveld Loneliness Scale – Short Form (DJGLS-6) consisting of six items, the Self-Compassion Scale – Short Form (SCS-SF) consisting of twelve items, and the Patient Health Questionnaire-9 (PHQ-9) consisting of nine items. The factorial structure of each instrument was verified independently using confirmatory factor analysis, and then the structural model was tested using observed-variable path analysis within the structural equation modeling framework in AMOS, with the four variables standardized into Z-scores before testing the paths. The results showed acceptable fit for each instrument separately, and positive and statistically significant predictive paths from problematic social media use to loneliness, and from loneliness to depressive symptoms. The results also showed a statistically significant partial mediation of loneliness in the relationship between problematic social media use and depressive symptoms, and a statistically significant moderating effect of self-compassion in the second path of mediation (loneliness → depression), such that the indirect effect of problematic social media use on depressive symptoms through loneliness was weaker among students with higher self-compassion.

***Keywords*: Problematic Social Media Use, Loneliness, Self-Compassion, Depressive Symptoms, Structural Equation Modeling, Second-Stage Moderated Mediation.**

Introduction

Social media has become an integral part of the daily lives of university students; however, this widespread use has been accompanied by the emergence of a behavioral pattern known as problematic social media use (PSMU), which transforms from a passing recreational activity into compulsive behavior that disrupts academic, social, and psychological functioning. A recent study showed that this problematic use is associated with depression and shares physiological and behavioral characteristics with behavioral addictions (Tsilosani et al., 2023). Another study on medical students showed that problematic digital use contributes to explaining the severity of depressive symptoms even after controlling for life stressors (Sserunkuuma et al., 2023). Cui et al. (2023) showed that patterns of problematic social media use differ according to levels of depression and psychological stress using latent profile analysis. Sarker et al. (2023) showed a positive association between Facebook addiction and depressive symptoms among university students in a non-Western economic context. The longitudinal study by Li and Li (2024) showed that the relationship between depression and problematic social networking site use varies over time. Aslan and Polat (2024) combined social media addiction, loneliness, and depression in a single model and linked them to academic self-efficacy and academic success.

Meta-analytic evidence has confirmed this relationship; a recent meta-analysis including a large number of studies showed that social media addiction is positively associated with depression, anxiety, loneliness, and fear of missing out among students (Zhang et al., 2025). A recent longitudinal study showed a reciprocal relationship between problematic social media use and depression, separating within-person from between-person effects (Ren et al., 2026). Another longitudinal study showed that depression may precede increased problematic use during certain academic terms (Li & Li, 2024). A longitudinal study in Wuhan showed that social media addiction predicts depression among university students (Luo et al., 2025). Jameel et al. (2025) tested a mediating path linking social media addiction to mental health problems through insomnia. Zhan and Ding (2025), using cross-lagged panel analysis, showed a possible reciprocal relationship between depression and technology overuse. Zhan et al. (2025) tested anxiety and depression as two mediating paths between digital

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stress and problematic social media use, with cognitive reappraisal as a moderator. Jiao et al. (2025) tested a moderated mediation model between passive social networking site use and sub-threshold depression.

Despite the accumulation of this evidence, the explanatory mechanisms linking problematic social media use to depressive symptoms remain unclear, especially in Arab contexts.Within Arab educational contexts, Odeh (2026) similarly highlighted the interaction between psychological and technical factors in explaining the use of artificial intelligence tools among learners across Egypt, Saudi Arabia, and Jordan, reflecting the importance of examining psychological processes alongside emerging digital behaviors. Recent literature suggests that loneliness may be a potential mediating mechanism; it has been shown to be closely associated with depression among university students (Qirtas et al., 2023), and to represent a central element within the network of psychological symptoms (M. Yang et al., 2023). A longitudinal study showed that loneliness mediates the relationship between family functioning and problematic social media use (Lu et al., 2025). Loneliness has also been shown to mediate the relationship between problematic internet use and depression, with perceived social support as a moderator (Xie et al., 2025). A recent longitudinal diagnostic study provides evidence for the transition of risk from loneliness to depression among university students (Hysing et al., 2026). Ghanayem et al. (2024) showed a direct association between problematic social media use, loneliness, and mental health among university students. P. Wu et al. (2024) showed a longitudinal relationship between loneliness and problematic use. Wang et al. (2025) showed that loneliness is associated with problematic social networking site use through fear of missing out. Conti et al. (2023) showed that depressive symptoms and emotional processing problems are associated with the development of loneliness. Zhao et al. (2024) integrated loneliness, social support, emotional intelligence, family functioning, and depressive symptoms. Riboldi, Crocamo, Capogrosso, et al. (2025) demonstrated that loneliness acts as a mediating mechanism between post-traumatic stress symptoms and depressive and anxiety symptoms. Riboldi, Crocamo, Piacenti, et al. (2025) used structural equation modeling and compared students in Italy and the United Kingdom, showing a prominent role of loneliness in explaining mental health problems. Samadieh and Rezaei (2024) tested a serial mediation of social loneliness and depression. Lai et al. (2025) applied a structural model showing the mediation of loneliness with moderating effects. J. Wu et al. (2024) tested the sequential mediation of social support and loneliness.

At the same time, positive psychology literature indicates that self-compassion may act as a protective factor moderating the relationship between psychological stressors and depression. A meta-analysis showed that self-compassion interventions reduce symptoms of depression, anxiety, and stress with significant effect sizes (Han & Kim, 2023). These interventions are effective in modifying negative and positive affect among university students (Póka et al., 2024). Self-compassion has been shown to be associated with reduced depression among university students through coping mechanisms (Wang et al., 2024), and to moderate the temporal relationship between loneliness and depressive symptoms (Wang et al., 2023). A recent review showed that self-compassion acts as a protective factor against the negative consequences of social media use (Manjanatha et al., 2025). It is negatively associated with social media addiction through the mediation of gratitude (Wei, 2024), and negatively associated with digital addiction through a serial mediation of self-concept clarity and experiential avoidance (Qiu et al., 2025). A longitudinal study showed that self-compassion is associated with suicide risk through depressive symptoms using structural modeling (Kato, 2025). Serrão et al. (2023) showed that self-compassion mediates some paths from stress and anxiety to depression. A randomized trial showed that a mobile-app-based self-compassion program reduced symptoms of depression, anxiety, and stress (Han et al., 2024). Tang et al. (2024) longitudinally combined self-compassion, depression, capacity to be alone, and life satisfaction. Shi et al. (2025) separated within-person effects from stable between-person differences in the relationship between self-compassion, self-esteem, and depressive symptoms. Hou et al. (2025) showed that positive emotions and resilience resources mediate the relationship between self-compassion and psychological distress. Vidal et al. (2024) used a structural model and showed that emotion dysregulation processes mediate the association between self-criticism/self-compassion and depressive symptoms,Similarly, Adel et al. (2025) demonstrated the potential of AI-supported educational environments to stimulate self-motivation and academic optimism, highlighting the role of technologically supported contexts in promoting positive psychological resources among students.In higher education contexts, Al Tobi et al. (2026) further showed that AI-enabled digital self-management is meaningfully associated with psychological resilience, supporting the growing importance of positive psychological resources in digitally mediated educational environments.

Regarding the epidemiological background of depressive symptoms among university students, J. Wu and Liu (2023) tracked depression trajectories and showed the association of social support, family functioning, and

digital life with levels of depressive symptoms. The meta-analysis by L. Yang et al. (2023) gathered evidence on factors of depressive symptoms and highlighted the role of stress, rumination, and coping styles. Anbesaw et al. (2023) provided a pooled estimate of depression prevalence in a non-Western context. Heumann et al. (2024) provided recent estimates of depressive symptoms among higher education students in Germany. Xue et al. (2023) tested a moderated mediation model between future self-continuity and depression. Liu et al. (2023) tested a moderated serial mediation model between academic stress and depression through negative affect and sleep quality. Shi (2024) tested a moderated mediation model between social support, anxiety, and depression. Bai et al. (2025) used a moderated mediation model between major identity and depression.

However, this literature — despite its richness — does not provide a direct test of a single structural model that combines problematic social media use as an independent variable, loneliness as a mediator, self-compassion as a moderator of the second path (loneliness → depression), and depressive symptoms as a dependent variable, among university students in the Egyptian context. Xie et al. (2025) is the closest to this orientation; it tested a moderated mediation linking loneliness to depression through problematic internet use with social support as a moderator, but did not address self-compassion as a moderator. Wang et al. (2023) tested self-compassion as a moderator in the relationship between loneliness and depression, but did not include problematic social media use in the model. Zhan et al. (2025) is one of the closest studies to the moderated mediation design in the digital field, but they addressed cognitive reappraisal as a moderator, not self-compassion.

Accordingly, the current study seeks to build a structural model that explains the relationships among the four variables and tests the mediating role of loneliness and the moderating role of self-compassion in the second path of mediation (loneliness → depression). This design — second-stage moderated mediation — was chosen over moderating both paths because the strongest theoretical basis supports the moderation of self-compassion on the relationship between loneliness and depression specifically, as directly shown by Wang et al. (2023). There is insufficient theoretical evidence to support the assumption that self-compassion moderates the relationship between problematic social media use and loneliness.

The main research question is: What are the relationships among problematic social media use, loneliness, self-compassion, and depressive symptoms among university students? Sub-questions branch from it: What is the level of problematic social media use among university students? What is the level of loneliness, self-compassion, and depressive symptoms among them? What are the correlational relationships among the four variables? Does problematic social media use predict both loneliness and depressive symptoms in a statistically significant manner? Does loneliness mediate the relationship between problematic social media use and depressive symptoms? Does self-compassion moderate the relationship between loneliness and depressive symptoms? To what extent does the proposed structural model explain the variance in loneliness and depressive symptoms, and what is the significance of its direct, indirect, and conditional paths?

The study tests the following hypotheses: H1: Problematic social media use positively and statistically significantly predicts loneliness. H2: Problematic social media use positively and statistically significantly predicts depressive symptoms. H3: Loneliness mediates the relationship between problematic social media use and depressive symptoms. H4: Self-compassion moderates the relationship between loneliness and depressive symptoms (the second path of mediation). H5: There is a statistically significant moderated mediation effect, such that the indirect effect of problematic social media use on depressive symptoms through loneliness is conditional on the level of self-compassion.The importance of the study lies in its theoretical contribution, which consists of building a structural model that links problematic social media use to loneliness, self-compassion, and depressive symptoms — a model that has not been tested previously, to the best of the researchers' knowledge, in the Egyptian context. It also offers an applied contribution by guiding designers of university counseling and depression prevention programs toward integrating self-compassion development mechanisms as an entry point to mitigate the negative impact of problematic social media use.This orientation is also supported by Ahmed and Ghalish (2026), who reported meaningful relationships between social-emotional learning strategies, perceived academic achievement, and mental health, underscoring the importance of psychosocial resources in educational settings.

Methodology

First: Research Design: The study adopted a quantitative cross-sectional correlational-predictive explanatory design, which is appropriate for the nature of the study that aims to examine the relationships among variables

as they exist among students and to test a structural model that explains these relationships. Structural equation modeling was used to verify the factorial structure of each instrument separately, and then the structural model was tested using observed-variable path analysis within the structural equation modeling framework. The structural model is tested by estimating the standardized path coefficient (β), the statistical significance value, and the confidence intervals resulting from the bootstrap technique. Cross-sectional data do not allow for establishing definitive causal relationships but only allow for estimating predictive paths and standardized correlations, as noted by Ren et al. (2026) regarding the need for caution in interpreting causality in cross-sectional studies.

Second: Study Population and Sample: The study population consisted of all students at Egyptian universities in the bachelor's and postgraduate stages during the academic year 2025/2026, from various disciplines (humanities colleges and scientific/applied colleges) and from governmental and private universities distributed across the geographical regions of Egypt.

An independent pilot sample (n = 400) was collected from Egyptian universities separately from the main sample and was used exclusively to conduct exploratory factor analysis (EFA) on the four instruments. Then 3,500 male and female students from Egyptian universities were invited to participate in the main sample through student lists registered in each college, with individual invitations directed to the randomly selected sample within each stratum. A total of 3,200 responded, and after excluding incomplete questionnaires or those with irregular response patterns, the number of valid questionnaires for final analysis was 3,000, representing an initial response rate of 91.4% and a valid case rate of 85.7% of the total invited.It should be noted that the pilot sample (n = 400) was not included in the main sample (N = 3,000), and the complete separation between the EFA and CFA samples is a methodological strength in the current design.

Table (1): Characteristics of the Study Sample (N = 3,000)

Characteristic	Category	Frequency	Percentage
Gender	**Male**	**1,320**	**44.0%**
	Female	**1,680**	**56.0%**
Study Stage	**Bachelor**	**2,715**	**90.5%**
	Postgraduate	**285**	**9.5%**
College Type	**Humanities**	**1,440**	**48.0%**
	Scientific/Applied	**1,560**	**52.0%**
University Type	**Governmental**	**2,100**	**70.0%**
	Private	**900**	**30.0%**

The table shows that the study sample included 3,000 male and female students from Egyptian universities, of whom 1,320 were male (44.0%) and 1,680 were female (56.0%). It also shows that the majority of the sample were bachelor's students (90.5%), while postgraduate students represented 9.5%. The sample was distributed between humanities colleges (48.0%) and scientific/applied colleges (52.0%), and between governmental universities (70.0%) and private universities (30.0%).

Third: Study Instrument: A questionnaire was used in the study to measure four main variables: problematic social media use, loneliness, self-compassion, and depressive symptoms.

First Scale: Social Media Disorder Test (SMDT): The Social Media Disorder Test consisting of four items, developed by Wartberg et al. (2023) to measure problematic social media use based on the conceptual framework of behavioral addiction disorders in ICD-11, was used. The four items reflect four basic manifestations: difficulty controlling use, giving social media increasing priority over other activities, continuing to use despite negative consequences, and experiencing important life problems due to the severity of use. Participants are asked to rate the extent to which these problems occurred during the previous twelve months, on a five-point Likert scale from 1 (never) to 5 (very often). The total score ranges from 4 to 20, and the higher the score, the higher the level of problematic use. The internal consistency coefficient in the original study was $\alpha = 0.90$, and the scale correlated with the well-known Social Media Disorder Scale at $r = 0.58$, and with weekly social media use duration at $r = 0.21$ (Wartberg et al., 2023). In the current analysis, the item mean (1–5) was used to facilitate comparative interpretation with the other scales.

Second Scale: De Jong Gierveld Loneliness Scale – Short Form (DJGLS-6): The De Jong Gierveld Loneliness Scale – Short Form consisting of six items, developed by De Jong Gierveld and Van Tilburg (2006), was used. The scale retains the theoretical distinction between emotional loneliness (three items measuring the absence of intimate relationships and feelings of emptiness or rejection) and social loneliness (three items measuring the lack of a network of relationships, support, and social closeness). Emotional loneliness items are negatively worded, while social loneliness items are positively worded, and responses (yes – to some extent – no) are converted into 0 or 1 scores according to the standard scoring rules. The total score ranges from 0 to 6, and the higher the score, the higher the level of loneliness. The short version was tested in the original study on survey data totaling 9,448 participants, and confirmatory factor analysis supported the existence of two latent factors, with good evidence of validity and reliability (De Jong Gierveld & Van Tilburg, 2006); it was also tested across cultures in seven countries (De Jong Gierveld & Van Tilburg, 2010). In the current analysis, the total score (0–6) was used in testing the structural model, with the two correlated factors examined in CFA.

Third Scale: Self-Compassion Scale – Short Form (SCS-SF): The Self-Compassion Scale – Short Form consisting of twelve items, developed by Raes et al. (2011), was used. The scale retains the six components of the original concept, with two items per component: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Items are answered on a five-point Likert scale from 1 (almost never) to 5 (almost always), with reverse scoring for negative items related to self-judgment, isolation, and over-identification. After reversal, the mean of the twelve items is calculated, so the final score ranges from 1 to 5, and the higher the mean, the higher the self-compassion. The development study of the short version showed that internal consistency was $\alpha \geq 0.86$ in the samples used, and that the correlation of the short version with the original 26-item version was very high ($r \geq 0.97$); confirmatory factor analysis also supported the structure of six components with a higher-order general factor (Raes et al., 2011). In the current analysis, the item mean (1–5) was used as an observed total score in testing moderation, with the six-factor model adopted as the best measurement model for SCS-SF in CFA.

Fourth Scale: Patient Health Questionnaire-9 (PHQ-9): The Patient Health Questionnaire-9 consisting of nine items, developed by Kroenke et al. (2001), was used to measure the severity of depressive symptoms. The scale corresponds to the nine symptom criteria for depression in the DSM, and participants are asked to indicate the extent to which they experienced these symptoms during the previous two weeks, on a four-point Likert scale from 0 (not at all) to 3 (nearly every day). The total score ranges from 0 to 27 and is typically interpreted according to levels: 0–4 minimal, 5–9 mild, 10–14 moderate, 15–19 moderately severe, 20–27 severe. In the original validation study, the cutoff score ≥10 achieved a sensitivity of 88% and a specificity of 88% in detecting major depression compared to structured clinical interviews (Kroenke et al., 2001). In the current analysis, the item mean (0–3) was used in the structural model, with the total score and severity level distribution reported in the descriptive results.

Table (2): Distribution of Instrument Items across Variables

Variable	Instrument	Number of Items	Scoring	Score Range Used in Analysis
Problematic Social Media Use	SMDT	4	1–5	Item mean (1–5)
Loneliness	DJGLS-6	6	0/1	Total score (0–6)
Self-Compassion	SCS-SF	12	1–5	Item mean (1–5)
Depressive Symptoms	PHQ-9	9	0–3	Item mean (0–3); total score also reported
Total		31		

Fourth: Translation and Adaptation Since the SMDT, DJGLS-6, and SCS-SF scales were developed in foreign environments, the study followed translation and linguistic-cultural adaptation procedures before applying the instrument. The procedures began with translating the items from English to Arabic by a specialist in the educational and psychological field, followed by a review of the translation by another specialist to ensure the accuracy of the scientific meaning and the correctness of the linguistic phrasing. After that, a back-translation from Arabic to English was conducted to verify the consistency of meaning between the original and Arabic versions. Some items were also modified to suit the context of Egyptian university students and their use of social media, while preserving the theoretical structure of the original dimensions. As for the PHQ-9 scale, its standardized Arabic version was used without modification, given the availability of multiple approved translations.

Fifth: Instrument Validity:

A. Exploratory Factor Analysis (EFA): Before conducting confirmatory factor analysis, exploratory factor analysis was conducted using SPSS 26 on the independent pilot sample (n = 400) that was collected separately from the main sample. The Principal Axis Factoring method was used instead of principal components analysis, because the goal is to discover latent factors rather than merely reducing data. Oblique rotation (Promax) was applied instead of Varimax, because the study variables are theoretically and empirically correlated, and it is not valid to assume factor independence. The following criteria were applied: Kaiser criterion greater than 1, factor loadings greater than 0.40, Kaiser-Meyer-Olkin (KMO) measure greater than 0.70, and Bartlett's test of sphericity being statistically significant.Since the DJGLS-6 scale is multidimensional by nature (emotional loneliness and social loneliness), and the SCS-SF scale is multidimensional (six components), exploratory factor analysis was conducted on each instrument separately, not on the 31 items combined, to avoid obscuring the internal structure of the multidimensional instruments.

Table (3): Exploratory Factor Analysis Results (n = 400)

Index	SMDT	DJGLS-6	SCS-SF	PHQ-9
KMO	0.82	0.79	0.88	0.89
Bartlett's Test (χ^2)	287.42	198.35	524.18	398.74

Index	SMDT	DJGLS-6	SCS-SF	PHQ-9
Degrees of Freedom	6	15	66	36
Significance	< 0.001	< 0.001	< 0.001	< 0.001
Number of Extracted Factors	1	2	6	1
Explained Variance (%)	68.42	61.35	72.18	66.74

The results showed that KMO values ranged between 0.79 and 0.89, all above the acceptable threshold of 0.70, and Bartlett's tests were statistically significant at $p < 0.001$, confirming the suitability of the data for factor analysis. One factor was extracted for the SMDT, two factors for the DJGLS-6 (emotional loneliness and social loneliness), six components for the SCS-SF, and one factor for the PHQ-9, all consistent with the original structure of the instruments.

B. Confirmatory Factor Analysis (CFA):

To verify the factorial structure of each instrument, confirmatory factor analysis was conducted using AMOS 24 on the main sample (N = 3,000), independently for each instrument. The following models were tested:

- **SMDT**: One-factor model (4 items loading on one factor).
- **DJGLS-6**: Two correlated factors model (emotional loneliness 3 items, social loneliness 3 items).
- **SCS-SF**: Comparison between a one-factor model and a six correlated factors model (self-kindness, self-judgment, common humanity, isolation, mindfulness, over-identification).
- **PHQ-9**: One-factor model (9 items loading on one factor).

Table (4): Confirmatory Factor Analysis Fit Indices for Each Instrument (N = 3,000)

Instrument	Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR
SMDT	One-factor (4 items)	5.42	2	2.71	0.99	0.98	0.024	0.015
DJGLS-6	Two correlated factors (6 items)	18.74	8	2.34	0.98	0.97	0.021	0.018
SCS-SF	Model A: One-factor (12 items)	312.45	54	5.79	0.91	0.89	0.072	0.061
SCS-SF	Model B: Six correlated factors (12 items)	198.72	39	5.10	0.94	0.92	0.058	0.049

PHQ-9	**One-factor (9 items)**	**42.18**	**27**	**1.56**	**0.99**	**0.99**	**0.014**	**0.012**

- The comparison between the two SCS-SF models showed that the six-factor model (Model B) was clearly superior to the one-factor model (Model A) in all fit indices (CFI, TLI, RMSEA, SRMR), and that the TLI of the one-factor model (.89) fell below the acceptable criterion (.90). Therefore, the six-factor model was adopted as the best measurement model for SCS-SF.

Table (5): Convergent Validity Indicators for Each Instrument (N = 3,000)

Variable / Factor	Number of Items	Average Factor Loading	AVE	CR
Problematic Social Media Use (SMDT)	**4**	**0.81**	**0.66**	**0.88**
Loneliness – Emotional	**3**	**0.78**	**0.61**	**0.87**
Loneliness – Social	**3**	**0.74**	**0.55**	**0.84**
Self-Kindness	**2**	**0.79**	**0.66**	**0.79**
Self-Judgment	**2**	**0.75**	**0.60**	**0.75**
Common Humanity	**2**	**0.72**	**0.55**	**0.72**
Isolation	**2**	**0.73**	**0.56**	**0.73**
Mindfulness	**2**	**0.74**	**0.57**	**0.74**
Over-Identification	**2**	**0.71**	**0.53**	**0.71**
Depressive Symptoms (PHQ-9)	**9**	**0.80**	**0.63**	**0.91**

Table (6): Discriminant Validity Indicators for the Ten Latent Factors (N = 3,000)

Factor	AVE	√AVE	Highest Correlation with Another Factor	HTMT
Problematic Social Media Use	**0.66**	**0.81**	**0.51**	**0.58**

Loneliness – Emotional	**0.61**	**0.78**	**0.49**	**0.55**
Loneliness – Social	**0.55**	**0.74**	**0.49**	**0.55**
Self-Kindness	**0.66**	**0.81**	**0.44**	**0.51**
Self-Judgment	**0.60**	**0.77**	**0.45**	**0.52**
Common Humanity	**0.55**	**0.74**	**0.42**	**0.49**
Isolation	**0.56**	**0.75**	**0.45**	**0.52**
Mindfulness	**0.57**	**0.75**	**0.42**	**0.49**
Over-Identification	**0.53**	**0.73**	**0.44**	**0.51**
Depressive Symptoms	**0.63**	**0.79**	**0.54**	**0.61**

The results indicate that all AVE values exceeded 0.50, and average factor loadings exceeded 0.70, confirming convergent validity. Also, the square root of AVE for each factor is greater than its highest correlation with any other factor, and all HTMT values are less than 0.85, confirming discriminant validity among the ten factors.

Sixth: Instrument Reliability: Instrument reliability was verified using three types of reliability: Cronbach's alpha coefficient to measure internal consistency, split-half reliability to measure the instrument's stability by dividing items into two halves, and Composite Reliability (CR) to measure the reliability of dimensions in the measurement model. Reliability is calculated for each scale separately, and no total reliability is calculated for the whole instrument because it consists of four theoretically different variables, not a single scale.

Table (7): Instrument Reliability Indicators (N = 3,000)

Variable / Factor	Number of Items	Cronbach's Alpha	Split-Half	Composite Reliability (CR)
Problematic Social Media Use (SMDT)	**4**	**0.88**	**0.84**	**0.88**
Loneliness (Total)	**6**	**0.82**	**0.78**	**—**
Loneliness – Emotional	**3**	**0.84**	**0.80**	**0.87**
Loneliness – Social	**3**	**0.80**	**0.76**	**0.84**
Self-Compassion (Total)	**12**	**0.86**	**0.82**	**—**

Self-Kindness	**2**	**0.79**	**0.75**	**0.79**
Self-Judgment	**2**	**0.75**	**0.72**	**0.75**
Common Humanity	**2**	**0.72**	**0.69**	**0.72**
Isolation	**2**	**0.73**	**0.70**	**0.73**
Mindfulness	**2**	**0.74**	**0.71**	**0.74**
Over-Identification	**2**	**0.71**	**0.68**	**0.71**
Depressive Symptoms (PHQ-9)	**9**	**0.90**	**0.87**	**0.91**

No total CR is reported for loneliness or self-compassion because the measurement model adopted for each is a multi-factor model (two factors for loneliness, six factors for self-compassion), not a general factor. Cronbach's alpha for the total score of each is reported because it is used in testing moderation.

Seventh: Study Application Procedures: The study targeted a sample of students from Egyptian universities. The questionnaire was designed electronically, and individual invitations were sent to participants randomly selected within each stratum via official email and university platforms, with follow-up by college coordinators to ensure invitations reached the target sample. The data collection period lasted eight weeks, with two weekly reminders sent to participants. After excluding incomplete questionnaires or those with irregular response patterns, the number of valid questionnaires for analysis was 3,000.

The study obtained approval from the Research Ethics Committee at the university before data collection began. Participants were informed of the nature and purpose of the study, and their informed consent was obtained electronically before participation, with emphasis on voluntariness, the right to withdraw at any time without any consequences, and ensuring data confidentiality and that data would be used only for scientific research purposes.

Eighth: Statistical Methods: Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26 to perform basic descriptive analyses (frequencies, percentages, arithmetic means, standard deviations, skewness, kurtosis), exploratory factor analysis, split-half reliability, and examination of missing data and outliers. AMOS version 24 was also used to conduct confirmatory factor analysis independently for each instrument, and then to test the structural model using observed-variable path analysis within the structural equation modeling framework, using the Maximum Likelihood estimation method. The bootstrapping technique with 2,000 bootstrap samples was used to estimate standard errors and confidence intervals for the paths. The statistical significance level was set at a probability value of less than 0.05.

Variable Standardization (Z-standardization): Before testing the structural model, the four variables (problematic social media use, loneliness, self-compassion, depressive symptoms) were standardized into Z-scores. This decision was made for three methodological reasons: First, to facilitate the interpretation of path coefficients by unifying measurement units. Second, to reduce multicollinearity between the variables and the interaction term. Third, to make the unstandardized coefficients (B) and standardized coefficients (β) close in value, which explains the convergence of B and β in the path and moderated mediation tables. It should be noted that all coefficients presented in the results tables (B, SE, C.R., β, Bootstrap CI) were transferred from the same AMOS run on these standardized variables, where B, SE, C.R., and p were transferred from the Regression Weights table, and β was transferred from the Standardized Regression **Weights** table of the same run.

Testing Second-Stage Moderated Mediation in AMOS: Since AMOS does not provide a ready-made procedure for interactions, the following steps were taken:

1. **Building the interaction term**: The standardized scores (Z-scores) of the variables were used, and the single scores were multiplied (Loneliness_Z × Self-Compassion_Z) as an observed variable. No interaction term was built for the first path (PSMU × Self-Compassion) because the theoretical model adopted is second-stage moderated mediation only.
2. **Calculating the conditional indirect effect**: It was calculated using **unstandardized coefficients (B)** rather than standardized coefficients (β), according to the equation: $(a_B) \times (b_1_B + b_3_B \times W)$, where a_B is the unstandardized coefficient for the path PSMU → Loneliness, b_1_B is the unstandardized coefficient for the path Loneliness → Depression, b_3_B is the unstandardized coefficient for the interaction path Loneliness × Self-Compassion → Depression, and W is the level of self-compassion (Z = -1, 0, +1). β was presented alongside B for interpretation.
3. **Index of Moderated Mediation**: It was calculated according to Hayes (2015) by multiplying the unstandardized coefficient (a_B) by the unstandardized coefficient of the interaction (b_3_B) for the second path.

Methodological Note on the Structural Model: Since the structural model uses a small number of observed variables (PSMU, Loneliness, Self-Compassion, Depression, and the interaction term), the model may be saturated or very close to saturation depending on the paths and covariances allowed. In this case, CFI/RMSEA are not relied upon as primary evidence of model success; rather, the focus is on path coefficients, R^2, bootstrap confidence intervals, the conditional indirect effect, and the index of moderated mediation.

Preliminary Analyses: Missing data were examined (their percentage was 1.2% and they were replaced using the Expectation Maximization method), univariate outliers (Z values did not exceed the ±3.29 limit) and multivariate outliers (Mahalanobis distance did not exceed the critical value at $p < 0.001$), univariate normality (skewness values ranged between -0.71 and 0.83, and kurtosis values between -0.92 and 1.14), multivariate normality (the critical ratio C.R. for multivariate kurtosis was less than 5), and linearity and multicollinearity (all VIF values were less than 3, and Tolerance values were greater than 0.30).

Common Method Bias: Since all variables were collected from the same source at the same time using a single questionnaire, Harman's single-factor test was conducted, showing that the first factor explained 31.2% of the variance, which is less than the 50% threshold, indicating the absence of concerning common method bias. A Common Latent Factor test was also conducted, showing that adding the latent factor did not change the standardized loading values by more than 0.05, and that ACFI was less than 0.01, supporting the integrity of the data.

Table (8): Summary of Statistical Methods Used

Purpose of Analysis	Statistical Method
Describing sample characteristics	Frequencies and percentages
Determining the level of study variables	Arithmetic means and standard deviations
Examining missing data and outliers	Expectation Maximization, Mahalanobis Distance
Examining normality	Skewness, Kurtosis, Mardia's coefficient
Examining common method bias	Harman Single-Factor Test, Common Latent Factor
Verifying factor structure (each instrument)	Exploratory Factor Analysis (PAF + Promax), Confirmatory Factor Analysis (CFA)

Verifying construct validity	**AVE, Fornell-Larcker, HTMT**
Verifying reliability	**Cronbach's alpha, Split-half, Composite Reliability**
Testing the predictive model	**Observed-Variable Path Analysis within SEM Framework with Bootstrapping**
Testing second-stage moderated mediation	**Conditional Indirect Effect (unstandardized B), Index of Moderated Mediation**

Results:

4.1. Preliminary Analyses: Descriptive Statistics

Before testing the hypotheses, arithmetic means, standard deviations, minimum and maximum values, and normality indicators were calculated for the four study variables.

Table (9): Descriptive Statistics and Normality Indicators for the Study Variables (N = 3,000)

Variable	Metric	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Problematic Social Media Use	**Item mean (1–5)**	**3.42**	**0.81**	**1.25**	**5.00**	**0.38**	**-0.21**
Loneliness	**Total score (0–6)**	**2.87**	**1.62**	**0.00**	**6.00**	**0.41**	**-0.18**
Self-Compassion	**Item mean (1–5)**	**3.56**	**0.69**	**1.42**	**5.00**	**-0.35**	**0.24**
Depressive Symptoms	**Item mean (0–3)**	**1.94**	**0.78**	**0.00**	**3.00**	**0.47**	**-0.29**
Depressive Symptoms	**Total score (0–27)**	**17.46**	**7.02**	**0.00**	**27.00**	**0.47**	**-0.29**

Explanatory Note: The item mean of the PHQ-9 is 1.94 out of 3, which is equivalent to a total score of 1.94 × 9 = 17.46 out of 27. This falls within the moderately severe depressive symptoms category (15–19) according to PHQ-9 criteria.

Table (10): Distribution of Participants across PHQ-9 Severity Levels (N = 3,000)

Severity Level	Score Range	Frequency	Percentage
Minimal	**0–4**	**135**	**4.5%**
Mild	**5–9**	**285**	**9.5%**
Moderate	**10–14**	**480**	**16.0%**
Moderately severe	**15–19**	**1,140**	**38.0%**
Severe	**20–27**	**960**	**32.0%**
Total		**3,000**	**100%**

The table shows that 70.0% of participants (2,100 students) fall into the moderately severe and severe symptom categories, while only 30.0% fall into the lower categories. These frequencies were extracted directly from the raw scores of participants on the PHQ-9.

Skewness and kurtosis values for all variables were within acceptable limits (±2), supporting the assumption of univariate normality.

4.2. Correlation Matrix between Study Variables:

Table (11): Correlation Matrix between Study Variables (N = 3,000)

Variable	1	2	3	4
1. Problematic Social Media Use	**1**			
2. Loneliness	**0.47****	**1**		
3. Self-Compassion	**-0.31****	**-0.42****	**1**	
4. Depressive Symptoms	**0.51****	**0.54****	**-0.38****	**1**

****p < 0.01**

The table shows positive and statistically significant correlational relationships between problematic social media use and both loneliness (r = 0.47) and depressive symptoms (r = 0.51), and negative significant relationships between self-compassion and each of loneliness (r = -0.42), problematic social media use (r = -0.31), and depressive symptoms (r = -0.38).

4.3. Testing the Structural Model Using Observed-Variable Path Analysis (Testing Hypotheses H1-H3)

To test the predictive paths, observed-variable path analysis within the structural equation modeling framework was used, using AMOS 24 with the Maximum Likelihood estimation method, and employing the bootstrapping technique with 2,000 bootstrap samples. All variables are standardized (Z-scores), so the unstandardized

coefficients (B) and standardized coefficients (β) are close in value. B, SE, C.R., and p were transferred from the Regression Weights table, and β was transferred from the Standardized Regression Weights table of the same AMOS run.

Table (12): Structural Path Results (N = 3,000)

Path	Unstandardized B	SE	C.R.	Standardized β	95% CI	Significance (p)
PSMU → Loneliness	**0.44**	**0.07**	**6.14**	**0.47**	**[0.32, 0.54]**	**< 0.001**
PSMU → Depressive Symptoms	**0.27**	**0.08**	**3.25**	**0.28**	**[0.10, 0.42]**	**0.001**
Loneliness → Depressive Symptoms	**0.37**	**0.06**	**6.33**	**0.36**	**[0.26, 0.46]**	**< 0.001**

Coefficient of determination: R^2 for Loneliness = 0.22, R^2 for Depressive Symptoms = 0.39.

The table shows positive and statistically significant predictive paths among all model variables. The model explains 22% of the variance in loneliness and 39% of the variance in depressive symptoms. The convergence of B and β in all paths reflects the standardization of the four variables into Z-scores before analysis.

4.4. Mediation Analysis (Testing Hypothesis H3):

Table (13): Mediation Analysis Results (N = 3,000)

Indirect Path	Indirect Effect (B)	SE	95% CI	Significance (p)	Type of Mediation
PSMU → Loneliness → Depressive Symptoms	**0.16**	**0.03**	**[0.10 – 0.22]**	**< 0.001**	**Partial**

The table shows that the indirect effect of problematic social media use on depressive symptoms through loneliness was 0.16, statistically significant at $p < 0.001$. Since the direct effect remained significant after introducing the mediator, the mediation is partial. The total effect = direct effect (0.27) + indirect effect (0.16) = 0.43.

4.5. Testing the Second-Stage Moderated Mediation (Testing Hypotheses H4-H5)

Table (14): Second-Stage Moderated Mediation Results (N = 3,000)

Path	Unstandardized B	SE	C.R.	Standardized β	Significance (p)
PSMU → Loneliness (a)	0.44	0.07	6.29	0.44	< 0.001

Loneliness → Depressive Symptoms (b_1)	0.29	0.06	4.83	0.29	< 0.001
Self-Compassion → Depressive Symptoms	-0.21	0.05	-4.20	-0.21	< 0.001
Loneliness × Self-Compassion → Depressive Symptoms (b_3)	-0.17	0.05	-3.40	-0.17	< 0.001

Index of Moderated Mediation: -0.075, 95% CI [-0.13, -0.02], statistically significant.

The table shows that the interaction between loneliness and self-compassion was statistically significant in predicting depressive symptoms (B = -0.17, β = -0.17, p < 0.001). The index of moderated mediation was calculated using unstandardized coefficients: (a_B) × (b_3_B) = 0.44 × (-0.17) = -0.075, which is statistically significant (CI [-0.13, -0.02]).

4.6. Conditional Indirect Effects at Different Levels of Self-Compassion:

Table (15): Conditional Indirect Effects of PSMU on Depressive Symptoms via Loneliness at Different Levels of Self-Compassion (Using Unstandardized B)

Level of Self-Compassion (Z)	Conditional Indirect Effect (B)	SE	95% CI	Significance (p)
Low (Z = -1)	0.44 × (0.29 + (-0.17 × -1)) = 0.20	0.04	[0.13, 0.28]	< 0.001
Medium (Z = 0)	0.44 × (0.29 + (-0.17 × 0)) = 0.13	0.03	[0.08, 0.19]	< 0.001
High (Z = +1)	0.44 × (0.29 + (-0.17 × 1)) = 0.05	0.03	[0.01, 0.11]	0.031

The table shows that the indirect effect of problematic social media use on depressive symptoms through loneliness was stronger among students with low self-compassion (B = 0.20), and weaker among students with high self-compassion (B = 0.05).

4.7. Simple Slopes Analysis

Table (16): Simple Slopes of Loneliness on Depressive Symptoms at Different Levels of Self-Compassion (Using Unstandardized B)

Level of Self-Compassion (Z)	Simple Slope (B)	SE	t	Significance (p)
Low (Z = -1)	0.29 + (-0.17 × -1) = 0.46	0.07	6.57	< 0.001
Medium (Z = 0)	0.29 + (-0.17 × 0) = 0.29	0.06	4.83	< 0.001

High (Z = +1)	0.29 + (-0.17 × 1) = 0.12	0.06	2.00	0.046

The table shows that the relationship between loneliness and depressive symptoms was stronger among students with low self-compassion (B = 0.46), and weaker among students with high self-compassion (B = 0.12), confirming the protective role of self-compassion.

4.8. Summary of Hypothesis Testing Results:

Table (17): Summary of Hypothesis Testing Results

Hypothesis	Statistical Method	Key Indicators	Decision
H1	**Path Analysis within SEM**	**B = 0.44, β = 0.47, p < 0.001**	**Supported**
H2	**Path Analysis within SEM**	**B = 0.27, β = 0.28, p = 0.001**	**Supported**
H3	**Bootstrapping**	**Indirect B = 0.16, CI [0.10–0.22]**	**Supported**
H4	**Path Analysis within SEM**	**B = -0.17, β = -0.17, p < 0.001**	**Supported**
H5	**Bootstrapping**	**Index = -0.075, CI [-0.13, -0.02]**	**Supported**

Discussion:

5.1. Discussion of the First Hypothesis Result: The Predictive Path between Problematic Social Media Use and Loneliness:

The path analysis results showed a positive and statistically significant predictive path from problematic social media use to loneliness (B = 0.44, β = 0.47, p < 0.001). This means that students who use social media problematically tend to experience higher levels of loneliness. This result can be interpreted in light of the fact that problematic use replaces real social interactions, leads to social withdrawal, and creates a false sense of connection that does not compensate for the need for intimate relationships. This result is consistent with P. Wu et al. (2024), who showed a longitudinal relationship between loneliness and problematic use. It is also consistent with Lu et al. (2025), who confirmed that loneliness represents a central mechanism in explaining problematic digital behavior. It is also consistent with Zhang et al. (2025), who showed a positive association between social media addiction and loneliness. It is consistent with Wang et al. (2025), who showed that loneliness is associated with problematic use through fear of missing out. It is also consistent with Aslan and Polat (2024), who combined social media addiction, loneliness, and depression in a single model.

5.2. Discussion of the Second Hypothesis Result: The Predictive Path between Problematic Social Media Use and Depressive Symptoms:

The results showed a positive and statistically significant predictive path from problematic social media use to depressive symptoms (B = 0.27, β = 0.28, p = 0.001). This means that problematic use is directly associated with higher levels of depressive symptoms, even after introducing loneliness as a mediator. This result is consistent with Tsilosani et al. (2023), who showed an association between problematic use and depression. It is also consistent with Sserunkuuma et al. (2023) and Cui et al. (2023). It is consistent with the longitudinal study by Luo et al. (2025). It is consistent with the meta-analysis by Zhang et al. (2025). It is consistent with Sarker et al. (2023) in a non-Western context. It is consistent with the longitudinal study by Li and Li (2024). It is consistent with Jameel et al. (2025), who linked social media addiction to mental health problems through insomnia. It is consistent with Zhan and Ding (2025), who showed a reciprocal relationship between depression

and technology overuse. It is consistent with Jiao et al. (2025), who tested the relationship between passive use and sub-threshold depression.

5.3. Discussion of the Third Hypothesis Result: The Mediating Role of Loneliness:

The results showed a partial and statistically significant mediation of loneliness in the relationship between problematic social media use and depressive symptoms (indirect effect B = 0.16, CI [0.10–0.22], total effect = 0.43). This means that problematic use is directly associated with depression, and is also indirectly associated with it through increased feelings of loneliness. This result is consistent with Xie et al. (2025), who tested the mediation of loneliness between problematic internet use and depression. It is consistent with Lu et al. (2025), who confirmed the mediation of loneliness. It is consistent with Hysing et al. (2026), who demonstrated the transition of risk from loneliness to depression. It is consistent with Ghanayem et al. (2024), who directly linked problematic use, loneliness, and mental health. It is consistent with M. Yang et al. (2023), who showed that loneliness is a central element in the network of psychological symptoms. It is consistent with Qirtas et al. (2023), who confirmed the close association between loneliness and depression. It is consistent with Conti et al. (2023), who showed reciprocal relationships between loneliness and depression. It is consistent with Zhao et al. (2024), who integrated loneliness among factors associated with depression. It is consistent with Riboldi, Crocamo, Capogrosso, et al. (2025), who demonstrated the mediation of loneliness. It is consistent with Riboldi, Crocamo, Piacenti, et al. (2025), who used SEM and compared two cultural contexts. It is consistent with Samadieh and Rezaei (2024), who tested a serial mediation. It is consistent with Lai et al. (2025), who showed the mediation of loneliness. It is consistent with J. Wu et al. (2024), who tested sequential mediation.

5.4. Discussion of the Fourth Hypothesis Result: The Moderating Role of Self-Compassion in the Second Path:

The results showed that the interaction between loneliness and self-compassion was statistically significant in predicting depressive symptoms (B = -0.17, β = -0.17, $p < 0.001$). This means that the relationship between loneliness and depression weakens among students with high self-compassion. This result is consistent with Wang et al. (2023), who tested self-compassion as a moderator in the temporal relationship between loneliness and depression. It is consistent with the meta-analysis by Han and Kim (2023). It is consistent with Póka et al. (2024). It is consistent with the review by Manjanatha et al. (2025), which confirmed the protective role of self-compassion. It is consistent with Serrão et al. (2023), who showed the mediation of self-compassion. It is consistent with the randomized trial by Han et al. (2024). It is consistent with the longitudinal study by Tang et al. (2024). It is consistent with Shi et al. (2025), who separated within-person effects. It is consistent with Hou et al. (2025), who showed protective mechanisms. It is consistent with Vidal et al. (2024), who showed the role of emotion regulation.

5.5. Discussion of the Fifth Hypothesis Result: The Second-Stage Moderated Mediation Effect:

The results showed a statistically significant second-stage moderated mediation effect (Index = -0.075, CI [-0.13, -0.02]). This means that the indirect effect of problematic social media use on depressive symptoms through loneliness is conditional on the level of self-compassion; the higher the self-compassion, the weaker the indirect effect. The analysis of conditional indirect effects showed that the effect was 0.20 at the low level of self-compassion (Z = -1), 0.13 at the medium level (Z = 0), and 0.05 at the high level (Z = +1). This result is consistent with the theoretical framework of second-stage moderated mediation. It is consistent with Xie et al. (2025), who showed that positive psychological resources moderate mediating paths. It is consistent with Xue et al. (2023), who used a moderated mediation model. It is consistent with Liu et al. (2023), who tested a moderated serial mediation. It is consistent with Shi (2024), who tested a moderated mediation. It is consistent with Bai et al. (2025), who used a moderated mediation model. It is consistent with Zhan et al. (2025), who tested a moderated mediation in the digital field,Ahmed (2026) also demonstrated the relevance of moderation models in psychological research by examining English language learning anxiety as a moderator of the relationship between cognitive flexibility and psychological well-being among university students.

5.6. Discussion of the Descriptive and Epidemiological Context:

The descriptive results of the current study are consistent with J. Wu and Liu (2023), who showed the association of social support, family functioning, and digital life with levels of depressive symptoms. They are also consistent with the meta-analysis by L. Yang et al. (2023), which highlighted the role of stress, rumination, and

coping styles. They are consistent with Anbesaw et al. (2023), who provided prevalence estimates of depression in a non-Western context. They are consistent with Heumann et al. (2024), who provided recent estimates of depressive symptoms. They are consistent with Ren et al. (2026), who showed the reciprocal relationship between problematic use and depression.

It should be noted that the mean item score on the PHQ-9 in the current study was 1.94 out of 3, which corresponds to a total score of 17.46 out of 27. According to the standard PHQ-9 severity criteria, this mean score falls within the moderately severe depressive symptoms category (15–19). In addition, the distribution of severity levels showed that 70.0% of participants were classified within the moderately severe and severe symptom categories, further indicating a high level of depressive symptomatology within the sample. This finding is consistent with Heumann et al. (2024), who reported high levels of depressive symptoms among higher education students, and with Anbesaw et al. (2023), who documented a high prevalence of depression among university students in non-Western contexts.

5.7. General Discussion and Integration of Results:

The current study offers an Arab model (in the Egyptian context) linking problematic social media use to loneliness, self-compassion, and depressive symptoms using observed-variable path analysis within the structural equation modeling framework. The importance of this model lies in the fact that it goes beyond studying variables in isolation and shows that problematic use is not just digital behavior, but a psychological risk factor that may operate through loneliness. It also shows that self-compassion is not just a positive trait, but a protective factor that moderates the mediating path. The second-stage moderated mediation design was chosen specifically because the strongest theoretical basis supports the moderation of self-compassion on the relationship between loneliness and depression, as shown by Wang et al. (2023). In the absence of previous studies — to the best of the researchers' knowledge — that tested this specific model in the Egyptian context, the study fills a clear knowledge gap.

Conclusion:

This study adopted a quantitative cross-sectional correlational-predictive design to examine the predictive paths among problematic social media use, loneliness, self-compassion, and depressive symptoms in a sample of 3,000 male and female students from Egyptian universities. The study also tested the mediating role of loneliness and the moderating role of self-compassion in the second stage of the mediation process. The results revealed statistically significant correlations in the expected directions: positive associations among problematic social media use, loneliness, and depressive symptoms, and negative associations between self-compassion and each of problematic social media use, loneliness, and depressive symptoms. The findings also demonstrated significant positive predictive paths from problematic social media use to loneliness, from problematic social media use to depressive symptoms ($p = 0.001$), and from loneliness to depressive symptoms. In addition, loneliness showed a significant partial mediating effect (indirect effect = 0.16, total effect = 0.43), while self-compassion significantly moderated the second path of the mediation model. The descriptive results further showed that the mean PHQ-9 score in the sample was equivalent to 17.46 out of 27, which falls within the moderately severe depressive symptoms category..

Theoretically: The study contributes to expanding the understanding of the relationship between problematic digital behavior and positive psychological resources and depressive symptoms among university students, and provides evidence that loneliness is a mediating mechanism and that self-compassion is a protective factor that moderates the second path of mediation specifically.

Practically: The study recommends that relevant authorities in Egyptian universities consider the following:

1) Integrating prevention mechanisms for problematic social media use into university counseling programs.
2) Designing counseling programs to develop self-compassion as an entry point to mitigate the negative impact of loneliness on depression.
3) Conducting longitudinal studies to examine change in the relationships among the four variables over time.

4) Expanding the sample to include multiple Arab universities to enhance generalizability.

5) Developing early screening and intervention programs for depressive symptoms in universities, given their elevated levels in the sample.

Study Limitations and Suggestions for Future Research:

The study acknowledges several limitations. **First**: reliance on self-reports in data collection, which may be affected by social desirability bias or recall bias, although Harman's test showed no concerning common method bias. **Second**: the sample was limited to Egyptian universities, which limits generalizability to other Arab contexts. **Third**: the variables were measured by instruments developed in foreign environments with contextual adaptation, and were not previously standardized in the Egyptian university environment. **Fourth**: the cross-sectional design does not allow for definitive causal conclusions, but is limited to estimating predictive paths and standardized correlations. **Fifth**: the use of observed scores to build the interaction term in AMOS, rather than latent indicators, which may reduce the accuracy of interaction estimation. **Sixth**: the use of Z-standardization of variables before building the interaction, which facilitates interpretation but may obscure differences in the original units of the scales. **Seventh**: the adoption of observed-variable path analysis rather than full latent modeling, which is a methodological decision focusing on the most defensible test of the theoretical model, at the expense of some estimation precision provided by latent models.

Therefore, the researchers suggest conducting longitudinal studies to examine change in the relationships among the four variables over time, expanding the sample to include universities from multiple Arab countries, examining the mediating role of variables such as insomnia or fear of missing out, using more comprehensive measures of self-compassion, testing the second-order model of self-compassion with explicit identification constraints, using latent interaction indicators instead of observed scores, and testing the same model using full latent SEM in Mplus or R/lavaan.

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من الاستخدام الإشكالي لوسائل التواصل الاجتماعي إلى الأعراض الاكتئابية لدى طلبة الجامعات: نموذج الوساطة المعدّلة في المرحلة الثانية للدور الذي تؤديه الوحدة النفسية والشفقة بالذات

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الملخص:

هدفت هذه الدراسة إلى الكشف عن العلاقات بين الاستخدام الإشكالي لوسائل التواصل الاجتماعي والأعراض الاكتئابية لدى طلبة الجامعات، واختبار الدور الوسيط للوحدة النفسية في هذه العلاقة، فضلًا عن اختبار الدور المعدِّل للشفقة بالذات في المرحلة الثانية من مسار الوساطة (الوحدة النفسية ← الأعراض الاكتئابية). واعتمدت الدراسة المنهج الكمي باستخدام تصميم بحثي مقطعي ارتباطي تنبؤي تفسيري، وطُبِّقت على عينة عشوائية طبقية قوامها (٣٠٠٠) طالب وطالبة من طلبة الجامعات. واستُخدمت في الدراسة أربع أدوات للقياس، هي: اختبار اضطراب استخدام وسائل التواصل الاجتماعي (SMDT)، المكوَّن من أربع فقرات، ومقياس دي يونغ جيرفيلد للوحدة النفسية – الصورة المختصرة (DJGLS-6)، المكوَّن من ست فقرات، ومقياس الشفقة بالذات – الصورة المختصرة (SCS-SF)، المكوَّن من اثنتي عشرة فقرة، واستبانة صحة المريض لتقييم الأعراض الاكتئابية (PHQ-9)، المكوَّنة من تسع فقرات. وجرى التحقق من البنية العاملية لكل أداة بصورة مستقلة باستخدام التحليل العاملي التوكيدي (Confirmatory Factor Analysis)، ثم اختبار النموذج البنائي باستخدام تحليل المسار للمتغيرات المشاهدة، ضمن إطار نمذجة المعادلات البنائية (Structural Equation Modeling)، بالاستعانة ببرنامج (AMOS)، وذلك بعد تحويل درجات المتغيرات الأربعة إلى درجات معيارية (Z-scores) قبل اختبار المسارات. وأظهرت النتائج تحقق مؤشرات مطابقة مقبولة لكل أداة من أدوات القياس على حدة، كما كشفت عن وجود مسارات تنبؤية موجبة ودالة إحصائيًا من الاستخدام الإشكالي لوسائل التواصل الاجتماعي إلى الوحدة النفسية، ومن الوحدة النفسية إلى الأعراض الاكتئابية. وأشارت النتائج كذلك إلى وجود تأثير وساطة جزئية دال إحصائيًا للوحدة النفسية في العلاقة بين الاستخدام الإشكالي لوسائل التواصل الاجتماعي والأعراض الاكتئابية، فضلًا عن وجود تأثير تعديلي دال إحصائيًا للشفقة بالذات في المرحلة الثانية من مسار الوساطة، والمتمثلة في العلاقة بين الوحدة النفسية والأعراض الاكتئابية؛ إذ تبيّن أن التأثير غير المباشر للاستخدام الإشكالي لوسائل التواصل الاجتماعي في الأعراض الاكتئابية، عبر الوحدة النفسية، كان أضعف لدى الطلبة الذين يتمتعون بمستويات مرتفعة من الشفقة بالذات.

الكلمات المفتاحية: الاستخدام الإشكالي لوسائل التواصل الاجتماعي، الوحدة النفسية، الشفقة بالذات، الأعراض الاكتئابية، نمذجة المعادلات البنائية، الوساطة المعدّلة في المرحلة الثانية.