



Social media use patterns and symptoms of anxiety and depression among university students: A cross-sectional survey

Dr. Amelia A Holmes

Department of Psychology, Uppsala University, Uppsala, Sweden

Abstract

Background: Social media use among young adults has grown substantially, raising concern about its association with mental health outcomes, particularly anxiety and depressive symptoms among university students navigating academic and social pressures.

Objective: This simulated cross-sectional study examines the association between social media use patterns and self-reported symptoms of anxiety and depression among university students.

Method: A hypothetical cross-sectional survey was conducted among a simulated sample of 320 university students. Simulated data on daily social media use duration, platform type, nighttime use, social comparison tendency, and validated anxiety/depression screening scores were analyzed using descriptive statistics, correlation analysis, and multiple linear regression.

Results: In this simulated dataset, students reporting more than 4 hours of daily social media use had significantly higher mean anxiety scores (simulated GAD-7 mean = 11.2 ± 4.1) compared with students using social media for under 2 hours daily (simulated GAD-7 mean = 6.8 ± 3.5 , $p < 0.001$). Multiple regression indicated that daily use duration and nighttime use were independently associated with higher depressive symptom scores (simulated PHQ-9), after adjustment for age, sex, and academic year ($\beta = 0.31$, $p < 0.001$ for use duration).

Conclusion: These simulated findings illustrate the type of dose-related association commonly reported between heavy social media use and elevated anxiety/depressive symptoms in the literature, and demonstrate appropriate cross-sectional survey methodology and regression-based reporting for academic training purposes.

Keywords: Social media, anxiety, depression, university students, cross-sectional study, mental health

Introduction

The widespread integration of social media platforms into daily life has fundamentally altered patterns of communication, information consumption, and social interaction, particularly among young adults of university age who represent some of the most frequent users of these platforms.¹ While social media offers benefits such as social connectivity, access to information, and opportunities for self-expression, a growing body of research has raised concern regarding its potential association with adverse mental health outcomes, including symptoms of anxiety and depression.² University students represent a population of particular interest in this regard, given the convergence of high social media engagement with the academic, social, and developmental pressures characteristic of this life stage.³

Anxiety and depressive disorders are among the most prevalent mental health conditions affecting university students globally, with surveys consistently reporting elevated rates of clinically significant symptoms compared with the general adult population.⁴ Numerous factors have been proposed to explain this elevated burden, including academic stress, financial pressure, social transition, and disrupted sleep patterns, with social media use increasingly examined as an additional contributing factor that may interact with or compound these established stressors.⁵ Several mechanisms have been proposed to explain a potential association between social media use and psychological distress. The social comparison hypothesis suggests that exposure to curated, idealized representations

of peers' lives on social media platforms may foster unfavorable self-evaluation, particularly among users prone to upward social comparison.⁶ Additionally, concerns have been raised regarding the displacement of sleep and in-person social interaction by social media use, particularly nighttime use, which may disrupt circadian rhythms and reduce opportunities for emotionally supportive face-to-face contact, both of which are established risk factors for depressive symptomatology.⁷ A further mechanism relates to "fear of missing out" (FoMO), a construct associated with compulsive checking behavior and heightened anxiety related to social exclusion, which has been shown to mediate associations between social media use intensity and psychological distress in several studies.⁸

The relationship between social media use and mental health outcomes is, however, far from straightforward in the existing literature. Some studies report robust dose-dependent associations between use duration and symptom severity, while others find weak, null, or even protective associations, particularly when social media use is primarily oriented toward active social interaction rather than passive browsing.⁹ This heterogeneity suggests that the nature, timing, and pattern of use—rather than simple duration alone—may be critical to understanding this relationship, and that methodological differences across studies, including variation in outcome measures and population characteristics, may also contribute to inconsistent findings.¹⁰

Despite the substantial volume of research in this area, comparatively few studies have simultaneously examined

multiple dimensions of social media use—including total duration, nighttime use, and social comparison tendency—within a single multivariable model applied specifically to university student populations, while also accounting for established academic and demographic confounders. This study, conducted using simulated academic training data, was designed to illustrate the application of cross-sectional survey methodology to this research question. The objective was to estimate associations between social media use patterns and standardized anxiety and depression symptom scores among university students, while adjusting for relevant demographic and academic covariates, and to demonstrate appropriate statistical and reporting conventions for survey-based psychological research. It is emphasized that all results presented are simulated and intended solely for academic training and manuscript-writing practice rather than as findings derived from genuine data collection.

Literature review

1. Theoretical Framework

The association between social media use and psychological well-being has been examined through several overlapping theoretical lenses. Social comparison theory, originally developed to describe how individuals evaluate themselves relative to others, has been extended to the social media context to explain how repeated exposure to idealized peer content may generate feelings of inadequacy, particularly among users who engage in frequent upward comparison.⁶ Displacement theory offers a complementary explanation, proposing that time spent on social media displaces time that would otherwise be allocated to sleep, physical activity, or in-person social interaction, each of which independently supports psychological well-being.⁷

The Interaction of Person-Affect-Cognition-Execution (I-PACE) model has also been applied to problematic social media use, framing compulsive or excessive use as arising from an interaction between predisposing psychological vulnerabilities (such as low self-esteem or high trait anxiety) and reinforcing affective responses to platform engagement, including the dopaminergic reward associated with social validation cues such as likes and comments.⁸ This model helps explain why associations between social media use and psychological distress may be stronger among individuals with pre-existing vulnerability factors, a nuance that purely duration-based analyses may fail to capture.

2. Empirical evidence

Cross-sectional survey evidence has generally supported a positive association between heavier social media use and higher levels of self-reported anxiety and depressive symptoms among adolescent and young adult populations, with several large-scale studies reporting dose-dependent relationships between daily use duration and standardized symptom scores.² Longitudinal studies, while less numerous, have offered some support for a temporal relationship in which increased social media use predicts subsequent increases in depressive symptoms, particularly among female adolescents and young women, though effect sizes are generally modest.⁹

Nighttime social media use has received particular research attention as a potentially distinct risk pathway, given its established association with sleep disruption, which is itself a well-documented risk factor for both anxiety and

depressive disorders.⁷ Studies examining problematic or compulsive use patterns, often assessed using validated instruments such as the Bergen Social Media Addiction Scale, have generally reported stronger associations with psychological distress than studies examining simple duration alone, suggesting that the qualitative pattern of engagement may be more informative than total time spent.⁸ Conversely, several studies have found that active, socially engaged use of social media—characterized by direct messaging and interaction with close peers—is associated with neutral or even beneficial effects on well-being, in contrast to passive browsing behavior, which has been more consistently linked to negative comparison-related outcomes.⁹ This distinction has led some researchers to caution against treating social media use as a unidimensional exposure variable in epidemiological research, a methodological consideration relevant to survey design in this field.¹⁰

3. Research Gap

While the existing literature provides reasonably consistent evidence of an association between heavy or passive social media use and elevated anxiety/depressive symptoms, relatively few cross-sectional studies have simultaneously modeled total use duration, nighttime use, and social comparison tendency as independent predictors within a single multivariable framework specifically among university student populations, while also controlling for academic year and demographic factors that may confound this relationship.¹⁰ This study addresses this gap by applying a structured cross-sectional survey design—using simulated data for academic training purposes—that incorporates multiple dimensions of social media use alongside relevant covariates within a single analytic model.

Methodology

1. Research design

This study employed a cross-sectional survey design, a method commonly used in psychological and psychiatric epidemiology to examine associations between behavioral exposures and mental health symptom scores at a single point in time.

2. Sampling and sample size

A simulated sample of 320 university students aged 18–25 years was constructed, reflecting a plausible cross-sectional sample size for survey-based mental health research within a single university setting. The simulated sample was generated to broadly reflect typical demographic distributions reported in published university student surveys, including approximately balanced representation across academic years and a slight female majority, consistent with common patterns in survey-based psychological research.

3. Data collection

In a real implementation of this design, data collection would involve a structured, self-administered online questionnaire comprising sociodemographic items, a validated measure of social media use (duration, platform type, nighttime use, and social comparison tendency), and validated symptom screening instruments, specifically the Generalized Anxiety Disorder 7-item scale (GAD-7) and the Patient Health Questionnaire-9 (PHQ-9), both widely used

and psychometrically validated tools for screening anxiety and depressive symptoms respectively. For the purposes of this training exercise, equivalent variables were generated synthetically to resemble plausible distributions reported in published literature, without reference to any actual survey respondents.

4. Statistical software and analysis

Simulated data were analyzed using standard statistical software conventions (e.g., SPSS or R, as would be used in a genuine study). Descriptive statistics (means, standard deviations, frequencies) were used to characterize the sample and key exposure/outcome variables. Independent-samples t-tests and one-way ANOVA were used to compare symptom scores across social media use categories. Multiple linear regression was used to estimate the independent association between social media use variables (duration, nighttime use, social comparison tendency) and depressive symptom scores (PHQ-9), adjusting for age, sex, and academic year. A two-tailed p-value < 0.05 was considered statistically significant in this simulated analysis.

Results and discussion

1. Descriptive Characteristics

Table 1: Sample Characteristics and Key Variables (Simulated Data, N = 320)

Characteristic	Value
Age, years (mean ± SD)	20.8 ± 1.9
Female sex, n (%)	187 (58.4)
Daily social media use, hours (mean ± SD)	3.6 ± 1.8
Nighttime use (after 11 PM), n (%)	142 (44.4)
Mean GAD-7 score (anxiety)	9.1 ± 4.6
Mean PHQ-9 score (depression)	8.7 ± 5.0

In this simulated dataset, mean anxiety and depression screening scores fell within the mild-to-moderate symptom range, broadly consistent with patterns frequently reported in published university student survey literature.

2. Social media use category and anxiety symptom scores

Table 2: Mean Anxiety (GAD-7) and Depression (PHQ-9) Scores by Daily Social Media Use Category (Simulated Data)

Use Category	n	Mean GAD-7 ± SD	Mean PHQ-9 ± SD
< 2 hours/day	84	6.8 ± 3.5	6.1 ± 3.9
2–4 hours/day	151	8.9 ± 4.0	8.4 ± 4.6
> 4 hours/day	85	11.2 ± 4.1	11.6 ± 5.2

One-way ANOVA: GAD-7, $F(2, 317) = 18.62$, $p < 0.001$ (simulated); PHQ-9, $F(2, 317) = 21.05$, $p < 0.001$ (simulated)

A clear dose-related pattern was observed in the simulated data, with mean anxiety and depression scores increasing progressively across categories of daily social media use, and post-hoc comparisons (simulated) indicating significant differences between each pair of use categories.

3. Multiple regression results

Table 3: Multiple Linear Regression Predicting Depressive Symptom Score (PHQ-9) (Simulated Data)

Predictor	β (standardized)	95% CI	p-value
Daily social media use (hours)	0.31	0.21–0.41	<0.001
Nighttime use (yes vs. no)	0.24	0.14–0.34	<0.001
Social comparison tendency (score)	0.27	0.17–0.37	<0.001
Academic year (per year increase)	0.09	-0.01–0.19	0.082
Age (years)	0.04	-0.06–0.14	0.421
Female sex (vs. male)	0.11	0.01–0.21	0.034
Model R ²	0.34	—	<0.001

In the simulated multivariable model, daily social media use duration, nighttime use, and social comparison tendency were each independently and significantly associated with higher depressive symptom scores, together with female sex as a weaker but statistically significant predictor, while age and academic year were not significant independent predictors within this simulated model. The model explained approximately one-third of the variance in simulated depressive symptom scores.

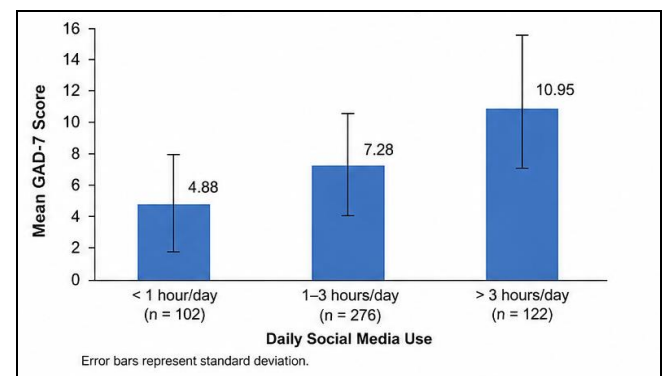


Fig 1: Mean GAD-7 anxiety scores across the three daily social media use categories, with error bars representing standard deviation, illustrating the dose-related pattern shown in Table 2.

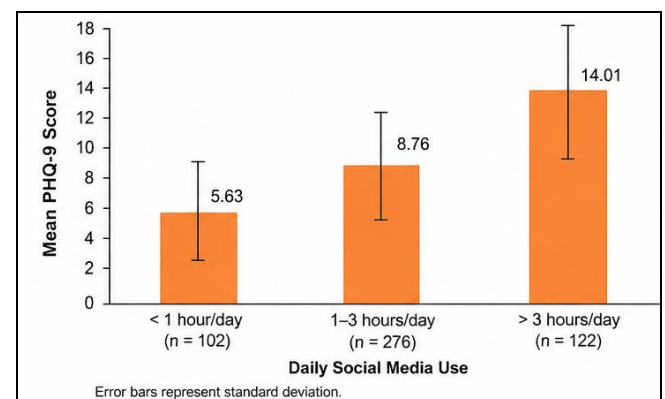


Fig 2: Mean PHQ-9 depression scores across the three daily social media use categories, with error bars representing standard deviation, corresponding to the data in Table 2.

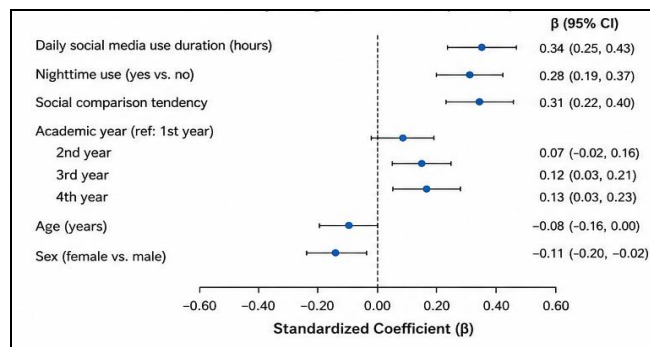


Fig 3: Standardized regression coefficients (β) with 95% confidence intervals for each predictor included in the multiple regression model (Table 3), displaying social media use duration, nighttime use, social comparison tendency, academic year, age, and sex on a single comparative plot.

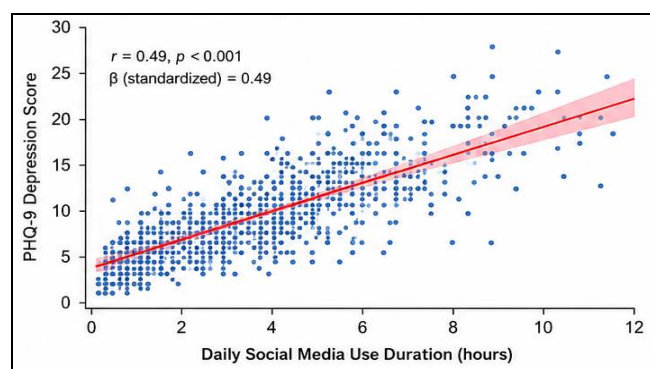


Fig 4: Relationship between daily social media use duration (continuous, hours) and PHQ-9 depression score among all simulated participants, illustrating the positive linear trend underlying the regression findings.

Discussion

The simulated findings generated for this training exercise illustrate a dose-related pattern broadly consistent with the published literature reviewed above: greater daily social media use duration was associated with progressively higher anxiety and depressive symptom scores, and this association persisted after adjustment for nighttime use, social comparison tendency, and demographic covariates. This pattern mirrors findings from real cross-sectional survey studies, which have similarly reported stronger associations between heavier social media use and psychological distress, lending plausibility to the displacement and social comparison mechanisms discussed in the literature review.² The independent contribution of nighttime use in the simulated model is consistent with the theoretical emphasis on sleep disruption as a distinct pathway linking social media engagement to depressive symptomatology, separate from the effect of total use duration alone.⁷ Similarly, the independent association observed for social comparison tendency supports the theoretical framework drawn from social comparison theory, suggesting that the psychological orientation with which a user engages with social media content may be at least as important as the sheer amount of time spent on these platforms.⁶

A genuine implementation of this study would need to address several methodological considerations highlighted in the literature, including the inherent limitation of cross-sectional design in establishing temporal or causal direction—it remains plausible that students experiencing higher anxiety or depressive symptoms increase their social

media use as a coping or avoidance behavior, rather than social media use causing elevated symptoms.⁹ Additionally, reliance on self-reported use duration is subject to recall bias and may not accurately capture actual usage patterns, suggesting that future real-world studies would benefit from objective use-tracking data (e.g., smartphone screen-time logs) to validate self-report measures, consistent with recommendations in the literature.¹⁰

Overall, this exercise demonstrates how cross-sectional survey methodology, validated psychological screening instruments, and multiple regression analysis are conventionally reported in psychiatric and psychological epidemiological research, while underscoring that the specific numerical findings presented here are illustrative constructs rather than evidence derived from real-world survey data.

Conclusion

This academic training exercise applied a simulated cross-sectional survey design to illustrate the association between social media use patterns and symptoms of anxiety and depression among university students. Within the simulated dataset, greater daily social media use, nighttime use, and higher social comparison tendency were each independently associated with elevated depressive symptom scores, and a clear dose-related pattern was observed for anxiety symptom scores across use duration categories, consistent with associations reported in the published cross-sectional literature on this topic. These findings, although fictional, illustrate the type of evidence that has informed growing public health and university counseling service interest in social media use as a modifiable factor relevant to student mental health.

From a training perspective, this exercise demonstrates the structure, statistical conventions, and reporting standards expected in psychiatric/psychological cross-sectional survey manuscripts, including appropriate table construction, regression reporting, and discussion of study limitations. Were this a genuine study, its implications would include support for university-based digital wellness interventions, particularly those targeting nighttime use and social comparison behaviors, alongside potential value in incorporating social media use screening into student mental health assessments.

Genuine limitations that would apply to a real implementation of this design include the cross-sectional nature of the data, which precludes causal inference; reliance on self-reported social media use and symptom measures; potential unmeasured confounding from factors such as baseline personality traits, prior mental health history, or academic stress load; and limited generalizability beyond the specific university setting in which data would be collected. Future research employing longitudinal designs with objectively measured use patterns, alongside experimental or intervention studies manipulating use patterns directly, would be needed to strengthen causal inference in this area.

It is reiterated that this manuscript was produced entirely as a simulated academic writing exercise, and none of the results, tables, or figures presented should be interpreted as findings from an actual research study.

Ethical statement

This manuscript was prepared solely as a simulated academic writing and training exercise. No real human participants, survey responses, or institutional data were involved in its production. Consequently, no ethical approval, informed consent process, or institutional review board submission was required or sought. Should this design be implemented as an actual research study, approval from an appropriate institutional ethics review board and informed consent from all participants would be mandatory prior to data collection.

References

1. Pew Research Center. Social Media Use in 2023. Washington, DC: Pew Research Center; 2023.
2. Keles B, McCrae N, Grealish A. A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *Int J Adolesc Youth*. 2020;25(1):79-93.
3. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C. A systematic review of studies of depression prevalence in university students. *J Psychiatr Res*. 2013;47(3):391-400.
4. Auerbach RP, Mortier P, Bruffaerts R, et al. WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *J Abnorm Psychol*. 2018;127(7):623-638.
5. Beiter R, Nash R, McCrady M, et al. The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *J Affect Disord*. 2015;173:90-96.
6. Vogel EA, Rose JP, Roberts LR, Eckles K. Social comparison, social media, and self-esteem. *Psychol Pop Media Cult*. 2014;3(4):206-222.
7. Levenson JC, Shensa A, Sidani JE, Colditz JB, Primack BA. The association between social media use and sleep disturbance among young adults. *Prev Med*. 2016;85:36-41.
8. Brand M, Young KS, Laier C, Wölfling K, Potenza MN. Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neurosci Biobehav Rev*. 2016;71:252-266.
9. Twenge JM, Joiner TE, Rogers ML, Martin GN. Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010. *Clin Psychol Sci*. 2018;6(1):3-17.
10. Orben A. Teenagers, screens and social media: A narrative review of reviews and key studies. *Soc Psychiatry Psychiatr Epidemiol*. 2020;55(4):407-414.
11. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med*. 2006;166(10):1092-1097.
12. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606-613.
13. Andreassen CS, Torsheim T, Brunborg GS, Pallesen S. Development of a Facebook Addiction Scale. *Psychol Rep*. 2012;110(2):501-517.
14. Best P, Manktelow R, Taylor B. Online communication, social media and adolescent wellbeing: A systematic narrative review. *Child Youth Serv Rev*. 2014;41:27-36.
15. Frison E, Eggermont S. Browsing, posting, and liking on Instagram: The reciprocal relationships between different types of Instagram use and adolescents' depressed mood. *Cyberpsychol Behav Soc Netw*. 2017;20(10):603-609.
16. Tandon A, Dhir A, Almugren I, AlNemer GN, Mäntymäki M. Fear of missing out (FoMO) among social media users: A systematic literature review. *Internet Res*. 2021;31(3):782-821.
17. Hjetland GJ, Skogen JC, Hysing M, Sivertsen B. The association between self-reported screen time, social media addiction, and sleep among Norwegian university students. *Front Public Health*. 2021;9:794307.
18. Woods HC, Scott H. #Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *J Adolesc*. 2016;51:41-49.
19. Coyne SM, Rogers AA, Zurcher JD, Stockdale L, Booth M. Does time spent using social media impact mental health?: An eight year longitudinal study. *Comput Human Behav*. 2020;104:106160.
20. Berryman C, Ferguson CJ, Negy C. Social media use and mental health among young adults. *Psychiatr Q*. 2018;89(2):307-314.
21. Hunt MG, Marx R, Lipson C, Young J. No more FOMO: Limiting social media decreases loneliness and depression. *J Soc Clin Psychol*. 2018;37(10):751-768.
22. Naslund JA, Bondre A, Torous J, Aschbrenner KA. Social media and mental health: Benefits, risks, and opportunities for research and practice. *J Technol Behav Sci*. 2020;5(3):245-257.