

Bedtime Social Media Use and Academic Procrastination Among University Students: A Simulation-Based Correlational Analysis

Pallavi Nair¹

¹Department of Psychology
Jain (Deemed-to-be University)
Bangalore, Karnataka, India

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Abstract: Bedtime social media use is a behaviorally specific form of digital media exposure that may compete with sleep-related routines and next-day academic self-regulation. Academic procrastination, in parallel, reflects the voluntary delay of intended academic activity despite anticipated disadvantage. This publication-style study demonstrates a quantitative framework for testing their association among university students. A synthetic dataset of 100 cases was used to illustrate the prespecified analysis; no participant responses are represented. Bedtime social media use was operationalized as a seven-item nighttime-use score and academic procrastination as a 25-item academic-specific score. The simulated measures showed high internal consistency (Cronbach's $\alpha = .90$ and $.96$). Bedtime social media use was moderately and positively correlated with academic procrastination, $r(98) = .480$, 95% CI $[.313, .618]$, $p < .001$. In a supplementary regression adjusting for age, gender coding, average sleep duration, and overall daily social media time, bedtime social media use remained positively associated with procrastination ($B = 1.23$, $SE = 0.38$, $\beta = .393$, $p = .002$). Average sleep duration was inversely associated with procrastination ($B = -9.53$, $p < .001$). The model explained 33.3% of the simulated variance (adjusted $R^2 = .298$). The manuscript highlights bedtime-specific digital behavior as a conceptually distinct exposure from general social media addiction, while emphasizing that the numerical findings are analytical demonstrations rather than empirical evidence. A future participant-based study should retain the same transparent measurement and analysis plan while obtaining ethical approval and genuine observations.

Keywords: Bedtime Social Media Use; Academic Procrastination; University Students; Self-Regulation; Sleep; Smartphone Behavior.

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I. INTRODUCTION

Academic procrastination is commonly understood as an unnecessary and voluntary delay of intended academic action despite awareness that the delay may produce negative consequences. It is therefore more than poor scheduling; it reflects a failure to translate intentions into timely action. Steel positioned procrastination as a core self-regulatory failure [1], while the short-term mood-regulation account emphasizes how immediate affective relief can be prioritized over longer-term academic goals [2]. University students may be particularly vulnerable because substantial autonomy, multiple deadlines, variable study schedules, and digitally mediated leisure all create repeated opportunities to substitute immediately rewarding activities for effortful academic tasks.

Social media is now embedded in university life, but total daily use may be too broad an exposure for explaining self-regulatory difficulties. Timing matters. Woods and Scott demonstrated that nighttime-specific social media use can be distinguished from overall use and may show particularly strong associations with sleep-related outcomes [3]. A systematic review of late-adolescent and young-adult digital media use likewise concluded that digital media exposure is generally associated with shorter sleep duration and poorer sleep quality, while emphasizing substantial heterogeneity in measurement and design [4]. Population-based evidence has also linked bedtime media use with sleep outcomes in adults [5]. More recent work has moved toward direct pre-bedtime tracking and objective sleep measures, underscoring the methodological value of isolating the period immediately before sleep rather than treating all screen time as equivalent [6].

The sleep pathway is relevant because self-regulation is not independent of physiological state. Systematic review and meta-analytic evidence indicates that social media use is associated with sleep and mental-health outcomes, although effect sizes vary across operational definitions and populations [7]. Fear of missing out, pre-sleep cognitive arousal, and habitual checking may help sustain nighttime engagement [8]. Importantly, not all intensive momentary research finds simple harmful effects: an experience-sampling study in healthy young adults reported no consistent detrimental association between bedtime social media use and sleep or affective wellbeing [9]. This mixed evidence argues against deterministic claims and supports careful measurement of behavior, timing, context, and potential confounders.

A second pathway concerns the broader literature on digital overuse and procrastination. Bedtime procrastination has been conceptualized as delaying intended sleep without external reasons [10], and smartphone addiction has been linked with poorer sleep through self-regulation and bedtime procrastination mechanisms in university students [11]. At the academic level, a 2024 meta-analysis of 75 studies involving 48,031 students found a moderate positive correlation between mobile-phone addiction and procrastination (pooled $r = .376$) [12]. Recent university studies have similarly linked social media disorder or problematic use with academic procrastination and have highlighted intrusive thinking, fatigue, self-control, and fear of missing out as plausible mechanisms [13]-[15]. Notification design may also alter engagement and self-regulation, showing that digital cues can influence procrastination behavior rather than merely reflect it [16].

Despite this growing evidence, an important conceptual gap remains. Most studies examine broad constructs such as smartphone addiction, social media disorder, or total media use. These constructs are valuable, but they do not answer a narrower behavioral question: whether social media use specifically at bedtime is associated with academic procrastination. The present manuscript therefore focuses on bedtime social media use as a timing-defined exposure and academic procrastination as a domain-specific academic outcome. This distinction may be practically useful because bedtime routines are identifiable and potentially modifiable even among students who would not describe themselves as addicted to social media.

II. CONCEPTUAL FRAMEWORK AND HYPOTHESIS

The proposed association is grounded in a self-regulatory conflict between immediate digital rewards and delayed academic rewards. Bedtime social media use may prolong wakefulness, stimulate cognitive arousal, fragment intended routines, and reduce next-day alertness. At the same time, habitual checking may reinforce a preference for brief, rapidly rewarding activities that competes with sustained academic effort. These processes may be amplified by fear of missing out and weaker inhibitory control [8], [15]. The model does not assume that sleep is the only pathway, nor that bedtime social media necessarily causes procrastination. Rather, it

treats sleep-related disruption, fatigue, attentional capture, and self-regulatory depletion as plausible mechanisms that warrant direct testing in future longitudinal research.

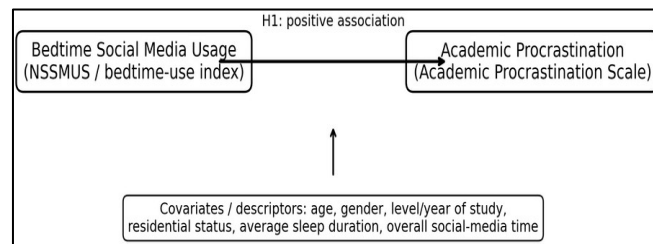


Fig 1 Conceptual Framework Linking Bedtime Social Media Use with Academic Procrastination.

The primary hypothesis is therefore directional: higher bedtime social media usage scores will be positively associated with higher academic procrastination scores. The null hypothesis is that no statistically significant association exists between the two continuous measures. A supplementary model considers age, gender coding, typical sleep duration, and overall daily social media duration as covariates to examine whether the focal relationship is robust to a limited set of plausible confounding variables.

III. MATERIALS AND METHODS

A. Design and Data Provenance

The analytical structure follows a quantitative, cross-sectional, correlational design planned for adult university students. For the present publication-style demonstration, however, the dataset is synthetic. One hundred records were generated solely to demonstrate scoring, reliability analysis, descriptive statistics, correlation, regression, and journal reporting. No real students were recruited, no participant responses were collected, and the numerical results must not be interpreted as empirical evidence. Any future participant-based study using this protocol would require prior institutional ethical approval, informed consent, confidential data handling, and replacement of all synthetic observations with verified study data.

B. Measures

Bedtime social media use was represented by a seven-item nighttime-specific index scored from 1 to 5 per item, producing a possible total range of 7-35. The construct captures behaviors such as social media engagement in bed, use near intended sleep, and nighttime checking. The index is conceptually informed by timing-specific social media work [3], but copyrighted item wording is not reproduced here. Higher scores indicate more intensive bedtime social media engagement.

Academic procrastination was represented by a 25-item academic-specific score with Likert-type responses and a possible total range of 25-125. McCloskey developed an academic-focused procrastination instrument for student populations [17], and later psychometric work has supported the measurement of academic procrastination as a distinct educational construct [18]. In a real study, the final authorized scale version, permissions, scoring key, and any reverse-coded

items would need to be confirmed before data collection. Higher scores indicate greater academic procrastination.

The synthetic dataset also contained age, gender, study level, year of study, residence, typical daily social media duration, and average sleep duration. These variables were included for sample description and limited covariate adjustment rather than for exploratory model expansion.

C. Statistical Analysis

Analyses were based on 100 complete synthetic cases. Internal consistency was summarized with Cronbach's alpha. Continuous variables were described using means, standard deviations, medians, and ranges. The primary association was estimated with Pearson's product-moment correlation and a 95% confidence interval. Spearman's rho was calculated as a sensitivity check. A multiple linear regression then modeled academic procrastination as the outcome, with bedtime social media use as the focal predictor and age, female gender coding, average sleep duration, and daily social media duration as covariates. Variance inflation factors, residual behavior, the Breusch-Pagan test, and Cook's distance were used as diagnostic indicators. All tests were two-tailed with $\alpha = .05$.

IV. RESULTS

A. Sample Characteristics

The simulated sample had a mean age of 21.56 years ($SD = 2.01$; range = 18-25). Fifty-three records were coded female, 44 male, and three other/prefer not to say. Eighty-one cases were undergraduate and 19 postgraduate. The distribution was intentionally heterogeneous enough to illustrate common descriptive reporting in a university sample.

Table 1 Characteristics of the Simulated Sample (N = 100)

Characteristic	n	%
Female	53	53.0
Male	44	44.0
Other / prefer not to say	3	3.0
Undergraduate	81	81.0
Postgraduate	19	19.0
With family	53	53.0
Private/shared accommodation	31	31.0
Hostel/university residence	16	16.0

B. Reliability and Descriptive Statistics

Internal consistency was high for both simulated multi-item measures: $\alpha = .90$ for the seven-item bedtime social media score and $\alpha = .96$ for the 25-item academic procrastination score. Bedtime social media use averaged 19.72 ($SD = 7.28$) on the 7-35 scale, while academic procrastination averaged 75.48 ($SD = 22.84$) on the 25-125 scale. Average daily social media duration was 3.99 hours ($SD = 1.46$), and average sleep duration was 6.96 hours ($SD = 0.82$).

Table 2 Descriptive Statistics and Internal Consistency

Measure	M	SD	Range	alpha
Bedtime social media use	19.72	7.28	7-35	.90
Academic procrastination	75.48	22.84	25-125	.96
Daily social media hours	3.99	1.46	1.0-7.6	-
Average sleep hours	6.96	0.82	4.6-9.0	-

C. Primary Association

Bedtime social media use showed a moderate positive correlation with academic procrastination, $r(98) = .480$, 95% CI [.313, .618], $p < .001$. The rank-based sensitivity analysis was nearly identical, Spearman's $\rho = .479$, $p < .001$, indicating that the simulated association was not dependent on the Pearson metric. The direction of the result was consistent with the prespecified alternative hypothesis.

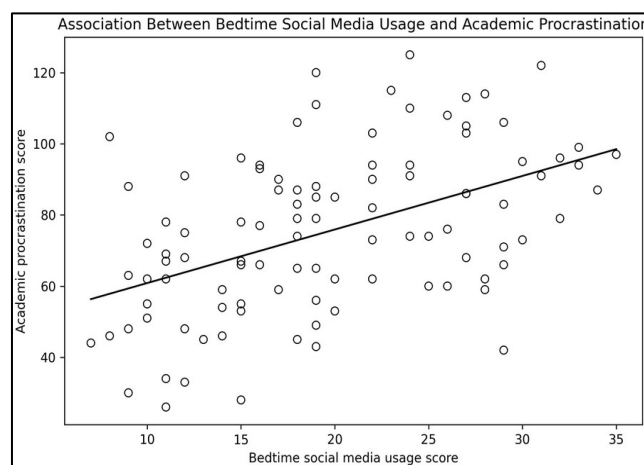


Fig 2 Scatterplot of Bedtime Social Media Use and Academic Procrastination in the Simulated Dataset.

D. Multiple Regression

The adjusted regression model was statistically significant, $F(5, 94) = 9.39$, $p < .001$, and explained 33.3% ($R^2 = .333$) of the simulated variance in academic procrastination (adjusted $R^2 = .298$). Bedtime social media use remained a significant positive predictor after covariate adjustment, $B = 1.23$, $SE = 0.38$, $\beta = .393$, $p = .002$. Average sleep duration showed an inverse association with procrastination, $B = -9.53$, $SE = 2.78$, $\beta = -.343$, $p < .001$. Age, gender coding, and overall daily social media duration were not significant in this model. Variance inflation factors were all below 2.1. The Breusch-Pagan test was nonsignificant ($p = .160$), and no observation had Cook's D above 1; the largest Cook's D was .362.

Table 3 Multiple Regression Predicting Academic Procrastination

Predictor	B (SE)	beta	p
Bedtime social media use	1.23 (0.38)	.393	.002
Age	0.83 (1.01)	.073	.411
Female gender coding	-2.15 (3.86)	-.047	.578
Average sleep duration	-9.53 (2.78)	-.343	<.001
Daily social media duration	-2.15 (1.75)	-.137	.222

V. DISCUSSION

The simulation demonstrates how a bedtime-specific social media exposure can be evaluated against an academic procrastination outcome using a compact, reproducible analysis plan. The generated correlation was moderate and positive, and the focal association remained in the adjusted model. Because these data are synthetic, the result cannot be cited as evidence that bedtime social media use is empirically related to procrastination. Its value is methodological: it shows the form of the test, effect-size reporting, diagnostic checks, and interpretation that should be retained once genuine participant data are available.

The direction of the simulated association is nevertheless theoretically coherent with the broader evidence base. The meta-analysis by Zhou et al. found a moderate positive relation between mobile-phone addiction and procrastination across a large student literature [12]. Recent work has also linked social media disorder with academic procrastination through intrusive thinking and fatigue [13], and inappropriate social-network use with academic procrastination in university students [14]. Tang and He further identified self-control and fear of missing out as mediating processes in the relationship between social media addiction and academic procrastination [15]. Together, these studies suggest that digital behavior and procrastination may be connected through attentional capture, immediate reward, fatigue, and self-regulatory processes, even though the present bedtime-specific hypothesis remains to be tested directly with real data.

The sleep-related covariate is also conceptually relevant. Longitudinal work among university students has described reciprocal relationships among problematic smartphone use, bedtime procrastination, sleep quality, and mental health [19]. Large cross-sectional work has similarly found associations between mobile-phone addiction and bedtime procrastination, with physical activity and anxiety contributing to the explanatory pathways [20]. These findings reinforce the need for future research to separate bedtime digital behavior, sleep timing, sleep quality, and academic delay rather than compressing them into a single general-use measure.

The literature also cautions against assuming that all bedtime social media use has uniformly negative consequences. Experience-sampling evidence in healthy young adults did not find a simple detrimental relationship between bedtime social media use and sleep or affective wellbeing [9], and recent pre-bedtime tracking work continues to show that subjective and objective sleep associations can

differ [6]. A high-quality empirical test should therefore avoid causal language, assess alternative explanations, and report null findings transparently. The most defensible interpretation of a cross-sectional correlation is that the variables are associated, not that one causes the other.

VI. THEORETICAL AND PRACTICAL IMPLICATIONS

Conceptually, the proposed study shifts attention from broad labels such as social media addiction to a specific temporal context: use during the period when students intend to disengage and sleep. This narrower exposure may improve behavioral interpretability. A student can have moderate overall social media time yet repeatedly engage in late-night checking, short-form video consumption, or messaging that competes with sleep routines and next-day academic regulation. Conversely, a student with high daily social media exposure may use little social media at bedtime. Treating these patterns as equivalent can obscure meaningful differences.

For student-support practice, the hypothesis suggests low-intensity strategies that do not require labeling students as addicted. Examples include scheduled do-not-disturb modes, removal of nonessential notifications near bedtime, device placement away from the sleeping area, pre-commitment to a stopping time, and separating academic reminders from entertainment notifications. The notification literature also shows that digital cues can sometimes support self-regulation when deliberately designed for learning rather than distraction [16]. Future intervention research should therefore distinguish harmful cueing from supportive cueing rather than treating all notifications as equivalent.

VII. LIMITATIONS AND FUTURE RESEARCH

The most important limitation is that the present numerical results are synthetic. They demonstrate analysis and reporting but provide no empirical estimate of prevalence, association, or prediction in a real university population. Second, the proposed eventual design is cross-sectional and would not establish temporal ordering. Third, both focal constructs are likely to be self-reported, creating the possibility of recall bias and common-method variance. Fourth, bedtime social media use is a heterogeneous behavior that may differ by platform, purpose, active versus passive engagement, and social context. Fifth, university samples obtained through convenience recruitment may not represent the wider student population.

A future empirical study should obtain ethical approval, preregister or finalize the analysis plan before examining the focal association, use an authorized and psychometrically appropriate procrastination measure, and pilot the bedtime-use index. Longitudinal designs could assess whether changes in bedtime social media use precede changes in procrastination. Ecological momentary assessment, passive smartphone logs, and sleep-tracking methods could reduce reliance on retrospective reporting. Mediation models should test sleep quality, fatigue, fear of missing out, attentional control, and

self-regulation only when sample size and temporal design are adequate to support those analyses.

VIII. CONCLUSION

Bedtime social media use represents a focused behavioral context at the intersection of digital engagement, sleep-related routines, and academic self-regulation. The publication-style analysis presented here shows how its association with academic procrastination can be tested with transparent reliability, descriptive, correlational, and regression procedures. In the synthetic demonstration, greater bedtime social media use was associated with greater academic procrastination, and the relationship remained after limited covariate adjustment. These values are not empirical findings and should not be presented as participant-derived evidence. The next research step is a properly approved university study that applies the same prespecified framework to genuine observations and evaluates whether the bedtime-specific association is replicated.

DECLARATIONS

➤ *Ethics Statement*

No human participants were involved in the synthetic analysis reported in this manuscript. Ethical approval and informed consent are required before any participant-based implementation of the proposed protocol.

➤ *Data Availability*

The synthetic dataset and analysis workbook used for the statistical demonstration are available from the author. They must not be represented as participant data.

➤ *Conflict of Interest*

The author declares no conflict of interest.

➤ *Funding*

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