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Social Media Use and Depressive Symptoms Among U.S. Female Adolescents: The Role of Cyberbullying and Weight Misperception

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Abstract

Introduction: Social media is a central part of adolescents' daily lives, and frequent use has been associated with poorer mental health. These associations may be particularly pronounced among female adolescents, who are more likely to engage with appearance-related content. However, the psychosocial factors underlying these associations remain unclear. This study examined the association between frequent social media use and depressive symptoms among U.S. high school students classified as female and assessed the roles of cyberbullying and weight misperception in this association.

Methods: We analyzed nationally representative cross-sectional data from the 2023 Youth Risk Behavior Survey, including 4,902 high school students classified as female (mean age = 16.06 years [SD = 1.22]). Logistic regression models estimated odds ratios (ORs) and 95% confidence intervals (CIs), adjusting for age, grade, and race/ethnicity.

Results: Overall, 55.4% of participants reported depressive symptoms and 40.8% reported frequent social media use. Frequent social media use (defined as use at least once per hour) was associated with higher odds of depressive symptoms (OR = 1.39, 95%CI = 1.26-1.53), cyberbullying (OR = 1.76, 95%CI = 1.57-1.98), and weight misperception (OR = 1.15, 95%CI = 1.01-1.30). Cyberbullying (OR = 3.70, 95%CI = 3.17-4.31) and weight misperception (OR = 1.50, 95%CI = 1.31-1.71) were also associated with depressive symptoms. The association between frequent social media use and depressive symptoms remained significant but was attenuated after adjustment for cyberbullying and weight misperception (OR = 1.17, 95%CI = 1.05-1.31).

Conclusion: Cyberbullying and weight misperception may be important psychosocial factors associated with the relationship between frequent social media use and depressive symptoms among female adolescents. Interventions addressing cyberbullying and promoting healthy body image may help improve adolescent mental health.

Keywords: Social media use, Depressive symptoms, Cyberbullying, Weight perception, Body image, Female adolescents, Mental health, Youth Risk Behavior Survey

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Introduction

Social media has become a central part of adolescents' everyday lives, influencing how they communicate, build relationships, and develop their sense of identity. In the U.S., more than 95% of adolescents use at least one social media platform,[1] and recent national surveys suggest that many spend a substantial amount of time online, with over half reporting four or more hours per day.[2] More than half of teens aged 13–17 visit platforms like YouTube, TikTok, Instagram, or Snapchat on a daily basis, and many describe themselves as being online "almost constantly."[3] These findings highlight how deeply social media is woven into adolescents' daily routines. Moreover, notable sex differences have been observed. On average, female adolescents spend nearly an hour more on social media each day than their male peers and are more likely to be active on appearance-oriented platforms such as TikTok and Instagram.[2]

Although social media can provide opportunities for connection, creativity, and social belonging,[4,5] a growing body of evidence indicates that intensive or frequent use is linked to poorer mental health outcomes, including depressive symptoms, anxiety, and lower self-esteem.[6,7] These negative effects appear to be particularly pronounced among female adolescents, who may be more sensitive to the emotional consequences of intensive online engagement.[8,9] Prior research suggests that female adolescents are more likely than boys to engage in appearance-based social comparison and feedback-seeking behaviors on social media.[10,11] As a result, they may become more attuned to how they are evaluated by others and more exposed to appearance-focused scrutiny, which can increase vulnerability to online stressors such as cyberbullying and body image concerns.[12,13] Both experiences have been identified as key psychosocial risk factors for depression among female adolescents.[14,15]

Cyberbullying, defined as aggression or harassment through electronic communication, has become a widespread form of peer victimization during

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adolescence.[16,17] Social media can intensify these experiences by making negative feedback, exclusion, and humiliation more visible, enduring, and widely shared.[16,18] Female adolescents are especially likely to experience relational forms of aggression, such as social exclusion or rumor spreading, which can be easily amplified in online environments.[19] Such experiences can evoke feelings of shame, isolation, and perceived social rejection, all of which are closely linked to depression.[20,21] In this way, cyberbullying can be understood as a key social-relational factor associated with the relationship between frequent social media use and depressive symptoms.

In a similar way, inaccurate weight perception, defined as perceiving oneself as overweight or obese despite having a non-overweight body weight,[22] has been linked to body dissatisfaction and emotional distress, with these associations often stronger among female adolescents.[23,24] Because social media is highly visual and appearance-oriented, adolescents are frequently exposed to idealized body images and ongoing peer comparison,[25] which can contribute to distorted self-perceptions and reinforce unrealistic beauty ideals. Within this context, weight misperception may function as a cognitive-affective factor connecting appearance-focused social media exposure to emotional distress and depressive symptoms.[26]

Together, cyberbullying and weight misperception reflect distinct but related psychosocial factors associated with social media use and adolescent mental health, particularly among female adolescents. Because these relational and appearance-based stressors tend to be more common and more strongly tied to depressive symptoms in female adolescents,[27,28] this study focuses specifically on adolescents classified as female in survey-based data to better understand these gendered mechanisms. Despite increasing recognition of these risks, few studies have examined cyberbullying and weight perception together as potential mechanisms linking social media use to depressive symptoms. Understanding these mechanisms side by side is important for identifying specific intervention targets and developing prevention strategies within school and community settings, providing a more comprehensive perspective on how external and internal stress processes jointly operate in the context of social media use.

This study addresses this gap by using nationally representative data from the 2023 Youth Risk Behavior Survey to examine the associations among social media use, cyberbullying, weight perception, and depressive symptoms among U.S. adolescents classified as female, acknowledging that this reflects a survey-based categorization rather than self-identified gender. Guided by previous research, we hypothesized that (1) heavier social media use would be associated with higher levels of depressive symptoms, and (2) cyberbullying and inaccurate weight perception would be associated with the relationship between social media use and depressive symptoms. By improving understanding of these associations, the study aims to inform evidence-based strategies that support healthier social media engagement and promote mental well-being among female adolescents.

Methods

Data and Study Participants

Data were drawn from the 2023 Youth Risk Behavior Surveillance System (YRBSS), a nationally representative cross-sectional biennial survey conducted by the U.S. Centers for Disease Control and Prevention (CDC). The YRBSS tracks health-risk behaviors among students in grades 9 through 12 across the U.S. using a three-stage cluster sampling design to generate representative estimates of public and private high school students. Students completed anonymous, self-administered questionnaires during regular class periods. In the YRBSS, sex is assessed with the question "What is your sex?" (female/male). Accordingly, references to respondents classified as female reflect reported sex rather than gender identity. This cross-sectional analysis focused on respondents classified as female who provided valid responses to items assessing social media use, cyberbullying, weight perception, and depressive symptoms. The final analytic sample included 4,902 high school students classified as female with complete data on all key variables and covariates. Sampling weights, primary sampling units, and strata variables provided by the CDC were incorporated into analyses to account for the complex survey design and ensure population-representative estimates. Because the YRBSS dataset is publicly available and fully deidentified, the study was deemed exempt from institutional review board review. The YRBSS data were collected by the Centers for Disease Control and Prevention (CDC) using procedures designed to ensure voluntary and anonymous participation and to protect participants' confidentiality. Because the YRBSS dataset is publicly available and fully de-identified, this study was exempt from institutional review board review under 45 CFR 46.

Measures

Social Media Use

Participants reported how often they used social media using an eight-category response scale ranging from "*I do not use social media*" to "*More than once an hour*." Responses were dichotomized to reflect less frequent social media use (< once per hour [coded as 0]) and frequent social media use (≥ once per hour [coded as 1]). Thus, the measure reflects the frequency of social media engagement throughout the day rather than the total amount of time spent on social media.

Cyberbullying

Cyberbullying was assessed with the question, "*During the past 12 months, have you ever been electronically bullied?*" Examples included bullying through texting, Instagram, Facebook, or other social media platforms. Responses were coded dichotomously (no = 0, yes = 1).

Weight Misperception

Participants were asked, "*How do you describe your weight?*" with response options including *very underweight, slightly underweight, about the right weight, slightly overweight*, or *very overweight*. Those who described themselves as slightly or very overweight were categorized as perceiving themselves as overweight. Weight misperception was defined as reporting being "slightly overweight" or "very overweight" while having a body mass index (BMI) below the 85th percentile for age and sex (i.e., not classified as overweight according to YRBSS criteria; 0 = aligned perception, 1 = misperception).

Depressive Symptoms

Depressive symptoms were measured using a single item asking whether participants had *"felt so sad or hopeless almost every day for two weeks or more in a row that they stopped doing some usual activities"* during the past 12 months (0 = no, 1 = yes).

Covariates

Demographic covariates included grade level (9th-12th), age (≤14, 15, 16, 17, ≥18), and race/ethnicity (Hispanic/Latino of any race; non-Hispanic Black; non-Hispanic White; and non-Hispanic other races including American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and multiracial). These variables were included based on prior research linking them to adolescent social media use and mental health outcomes.

Data Analysis

First, weighted descriptive statistics were computed to summarize sample characteristics. Next, a series of binary logistic regression analyses were performed to examine associations between frequent social media use and depressive symptoms. The first model tested the unadjusted association between social media use and depression. The second model adjusted for demographic covariates (grade, age, and race/ethnicity). The final model included cyberbullying and weight misperception to examine their associations with depressive symptoms and the association between social media use and depressive symptoms. Results from all models were reported as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). All tests were two-tailed, and $P < .05$ was considered statistically significant. Missing data in sociodemographic covariates (all < 0.4%) were addressed using multiple imputation. All analyses were conducted using IBM SPSS Statistics version 29 (IBM Corp., Armonk, NY).

Results

Descriptive Statistics

Among 9,884 high school students classified as female who participated in the 2023 YRBSS survey, our analytic sample included 4,902 respondents who completed all key study variables in our primary analyses, including social media use, cyberbullying, weight misperception, and depressive symptoms. Respondents included in the analytic sample were generally older and more likely to be Hispanic/Latino or non-Hispanic Black/African American compared with those excluded because of missing data (Supplementary Table S1).

Table 1 presents descriptive statistics for study variables among 4,902 respondents classified as female included in the analysis. Grade distribution was relatively even across 9th through 12th grades, ranging from 24.0% to 26.0%. Nearly two-thirds of participants were aged 15-17 years, with the largest proportion aged 17 (26.5%) and 16 years (24.9%). The sample was racially and ethnically diverse: the largest group was non-Hispanic White (45.8%), followed by Hispanic/Latina students (30.1%), non-Hispanic Black/African American students (14.8%), and students identifying as non-Hispanic other races (9.2%). Regarding social media engagement, 40.8% of respondents reported frequent social media use (defined as using social media at least once per hour). About one in five students

Table 1. Descriptive statistics of study variables[a]

Variables	Unweighted N (Weighted %)
Grade	
9th	1257 (24.0)
10th	1329 (25.8)
11th	1160 (24.2)
12th	1146 (26.0)
Age, year	
14 or younger[b]	552 (11.2)
15	1244 (24.3)
16	1266 (24.9)
17	1224 (26.5)
18 or older	616 (13.1)
Ethnicity/race	
Hispanic/Latino Any races	1132 (30.1)
Non-Hispanic Black/African American	549 (14.8)
Non-Hispanic White	2138 (45.8)
Non-Hispanic Other races[c]	1062 (9.2)
Social media use	
Less frequent social media use (<once per hour)	2808 (59.2)
Frequent social media use (≥about once per hour)	2094 (40.8)
Cyberbullying	
No	3734 (78.8)
Yes	1168 (21.2)
Weight misperception	
No	3663 (76.4)
Yes	1239 (23.6)
Depression	
No	2028 (44.6)
Yes	2874 (55.4)

[a]Analytic sample N = 4902 (Respondents who completed all key study variable surveys [i.e., social media use, cyberbullying, weight misperception, depression]). [b]Includes respondents aged 13 years or younger (N = 3). [c]Includes American Indian/Alaska Native, Asian, Native Hawaiian/Other Pacific Islander, and Non-Hispanic Multiracial groups.

(21.2%) reported experiencing cyberbullying in the past 12 months, and nearly one-fourth (23.6%) misperceived their weight status relative to BMI classifications. More than half (55.4%) of respondents reported experiencing depressive symptoms during the past 12 months.

Descriptive Patterns of Social Media Use, Cyberbullying, Weight Misperception, and Depressive Symptoms

Figure 1 presents the prevalence of depressive symptoms, cyberbullying, and weight misperception by social media use frequency, as well as differences in depressive symptoms by experiences of cyberbullying and weight misperception. Adolescents who reported frequent social media use showed a higher prevalence of depressive symptoms (58.9% vs. 52.9%), cyberbullying (24.8% vs. 18.7%), and weight misperception (24.8% vs. 22.7%) compared to those with less frequent use.

In addition, depressive symptoms were more prevalent among adolescents who experienced cyberbullying and among those who reported weight misperception. Specifically, adolescents who experienced cyberbullying reported higher levels of depressive symptoms than those who had not (78.6% vs. 49.1%). Similarly, depressive symptoms were more common among adolescents with weight misperception compared with those who had accurate weight perception (64.6% vs. 52.5%). These patterns suggest that both cyberbullying and inaccurate body weight perception are associated with higher levels of depressive symptoms.

Associations Between Social Media Use, Cyberbullying, Weight Misperception, and Depressive Symptoms

Building on these descriptive patterns, Table 2 presents results from the binary logistic regression analyses examining the associations among frequent social media use, cyberbullying, weight misperception, and depressive symptoms. Model A tested the association between frequent social media use and depressive symptoms. After adjusting for participants' age, grade, and race/ethnicity, frequent social media use was significantly associated with

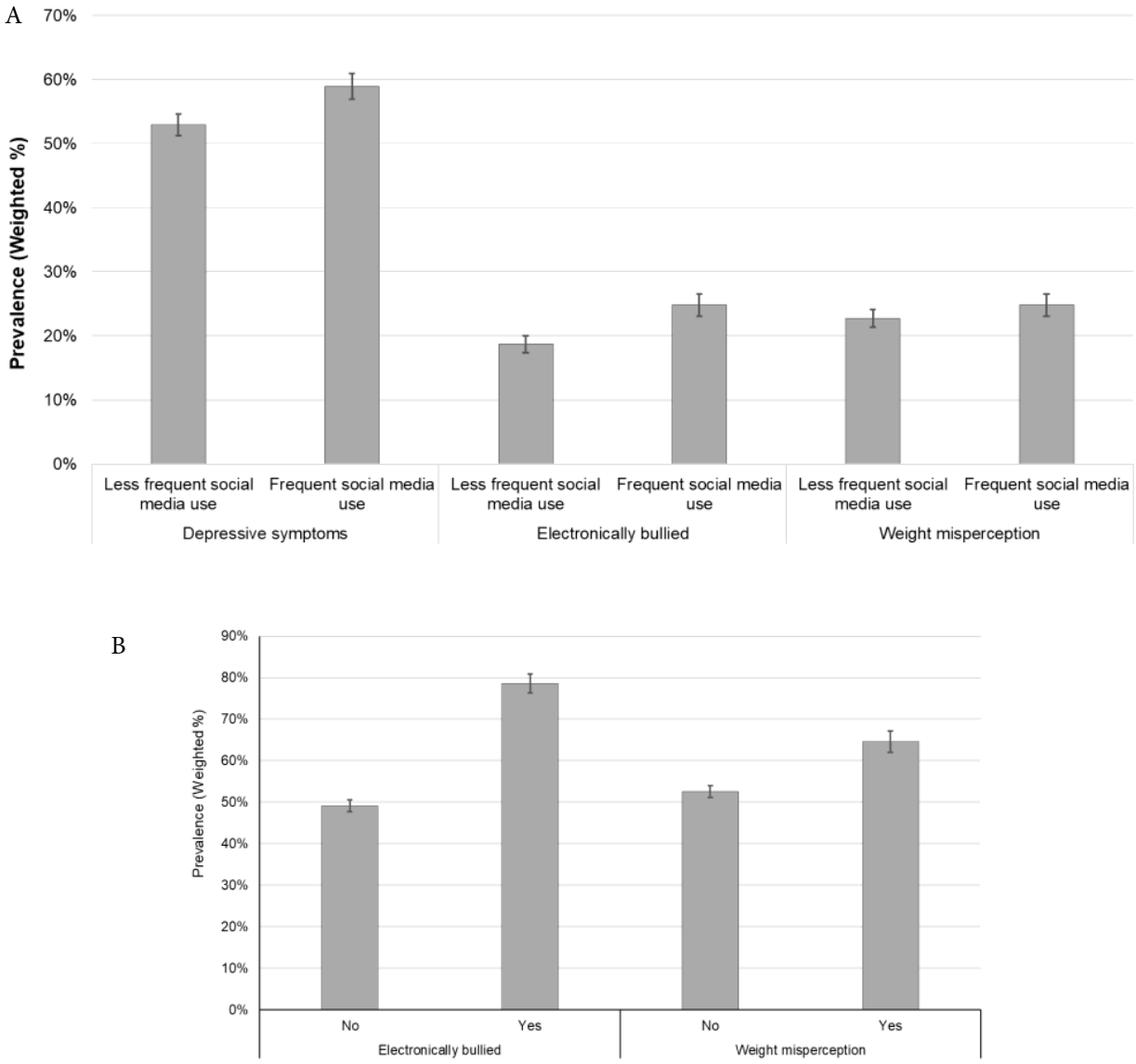

Figure 1. Associations of key study variables. A. Prevalence of depressive symptoms, cyberbullying, and weight misperception, stratified by social media use frequency. B. Prevalence of depressive symptoms, stratified by cyberbullying and weight misperception

Table 2. Association of social media use, cyber-bullying, and perception of weight with depressive symptoms[a]

Model A: Association of social media use with depressive symptom[b]		
Predictors	Outcome: Depressive symptoms	
	OR (95%CI)	*P*
Frequent social media use	1.39 (1.26, 1.53)	<0.001
Model B: Association of social media use with cyberbullying[b]		
Predictors	Outcome: Cyberbullying	
	OR (95%CI)	*P*
Frequent social media use	1.76 (1.57, 1.98)	<0.001
Model C: Association of social media use with weight misperception[b]		
Predictors	Outcome: Weight misperception	
	OR (95%CI)	*P*
Frequent social media use	1.15 (1.01, 1.30)	0.03
Model D: Association of social media use, cyberbullying, and weight misperception with depressive symptom[b]		
Predictors	Outcome: Depressive symptoms	
	OR (95%CI)	*P*
Frequent social media use	1.17 (1.05, 1.31)	.006
Cyberbullying	3.70 (3.17, 4.31)	<.001
Weight misperception	1.50 (1.31, 1.71)	<.001

[a]Analytic sample N = 4902 (Respondents who completed all key study variable surveys [i.e., social media use, cyberbullying, weight misperception, depression]). [b]Each binary logistic regression model controlled for participants' age, grade, and race/ethnicity variables.

higher odds of reporting depressive symptoms (OR = 1.39, 95% CI = 1.26-1.53, *P* < .001). These results indicate that adolescents who use social media frequently are more likely to experience depressive symptoms compared with those who use social media less frequently.

Next, additional models examined the associations between frequent social media use and cyberbullying and weight misperception. In Model B, frequent social media use was related to the likelihood of experiencing cyberbullying (OR = 1.76, 95% CI = 1.57-1.98, *P* < .001). In Model C, frequent social media use was positively associated with weight misperception (OR = 1.15, 95% CI = 1.01-1.30, *P* = .03). These findings suggest a positive association between frequent social media use and weight misperception.

Finally, in the combined model (Model D), which simultaneously included frequent social media use, cyberbullying, and weight misperception, the association between frequent social media use and depressive symptoms remained statistically significant but was reduced in magnitude compared with Model A (OR = 1.17, 95% CI = 1.05-1.31, *P* = .006). Both cyberbullying and weight misperception were independently associated with depressive symptoms. Participants who reported cyberbullying had over three times higher odds of experiencing depressive symptoms (OR = 3.70, 95% CI = 3.17-4.31, *P* < .001), and those who perceived themselves as overweight had 1.5 times higher odds of reporting depressive symptoms (OR = 1.50, 95% CI = 1.31-1.71, *P* < .001).

Discussion

This study examined the association between frequent social media use and depressive symptoms among U.S. adolescents classified as female, with a focus on the potential roles of cyberbullying and weight misperception. Using nationally representative data from the 2023 Youth Risk Behavior Survey, the findings revealed that frequent social media use was significantly associated with increased odds of depressive symptoms, even after adjusting for demographic covariates. Adolescents classified as female who used social media at least once per hour had higher odds of reporting cyberbullying and weight misperception relative to BMI-based classifications. Both of these psychosocial factors were independently linked to depressive symptoms. Importantly, when cyberbullying and weight misperception were considered together, the association between frequent social media use and depressive symptoms was reduced but remained statistically significant, indicating that these factors were associated with the relationship between frequent social media engagement and depressive symptoms among female adolescents.

These findings are consistent with prior evidence showing that frequent social media use is linked to higher levels of depressive symptoms among adolescents, particularly female adolescents.[6,7] Adolescence is a period when young people often show heightened sensitivity to social evaluation, a growing reliance on peer approval, and an ongoing search for identity.[29-31] Within this context, social media platforms magnify both opportunities and vulnerabilities: while they enable connection and self-expression, they also expose youth to constant peer comparison and curated images that shape perceptions of self-worth.[5,10,32,33] For adolescents whose self-concept is still developing, such feedback-driven environments can intensify emotional reactivity and undermine psychological well-being.

These developmental dynamics appear especially pronounced among female adolescents,[27,34] who are more likely to use visually oriented and appearance-based platforms, place greater importance on social validation, and internalize appearance ideals emphasized in online culture.[10,11,14] Continuous exposure to idealized images and evaluative feedback may reinforce social comparison and body dissatisfaction, gradually eroding self-esteem and contributing to depressive symptoms.[35,36] This pattern aligns with observed differences in digital engagement behaviors and may help contextualize the stronger associations between frequent social media use and depressive symptoms reported among female adolescents compared with their male peers.

Extending prior research, the present study highlights distinct yet complementary psychosocial factors associated with social media engagement and depressive symptoms by considering both social-relational and cognitive-affective processes. Cyberbullying represents an interpersonal stressor associated with poorer mental health outcomes among adolescents,[37,38] whereas

weight misperception reflects a cognitive-affective factor that has been linked to body dissatisfaction and depressive symptoms.[26] Together, these findings suggest that cyberbullying and weight misperception may be important correlates of the association between frequent social media use and depressive symptoms. By examining these factors simultaneously, our findings add to existing frameworks emphasizing the interplay between external social stressors and internal cognitive vulnerabilities in adolescent mental health.

Conceptually, these findings build upon social comparison frameworks,[11,39] which emphasize that adolescents' emotional well-being is shaped by social evaluation and exposure to idealized peer content. Our findings are consistent with these frameworks by demonstrating associations involving both social-relational and cognitive-affective factors. Specifically, cyberbullying and weight misperception were both associated with depressive symptoms and may reflect distinct psychosocial correlates of adolescent well-being. By moving beyond direct associations between time spent on digital environments and mental health, this study highlights the value of considering multiple psychosocial factors when examining associations between social media use and adolescent mental health. This integrated perspective helps inform more targeted and developmentally appropriate prevention efforts.

From a prevention and practice standpoint, these results point to the need for multi-level strategies that address both digital safety and body image resilience. School-based initiatives could integrate education on respectful online communication, peer support, and cyberbullying reporting systems to reduce social-relational stressors.[40,41] Simultaneously, media literacy and body image programs can help adolescents critically interpret appearance-focused content, challenge unrealistic beauty norms, and develop healthier self-perceptions.[42-44] Collaborative efforts among educators, parents, and social media platforms may further support digital environments that prioritize well-being and inclusion. Tailoring such interventions for female adolescents, who are more likely to experience appearance-based pressures, could be especially effective in mitigating the psychological toll of intensive social media use.

Several limitations should be considered when interpreting these findings. The cross-sectional nature of the YRBSS data means that causal relationships cannot be established. It is possible that depressive symptoms also increase vulnerability to cyberbullying or influence perceptions of weight. Longitudinal studies are needed to clarify directionality and temporal sequencing of these associations. Second, all measures relied on adolescent self-reports, which may be subject to recall or social desirability biases. In addition, depressive symptoms were assessed using a single survey item and may not fully capture the complexity of depression. Incorporating objective indicators, such as digital trace data, peer reports, or clinical assessments, could help strengthen measurement accuracy in future work. Third, the data did not capture important details about how adolescents use social media, such as specific platforms, types of content viewed, the quality of online interactions, or the total duration of use. In addition, the social media measure assessed frequency of use rather than time spent on social media.[45] Future research could benefit from incorporating more comprehensive measures of digital engagement to better understand these dynamics. Fourth, BMI may not fully capture body composition during adolescence. Some adolescents with a non-overweight BMI may have higher body fat levels or previous experiences with overweight that influence weight perceptions. Future studies incorporating measures such as waist-to-height ratio or dual-energy X-ray absorptiometry (DXA) may provide a more comprehensive assessment of body composition. Fifth, sex was assessed in the YRBSS using a binary survey item. Therefore, the findings reflect experiences among adolescents classified as female based on reported sex and should be interpreted within the context of this survey-based classification. Future research would benefit from examining whether these associations vary across diverse gender identities. Finally, although the present analysis focused on adolescents classified as female to illuminate gender-specific processes, future research would benefit from examining diverse gender identities and intersectional factors such as race/ethnicity and socioeconomic status to better understand the diversity of adolescents' digital experiences and mental health outcomes.

Despite these limitations, this study provides valuable insights by examining cyberbullying and weight misperception alongside social media use and depressive symptoms among adolescents classified as female. Findings suggest that both social-relational and cognitive-affective factors are associated with depressive symptoms in the context of social media use. Efforts to address cyberbullying and promote healthier body perceptions may support adolescent mental health in the context of frequent social media use.

Conclusion

This study highlights cyberbullying and weight misperception as important psychosocial factors associated with frequent social media use and depressive symptoms among U.S. adolescents classified as female. By considering both social-relational and cognitive-affective factors, the findings provide a broader understanding of psychosocial correlates associated with depressive symptoms among adolescents who frequently use social media. As social media continues to play an important role in adolescents' daily lives, education, digital literacy, and supportive school environments may help promote adolescent mental health. Future prevention efforts should move beyond merely limiting screen time and instead focus on equipping young users with the skills and resources to navigate social media spaces safely and confidently.

Authors' Contribution

Conceptualization: Kayla G. Kim, Stephen Shifflett.
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Supervision: Stephen Shifflett.
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Visualization: Kayla G. Kim.
Writing–Original Draft: Kayla G. Kim.
Writing–Review & Editing: Kayla G. Kim, Stephen Shifflett.

Competing Interests

The authors declare that they have no competing interests.

Ethical Approval

The 2023 Youth Risk Behavior Surveillance System (YRBSS) data are publicly available and fully de-identified. Therefore, this secondary analysis was exempt from institutional review board review under 45 CFR 46.

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Supplementary Files

Supplementary file 1 contains Table S1.

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