The Effects of Sleep on Body Image: Examining the Roles of Depression, Perceived Stress, and Anxiety

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Abstract

Objective: Although health and wellness behaviors are associated with positive body image, research is limited regarding the relationship between sleep and positive body image. We propose that negative affective states may link sleep and body image. Specifically, we examined whether better sleep may relate to positive body image through reductions in negative affective experiences.

Participants: Participants were 269 undergraduate women.

Methods: Cross-sectional surveys were administered.

Results: We found correlations in the expected directions between sleep, positive body image variables (i.e., body appreciation, appearance evaluation, appearance orientation), and negative affective states (i.e., depression, anxiety, and stress). There were group differences in negative affective states and body image based on adequate sleep. Data supported indirect effects of sleep through depression on appearance evaluation, and through depression and stress on body appreciation, respectively.

Conclusions: Our findings indicate sleep warrants further research attention as a wellness behavior related to more positive body image.

Keywords: positive body image; sleep; depression; anxiety; stress
Positive body image, or the degree to which individuals value and feel love for their bodies, has been identified as an important factor in well-being among women. Previous research supports a relationship between women’s positive regard for their bodies and their investment in behaviors meant to preserve their health and functioning. Specifically, research exists to support both the impact of positive body image on health behaviors, and the impact of health behaviors on positive body image.

First, individuals who feel more positively about their bodies and hold their bodies in higher esteem may expend greater effort to take care of them. This has been supported by previous work demonstrating that positive body image is associated with greater engagement with health behaviors such as sun-related skin protection, seeking medical attention when needed, and fewer unhealthy dieting behaviors. However, positive body image may not have an impact on all health behaviors. For instance, previous research has not found relations between positive body image and alcohol consumption, tobacco use, or certain types of cancer screenings, such as breast screenings and pap tests. Therefore, it is possible that positive body image may confer benefits for some health behaviors, but not others.

Second, it may be the case that those who expend more effort on taking care of their physical selves engender more positive feelings toward their bodies. Although previous research, as noted above, has investigated body image as a predictor of health behaviors, some studies have considered it as an outcome as well. For instance, conversing with others about exercise has been shown to predict greater body appreciation among women, and participation in sports clubs is linked to higher functional body image in youth. Cross-sectional relationships
have also been established with enjoyment of physical activity, physical health related quality of life, and body appreciation.6

**Sleep and Body Image**

Thus far, few have examined one of the most critical health behaviors – sleep – in relation to body image. Sleep is an essential element to physical and mental wellness. Experimental data show that limited sleep impairs mood and cognition, and can result in increased physical health issues including headaches, joint soreness, and gastrointestinal dysfunction.7 Positive sleep experiences, referred to as “good sleep” or “sleep health” have been shown to benefit physical functioning and mental health, including lower perceived stress, greater positive affect, and greater well-being.8,9 As such, individuals who prioritize their sleep needs may experience more positive thoughts and feelings, generally, and in particular, may hold their bodies’ needs in higher esteem. Although few have investigated the link between sleep and positive body image, at least one study has found poor sleep quality is related to lower body appreciation.6 Similarly, body positive behaviors (e.g., positive self-talk about appearance) are lower among individuals with insomnia.10

The small literature regarding the relationship between sleep and positive body image is supported by evidence suggesting a connection between poor sleep and body image dissatisfaction. In particular, insomnia symptoms have been associated with more negative body image, including negative beliefs about one’s body, behaviors aimed toward hiding or correcting perceived flaws in one’s appearance, and avoidance of situations in which body concerns may arise.10

**Sleep and Negative Affect**
Negative affect is a term that captures feelings of depression, anxiety, and emotional reactions to stress. There is a well-established relationship between negative affect and sleep. The odds of clinically significant depression and anxiety are over 9 and 17 times greater, respectively, for individuals with insomnia. Poor sleep may pose a risk for more maladaptive negative thoughts and feelings. Specifically, laboratory evidence indicates that sleeping on average for approximately 5 hours per night results in feelings of depression, tension, anxiety, and stress, and that the severity of these problems increases with each day of sleep deprivation experienced. Similarly, sleep deprivation is associated with a reduction in positive affect and decreased effectiveness in negative emotion regulation. Interestingly, the relationship between negative affect and sleep may be bidirectional. That is, not only may limited sleep result in increased negative affect, but it appears that negative affective states such as stress and anxiety may limit the ability to achieve restful, quality sleep. Clinically significant depression and anxiety disorder diagnoses have been associated with increased odds for shorter sleep duration and insomnia in epidemiological work. Treatment research also suggests that insomnia-focused interventions may result in not only improvements to sleep, but also symptoms of anxiety and depression.

**Sleep, Negative Affect, and Body Image**

The body image literature has established a clear relationship between negative affect and body image concerns. It has been demonstrated that self-criticism and over-evaluation of one’s shape and weight are related, and partially accounted for via depression symptoms. The literature also supports an inverse relationship between negative affect and positive body image. Specifically, greater positive body image is associated with lower levels of depression. Since
sleep and body image both demonstrate an established relationship with negative affect, negative affect may constitute a bridge connecting sleep and body image.

Some work provides support for this idea. Specifically, poorer sleep quality has been linked to greater symptoms of depression and anxiety, as well as greater body image dissatisfaction\(^1\). Previous research has found negative affect a factor of relevance to both sleep and body image, notable enough to control for its impact\(^6\). Thus far however, no existing study has considered negative affective states (i.e., depression, anxiety, and stress) as pathways through which sleep may impact body image. In particular, the literature examining negative affective states, sleep, and positive body image is especially limited. Although some related work has found cognitive mechanisms associated with negative affect may link insomnia symptoms to body image dissatisfaction\(^10\), we are not aware of any research examining the potential links between sleep, negative affect, and positive body image.

Given the potential connection between these variables, and the importance of both positive body image and health behaviors to overall well-being, exploration of how sleep may impact positive body image experiences is warranted. Specifically, it may be the case that adequate sleep mitigates the severity of negative affective experiences, since sleep confers benefits in the domains of emotion regulation, adaptive thought processes, and cognitive control\(^24\). As such, better sleep may relate to positive body image through reductions in negative affective experiences.

**Current Study**

The current study set out to examine the relationship between sleep and positive body image among a sample of women undergraduates. We were interested in this population given the importance of positive body image for women in emerging adulthood\(^2\), and the prevalence of
poor sleep among undergraduates. In particular, previous research has shown that chronic insomnia is present in 9.5% of undergraduates, and that those undergraduates with chronic insomnia also experience greater depression, anxiety, and stress; however, little is known about the relation between insomnia and body image among undergraduates, or their potential links through depression, anxiety, and stress. Therefore, greater work is necessary within samples of undergraduate women to explore these issues. Given the importance of positive body image, and the barrage of negative body-focused messages put forth toward women in society, we wondered whether something as seemingly straightforward as more sleep could offer the opportunity for greater appreciation and love for one’s body. Acknowledging the potential for some complexity in this relationship, we had a goal to evaluate whether greater sleep duration allowed for greater positive body image through reductions in negative thoughts and feelings in general.

In sum, our aims were as follows:

1. Examine the bivariate relationships between sleep, positive body image, and negative affect variables.
2. Determine whether differences existed in body image and negative affective states between those who were and were not getting enough sleep at night.
3. Evaluate the direct effect of sleep duration on positive body image.
4. Evaluate the indirect effects of sleep duration through depression, stress, and anxiety on positive body image.

**Methods**

**Participants and Procedure**

We recruited undergraduate women (N = 269) who were at least 18 years of age from a Mid-Atlantic University to take part in an online survey assessing “College Women’s Health.”
On average, participants were 19.53 years old (SD = 3.26). The race and ethnicity of participants were distributed as follows: 20.1% African American/Black, 20.4% Asian American/Asian/Pacific Islander, 16.0% Latina/Hispanic, 0.4% Native American/American Indian, 5.9% Multiracial, 33.8% White, 3.0% Other, and 0.4% declined to provide this information. Approximately 53% of participants reported they were employed at least part-time in addition to being a student.

Participants were recruited via the psychology research subject pool and received course credit for their participation. We targeted undergraduate women for recruitment as this is a demographic group that is vulnerable to body image challenges, and may be experiencing changes in their health behaviors, including sleep habits. This study was approved by the Institutional Review Board at the university at which it was conducted.

Measures

**Background Information.** Participants self-reported their age, race/ethnicity, employment status, and height and weight on our demographic information form. Body mass index (BMI) was calculated from participants’ height and weight information based on the formula provided by the Centers for Disease Control (CDC)\(^26\). We calculated BMI as it accounts for the ratio of weight relative to height and is more descriptive than weight alone.

**Sleep.** We asked participants “*In the past 7 days, on average, how many hours of sleep did you get per night?*” Responses were open-ended. Participants responded with the integer that best reflected their sleep duration over the past week. This item was based on the sleep duration question from the Pittsburgh Sleep Quality Index (PSQI)\(^27\) (i.e., “*How many hours of actual sleep do you get at night?*”). Since we were primarily interested in assessing sleep quantity rather than quality, we excerpted and adapted this item for our survey. We elected to operationalize
sleep as average hours because we felt that participants would be able to provide a reasonably accurate estimate of a simple quantitative variable such as sleep duration. Additionally, we wanted to keep the overall questionnaire battery relatively brief to optimize completeness and accuracy in participant response, and the single item on sleep duration helped us to achieve reasonable balance between breadth of data and participant burden. Our sleep duration item is consistent with the approach used in some previous studies of the general population and university students.  

**Depression.** Depression was assessed via the 20-item Center for Epidemiologic Studies Depression Scale (CES-D). This scale asks participants to indicate the frequency with which they have experienced thoughts, feelings, and behaviors associated with depression over the past week. For example, “I felt that I could not shake off the blues even with help from my family or friends.” The frequency choices range from 0 (rarely or none of the time, less than 1 day) to 3 (most or all of the time, 5-7 days); scores are totaled, with higher scores indicating greater depression symptoms. Scores less than 16 have been described as below the threshold of clinical significance, and scores of 16 and above are considered of clinical concern. A meta-analysis indicates that the CES-D has good sensitivity and adequate specificity as a depression screener in the general population. Internal consistency in the current study was \( \alpha = 0.92 \), which is similar to previously reported values among samples of women.  

**Stress.** The 10-item Perceived Stress Scale (PSS) assesses the degree to which individuals feel challenged by stressors in their lives. An example item is “How often have you found that you could not cope with all the things that you had to do?” Participants provide ratings ranging from 0 (Never) to 4 (Very Often). After reverse scoring some items, a total score was calculated with higher scores indicating greater perceived stress. This measure has
previously demonstrated strong validity (both concurrent and predictive) and reliability. Internal consistency in the current sample (Cronbach’s $\alpha = 0.81$) was similar to previous estimates ranging from 0.84 – 0.87 in other studies. Normative sample scores for women average between 13.68 - 16.14.

**Anxiety.** We utilized the 6-item short form of the state anxiety scale, adapted from the State-Trait Anxiety Inventory (STAI). Participants are asked to provide ratings on items pertaining how they feel, such as “I am tense.” Responses range from 1 (Not at all) to 4 (Very Much). After reverse scoring a portion of the responses, a total score was calculated. The STAI is a widely used measure that provides a broad-based (rather than disorder-specific) assessment of anxiety in the general population. It has been shown to have construct and concurrent validity. The short form has been shown to perform comparably to the original version in regard to validity and sensitivity. Internal consistency in the current sample was good ($\alpha = 0.82$), and matched that of the sample upon which the psychometrics for the short form were originally evaluated.

**Body Appreciation.** The 10-item Body Appreciation Scale-2 (BAS-2) was used to assess positive attitudes toward one’s body (e.g., respect, favorable beliefs, acceptance). The measure asks participants to respond to items such as “I feel good about my body” with choices ranging from 1 (Never) to 5 (Always). Scores are totaled, with higher scores indicating greater positivity toward, and appreciation of, one’s body. Strong psychometrics, including construct validity, test-retest reliability, and measurement invariance have been shown previously. Internal consistency was excellent in the current study ($\alpha = 0.96$), and similar to internal consistency found in other samples of women.
questionnaires that evaluates positive body image \(^1\) and because it has been previously demonstrated strong psychometrics in samples of young women \(^4\)1.

**Appearance Evaluation and Appearance Orientation.** We utilized the Appearance Evaluation and Appearance Orientation subscales of the Multidimensional Body Self Relations Questionnaire (MBSRQ) \(^4\)3. We elected to use this measure because it is a gold standard measure of body image and the Appearance Evaluation and Appearance Orientation subscales have been shown to be valid assessments of their respective constructs across different demographic groups \(^4\)4. Respondents indicate their agreement with statements about their bodies using a scale ranging from 1 (*Definitely Disagree*) to 5 (*Definitely Agree*). Both scales include items that are reverse scored prior to calculating their averages. The Appearance Evaluation scale includes 7 items that assess the degree to which an individual feels they are attractive. For instance, “*I like my looks just the way they are.*” Higher scores indicate greater satisfaction regarding physical appearance. The 12-item Appearance Orientation scale evaluates the degree to which an individual values, monitors, and invests in their physical appearance. For instance, “*I am always trying to improve my physical appearance.*” Higher scores indicate greater importance of appearance. In the current study, internal consistency was \(\alpha = 0.91\) for Appearance Evaluation and \(\alpha = 0.77\) for Appearance Orientation. Cronbach’s alphas were also good in previous research \(^4\)3.

**Data Analytic Plan**

We used SPSS version 26 \(^4\)5 for our analyses including calculation of frequencies, descriptive statistics, correlations, and scale reliabilities. Data were screened for outliers prior to analyses. Mean imputation was utilized for scoring questionnaires with at least 80% completeness.
For analyses examining group differences we established a cut point in average sleep duration to classify those who were and were not achieving a sufficient quantity of sleep. Although individual sleep needs may vary, a general cut point of 6 hours of sleep or more was operationalized as sufficient sleep based on Dinge’s and colleagues’ previous findings on health and emotional functioning. Additionally, using a 6 hour cut point to reflect limited sleep is consistent with the operationalization used in previous research. Group differences were evaluated using t-tests.

For our analyses examining direct and indirect effects, we also employed PROCESS version 3.4 which is a statistical package that can be used within SPSS to perform ordinary least squares regression-based path analyses. Our analyses included the use of 5,000 bootstrap samples which is a recommended approach for assessing indirect effects. We used PROCESS model 4, which considers the effect of an independent variable on a dependent variable through one or more mediators in our analyses investigating the effects of sleep on body image. More specifically, we examined three parallel indirect effect pathways through depression, stress, and anxiety. Prior to building our models we screened for relevant confounding variables and controlled for these as indicated.

Results

Descriptive Statistics and Correlations

Table 1 provides the means and standard deviations for sleep, body appreciation, appearance evaluation, appearance orientation, depression, perceived stress, and anxiety. Sleep duration ranged from 3 to 12 hours across the sample; 5.0% of the sample averaged 3-4 hours per night, 35.7% averaged 5-6 hours per night, 46.5% averaged 7-8 hours per night, 12.1% averaged 9-10 hours per night, and 0.8% averaged 11-12 hours per night. Approximately 57.3% of the
sample had CES-D scores at or above the cutpoint for clinical concern \(^3^2\). Average BMI was 25.09 kg\(m^2\) (SD = 6.18), and approximately 61% of participants had BMIs below the threshold for overweight set by the CDC \(^2^6\).

To evaluate Aim 1, we performed bivariate correlations. Hours of sleep at night was positively and significantly correlated with body appreciation and appearance evaluation, indicating that more sleep was associated with more appreciation for one’s body and with more positive feelings regarding one’s appearance. Sleep was not related to appearance orientation, therefore, appearance orientation was not included as a dependent variable in subsequent models examining sleep and body image. Sleep was negatively and significantly correlated with depression, perceived stress, and anxiety, indicating that less sleep was associated with greater negative affective experiences.

**Group Comparisons**

Aim 2 focused on differences in body image and negative affective states between those who were and were not getting enough sleep at night. Given the importance of achieving 6 or more hours of sleep per night on health, participants who averaged at least 6 hours of sleep per night \((n = 204)\) were compared to those who had fewer than 6 hours of sleep per night \((n = 54)\). Please refer to Table 2 for means, standard deviations, group comparisons, and effect size estimates.

**Direct and Indirect Effects**

Aim 3 and Aim 4 were examined in models examining direct and indirect effects. Prior to examining direct and indirect effects, we performed tests to evaluate whether demographic factors might impact our models. We first screened for significant relationships with our dependent variables. Age was not significantly related to body appreciation \((r = -0.03, p = 0.59)\),
or appearance evaluation \((r = -0.05, p = 0.44)\). We found that BMI was related to body appreciation \((r = -0.17, p = 0.005)\) and appearance evaluation \((r = -0.20, p = 0.001)\); however, it was not related to average hours of sleep \((r = -0.07, p = 0.25)\), therefore, it was not included as a co-variante in our models since it was not determined to be a confounding factor. An ANOVA indicated significant differences in body appreciation based on race/ethnicity \((F(5, 262) = 2.82, p = 0.02)\). A post-hoc Bonferroni test indicated this was due to higher levels of body appreciation among Latina participants \((M = 4.06, SD = 0.88)\), compared to White participants \((M = 3.52, SD = 0.87, p = 0.02)\), who had the lowest levels in the sample. Similarly, there were differences in appearance evaluation based on race/ethnicity \((F(5, 262) = 3.01, p = 0.01)\). Post-hoc Bonferroni testing revealed this was because Latina participants had higher levels of appearance evaluation \((M = 3.74, SD = 0.84)\) compared to Asian American/Asian/Pacific Islander participants \((M = 3.19, SD = 0.83, p = 0.03)\). In the case of our race/ethnicity variable, there were also significant differences in average hours of sleep per night \((F(5, 251) = 3.17, p = 0.009)\), such that African American/Black participants averaged less sleep per night \((M = 6.26, SD = 1.44)\) than White participants \((M = 7.19, SD = 1.57, p = 0.007)\). As such, we controlled for race/ethnicity in subsequent models examining direct and indirect effects.

Our first model (see Figure 1) examined the impact of sleep on body appreciation. The overall regression model examining the effects of sleep, depression, anxiety, and stress on body appreciation, controlling for race/ethnicity was statistically significant \((F(5, 250) = 18.10, p < 0.001)\). Approximately 27% of the variance in body appreciation was accounted for by the variables collectively \((f^2 = 0.37)\), which is consistent with a medium effect. Less sleep was associated with greater depression \((F(2, 253) = 12.79, B = -.27, SE = 0.41, p < 0.001)\), greater stress \((F(2, 253) = 8.92, B = -0.25, SE = 0.21, p < 0.001)\), and greater anxiety \((F(2, 253) = 4.63,
$B = -0.18, SE = 0.02, p = 0.01$). Greater depression ($B = -0.33, SE = 0.01, p < 0.001$), and greater stress ($B = -0.19, SE = 0.01, p = 0.02$) were significantly associated with less body appreciation. Anxiety ($B = 0.00, SE = 0.10, p = 0.99$) was not significantly associated with body appreciation in the multivariate context that included depression and stress. The total effect of sleep on body appreciation was significant ($B = 0.12, SE = 0.04, p = 0.001$). The direct effect of sleep was not significant ($B = 0.08, SE = 0.03, p = 0.18$), and the overall indirect effect was ($B = 0.14, SE = 0.04, 95\% CI: 0.07, 0.21$), indicating that the total effect was attributable to the pathways through intervening variables. More specifically, there were significant indirect effects through both depression and stress, but not through anxiety (shown on Fig. 1).

Our second model (see Figure 2) examined the impact of sleep on appearance evaluation. The overall model which examined sleep, along with all three negative affect variables (i.e., depression, stress, and anxiety), and controlled for race/ethnicity, was significant ($F(5, 250) = 9.01, p < 0.001$). The variance in appearance evaluation that was accounted for by the variables in the model was 15.26%, which is representative of a medium-sized effect. Similar to our first model, less sleep was associated with greater depression ($F(2, 253) = 12.80, B = -0.27, SE = 0.41, p < 0.001$), greater stress ($F(2, 253) = 8.92, B = -0.25, SE = 0.24, p < 0.001$), and greater anxiety ($F(2, 253) = 4.63, B = -0.18, SE = 0.03, p = 0.005$). Also consistent with the previous model, greater depression ($B = -0.20, SE = 0.01, p = 0.03$), and greater stress ($B = -0.17, SE = 0.01, p = 0.049$) were significantly associated with less favorable appearance evaluation; however, there were no significant findings for anxiety ($B = 0.00, SE = 0.11, p = 0.98$). Although the total effect of sleep on appearance evaluation was significant ($B = 0.11, SE = 0.04, p = 0.002$), the direct effect was not ($B = 0.10, SE = 0.04, p = 0.11$). The total indirect effect of sleep
was significant ($B = 0.10, SE = 0.03, 95\% CI: 0.04, 0.17$), with a significant indirect effect through depression, but not through stress or anxiety (shown on Fig. 2).

**Discussion**

Among young women, less sleep was associated with less positive body image and greater negative affect including stress, depression and anxiety. These findings held when considering sleep as a continuous variable as well as when comparing those who slept for at least 6 hours a night to those who received less than 6 hours of sleep per night. To further explore these associations, we considered that relations between sleep and body image may be explained by negative affective states. Results generally supported this idea. In two path models, associations between sleep and body image were not direct, but rather were explained by negative affective states. In particular, sleep was indirectly associated with body appreciation through depression and stress. Sleep was also indirectly associated with appearance evaluation through depression.

Sleep was associated with more positive body image. That is, women who reported sleeping more hours had higher appreciation for their bodies and more positive evaluations of appearance. Findings were also significant when comparing women who slept 6 hours or more to those who slept less than 6 hours on these body image variables. Individuals who value sleep may have more positive attitudes toward issues of wellness, and higher regard for their bodies’ various needs. Self-care behaviors have previously been related to positive body image. Sleep is an essential aspect of self-care along with making nutritious food choices, eating mindfully, and engaging in regular physical activity. In prior research, intuitive eating, less unhealthy dieting behavior, and engaging in regular exercise (not due to weight or appearance concerns)
have shown relations to positive body image\textsuperscript{2,53,54}. Sleep may be part of a constellation of wellness behaviors related to more positive body image.

Sleep duration was also significantly associated with negative affective states. That is, women who slept more hours reported less anxiety, stress, and depression. When comparing women who slept 6 hours or more to those who slept fewer than 6 hours, the higher sleep group also demonstrated significantly less negative emotional experiences. Inadequate sleep raises risk for discouraging thoughts and feelings, and less positive thinking. When individuals are sleep-deprived, they tend to feel more lethargic and irritable, and less focused. These feelings can give rise to negative thinking patterns that can exacerbate feelings of stress and anxiety, and contribute to the feelings of dejection and lack of energy characteristic of depression. Our sample had mean total anxiety scores that were slightly higher (i.e., 13.79) than other university student samples who have utilized this measure (e.g., 11.98 and 9.07, respectively)\textsuperscript{55,56} as well as stress levels that were somewhat above those of a normative sample of women\textsuperscript{37}. It is also worth noting though that over half of our sample had depression scores that reached or exceeded the level warranting clinical concern\textsuperscript{32}. As such, this means that even in the group who slept for 6 or more hours per night on average, some depression and anxiety symptoms were still present. Thus, sleep is not the only variable of concern in relation to negative affect, and interventions for clinical concerns rightfully focus on a variety of behaviors beyond rest. Nonetheless, the correlation we observed between hours of sleep and depression approached a moderate strength effect while the effects of stress and anxiety fell within the small category\textsuperscript{57}, suggesting limited sleep is still a factor of importance for negative affect, particularly depressed mood.

Given that insufficient sleep can lead to maladaptive thoughts and feelings, it is possible that this negative cognitive and emotional state can reduce positive feelings for the body. We
explored this idea in two path models examining the indirect effects of sleep on positive body image through negative affective states. In the first model examining body appreciation, sleep was indirectly related to body appreciation through stress. That is, getting less sleep reduces appreciation for the body, which is explained by having higher levels of stress. Insufficient sleep produces changes in thinking which can worsen feelings of stress. For example, a minor setback might feel more stressful after several nights of getting 4 hours of sleep per night rather than 8 hours of sleep per night. When stress levels are higher, appreciation for the body may be diminished. It may be harder to feel grateful or appreciative for the body when experiencing challenges that feel particularly overwhelming. In both the first and second models (the second model examined appearance evaluation), less sleep was related to less body appreciation and less positive views of appearance, respectively, which was explained by having higher levels of depression. Poor sleep can increase feelings of fatigue and therefore may reduce interest and enthusiasm for regularly enjoyable activities. Experiencing these feelings regularly can increase the risk for clinical levels of depression. When feeling dejected, lethargic and/or disinterested, individuals may lack the energy and positivity to be grateful for and see their bodies in a positive way.

Our descriptive findings indicate a wide range of average sleep duration (3 – 12 hours per night) among young women, although 40.7% were experiencing 6 or fewer hours of sleep per night. Individuals who routinely sleep for 6 or fewer hours per night can be considered to be experiencing chronic sleep restriction based on the way this term has been operationalized in previous research. Chronic sleep restriction has been shown to result in decrements in cognitive functioning akin to those observed among individuals deprived of sleep for 48 hours straight, suggesting that limited sleep is an issue that presents acute risk. Not getting enough
sleep is also linked to increased long-term risk for chronic diseases such as obesity and depression. Given that a substantial proportion of the sample is not receiving enough sleep, interventions are needed to promote sleep duration and quality among young women. Young women are likely busy with school, employment, and socializing with friends and significant others. Searching for identity in love and work are important developmental tasks of emerging adulthood, and can take time. It is important, however, to encourage women to also allot time for self-care and activities that foster well-being, including sleep. Social media campaigns on sites with high youth membership (e.g., Instagram, TikTok), coursework, and campus-wide educational programming on the importance of sleep may be helpful for increasing positive attitudes toward and investment in sleep, and ultimately, increasing sleep hours. Although these interventions would be beneficial for all women, they should focus on African American/Black young women, who reported sleeping significantly fewer hours than their White counterparts. These findings are similar to those from prior work, and may be explained by racial/ethnic minorities’ increased risk for disadvantages in neighborhood contexts, employment stressors, racial discrimination, and lower access to sleep disorder treatment. Indeed, institutional racism and race-related stressors have been shown to have deleterious effects on well-being and mental health, and differences in our sample may reflect the larger effects of societal inequities.

This study has some limitations. Although we considered a path model examining sleep as an initial predictor of negative affect and positive body image, it is possible that these relations can work in both directions. For example, sleep can create negative affective states, and negative affective states can interfere with the ability to get adequate quality and duration of sleep. Adequate sleep can also promote general feelings of wellness including positive feelings toward the body, just as positive body image can encourage getting enough sleep. Additionally,
our data collection was cross-sectional in nature. Therefore, we cannot establish causality from our analyses, and interpretation of these data should acknowledge the potential for bidirectional relationships. Our question on sleep was a single item that reflected average amount of sleep over the past week, which may or may not reflect typical sleep patterns over time. Additionally, future research may benefit from a broader examination of sleep quality using a standardized questionnaire. Data were collected among college women at a 4-year institution, limiting our ability to generalize findings to non-college students, older women, and other gender identities.

In sum, findings suggest that young women who get less sleep experience more negative affective states, which in turn, diminish feelings of positivity toward the body. Positive thoughts and feelings toward the body that are characteristic of positive body image may be challenging to adopt when one’s cognitive and emotional regulation abilities suffer from poor sleep. Inadequate sleep has numerous health risks; the current study suggests that negative affect and body image can be included in this array of risks.
References


Table 1  
*Means, Standard Deviations, and Correlations of Key Study Variables*

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<th>Hours of Sleep</th>
<th>Body Appreciation</th>
<th>Appearance Evaluation</th>
<th>Appearance Orientation</th>
<th>Depression</th>
<th>Perceived Stress</th>
<th>Anxiety</th>
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<td>3.72</td>
<td>3.43</td>
<td>3.63</td>
<td>20.07</td>
<td>20.27</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.52</td>
<td>0.91</td>
<td>0.88</td>
<td>0.52</td>
<td>11.81</td>
<td>5.86</td>
</tr>
</tbody>
</table>

* p < 0.05  
** p < 0.01  
*** p < 0.001
Table 2. *Differences in body image and negative affective states between the lower (n = 54) and higher (n = 204) sleep groups.*

<table>
<thead>
<tr>
<th></th>
<th>Lower sleep group (&lt; 6 hrs)</th>
<th>Higher sleep group (≥ 6 hrs)</th>
<th>t</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Appreciation</td>
<td>3.47 (0.88)</td>
<td>3.79 (0.88)</td>
<td>2.36</td>
<td>0.02</td>
<td>0.36</td>
</tr>
<tr>
<td>Appearance Evaluation</td>
<td>3.14 (0.90)</td>
<td>3.51 (0.86)</td>
<td>2.82</td>
<td>0.005</td>
<td>0.43</td>
</tr>
<tr>
<td>Appearance Orientation</td>
<td>3.60 (0.60)</td>
<td>3.63 (0.51)</td>
<td>0.28</td>
<td>0.78</td>
<td>0.04</td>
</tr>
<tr>
<td>Depression</td>
<td>25.21 (12.30)</td>
<td>18.52 (11.30)</td>
<td>-3.79</td>
<td>&lt; 0.001</td>
<td>0.58</td>
</tr>
<tr>
<td>Perceived Stress</td>
<td>23.25 (6.60)</td>
<td>19.52 (5.44)</td>
<td>-4.28</td>
<td>&lt; 0.001</td>
<td>0.65</td>
</tr>
<tr>
<td>Anxiety</td>
<td>15.06 (4.43)</td>
<td>13.46 (3.98)</td>
<td>-2.56</td>
<td>0.01</td>
<td>0.39</td>
</tr>
</tbody>
</table>
Figure 1

Direct and indirect effects of sleep on body appreciation.

Anxiety

\[ B = -0.18^{**} \quad B = -0.001 \]

Stress

\[ B = -0.25^{***} \quad B = -0.19^{*} \]

Depression

\[ B = -0.27^{***} \quad B = -0.33^{***} \]

Direct Effect \( B = 0.04 \), NS

Total Effect \( B = 0.12^{***} \)

Indirect Effect (Depression) \( B = 0.09, 95\% \text{ CI (0.03, 0.16)} \)

Indirect Effect (Stress) \( B = 0.05, 95\% \text{ CI (0.002, 0.11)} \)

Indirect Effect (Anxiety) \( B = 0.001, 95\% \text{ CI (-0.03, 0.03)} \)

\* \( p < 0.05 \), \** \( p < 0.01 \), \*** \( p < 0.001 \)
Figure 2

Direct and indirect effects of sleep on appearance evaluation.

Hours of sleep → Anxiety
  \[ B = -0.18^* \quad \text{NS} \]
  \[ B = -0.002, \text{NS} \]

Hours of sleep → Stress
  \[ B = -0.25^{***} \quad B = -0.17^* \]

Hours of sleep → Depression
  \[ B = -0.27^{***} \quad B = -0.20^* \]

Anxiety → Appearance Evaluation
  \[ B = 0.06, \text{NS} \]

Depression → Appearance Evaluation
  \[ B = 0.20^* \]

Stress → Appearance Evaluation
  \[ B = 0.11^{***} \]

Indirect Effect (Depression) \[ B = 0.06, 95\% \text{ CI} (0.005, 0.13) \]
Indirect Effect (Stress) \[ B = 0.04, 95\% \text{ CI} (-0.01, 0.10) \]
Indirect Effect (Anxiety) \[ B = 0.002, 95\% \text{ CI} (-0.04, 0.03) \]

* \[ p < 0.05 \]
** \[ p < 0.01 \]
*** \[ p < 0.001 \]