Attachment Security Priming: Effects on Mindful Self-Care and Sleep Behaviors in University Students

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Matthew D. Snyder

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Thesis Advisor: ___K Kidwell___

Katherine M. Kidwell., Ph.D.

Assistant Professor of Psychology

Thesis Reader: Brett Jakubiak

Brett K. Jakubiak, Ph.D.,

Associate Professor of Psychology

Honors Director:_____

Dr. Danielle Smith, Director

Abstract

Background. Attachment theory represents one potential framework for understanding how social relationships influence health behavior. While previous research has linked attachment security to positive health behaviors and outcomes, experimental evidence is needed to clarify the causal nature of this relationship. This study aimed to investigate the effects of attachment security priming on mindful self-care and sleep behaviors among undergraduate students.
Method. We employed attachment security priming, a method of activating feelings of attachment security, to examine its impact on mindful self-care and sleep behaviors. Participants ($N = 58$) were randomly assigned to either attachment security priming or a neutral priming control condition. Measures of mindful self-care and sleep quality and quantity were collected before and after the priming intervention.
Results. Results showed that attachment security priming led to significant increases in mindful relaxation and supportive structure behaviors, but not physical care, mindful awareness, nor supportive relationship aspects of mindful self-care behaviors. Additionally, there were no significant differences in sleep quantity and quality between the attachment security and neutral priming conditions.
Discussion. This study helps to clarify the relationship between attachment security and health behavior through providing the first experimental assessment of the effects of attachment security priming on two health and self-care variables: mindful self-care and sleep.

Executive Summary

This honors thesis project explores the application of attachment security priming in a novel domain: health and self-care behavior. Priming is a phenomenon studied extensively across cognitive and social psychology (Doyen et al., 2014). While priming can take many forms, it can be broadly defined as the process through which exposure to previous stimuli alters cognitions and emotions (e.g., viewing a Coca-Cola advertisement, and subsequently experiencing more favorable cognitions regarding Coca-Cola products). Attachment refers to a cognitive behavioral system guiding functioning in close relationships (e.g., Fraley, 2019; Fraley et al., 2011). The formation of attachment relationships and the consequential cultivation of psychological models of attachment is considered to be a fundamental component of psychological development. While attachment is a normative psychological process (Fearon & Roisman, 2017), individual differences in psychological representations (i.e., internal working models (henceforth, IWMs)), of attachment exist along the orthogonal dimensions of attachment anxiety and avoidance (Brennan et al., 1998). Individuals who are low in both of the insecure dimensions of attachment (anxiety and avoidance) are characterized as securely attached. Attachment security involves IWMs of the self as worthy of care and of close others as responsive and dependable caregivers (Bowlby, 1973).

Attachment security is associated with a plethora of positive interpersonal and intrapersonal outcomes, including physical (Pietromonaco & Beck, 2019) and psychological (Xing et al., 2022) health. The protective role of attachment security has been demonstrated in previous experiments employing attachment security priming (Gillath & Karantzas, 2019). Attachment security priming involves exposing individuals to stimuli meant to make more accessible their preexisting IWM of attachment security. The current investigation seeks to build upon and integrate two existing lines of research: 1) prior experimental research supporting the positive effects of attachment security priming (Gillath et al., 2022) and 2) previous correlational research indicating the protective role of attachment security in physical health and well-being. This thesis project sought to achieve this aim through employing attachment security priming over one week and assessing its effects on sleep and mindful self-care behaviors.

Participants were randomly assigned to either an experimental or control condition (N = 58). Those assigned o the experimental condition received daily attachment security priming across their one week of participation. Individuals randomly assigned to the control condition were exposed to daily neutral priming throughout participation. During the intervening period between their initial (baseline) and final (post-priming) laboratory visits, markers of sleep quality and quantity were tracked using wearable Fitbit watches. One week following their initial laboratory visit, participants returned to the lab and completed self-report questionnaires assessing their mindful self-care behaviors during the previous seven days.

We hypothesized that individuals who were exposed to attachment security priming would report greater sleep quality and quantity (H1) and mindful self-care behaviors (H2) than participants who completed the control, neutral priming procedures. Analyses did not support H1: there were no statistically significant differences in any markers of sleep quality or quantity between those who received attachment security priming, and those who received neutral priming. We did, however, find partial support for H2. Compared to individuals in the control condition, participants who received attachment security priming reported higher engagement in the supportive structure components of mindful self-care behavior. Contrary to H2, we did not

observe any differences between conditions in reports of the supportive relationships, physical care, or mindful awareness subscales of mindful self-care behavior.

Although our hypotheses were mostly unsupported, this study is significant for its position as the first investigation of attachment security and health within an experimental framework. Additionally, our study is important because it outlines potential future directions for research exploring the relationship between attachment, health, and self-care. While prior cross-sectional research has linked attachment to positive health outcomes, including sleep and mindfulness, the general lack of support for this relationship observed in our experimental design suggests that the association between attachment security and health may be indirect. In other words, the current study indicates that other factors, rather than attachment security itself, may explain the relationship between attachment security and health behaviors and outcomes. Our study thus highlights the need for future cross-sectional research to explore mediators of the relationship between attachment and health, which will enable greater understanding of why attachment security seems to enable individuals to engage in healthier behavior and to experience better health outcomes.

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Chapter 1

Attachment Security Priming: Effects on Mindful Self-Care and Sleep Behaviors in University Students

Supportive and high quality close relationships have been repeatedly linked to physical health (Cohen, 2004; Holt-Lunstad et al., 2010). Given the relevance of numerous processes of the attachment system to health behavior (e.g., caregiving, affect regulation, self-regulation, self-efficacy and self-care behavior), attachment theory represents a particularly pertinent lens through which the role of social relationships in physical health can be investigated. While substantial prior research provides correlational evidence tying attachment to both health and self-care behavior (Bender & Ingram, 2018; Ciechanowski et al., 2004; Scharfe & Eldredge, 2001), as well as health outcomes (e.g., Adams et al., 2014; B. Ehrlich & Cassidy, 2019; Jones et al., 2017; Tasca & Balfour, 2014), assessing these relationships experimentally is necessary to elucidate issues of directionality and causality. This study seeks to clarify the nature of the relationship between attachment security and health behavior through assessing the effects of attachment security priming on the sleep and mindful self-care behaviors of a sample of undergraduate students.

Attachment & Health

An important individual difference that may influence people's health and self-care behavior is their attachment orientations: their internal working models (IWMs) of close relationships, including their perception of their own worthiness of care and social support and their expectations about others' dependability (e.g., Fraley, 2019; Fraley et al., 2011). Attachment orientations are defined by two dimensions of attachment insecurity—attachment avoidance and attachment anxiety—and people who lack these forms of insecurity are

considered securely attached. Attachment avoidance is defined as the extent to which people are uncomfortable with closeness due to concerns about others' unresponsiveness (e.g., Brennan et al., 1998; Fraley & Shaver, 2000). Alternatively, attachment anxiety is the extent to which people worry about their own lovability and worthiness in close relationships, and the extent to which people are concerned about being abandoned or rejected (e.g., Brennan et al., 1998; Fraley et al., 2000). In contrast to these dimensions of attachment insecurity, attachment security is characterized by a sense of the self as worthy of care, and an expectation that close others will be responsive and sensitive to one's needs (Bowlby, 1973).

Attachment orientations are thought to serve as models guiding behavior and cognitions related to functioning in close relationships throughout the lifespan (Bowlby, 1969, 1973, 1980), and seem likely to reflect the manner in which individuals relate to themselves (cf. Kunce & Shaver, 1994). Indeed, prior research has shown links between attachment orientation and desirable physical health outcomes, including sleep (Adams et al., 2014; Carmichael & Reis, 2005; Scharfe & Eldredge, 2001) and mindfulness (Stevenson et al., 2017, 2021). Importantly, such associations seem at least partially related to a tendency for securely attached individuals to more readily engage in self-care and health maintenance behavior. In a sample of primary care patients with diabetes, for instance, Ciechanowski et al. (2004) found that, compared to individuals with secure attachment orientations, insecure individuals were significantly less likely to exercise, follow dietary recommendations, and adhere to their hypoglycemic medication regimens. Moreover, Scharfe and Eldredge (2001) found that attachment security was associated with a greater prevalence of engaging in health-promoting behavior amongst university students. These and similar findings have recently been contextualized within the "Broaden and Build" cycle of attachment security (Mikulincer & Shaver, 2003; 2020). According to Mikulincer &

Shaver (2003; 2020), the activation of internal working models of attachment security promotes both adaptive behavioral responses to stress through *building* one's resilience, as well the confident and autonomous pursuit of non-attachment related goals—such as improving health—through *broadening* one's sense of self-efficacy and self-esteem.

While the broadening of a sense of security into non-relationship domains may bolster healthy behavior generally, this tendency may be especially relevant to mindfulness and sleep behaviors given their relationship to various qualities of the attachment system. Like attachment, mindfulness can be conceptualized both at the trait and state level (Bosmans et al., 2014; Kiken et al., 2015). At the trait level, attachment insecurity and low mindfulness share deficits in emotional regulation, including rumination, negative emotion, and thought suppression (Caldwell & Shaver, 2013). Moreover, both attachment security (Gunnar et al., 1996) and mindfulness (Kadziolka et al., 2016) contribute to well-being through buffering against stress. Of particular relevance to the current investigation, recent research by Stevenson et al., (2021) showed that a single-dose of attachment security priming predicts increases in dispositional mindfulness to a greater extent than single-session mindfulness training. Complementing the "Broaden and Build" cycle of attachment security, Stevenson et al., (2021) theorize that this observed causal relationship between attachment security priming and dispositional mindfulness results from the attachment systems role in the multivariate processes governing emotional regulation. Insecurely attached individuals tend to experience deficits in regulating negative emotions (e.g., Mikulincer & Shaver, 2007), which may theoretically prevent the cultivation of the nonjudgmental attitude toward present thoughts and feelings defining states of mindfulness. Conversely, activating a sense of attachment security may bolster an individual's capacity to regulate negative emotions through *building* their resilience against stress, and may therefore

make more accessible the state of relating to present emotions representing mindful awareness. This proposed relationship between attachment security, emotion regulation, and mindful awareness may then predispose individuals to more regularly engaging in mindful self-care behavior.

Although most prior research investigating the connection between attachment and sleep has focused on infant and early childhood populations (e.g., Perpétuo et al., 2021), the protective role of attachment security in sleep seems to remain present into late adolescence and adulthood (see Adams et al., 2014 for a review). Specifically, amongst adult samples, Hsiao et al., (2013) found a positive association between attachment insecurity and sleep problems, and Maunder et al., (2011) observed a negative correlation between attachment insecurity and sleep quality. While more research is needed to clarify the psychophysiological mechanisms underlying the relationship between attachment and sleep, theoretically, the perception of available and sensitive support characterizing the state of attachment security functions to reduce stress reactivity and overall allostatic load, reducing sympathetic arousal and promoting sleep (Robles & Kane, 2014). In line with this perspective, prior research indicates that the presence of a supportive other during a painful exposure to cold water attenuates blood pressure, heart rate, cortisol reactivity, and perceptions of pain, task difficulty, and effort (Roberts et al., 2015). Particularly relevant to the function of the attachment system as a regulator of stress are findings which suggest that perceptions of social support, to a greater extent than objective social support, predict physiological reactivity to stress (e.g., Chen et al., 2021).

Attachment Security Priming

Despite the correlational evidence supporting the relationship between attachment security and health behavior, the nature of this relationship remains unclear due to lack of

experimental testing. Although one's general (or trait) attachment orientation is considered to be relatively stable throughout the lifespan (Dugan et al., 2022; Waters et al., 2000), in the short term, significant fluctuations in attachment orientation emerge in response to relationship experiences (e.g., Feeney & Noller, 1992; Kirkpatrick & Hazan, 1994). Baldwin et al. (1996) argued that such changes in attachment orientation occur because individuals simultaneously possess several representations of the self and of others which fluctuate in their accessibility in response to experience.

Such lability of attachment representations in response to relational experiences have been demonstrated in research using attachment security priming. Attachment security priming refers to the presence of a stimulus, or multiple stimuli, activating a sense of attachment security and subsequently leading individuals to behave as if their global attachment orientation is secure (Baldwin et al., 1996; Mikulincer & Shaver, 2001; Mikulincer et al., 2001; Mikulincer et al., 2003; Rowe & Carnelley, 2003). Attachment security priming has been shown to improve views of oneself and one's relationships (e.g., Carnelley & Rowe, 2007), increase states of mindfulness (e.g., Stevenson et al., 2021), and reduce body distortions common in women with eating disorders (Admoni, 2006). Although most priming experiments indicate that such effects generally last seconds to minutes (e.g., Becker, Moscovitch, Behrmann, & Joordens, 1997; Joordens & Becker, 1997), repeated priming can produce enduring changes in cognitions and behavior. Carnelley and Rowe (2007), for instance, showed significant decreases in participant's general attachment anxiety following repeated attachment security priming two days removed from the most recent priming exposure.

The Current Investigation

The primary aim of the current investigation is to expand the literature on attachment and health behavior through testing whether exposure to repeated attachment security priming can promote mindful self-care and sleep quality and quantity in university students. To our knowledge, this will act as the first experiment assessing the effects of attachment on health behavior, thus contributing initial causal data on this correlatively supported phenomenon.

In consideration of the aforementioned research linking attachment orientation to health behavior (e.g., Adams et al., 2014; Ehrlich et al., 2018; Ciechanowski et al., 2004; Scharfe et al., 2001), we predict that individuals exposed to attachment security priming will engage in more mindful self-care behavior (H1) and report greater sleep quality and quantity (H2) than participants who receive the control, neutral prime.

Chapter Two

Methods

Participants

Participants ($N = 58$) were Syracuse University undergraduate students recruited through the participant management platform, SONA Systems, between September 2023 and March 2024. Most of the participants identified as cisgender women (67.7%), and approximately half of participants identified as White (51.1%). Participants reported a mean age of 19.27 ($SD = 1.84$). Participant characteristics are included in Table 1 (see appendix).

Procedure

The study's procedure was divided into three sections which occurred across eight days. Participation in part one entailed in-person completion of baseline health and attachment-related questionnaires and an attachment security priming writing procedure. Participants were randomly assigned to the experimental (attachment security priming) condition or to a control (neutral priming) condition. The priming procedure consisted of a 10-minute writing prompt derived from Mikulincer and Shaver (2001). Part two was conducted in a naturalistic setting and spanned the six day period in between parts one and three. During part two, nightly measurements of sleep quantity and quality were tracked via wearable Fitbit watches. Participants also completed a daily priming procedure through the medium of a brief Go/No Go task, which they received through email. Part three occurred one week following part one's initial laboratory visit, and entailed the completion of follow-up questionnaires assessing mindful self-care, sleep, and attachment.

Measures

Demographics

Prior to beginning the health and attachment-related questionnaires, participants responded to a set of questions assessing personal demographics. Throughout the completion of the survey, participants were instructed to skip questions they did not feel comfortable answering.

Attachment Orientation

After completing demographic questions, participants reported on their general attachment orientation through completing the Experiences in Close Relationships — Revised Scale (ECR-R, Fraley et al., 2000). Participants completed the ECR-R during both part one (pre-priming) and part three (post-priming). The ECR-R includes 36 items, 18 of which assess attachment anxiety (e.g., "I worry a lot about my relationships"), and 18 of which assess attachment avoidance (e.g., "It's not difficult for me to get close to my partner"). Items were arranged along a 7-point likert scale (1 = "Strongly Disagree", 7 = "Strongly Agree").

Mindful Self-Care

Next, participants reported on their levels of mindful self-care using the Mindfulness Self-Care Scale — Brief (MSCS-B, Cook-Cottone & Guyker, 2017). Participants completed the MSCS-B during both part one (pre-priming) and part three (post-priming) of this study's procedure. The MSCS-B contains 24 items which are distributed across six dimensions of mindful self-care behavior. Participants were instructed to respond along a five-point likert scale (1 = "Never (0 days)", 5 = "Regularly (6-7 days") reflecting the number of days they engaged in mindful self-care behaviors during the previous week. The MSCS-B includes items assessing *mindful relaxation* (e.g., "I did something creative to relax (e.g., drew, played an instrument, wrote creatively, sang, organized)"), *physical care* (e.g., "I ate a variety of nutritious foods (e.g., vegetables, proteins, fruits, and grains)"), s*elf-compassion and purpose* (e.g., "I kindly

acknowledged my own challenges and difficulties), *supportive relationships* (e.g., “I spent time with people who are good to me (e.g., support, encourage, and believe in me)”), *supportive structure* (e.g., “I maintained balance between the demands of others and what is important to me”), and *mindful awareness* (e.g., I had a calm awareness of my feelings). Survey responses were also aggregated to produce a cumulative mindful self-care score.

Attachment Security Priming

Writing Procedure: Supraliminal Priming

Following the baseline attachment and health-related questionnaires, participants in the experimental condition (n = 29) completed an attachment security writing procedure. Participants were presented with a prompt derived from Mikulincer and Shaver (2001) and asked to write about the experience described for ten minutes. The attachment security priming prompt generated by Mikulincer and Shaver (2001) outlines a situation theoretically aligned with the primary strategies of the attachment system (secure base, safe haven, and proximity), and was shown to significantly reduce differential evaluation of out-group and in-group members in the original study. Participants in the control condition were instructed to respond to an attachment-neutral prompt for an equal length of time. Participants in the experimental condition were presented with the following prompt: “Imagine yourself in a problematic situation that you cannot solve on your own, and imagine that you are surrounded by people who are sensitive and responsive to your distress, want to help you only because they love you, and set aside other activities in order to assist you”. By contrast, participants in the control condition were asked to respond to the following prompt, "Imagine yourself going to a grocery store and buying products you need for your house, and imagine other persons who are also buying products, talking among themselves about daily issues, examining new brands, and comparing different products”.

Participants concluded their initial laboratory visit with their completion of this writing procedure.

Go/No Go Task: Subliminal Priming

Although the influence of exposure to primes is generally short-lived, prior research indicates that repeated attachment security priming can produce persistent increases in attachment security (e.g., Carnelley et al., 2018; Carnelley & Rowe, 2007). In line with these results, participants in the experimental condition were exposed to attachment security images derived from Maleki et al.,'s (2021) Attachment-Related Picture Set (ARPS). The ARPS is divided into eight categories of images. Four categories are of positive valence and depict scenarios theoretically aligned with attachment security (caring, parent-child relationship, familial and peer relationship, and romantic relationship); the other four categories are of negative valence and portray scenarios associated with attachment insecurity (separation, loneliness/rejection, maltreatment, and loss).

Images were included within a Go/No Go task, which was emailed to participants in the experimental condition daily throughout the seven days constituting part two. Participants in the control condition also completed a Go/No Go task daily, with all variables held constant excluding the "Go" stimulus. In the experimental condition, participants were provided with the following instructions: "If a picture of PEOPLE appears, press the SPACE key on the keyboard. If a BLUE square appears, do not press anything. You have only one second to respond and please be as fast as you can." Participants in the control condition were exposed only to the neutral images of blue and orange squares. The control Go/No Go task provided participants with the following instructions: "If an ORANGE square appears, press the SPACE key on the keyboard. If a BLUE square appears, do not press anything. You have only one second to

respond and please be as fast as you can." Because the daily form was completed at home, we could not ensure compliance. Amongst the 29 participants in the attachment security priming condition, the daily form was completed only 3.9 out of 7 days, on average. In addition, there was substantial variability in the rates of completing the Go/No Task across participants (SD = 2.99).

Sleep

During the seven intervening nights separating their first and final laboratory visits, measures of participant sleep duration and quality were recorded via Fitbit Inspire 3 watches. Prior research indicates that Fitbit devices are valid and reliable trackers of sleep, comparable to actigraphy (Chinoy et al., 2022). Averages of nightly total sleep time and nightly total wakefulness after sleep onset (WASO) across the seven days of participation were calculated in minutes. In addition, the proportion of nightly average sleep total and nightly wake after sleep onset (WASO) were calculated to determine nightly sleep efficiency (SE).

Chapter Three

Results

H1: Attachment Security Priming will Cause Increases in Mindful Self-Care Behavior

Univariate ANOVAs were conducted to assess the effect of attachment security priming on each of the five facets of mindful self-care behavior in the attachment security and neutral priming conditions, while controlling for baseline mindful self-care behavior. Baseline reporting of mindful self-care behaviors was included as a covariate to assess for changes in mindful self-care within-subjects between baseline and post-priming assessments. Partially supporting H1, significant differences were observed in two of the five subscales of mindful self-care behavior post-priming between the attachment security and neutral priming conditions. There were significant effects of attachment security priming on both mindful relaxation [$F(1, 55) = 7.79$, $p = .007$] and supportive structure [$F(1, 55) = 4.34$, $p = .042$], at the $p < .05$ level. In line with the first hypothesis, individuals who were exposed to attachment security priming were significantly more likely to report engaging in supportive structure behaviors over the course of the previous week than individuals who were exposed to neutral priming. These results held while controlling for baseline supportive structure behaviors. However, the effects of attachment security priming on mindful relaxation were opposite to our predictions: individuals in the attachment security priming condition reported less engagement in mindful relaxation behavior post-priming than individuals in the control condition while controlling for reports of baseline mindful relaxation. Inconsistent with H1, we did not observe significant differences in self-compassion and purpose [$F(1, 55) = .327$, $p = .570$], supportive relationships [$F(1, 55) = .664$, $p = .418$], or mindful awareness [$F(1, 55) = .022$, $p = .882$] between the attachment security and neutral priming conditions. Descriptive statistics are included in Table 2 (see appendix).

H2: Attachment Security Priming will Promote Sleep Quantity and Quality

Independent Samples T-tests were conducted to assess for differences in total sleep time, wakefulness after sleep onset (WASO), and sleep efficiency across the attachment security and neutral priming conditions. Support for H2 was not found across any of the three measures of sleep quantity and quality. Although the 26 participants who received the attachment security priming procedure (M = 388.76, SD = 70.43) reported slightly greater average nightly total sleep time than the 26 participants who were exposed to neutral priming (M = 370.04, SD = 45.65), the observed difference between the two conditions was not found to be significant $t(50) = -1.14$, $p = .261$. Moreover, participants (N = 26) in the attachment security priming condition (M = 56.59, SD = 11.06) did not differ from those (N = 26) in the control condition (M = 52.61, SD = 11.66) in mean nightly wakefulness after sleep onset (WASO) $t(50) = -1.262$, $p = .213$, nor did the experimental condition (M = .147, SD = .021) differ from the control (M = .143, SD = .033) in sleep efficiency (SE) $t(50) = -.458$, $p = .649$. Descriptive statistics are included in Table 2 (see appendix).

Chapter Four

Discussion

This study set out to examine the effects of attachment security priming on mindful self-care behaviors and sleep patterns among college students. The findings contribute to the understanding of how internal working models of attachment influence health behaviors and extend prior correlational research by providing experimental evidence of the impact of attachment security priming on these health-related outcomes. The results provide primarily null findings regarding the hypothesis that attachment security priming can enhance mindful self-care behaviors. Of the five minful self-care variables, only mindful supportive structure (involving mindfully structuring one's environment to support well-being (e.g., maintaining a manageable schedule)) was significantly improved through attachment security priming. Simiarly, our findings did not support the hypothesis that attachment security priming would improve sleep quantity and quality.

Mindful Self-Care Behavior

The significant effects of attachment security priming on mindful supportive structure behaviors are consistent with previous research suggesting that secure attachment cues can foster a sense of security (Gillath et al., 2022), which in turn promotes well-being (Carnelley et al., 2018). These findings imply that cultivating a sense of attachment security in the short-term might be beneficial in encouraging individuals to engage in certain activities that support their mental and physical health. The Broaden and Build cycle of attachment security, as outlined by Mikulincer and Shaver (2003; 2020), argues that secure base scripts guiding behavior in close relationships extend beyond traditionally conceptualized domains of the attachment behavioral system, ultimately facilitating the pursuit of non-attachment related goals (e.g., goals related to

physical health and self-care). According to Mikulincer and Shaver (2003; 2020), an internalized sense of security may build one's resilience against stress and capacity to regulate negative emotions when faced with challenges, as well as broaden an individual's positive perspectives of oneself and others. Indeed, prior research has shown that repeated attachment security priming is efficacious in producing positive views of the self (Carnelly & Rowe, 2007). In the current research, it is possible that participants exposed to attachment security priming were more prone to prioritize behaviors that the creation of a supportive environment due to perceiving themselves more positively (or more deserving of care), and were thus more inclined to provide themselves with care. Alternatively, the observed tendency to report more regularly engaging in mindful supportive structure behaviors amongst participants exposed to security priming may be attributable to differences in emotion regulation following priming. Correlative research suggests that securely attached individuals tend to experience more adaptive emotion regulation abilities (Mikulincer & Shaver, 2014). Moreover, Clear and Zimmer-Gembeck (2017), demonstrated that priming attachment insecurity leads to greater emotion dysregulation. Given the plethora of evidence linking mindfulness to emotion regulation (see Roemer et al., 2015 for a review), it is plausible that increased emotion regulation mediated the relationship between attachment security priming and supportive structure behaviors.

The lack of significant differences in mindful relaxation, self-compassion and purpose, supportive relationships, and mindful awareness between the priming conditions, however, suggests that the influence of attachment security priming on mindful self-care behavior may be limited to certain domains, or by features of the priming procedure itself. One factor which may potentially explain why we observed increased supportive structure, but not mindful relaxation, self-compassion and purpose, supportive relationships, or mindful awareness following security

priming is the malleability of these distinct but related constructs. The items assessed in the subscale of supportive structure, compared to self-compassion and purpose, supportive relationships, mindful relaxation, and mindful awareness may represent behaviors which are more sensitive to fluctuations in psychological states, such as attachment security. In line with this perspective, supportive structure items center on behaviors (e.g., maintaining an organized workspace) which are presumably modifiable within the context of university living without addressing one's broader environment or psychological traits. In contrast, a college student's agency over the items assessed in the physical care, supportive relationships, and mindful relaxation subscales (e.g., eating a variety of nutritious foods, feeling that one had someone who would listen to them if they became upset) may be limited by factors such as reliance upon dining hall food options or separation from dependable relationship figures (e.g., parents or high school friends). Furthermore, although mindful awareness can be differentiated into trait and state mindfulness (Kiken et al., 2015), features of mindful awareness (e.g., I had calm awareness of my body) may be primarily assessing mindfulness as a psychological trait (as opposed to state), and may thus be resistant to change. Therefore, the nonsignificant findings may indicate that attachment security priming can promote self-care behaviors that are state dependent and rely heavily on individual agency, while influencing one's physical health, relaxation, and relationship behaviors, or disposition for mindful awareness, may require longer interventions which target an individual's living environment or psychological traits.

Sleep Quantity and Quality

The hypothesis that attachment security priming would lead to improved sleep quantity and quality was not supported by the findings. Specifically, the experimental manipulation did not yield significant differences in total sleep time, wake after sleep onset (WASO), or sleep

efficiency (SE) between the attachment security and neutral priming conditions. This lack of significant difference challenges some of the expectations based on prior literature that suggests a positive link between attachment security and sleep outcomes (Adams et al., 2014). Several factors could explain this discrepancy. First, improving sleep through attachment security priming may share limitations with the nonsignificant mindful self-care subscales (i.e., resistance to change against stable individual differences and living conditions). It is possible that the duration and method of priming were insufficient to evoke changes in sleep patterns, suggesting that the impact of attachment security on sleep may require more prolonged or intense interventions. Alternatively, the complexity of sleep as a behavior influenced by numerous psychological and physiological factors (e.g., school-related stress, circadian rhythms) may mean that the relationship between attachment security and sleep is more indirect than hypothesized. For instance, while the theoretical Broaden and Build cycle of attachment security supports the expectation that security priming should promote emotion regulation—which is associated with positive sleep outcomes (Vandekerckhove & Wang, 2018)—this study's priming procedure may not have been powerful enough to affect this or other potential (though not tested) mediating variables significantly.

Strengths, Limitations, and Future Directions

This study's findings must be considered in light of its limitations. The sample size (N = 58) was relatively small and consisted of college students from a single university, which may limit the generalizability of the findings. Additionally, the use of self-reported measures to assess mindful self-care behaviors introduces the possibility of response biases, including inaccuracies with memory recall while reporting on behaviors which occurred over the course of the previous week. Future research could benefit from incorporating larger, more diverse samples and

employing theoretically more reliable methods of measuring self-care behavior (e.g., daily diary methods). One important limitation of the current research is the inconsistency of exposure to attachment security priming amongst participants in the experimental condition. While we were able to ensure in-lab completion of the attachment security priming writing procedure amongst all participants assigned to receive security priming, we could not control whether participants would complete the attachment security priming Go/No Go task which was emailed to them daily and meant to be completed at home. Participants were asked to complete this at-home priming task each day over the course of the seven day period spanning their first and last laboratory visits. However, amongst the 29 participants in the attachment security priming condition, the daily form was completed only 3.9 out of 7 days, on average. In addition, there was substantial variability in the rates of completing the Go/No Task across participants (SD = 2.99). This inconsistency of priming represents a methodological limitation of the current research, and may partially explain why we did not observe significant effects of attachment security priming across each of the five subscales of mindful self-care, nor sleep. Future research exploring methods of attachment security priming may benefit from assessing the duration and intensity of priming necessary to observe changes in potentially more stable forms of health behavior.

Despite its limitations, the present investigation also has several strengths. Although attachment security has been linked to a variety of beneficial health behaviors and outcomes—including mindfulness (Yang & Oka, 2022) and sleep (Adams et al., 2014)—in cross sectional designs, this study serves as the first investigation assessing whether the cultivation of IWMs of attachment security through attachment security priming directly leads to an increased tendency to engage in health-promoting and self-care behaviors. An additional strength of the current

research is the use of objective sleep tracking measurements, which offer greater reliability than self-report measures of sleep which have been the predominant method used in previous correlational research assessing the relationship between attachment and sleep (Adams et al., 2014).

Conclusion

In conclusion, the findings suggest that attachment security priming increases engagement in mindful supportive structure behaviors, but not physical care, mindful awareness, mindful relaxation, or supportive relationship components of mindful self-care behaviors. We also did not find support for attachment security priming as a method of improving sleep quality or quantity. This study opens avenues for future research to further elucidate the relationship between attachment, health, and self-care behaviors using novel methodologies.

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Appendix

Table 1

Participant Characteristics

Variable	Mean	SD	%
Age	19.27	1.84	
Race			51.1% (white)
Gender			67.7% (cisgender woman)

Table 2

Descriptive Statistics

Variable	Mean (Baseline)	SD (Baseline)	Mean (post-priming)	SD (post-priming)
Attachment anxiety (control)	3.80	1.05	3.28	1.16
Attachment anxiety (experimental)	3.32	1.25	3.32	1.25
Attachment avoidance (control)	3.10	0.98	2.77	0.82
Attachment avoidance (experimental)	3.31	0.96	3.31	0.96
Mindful relaxation (control)	11.72	3.14	12.31	3.01

Mindful Relaxation (experimental)	12.07	3.68	11.04	2.63
Mindful Physical care (control)	13.72	4.29	13.52	3.75
Mindful physical care (experimental)	13.10	3.68	12.52	2.85
Mindful relationships (control)	16.86	2.25	16.83	2.77
Mindful relationships (experimental)	17.04	2.57	17.41	2.63
Mindful supportive structure (control)	15.48	3.19	14.21	3.50
Mindful supportive structure (experimental)	15.31	3.26	15.31	3.01
Mindful awareness (control)	11.72	2.51	10.97	2.32
Mindful awareness (experimental)	10.72	2.93	10.59	2.34
Sleep quantity (control)			370.04	45.65
Sleep quantity (experimental)			389.17	71.85
Wakefulness after sleep onset (WASO) (control)			52.61	11.66

Wakefulness after sleep onset (WASO) (experimental)	56.28	11.67
Sleep efficiency (SE) (control)	0.14	0.33
Sleep efficiency (SE) experimental)	0.15	0.02