



Review Article

A narrative review of mechanisms linking romantic relationship experiences to sleep quality

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Abstract

Although a significant body of research has revealed associations between romantic relationship experiences and sleep quality, there has not been clarity regarding the mechanisms underlying such associations. Toward this end, we review the existing studies that have tested mechanisms linking romantic relationship experiences to sleep quality. Guided by both theory and existing research, we organize our review around five key categories of mechanisms that may explain associations between romantic relationship experiences and sleep quality: emotional/affective responses, self-perceptions, social perceptions, self-regulation, and biological functioning. Our review of the literature indicates strong evidence in support of the mediating effects of emotional/affective mechanisms (e.g. emotions and mood states) in explaining associations between various aspects of romantic relationships (e.g. relationship satisfaction, partner conflicts, and attachment orientation) and sleep quality. Although there is ample theoretical support for the other mechanisms proposed, and although all proposed mechanisms have been separately linked to both romantic relationship experiences and sleep quality, few studies have directly tested them, pointing to profitable directions for future research. Understanding underlying mechanisms will enable the development of wise, process-based interventions that target specific mechanisms to improve couple members' sleep quality and romantic relationship functioning.

Key words: sleep; romantic relationship experiences; mechanisms; emotion; self-regulation; biological functioning

Statement of Significance

This review focuses on sleep quality in the context of romantic relationships and highlights mechanisms that link romantic relationship experiences (e.g. relationship satisfaction, partner conflicts, and attachment orientation) to sleep quality. Most current evidence supports the mediating effects of emotional/affective mechanisms (e.g. emotions and mood states). Other proposed mechanisms (e.g. self-regulation and biological functioning) require more empirical testing in future research. Understanding underlying mechanisms is important for informing the development of wise-to-process interventions that target specific mechanisms to improve sleep quality and romantic relationship functioning.

Sleep is a crucial aspect of daily life. However, many people in America are troubled by sleep problems such as difficulties falling asleep, difficulties remaining asleep overnight, and difficulties waking up in the morning. For instance, in the United States, about 35% of adults report sleeping, on average, less than the recommended seven hours per night [1], and almost half of all Americans say that they feel sleepy during the day between 3 and 7 days per week [2]. At the same time, abundant research has shown that low-quality sleep, such as difficulty falling asleep and short sleep duration, has been associated with many negative health consequences such as increased risks for cardiovascular and metabolic disease, impaired psychological experiences, and ultimately shortened lifespan [3].

Given the importance of sleep for health and well-being, social scientists have investigated factors that may contribute to better or worse sleep quality in the context of romantic relationships, given that most adults sleep with a romantic bed-partner [4]. Researchers have found significant bidirectional associations between romantic relationship experiences and sleep quality [5–7]. Specifically, research shows that people who experienced more negative partner interactions (e.g. conflicts), fewer positive partner interactions (e.g. support provision), and lower overall romantic relationship satisfaction reported experiencing worse sleep quality overnight [5, 8]. Reciprocally, people who experienced worse sleep quality at night reported experiencing more negative partner interactions (e.g. conflicts)

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and fewer positive partner interactions (e.g. support provision) the next day [9, 10].

Especially lacking in the literature is clarity and understanding regarding mechanisms underlying the associations between romantic relationship experiences and sleep quality. While some researchers have proposed theoretical models delineating possible mechanisms [7], there are no current reviews that summarize the existing research that has tested mechanisms using empirical data. Thus, guided by theory and existing research, we identify five key categories of mechanisms that may explain associations between romantic relationship experiences and sleep quality, as summarized in Figure 1, and we review supporting evidence for each. We first describe how researchers operationally define “sleep quality,” and we discuss theoretical foundations for the proposed mechanisms.

Definitions and Validated Measures of Sleep Quality

In the literature we review, researchers typically define and measure sleep quality in standardized and well-validated ways. Sleep quality includes several components that reflect specific aspects of sleep. The Pittsburgh Sleep Quality Index (PSQI) [11] is frequently used to assess self-reports of each aspect of sleep quality, including (1) subjective sleep quality: measured by asking participants to rate their sleep quality overall, (2) sleep latency: measured by asking participants how long (in minutes) it has taken them to fall asleep each night, (3) sleep duration: measured by asking participants how many hours of actual sleep they get at night, (4) sleep efficiency: calculated by dividing participants’ total sleep time by their time in bed, (5) awakening: measured by asking participants how often they have had trouble sleeping because they wake up in the middle of the night or early morning, (6) medication use: measured by asking the participants how often they have taken medicine to help them sleep, and (7) alertness/sleepiness: measured by asking participants to report how often they have had trouble staying awake

and keeping up enthusiasm to get things done during the day. The PSQI score represents a summary of these components, with higher scores indicating worse sleep quality. Sometimes researchers focus on specific aspects of sleep quality, such as sleep duration and subjective sleep quality. For example, in daily diary studies, researchers often assess subjective sleep quality using a single item: “How would you rate your sleep quality last night?”. Although most existing studies in the domain of this review use subjective measures of sleep quality, the aspects of sleep quality (e.g. sleep duration, sleep latency, and sleep efficiency) are also assessed using objective methods such as actigraphy, which continuously records body movements for 24 hours each day of the assessment period. When reviewing the literature on mechanisms linking romantic relationship experiences to sleep quality, we indicate the aspects of sleep quality assessed.

Theoretical Foundation for Potential Mechanisms

Attachment theory provides a strong theoretical foundation for understanding mechanisms linking romantic relationship experiences to sleep quality. The theory [12] posits that humans are driven by an innate biological need for felt-security that is fulfilled through interactions with close others (attachment figures) who are responsive to one’s needs. People in secure, satisfying romantic relationships have partners who are supportive and reliable, and their attachment needs are met promptly. Thus, they experience a series of positive effects psychologically (e.g. feel safe, secure, supported, and cared for; experience decreased negative affect and increased positive affect) and biologically (e.g. attenuated neural activation in brain regions associated with threat; decreased heart rate and blood pressure) [13] that could, in turn, positively influence sleep quality [14, 15]. In contrast, people in insecure, unsatisfying romantic relationships often find their partners to be unresponsive (e.g. neglecting and rejecting) or inconsistently responsive to their attachment needs.

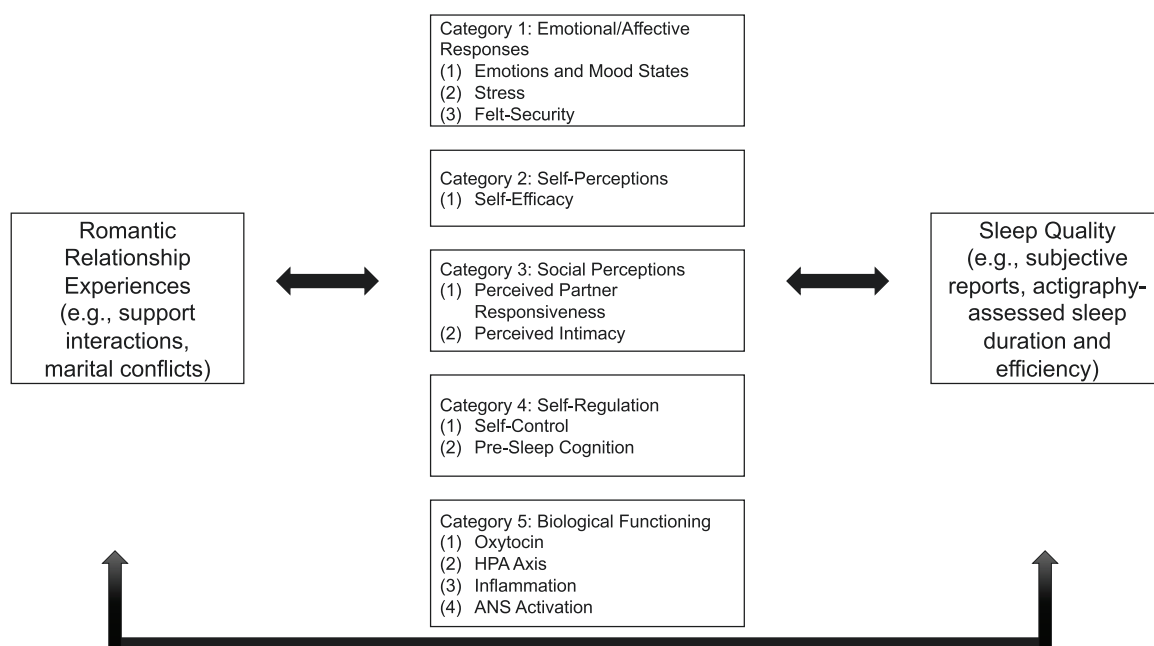


Figure 1. Theoretical mediation model linking romantic relationship experiences to sleep quality.

Thus, they experience a series of negative effects psychologically (e.g. feel unsafe, unworthy, unlovable, neglected, unsupported, and isolated; experience increased negative affect and decreased positive affect) and biologically (e.g. have higher daily cortisol levels) [13] that could, in turn, negatively impact sleep quality [16, 17].

The relationship experiences that attachment theory posits to be key in impacting attachment security (e.g. receiving encouragement and support from romantic partners) also should influence individuals' self-efficacy (the belief in one's own ability to reach personal goals and manage tasks) and self-control (one's capacity to exert control over impulses, emotions, and other dominant responses), which in turn may induce changes in sleep health behaviors (e.g. having a fixed bedtime and wake-up time) and sleep quality. Likewise, individuals' sleep experiences affect their self-efficacy and self-control, which in turn can affect relationship behaviors (e.g. interacting with their partner in a cheerful and positive manner) and romantic relationship experiences. This is consistent with social cognition theory [18], which proposes that self-efficacy and self-control are affected by the social environment and impact relational and health behaviors.

From this theoretical basis, we identify and review research in support of five key categories of mechanisms that explain associations between romantic relationship experiences and sleep quality. These include emotional (affective) responses, self-perceptions, social (relational) perceptions, self-regulation, and biological functioning. Because women are more sensitive to both the positive and negative aspects of marriage [19], and they experience poorer sleep quality than men overall [20], there could exist potential gender moderation effects. Although not all studies have tested gender differences for a variety of reasons (e.g. recruitment of all-female samples, small sample size, and gender difference not being a focal interest), we indicate the results for studies that did so in this review.

Emotional/affective response mechanisms

Emotional/affective responses to relationship experiences should mediate links between romantic relationship experiences and sleep quality. Emotional/affective response variables that have theoretical and empirical support as a mechanism include emotions and mood states, stress, and felt-security.

Emotions and mood states.

Affective mechanisms are the most rigorously investigated mechanisms underlying the associations between romantic relationship experiences and sleep quality in the current literature. This makes sense because emotions and mood states (e.g. anxiety, depression, and loneliness) are strongly linked with romantic relationship experiences [21–25], and sleep quality is both affected by and affects emotions and mood states [15, 17, 26, 27].

Several studies have directly investigated emotions and mood states as mechanisms underlying the associations between various aspects of romantic relationships and sleep quality in different populations. In daily-diary [10, 28] and cross-sectional [29, 30] studies conducted with community couples and adults in romantic relationships, negative affect mediated the significant associations between romantic relationship experiences (e.g. daily marital interactions, relationship satisfaction, and attachment orientation) and self-reported sleep quality (assessed using PSQI questionnaire or single item measure for subjective sleep quality) and sleep problems (assessed using sleep disturbance and sleep-related impairment subscales from the Patient-Reported

Outcomes Measurement Information System). One daily diary study conducted with older couples also found positive affect to be a mechanism linking subjective sleep quality with marital interactions [31].

Among a variety of mood states, researchers have especially focused on the mediating effects of anxiety and depression. In both longitudinal [32, 33] and cross-sectional [34, 35] studies, anxiety and depression mediated associations between negative aspects of romantic relationships (e.g. psychological abuse, conflict with partner, and attachment anxiety) and both self-reported and actigraphy-assessed sleep quality (e.g. subjective sleep quality and sleep disturbances, actigraphy-assessed sleep efficacy, and sleep latency) among married or cohabiting couples. Generally, negative aspects of romantic relationships (e.g. greater psychological abuse, greater conflict with partner, and higher attachment anxiety) were related to greater symptoms of anxiety and depression, which in turn were associated with worse sleep quality. Also, research [36] has focused on the mediating effects of another mood state, loneliness, which is defined as a subjective, negative feeling related to one's own experience of deficient social relations [37]. This daily diary study using a sample of military-connected couples found that loneliness mediated the associations between romantic capitalization support (i.e. responsive support for positive life events) and subjective sleep quality [36]. Specifically, this study revealed both actor and partner effects including indirect effects of poor capitalization support on own worse sleep outcomes via own perceived loneliness for both veterans and spouses (actor effects), and indirect effects of veteran's poor capitalization support on spouse's worse sleep quality via spouse's perceived loneliness (partner effects) [36].

Additional studies, one correlational and one longitudinal, showed that increased anger accounts for the association between poorer overall sleep quality (assessed using PSQI or a one-item measure for subjective sleep quality) and reduced relationship quality [38]. Researchers also partially replicated this finding in a quasi-experiment: they experimentally induced varying affective states among romantically involved undergraduates and found that poor sleepers reported decreased perceptions of relationship quality when exposed to anger induction. However, they also found that poor sleep quality was associated with greater baseline anger across the emotion induction conditions, suggesting that poor sleep may increase anger in general [38].

Generally, the existing studies found that more positive romantic relationship experiences (e.g. capitalization support) and fewer negative romantic relationship experiences (e.g. conflicts) are linked with better sleep quality via lower levels of negative emotions and mood states and higher levels of positive affect. However, one study of osteoarthritis (OA) patients (≥ 50 years old) and their spouses did not find negative affect to mediate the association between subjective sleep quality and refreshing sleep (i.e. how refreshed or rested they felt after the previous night's sleep) and marital tension [39]. This study found that morning anger resulted from unrefreshing sleep; however, morning anger did not predict marital tension throughout the rest of the day. It may be that older adults quickly recover from negative emotions experienced in the morning such that they do not influence marital interactions throughout the day. It is also possible that couples coping with a chronic illness may have romantic relationships and sleep experiences that are more strongly impacted by the chronic illness itself. In addition, older couples coping with a chronic illness might have developed a higher tolerance threshold for negative affect or better skills in regulating it. As a result, other mechanisms might play a more substantial role in

mediating links between sleep quality and marital functioning in older couples coping with a chronic illness. It will be important for future research to replicate and explain this study's findings with additional empirical data.

Similarly, another daily diary study conducted with older couples [10] did not find mediating effects of positive affect linking daily partner interactions to subjective sleep quality. This may be explained by different measures used to assess positive affect across studies, as research shows that specific types of positive affect influence sleep quality differently [40]. For example, high-activation positive affect (e.g. excitement) might cause physiological arousal before bed and interfere with sleep quality [41], while low-activation positive affect (e.g. calm) might help people relax and benefit their sleep [40]. Positive interpersonal emotions (e.g. compassion) and positive non-interpersonal emotions (e.g. calm and happy) might also exert different impacts on sleep quality. It will be important for future research to test the mediating effects of specific types of positive affect to discover how the various forms (e.g. calm, content, grateful, happy, excited, compassionate, and sympathetic) may differentially link romantic relationship experiences to sleep quality.

Of the three daily diary studies that tested for gender differences in the links between daily marital interactions and sleep quality, one study found no significant moderation effects of gender [28]; one study found negative affect to be a more salient mechanism for husbands [10]; and one study found positive affect to be a more salient mechanism for wives [31]. Of the two studies that tested for gender differences in the links between psychological abuse and sleep quality, one longitudinal study found depression to be a more salient mechanism for wives [33], while the other cross-sectional study found anxiety to be a more salient mechanism for wives [34]. Overall, the studies testing gender differences show the strongest mechanistic effects for wives; however, more research is needed to determine a clear pattern.

Stress.

Theory and research also support stress as an affective mechanism linking relationship experiences and sleep quality. Although stress has been conceptualized in a variety of ways [42, 43], researchers have predominately defined it as appraisals that environmental demands exceed one's coping resources [44–46]. Included as a stress mechanism are extremely stressful states resulting from shocking or dangerous life events, known as post-traumatic stress, which are experienced as flashbacks and overreactions to reminders of trauma [47]. Stress (and post-traumatic stress) have been significantly associated with both romantic relationship experiences [48, 49] and sleep quality [50, 51].

One longitudinal study has directly investigated stress as a mechanism underlying the associations between romantic relationship experiences and sleep quality [52]. The researchers recruited middle-aged to older participants and found that relationship effectiveness (i.e. the degree to which a person has attained competence in romantic relationships) positively predicted subjective sleep quality (but not self-reported sleep duration) via reduced stress exposure [52]. Relatedly, another longitudinal study utilized a sample of couples randomly assigned to a couple relationship education program and found that both men's and women's improved core couple skills (i.e. conflict management and self-care skills) predicted better overall sleep quality assessed using PSQI through lower stress levels [53]. Dyadically, men's and women's better conflict management skills were associated with their partner's better overall sleep quality

via partner's lower stress level; and men's better self-care skills were associated with their partner's better overall sleep quality via partner's lower stress level [53]. In addition, two cross-sectional studies have shown that post-traumatic stress disorder (PTSD) symptoms (e.g. stressful dreams, flashbacks, physical reactions, and easily startled) mediated the links between romantic relationship experiences and self-reported overall sleep quality assessed using PSQI [54, 55]. Conducted with women who experienced domestic violence, these studies revealed significant associations between intimate partner violence and self-reported sleep quality (i.e. worse global sleep quality and greater sleep disturbances), and PTSD symptomatology partially mediated the associations [54, 55].

It is surprising that there have not been more empirical investigations testing stress as a mechanism linking romantic relationship experiences to sleep quality given that stress has been separately linked to relationship experiences and sleep quality in many studies. For example, researchers have found that people in healthy and satisfying relationships (characterized by more responsive support and positive interactions) have lower levels of perceived stress [49], while those in abusive relationships (e.g. experiencing emotional and physical violence from partners) are likely to develop symptoms of PTSD [56]. Likewise, stress, even from daily hassles, has a negative impact on relationship quality [48, 57]. Moreover, the links between sleep quality and stress are also well-documented. For example, overnight sleep deprivation significantly increases perceived stress [16], and perceived stress and PTSD symptoms predict worse sleep quality. Research has shown that even exposure to a stressful video prior to sleep caused poorer sleep, particularly if it activated memories of stressful life events [50]. Additionally, PTSD patients have worse sleep quality overall (e.g. more light sleep and less slow wave sleep) compared to people without PTSD [51]. The strong research showing separate links between stress and both relationship experiences and sleep quality points to the need for more research to empirically establish it as a mechanism.

Felt-security.

A major postulate of attachment theory [12] is that people, across the lifespan, are driven by the fundamental need for felt-security (i.e. feeling safe and secure). Attachment theory [12] postulates that core relationships in which attachment figures are available and supportive (sensitively responsive), especially during times of stress or difficulties, promote felt-security. Consistent with the theory, felt-security has been linked with positive relationship cognitions [58, 59] and increased relationship satisfaction [60]. Moreover, felt-security plays a crucial role in one's ability to fall asleep because sleep is a defenseless condition and people need to feel secure and safe to reduce vigilance and fall asleep [14, 61]. Corroborating this, researchers have shown that increased felt-security is associated with reports of better sleep quality [29, 62, 63]. Thus, current theoretical and empirical work [60, 61] points to felt-security as an important mechanism underlying the associations between romantic relationship experiences and sleep quality.

Despite its theoretical importance and links to both romantic relationship experiences [60] and sleep quality [61], only one empirical publication, to our knowledge, has directly examined felt-security as a mechanism linking romantic relationship experiences to sleep quality. This cross-sectional research with a sample of younger to middle-aged adult couples (study 1) and a sample of older adult couples (study 2) showed that

relationship-specific felt-security mediated the association between one's general attachment orientation and self-reported sleep quality assessed using PSQI [29]. Specifically, couple members with insecure attachment (i.e. higher attachment anxiety and/or attachment avoidance) experienced worse sleep quality via lower levels of relationship-specific felt-security [29]. This indicates that, despite the dearth of research directly testing it thus far, felt-security is likely to be a strong mechanism linking romantic relationship processes to sleep quality. This mechanism requires further empirical testing in future research to replicate and establish its effects.

Self-perception mechanisms (self-efficacy)

Self-efficacy (i.e. the belief in one's own ability to reach personal goals and to manage tasks) [18] should be a mechanism linking romantic relationship functioning to sleep quality given its strong links to both romantic relationship functioning [64] and sleep quality [65]. First, research has shown that supportive behaviors by a romantic partner in challenging situations predicted the partner's self-efficacy, conceptualized in these studies as perceived capability [66, 67], and confidence in approaching challenging activities [68]. Moreover, relationship factors (e.g. investment, support, and satisfaction) significantly predicted the self-efficacy reports of patients with type 2 diabetes [64]. Reciprocally, greater self-efficacy has been linked with greater relationship satisfaction and relationship maintenance behaviors [69].

Self-efficacy also has been linked to sleep quality. Research has shown that sleep problems (e.g. insomnia) were associated with lower self-efficacy [65]. Moreover, perceptions of self-efficacy are theorized to promote individuals' well-being, including their sleep quality, by increasing feelings of competence, autonomy, and control, and by reducing stress associated with failing to meet important goals [70, 71]. Supporting this, researchers have found that self-efficacy for managing chronic disease was correlated with better nighttime sleep quality [72].

One cross-sectional study that tested self-efficacy as a mechanism (using a sample of long-term breast cancer survivors) found that greater social constraints from other people (e.g. making people feel that they cannot talk about their breast cancer because it makes others uncomfortable) were associated with greater self-reported sleep disturbances through lower self-efficacy for symptom management [73]. Relatedly, a daily diary study with a sample of older married couples revealed that people with greater spousal support reported more goal progress (i.e. were more self-efficacious in pursuing goals), and goal progress in turn predicted better subjective sleep quality, with no significant gender differences [74]. Although these studies point to self-efficacy as an important mechanism linking romantic relationship experiences to sleep quality, additional studies are needed to fully establish the mediating role.

Social (relational) perception mechanisms

People's perceptions of their social world, particularly their romantic partners, should mediate links between romantic relationship experiences and sleep quality. Two social perception variables that have theoretical and empirical support as mechanisms include perceived partner responsiveness (PPR) and perceived intimacy.

Perceived partner responsiveness.

PPR refers to the extent to which people believe that their romantic partner cares about, understands, and validates their thoughts

and feelings [75]. It has been closely associated with both romantic relationship functioning [76] and sleep quality [77]. First, research shows that relationship variables (e.g. secure attachment) predict PPR [78], and that PPR affects relational outcomes. For example, higher levels of PPR promote emotional expression toward partners [79], positive relationship feelings [79], relationship satisfaction [80], and sexual satisfaction [75].

There is also research supporting associations between sleep quality and PPR. For example, several studies have linked lower perceptions of available social support with poor sleep quality [77, 81, 82]. Theoretically, an inability to perceive one's social network (particularly a core attachment figure) as supportive and responsive to needs should disrupt all domains of well-being including sleep. Likewise, people who experience poor sleep quality may have difficulty recognizing, appreciating, and perceiving responsive support from their partners when it is provided.

Only one study, to our knowledge, has directly tested PPR as a mechanism linking romantic relationship experiences to sleep quality. This dyadic daily diary study with older adult couples showed that husbands' higher negative partner interactions and lower positive partner interactions were indirectly associated with their own and their wives' decreased subjective sleep quality that night via their own lower PPR and subsequent increased negative affect [10]. While this is a rigorous dyadic study that supports PPR as an important mechanism, additional studies are needed to empirically establish the mediating role of PPR in linking romantic relationship experiences to sleep quality. It will also be important to determine if the stronger pattern driven by husbands' relational behaviors replicates in other studies.

Perceived intimacy.

Perceived intimacy (i.e. subjective perceptions of closeness to one's romantic partner) is another social perception variable that is supported as a mechanism linking romantic relationship experiences to sleep quality. Perceived intimacy has been linked to both romantic relationship functioning [83] and sleep quality [84]. For example, couple members who report high relationship satisfaction report higher levels of intimacy in their relationships [83], and perceived intimacy is a strong predictor of romantic relationship satisfaction [85]. In addition, studies linking perceived intimacy to sleep quality have shown that daytime intimacy with romantic partners was positively associated with nighttime sleep quality [7, 86]. Relatedly, research has shown that intimate relationship behaviors such as self-disclosure [8] and affectionate touch [87] are associated with better sleep quality.

One empirical study has directly tested perceived intimacy as a mechanism linking romantic relationship experiences to sleep quality. This dyadic daily diary study using a sample of military-connected couples indicated that perceived intimacy mediated the associations between capitalization support (i.e. responsive support for positive life events) and subjective sleep quality [36]. This study revealed both actor and partner effects including indirect effects of capitalization support on own sleep outcomes via own perceived intimacy for both veterans and spouses (actor effects), and indirect effects of veteran's capitalization support on spouse's sleep quality via spouse's perceived intimacy (partner effects) [36]. Although this study supports perceived intimacy as a mechanism linking romantic relationship experiences to sleep quality, future research is needed to build on this foundation to empirically establish the mediating effects in additional studies and samples.

Self-regulation mechanisms

One's ability to regulate impulses, emotions, thoughts, and behaviors should mediate links between romantic relationship experiences and sleep quality. Two self-regulation variables that have empirical support as a mechanism include self-control and presleep cognition.

Self-control.

Self-control is defined as the capacity to exert control over one's impulses, emotions, and other dominant responses [18]. Emotion regulation is a specific type of self-control that involves attempts to monitor and modulate emotional experiences [88]. Past research has shown that self-control (e.g. emotion regulation) is related to both romantic relationship functioning [89] and sleep quality [84].

Empirical research supports self-control as a mechanism linking romantic relationship functioning to sleep quality. A cross-sectional study with a sample of married adults revealed that self-reported sleep problems undermined self-control, and lower self-control increased self-reported physical and psychological marital aggression [90]. Relatedly, two cross-sectional studies [91, 92] and one longitudinal study [93] that directly tested the mediating role of emotion regulation found that emotion regulation mediated the relationship between self-reported sleep quality (measured using PSQI) or self-reported sleep disturbance (measured using Youth Self-Rating Insomnia Scale) and interpersonal aggression, including anger, hostility, physical aggression, verbal aggression, and relationship violence perpetration. Of the two studies that tested gender as a potential moderator, no significant gender differences were found [90, 93], indicating that the mediation pathway was consistent across genders.

Additional studies are needed to assess how self-control might mediate the associations between other romantic relationship experiences (e.g. supportive interactions) and sleep quality, given that research has also shown significant associations between positive romantic relationship experiences and self-control. For example, studies have found that self-control is related to increased levels of perspective-taking [94], forgiveness [95], and relationship satisfaction [96]. There is also abundant evidence in support of links between self-control and sleep quality. For example, sleep deprivation and poor sleep quality cause problems with self-control (e.g. emotion regulation) [84, 97, 98]. Reciprocally, decreased self-control can negatively impact sleep quality, causing difficulties in falling asleep and remaining asleep (e.g. via unhealthy behaviors such as going to bed later than intended vs. keeping daily routines) [99]. More empirical research is needed to establish self-control as a mechanism linking not only negative romantic relationship experiences (e.g. marital aggression) but also positive romantic relationship experiences (e.g. supportive interactions) to sleep quality.

Presleep cognition.

Presleep cognition is a specific self-regulation mechanism aimed at controlling bedtime thoughts. The period of time before people go to sleep (while in bed) is known as sleep onset latency [100]. When a person lays down for bed, they often do not immediately begin to sleep. What people think before they sleep (presleep cognition) is crucial in affecting sleep onset. Some people may focus on getting to sleep, while others may think about positive or negative events that happened during the day. People who fail to regulate their cognitive activity may experience rumination, which is defined as repetitive thinking

about negative personal concerns and/or about the implications, causes, and meanings of them [101]. Rumination is a negative thought process and is significantly associated with both romantic relationship experiences [102] and sleep quality [103]. Given its role in both relationship and sleep functioning, presleep cognition should be a key mechanism underlying the associations between romantic relationship experiences and sleep quality.

Several studies have found that presleep cognition mediated the associations between relationship-relevant variables (e.g. social isolation, gratitude, and forgiveness) and sleep quality [104–107]. Specifically, one cross-sectional study found that gratitude (e.g. "I am grateful to a variety of people") predicted better sleep quality assessed using PSQI (including greater subjective sleep quality and sleep duration, and less sleep latency and daytime dysfunction) via more positive presleep cognitions and fewer negative presleep cognitions [104]. Another cross-sectional study found that ostracism (i.e. being ignored or excluded by others) predicted worse subjective sleep quality, assessed using the Sleep Quality Scale [108], via greater presleep cognitive arousal [105]. Moreover, in both cross-sectional and prospective studies, rumination mediated the relationship between both situational forgiveness (forgiveness toward a particular offender) and dispositional forgiveness (the general tendency or willingness to forgive an offender) and subjective sleep quality [106], as well as the relationship between ostracism (social isolation) and insomnia [107] as assessed by the Insomnia Severity Index [109].

These studies provide evidence that general relationship experiences influence subjectively assessed sleep quality via presleep cognition. However, no studies have directly tested the mediating role of presleep cognition linking romantic relationship experiences to sleep quality, which is surprising given its strong links to both romantic relationship experiences and sleep quality. For example, insecure attachment orientation (attachment anxiety and attachment avoidance) has been associated with self-reported presleep cognitive arousal (e.g. worry about falling asleep, cannot shut off thoughts) [110] and higher levels of rumination [111]. Moreover, individuals' own jealousy about a rival and their partner's expression of jealousy stimulated rumination [102, 112, 113]. Reciprocally, the tendency to ruminate impaired an individual's ability to maintain positive feelings about their romantic partner in the face of explicit or implicit reminders of relationship-threatening events [114]. There is also strong evidence linking presleep cognition to sleep quality. For example, researchers have found that presleep cognitive arousal was associated with greater sleep-onset latency, fewer hours of sleep, and greater difficulty in sleeping [103, 115, 116]. Researchers have also found that rumination in the presleep period following a stressful event had a negative impact on sleep quality [117]. Thus, there is strong evidence pointing to presleep cognition as a powerful mechanism. However, additional research is needed to establish the mediating effects of presleep cognition in the associations between romantic relationship experiences and sleep quality in samples of romantic couples.

Biological mechanisms

Specific biological responses to changes in one's social environment should mediate links between romantic relationship experiences and sleep quality. Four biological variables that have theoretical and empirical support as mechanisms include oxytocin, hypothalamic-pituitary-adrenal (HPA) axis, inflammation, and autonomic nervous system (ANS).

Oxytocin.

Oxytocin is widely known as the “love hormone” due to its role in promoting maternal, pair-bonding, and sexual behaviors [118–120]. Because of its strong association with romantic relationship experiences such as closeness and affectionate touch [121], as well as its association with sleep quality [122, 123], oxytocin should be a significant biological pathway linking romantic relationship experiences to sleep quality.

First, oxytocin has been associated with attachment behaviors and affiliative processes, such as positive communication in male–female pair bonding [124], social touch [125], and positive partner interactions [126]. Moreover, researchers have found that oxytocin administration increased positive communication [124], reduced cortisol and autonomic arousal during couple conflict [127], and increased people’s appraisal of positive aspects of their relationships [128]. Sleep quality has also been strongly linked to oxytocin. For example, sleeping with a partner can promote the release of oxytocin through affiliative (e.g. hugging and holding hands) and sexual behaviors [118, 120], and studies have shown positive effects of oxytocin administration on sleep quality [122, 123].

Despite oxytocin’s strong separate associations with both romantic relationship experiences and sleep quality, no studies to our knowledge have investigated oxytocin as a mechanism linking romantic relationship experiences to sleep quality. However, a few studies have tested and found a moderating effect of oxytocin in the associations between romantic relationship experiences (e.g. everyday couple interaction and social support) and self-reported sleep quality [86, 129]. Specifically, one study found that subjective closeness and positive couple interaction were positively associated with subjective sleep quality, and the associations were stronger for participants who were randomly assigned to self-administer intranasal oxytocin compared to participants who were randomly assigned to self-administer a placebo [86]. Another study found that for women with high oxytocin, support from friends was associated with better sleep quality assessed using PSQI; however, for women with low oxytocin, support from friends was associated with poorer sleep quality because women with low oxytocin may not effectively interpret and utilize available support resources [129]. Future research must consider both the moderating and mediating roles of oxytocin in the associations between romantic relationship experiences and sleep quality to clearly elucidate its effects. We view this as a fruitful area for future research.

HPA axis.

The HPA axis is another powerful candidate as a biological pathway linking romantic relationship experiences and sleep quality as it is one of the most crucial physiological systems [130]. It produces the stress hormone cortisol, and the actions of this physiological system normally are tightly regulated to ensure that the body can quickly respond to stressful events and return to a normal state [131]. Regulation of the HPA axis is strongly related to both romantic relationship experiences [132] and sleep quality [133].

First, researchers have found significant links between romantic relationship functioning and HPA axis functioning. For example, among a sample of mothers, positive marital relationship functioning was associated with higher morning cortisol levels and a steeper decline in cortisol across the day, which is a healthy diurnal pattern [134]. Reciprocally, researchers found that elevated adrenocorticotropic hormone (ACTH) during a conflict

discussion in the first year of marriage predicted decreased marital satisfaction 10 years later, and elevated norepinephrine predicted divorce [135]. Both ACTH and norepinephrine are associated with the regulation of the HPA axis. There also exist strong links between sleep quality and HPA axis functioning. Research has shown that sleep has an inhibitory influence on the HPA axis, whereas insomnia increases HPA-axis activity [136]. Moreover, successful versus unsuccessful regulation of the HPA axis impacts sleep quality. Individuals whose HPA axis was constantly activated could not get into a calm state that allowed them to fall asleep and remain asleep [137].

Although no studies to the best of our knowledge have directly tested the mediating role of the HPA axis underlying the associations between romantic relationship experiences and sleep quality, two studies have provided preliminary supporting evidence [138, 139]. In one study, researchers randomly assigned couples to either a single night of total sleep deprivation or a night of normal sleep, and all couples were instructed to discuss a topic of recurrent conflict after the experimental night. Results revealed higher cortisol levels during the conflict discussion for sleep-deprived couples compared to couples in the control condition [138], indicating that sleep-deprived couples felt more tension during the discussions. Greater cortisol levels and tension during conflict discussions have been associated with couple members dealing with the conflicts in a way that was harmful to their relationships [140, 141]. The other study also found significant associations among conflicts, sleep, and HPA axis. Specifically, greater quarreling was associated with worse subsequent sleep quality as assessed using PSQI as well as a dampened cortisol awakening response in highly anxiously attached women the next morning [139]. While these results point to the HPA axis as a strong mechanism, future research is needed to directly assess and establish the mediating function. For example, it is likely that greater conflict, poor handling of conflict, or unresolved conflict between couple members result in a continually activated HPA axis and increased release of cortisol, which in turn negatively affect sleep quality overnight.

Inflammation.

Inflammation is another physiological system that should mediate the links between romantic relationship experiences and sleep quality. Although we are under constant exposure to dangers such as bacteria, we do not always get ill because we are protected by the inflammation system. Like the HPA axis, the actions of the inflammation system normally are tightly regulated to ensure that the body can respond quickly to anything that might endanger health and return to a normal state. Given associations between sleep quality, relationship experiences, and inflammation in prior research [142], inflammation is likely to be an important pathway linking romantic relationship experiences to sleep quality.

First, researchers have found that spending more time copresent with a romantic partner in everyday life was associated with lower C-reactive protein (CRP), which suggests regulated inflammation [143]. Marital stress also has been associated with immune dysregulation, including increased production of interleukin 6 (IL-6) [141, 144, 145]. Significant associations between sleep quality and inflammation also have been well-documented. Sleep problems and poor subjective sleep quality have been shown to contribute to elevated inflammation [146, 147]. Moreover, dysregulation of the inflammation system influences sleep quality: biologically, sleep is regulated by circadian and homeostatic

processes, and pathological inflammation disrupts the chemical signaling required to maintain a healthy sleep profile [148].

Despite inflammation being another strong candidate for a biological mechanism linking romantic relationship experiences to sleep quality given its strong relations to both, no studies to our knowledge have directly tested its mediating role. However, in other ways, researchers have investigated the complicated associations among sleep disturbance, inflammation, and social relationship experiences. One study found that self-reported sleep disturbance was associated with heightened systemic inflammation among the general population over a 5-year follow-up, and this association was significantly stronger in those who reported feelings of social isolation [149]. Another related study found that lower levels of plasma IL-6 were predicted by greater objectively assessed sleep efficiency and by more positive social relations among aging women [150]. Also, aging women with the highest IL-6 levels were those with both poor objectively assessed sleep efficiency and poor social relations [150]. Moreover, among individuals who reported low levels of social support, poor sleep quality assessed using PSQI was associated with higher CRP and IL-6, which suggests elevation in the inflammation system [142]. Finally, couple members' shorter sleep duration was related to higher stimulated cytokine production after marital conflict [151]. Although these studies provide evidence in support of the significant links among inflammation, social relationship experiences, and sleep quality, it remains for future research to directly assess and determine the mediating role of inflammation underlying the associations between romantic relationship experiences and sleep quality.

Autonomic nervous system.

The ANS is another important biological system. It involves the sympathetic nervous system, which is responsible for fight or flight responses and the parasympathetic nervous system, which is responsible for rest and digest [152]. The sympathetic nervous system activates to speed up heart rate and to deliver more blood to areas of the body that need more oxygen to facilitate responses that assist in getting out of danger (e.g. fight or flight responses) [152]. The parasympathetic nervous system kicks in after periods of stress or danger to relax one's body [152]. Given ANS associations with both romantic relationship experiences [153] and sleep quality [154], it has strong potential as a biological mechanism.

To elaborate, research has shown that relationship behaviors are related to ANS activity. For example, romantic relational aggression is associated with exaggerated fight or flight responses to a conflict discussion (sympathetic activation and parasympathetic withdrawal) [153], whereas relationship depth and low conflict are associated with greater nocturnal diastolic blood pressure dipping [155]. Likewise, sleep quality and the ANS are intimately connected [156]. For example, it has been shown that shifts in the sympathovagal balance toward sympathetic dominance during sleep contribute to decreased sleep maintenance and more disturbances in the sleep architecture of healthy individuals [157]. Reciprocally, poor sleep quality has been linked with greater ANS activation, such as elevated blood pressure and increased heart rate [154].

Although no studies to our knowledge have directly tested the mediating role of ANS activation underlying the associations between romantic relationship experiences and sleep quality, two studies point to it as a mechanism [158, 159]. One cross-sectional study [159], which assessed the association between couple members' sleep-wake concordance and blood pressure, showed

that higher sleep-wake concordance between couple members was associated with lower sleep systolic and diastolic blood pressure and with lower wake systolic blood pressure for both couple members. However, this association was stronger for women, suggesting that women may be more sensitive to the potential benefits of sleep-wake concordance. This study also showed that poorer marital adjustment was associated with higher sleep systolic blood pressure. Relatedly, a longitudinal study found that in recently separated adults, greater sleep complaints predicted significant increases in both systolic and diastolic blood pressure three months later [158]. These findings indicate that romantic relationship experiences, sleep quality, and ANS are all closely related. However, it remains for future research to directly assess and determine the mediating role of ANS underlying the associations between romantic relationship experiences and sleep quality.

Conclusions and Future Directions

We reviewed five major categories of mechanisms that may link romantic relationship experiences to sleep quality, including (1) emotional/affective responses (i.e. emotions and mood states, stress, and felt security), (2) self-perceptions (i.e. self-efficacy), (3) social/relational perceptions (i.e. PPR, perceived intimacy), (4) self-regulation (i.e. self-control, presleep cognition), and (5) biological functioning (i.e. oxytocin, HPA axis, inflammation, and ANS activation). The current literature has predominantly focused on testing emotional (affective response) mechanisms, showing strong evidence in support of the mediating roles of emotions and mood states. There is also empirical evidence in support of the mediating roles of social perceptions (i.e. PPR, perceived intimacy) and self-regulation (i.e. self-control, presleep cognition). There is a lack of empirical research that directly tests the mediating roles of self-perceptions (i.e. self-efficacy) and biological functioning (i.e. oxytocin, HPA axis, inflammation, and ANS activation), although these are strong candidates for mechanisms linking romantic relationship experiences to sleep quality given their separate links to each.

Because romantic relationship experiences strongly impact sleep quality, and sleep quality reciprocally impacts romantic relationship experiences [7], it is important to understand the mechanistic pathways underlying these associations for the purposes of developing effective, wise-to-process interventions to improve both sleep and relationship quality. For example, to target the emotional/affective mechanisms that have gained strong empirical support in the existing literature, we can ask couples to complete brief writing prompts before they go to sleep, instructing them to reflect upon the happy experiences in their marriage and describe situations in which they feel supported by their romantic partners. Completing such brief exercises can theoretically increase their positive affect and decrease their negative affect, which in turn will improve both their sleep quality and relationship quality.

When reviewing the existing evidence for mechanisms, we also noted when there were moderating effects of gender, given that some research has shown that women, overall, sleep more poorly than men [20], and that women are more sensitive to both the positive and negative aspects of romantic relationships [19]. Most existing studies that have tested gender differences found either no significant gender differences or stronger effects for women, consistent with research showing that women are more reactive than men to relationship experiences [160]. However, one study found that only older husbands' relationship behaviors impacted

both their own and their wives' sleep quality via their own negative affect, consistent with research showing that men in traditional, heterosexual relationships tend to set the emotional tone in their relationships [10]. In addition to considering gender, future research might also consider other individual difference factors (e.g. personality traits such as cynical hostility) [161] that might strengthen or lessen the mediating effects of the proposed mechanisms. This may enable the design of effective interventions for specific populations.

Also, although we proposed the mechanisms to be bidirectional based on theory, there is not currently sufficient evidence in support of them working both ways. Most of the existing studies have tested and found evidence for the proposed mechanisms mediating the effects of romantic relationship experiences on sleep quality, but have not tested the other way around. Specifically, most current studies that have tested the proposed mechanisms have found that individuals' romantic relationship experiences influence the proposed mediators (e.g. emotions and mood states, perceived stress), which in turn influence their sleep experiences. More studies are needed to assess the other direction (how sleep experiences influence romantic relationship functioning via the proposed mechanisms) and to compare the mechanistic strength of both directions.

This review highlights a number of important directions for future research. First, there is a paucity of research examining biological mechanisms, and we see that as a priority in future work aimed at establishing mechanistic pathways. Second, it is important to note that all proposed mechanisms are likely to be interrelated, and to interact in predicting outcomes. It will be important for future research to not only establish each mechanistic pathway, but to consider how mechanisms interact with one another in determining outcomes. Ideally, researchers should test multiple mechanisms in the same study, which will allow them to assess the interactions among mechanisms and also compare the relative strength of the mechanisms. Third, most of the existing studies that test mechanisms have used cross-sectional or correlational designs, most likely due to the difficulty of experimentally manipulating relationship and sleep experiences. It will be important for future research to employ more rigorous tests of mechanistic pathways that involve experimental manipulations. For example, researchers could randomly assign couples to have conflict conversations or neutral conversations, and then measure how the proposed mediators (e.g. negative affect, perceived stress) change, and then how their sleep quality changes overnight. Reciprocally, researchers could randomly assign participants to conditions of sleep deprivation or normal sleep overnight, and then measure how the proposed mediators change, and subsequently how their romantic relationship experiences are affected the next day. Greater use of ecological momentary assessment designs or prospective longitudinal designs also would enable stronger conclusions regarding directionality.

It will also be important for future studies to assess sleep both subjectively and objectively within the same study. Most existing studies we reviewed used self-report measures to assess sleep quality. However, with the advancement of technology, we can easily track sleep quality via actigraphy [162] or other wearable devices such as the Apple Watch [163] and Fitbit [164]. Obtaining multiple assessments of sleep quality would enable conclusions regarding the alignment between subjective reports and objective measures. Finally, it will be important for future research to recruit more diverse samples to enable generalizability

of effects. In the existing studies reviewed, researchers have mainly focused on younger and middle-aged populations, white Americans, and heterosexual couples. There is a strong need for future research to investigate racial and cultural influences to understand if the same conclusions apply broadly.

In conclusion, this review summarizes the current theoretical and empirical evidence in support of five categories of mechanisms underlying the associations between romantic relationship experiences and sleep quality, including emotional/affective responses, self-perceptions, social/relational perceptions, self-regulation, and biological functioning. It also identifies both strengths and limitations of the existing literature and points to profitable directions for future research to fill important gaps. We hope this review will provide a foundational springboard for researchers to conduct needed studies to systematically fill important gaps in the literature. This will be important for informing the development of wise-to-process interventions that target specific mechanisms to improve sleep and relationship quality.

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Author Contributions

Yuxi Xie (Conceptualization [equal], Investigation [equal], Writing—original draft [Lead], Writing—review & editing [equal]), and Brooke C. Feeney (Conceptualization [equal], Investigation [equal], Supervision [lead], Writing—review & editing [equal])

References

1. CDC. CDC - Data and Statistics - Sleep and Sleep Disorders. Centers for Disease Control and Prevention. <https://www.cdc.gov/sleep/data-research/facts-stats/adults-sleep-facts-and-stats.html>. Accessed May 15, 2024.
2. Sia 2020 Q1 report - National Sleep Foundation. <http://www.thensf.org/wp-content/uploads/2020/03/SIA-2020-Report.pdf>. Accessed November 16, 2023.
3. Luyster FS, Strollo PJ, Zee PC, Walsh JK; Boards of Directors of the American Academy of Sleep Medicine and the Sleep Research Society. Sleep: a health imperative. *Sleep*. 2012;**35**(6):727–734. doi: 10.5665/sleep.1846
4. Barclay NL, Eley TC, Buysse DJ, Maughan B, Gregory AM. Nonshared environmental influences on sleep quality: a study of monozygotic twin differences. *Behav Genet*. 2012;**42**(2):234–244. doi: 10.1007/s10519-011-9510-1
5. Gordon AM, Carrillo B, Barnes CM. Sleep and social relationships in healthy populations: a systematic review. *Sleep Med Rev*. 2021;**57**:101428. doi: 10.1016/j.smrv.2021.101428
6. Troxel WM. It's more than sex: exploring the dyadic nature of sleep and implications for health. *Psychosom Med*. 2010;**72**(6):578–586. doi: 10.1097/PSY.0b013e3181de7ff8
7. Troxel WM, Robles TF, Hall M, Buysse DJ. Marital quality and the marital bed: examining the covariation between relationship

- quality and sleep. *Sleep Med Rev*. 2007;**11**(5):389–404. doi: [10.1016/j.smrv.2007.05.002](https://doi.org/10.1016/j.smrv.2007.05.002)
8. Kane HS, Slatcher RB, Reynolds BM, Repetti RL, Robles TF. Daily self-disclosure and sleep in couples. *Health Psychol*. 2014;**33**(8):813–822. doi: [10.1037/hea0000077](https://doi.org/10.1037/hea0000077)
 9. Haydon KC, Salvatore JE. Relationship stress, arguments, and sleep quality: a causal process analysis. *J Soc Pers Relatsh*. 2023;**40**(12):4268–4292. doi: [10.1177/02654075231190592](https://doi.org/10.1177/02654075231190592)
 10. Xie Y, Lemay EP, Feeney BC. Cyclical links between daily partner interactions and sleep quality in older adult couples: the mediating role of perceived partner responsiveness and negative affect. *Pers Soc Psychol Bull*. 2023;01461672231193800. doi: [10.1177/01461672231193800](https://doi.org/10.1177/01461672231193800)
 11. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;**28**(2):193–213. doi: [10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)
 12. Bowlby J. Attachment and loss: retrospect and prospect. *Am J Orthopsychiatry*. 1982;**52**(4):664–678. doi: [10.1111/j.1939-0025.1982.tb01456.x](https://doi.org/10.1111/j.1939-0025.1982.tb01456.x)
 13. Feeney BC, Collins NL. Thriving through relationships. *Curr Opin Psychol*. 2015;**1**:22–28. doi: [10.1016/j.copsyc.2014.11.001](https://doi.org/10.1016/j.copsyc.2014.11.001)
 14. Dahl RE, Lewin DS. Pathways to adolescent health sleep regulation and behavior. *J Adolesc Health*. 2002;**31**(6, suppl):175–184. doi: [10.1016/s1054-139x\(02\)00506-2](https://doi.org/10.1016/s1054-139x(02)00506-2)
 15. Steptoe A, O'Donnell K, Marmot M, Wardle J. Positive affect, psychological well-being, and good sleep. *J Psychosom Res*. 2008;**64**(4):409–415. doi: [10.1016/j.jpsychores.2007.11.008](https://doi.org/10.1016/j.jpsychores.2007.11.008)
 16. Minkel JD, Banks S, Htaik O, et al. Sleep Deprivation and stressors: evidence for elevated negative affect in response to mild stressors when sleep deprived. *Emotion*. 2012;**12**(5):1015–1020. doi: [10.1037/a0026871](https://doi.org/10.1037/a0026871)
 17. Slavish DC, Sliwinski MJ, Smyth JM, et al. Neuroticism, rumination, negative affect, and sleep: examining between- and within-person associations. *Pers Individ Dif*. 2018;**123**:217–222. doi: [10.1016/j.paid.2017.11.023](https://doi.org/10.1016/j.paid.2017.11.023)
 18. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;**84**(2):191–215. doi: [10.1037//0033-295x.84.2.191](https://doi.org/10.1037//0033-295x.84.2.191)
 19. Kiecolt-Glaser JK, Newton TL. Marriage and health: his and hers. *Psychol Bull*. 2001;**127**(4):472–503. doi: [10.1037/0033-2909.127.4.472](https://doi.org/10.1037/0033-2909.127.4.472)
 20. Zhang B, Wing YK. Sex differences in insomnia: a meta-analysis. *Sleep*. 2006;**29**(1):85–93. doi: [10.1093/sleep/29.1.85](https://doi.org/10.1093/sleep/29.1.85)
 21. Simpson JA, Collins WA, Tran S, Haydon KC. Attachment and the experience and expression of emotions in romantic relationships: a developmental perspective. *J Pers Soc Psychol*. 2007;**92**(2):355–367. doi: [10.1037/0022-3514.92.2.355](https://doi.org/10.1037/0022-3514.92.2.355)
 22. Fischer AH, Manstead ASR, Zaalberg R. Social influences on the emotion process. *Eur Rev Soc Psychol*. 2003;**14**(1):171–201. doi: [10.1080/104632803400000054](https://doi.org/10.1080/104632803400000054)
 23. Simpson JA. Influence of attachment styles on romantic relationships. *J Pers Soc Psychol*. 1990;**59**(5):971–980. doi: [10.1037//0022-3514.59.5.971](https://doi.org/10.1037//0022-3514.59.5.971)
 24. Crane CA, Testa M. Daily associations among anger experience and intimate partner aggression within aggressive and nonaggressive community couples. *Emotion*. 2014;**14**(5):985–994. doi: [10.1037/a0036884](https://doi.org/10.1037/a0036884)
 25. Meyer DD, Jones M, Rorer A, Maxwell K. Examining the associations among attachment, affective state, and romantic relationship quality. *Fam J*. 2015;**23**(1):18–25. doi: [10.1177/1066480714547698](https://doi.org/10.1177/1066480714547698)
 26. Baglioni C, Battagliese G, Feige B, et al. Insomnia as a predictor of depression: a meta-analytic evaluation of longitudinal epidemiological studies. *J Affect Disord*. 2011;**135**(1):10–19. doi: [10.1016/j.jad.2011.01.011](https://doi.org/10.1016/j.jad.2011.01.011)
 27. Haack M, Mullington JM. Sustained sleep restriction reduces emotional and physical well-being. *Pain*. 2005;**119**(1):56–64. doi: [10.1016/j.pain.2005.09.011](https://doi.org/10.1016/j.pain.2005.09.011)
 28. Sell NT, Sisson NM, Gordon AM, Stanton SCE, Impett EA. Daily sleep quality and support in romantic relationships: the role of negative affect and perspective-taking. *Affec Sci*. 2023;**4**:370–384. doi: [10.1007/s42761-023-00180-7](https://doi.org/10.1007/s42761-023-00180-7)
 29. Xie Y, Chin BN, Feeney BC. Mechanisms linking attachment orientation to sleep quality in married couples. *Pers Soc Psychol Bull*. 2022;**50**:331–350. doi: [10.1177/01461672221123859](https://doi.org/10.1177/01461672221123859)
 30. Jauregui ME, Kimmes JG, Ledermann T. Adult attachment and sleep disturbance: the role of the facets of mindfulness. *Mindfulness*. 2022;**13**(4):1042–1053. doi: [10.1007/s12671-022-01860-4](https://doi.org/10.1007/s12671-022-01860-4)
 31. Yorgason JB, Godfrey WB, Call VRA, Erickson LD, Gustafson KB, Bond AH. Daily sleep predicting marital interactions as mediated through mood. *GERONB*. 2016;**73**(3):421–431. doi: [10.1093/geronb/gbw093](https://doi.org/10.1093/geronb/gbw093)
 32. El-Sheikh M, Kelly RJ, Koss KJ, Rauer AJ. Longitudinal relations between constructive and destructive conflict and couples' sleep. *J Fam Psychol*. 2015;**29**(3):349–359. doi: [10.1037/fam0000083](https://doi.org/10.1037/fam0000083)
 33. Rauer AJ, Kelly RJ, Buckhalt JA, El-Sheikh M. Sleeping with one eye open: marital abuse as an antecedent of poor sleep. *J Fam Psychol*. 2010;**24**(6):667–677. doi: [10.1037/a0021354](https://doi.org/10.1037/a0021354)
 34. El-Sheikh M, Kelly R, Rauer A. Quick to berate, slow to sleep: interpartner psychological conflict, mental health, and sleep. *Health Psychol*. 2013;**32**(10):1057–1066. doi: [10.1037/a0031786](https://doi.org/10.1037/a0031786)
 35. Kent de Grey RG, Uchino BN, Pietromonaco PR, et al. Strained bedfellows: an actor-partner analysis of spousal attachment insecurity and sleep quality. *Ann Behav Med*. 2019;**53**(2):115–125. doi: [10.1093/abm/kay037](https://doi.org/10.1093/abm/kay037)
 36. Arpin SN, Starkey AR, Mohr CD, Greenhalgh AMD, Hammer LB. “A well spent day brings happy sleep”: a dyadic study of capitalization support in military-connected couples. *J Fam Psychol*. 2018;**32**(7):975–985. doi: [10.1037/fam0000469](https://doi.org/10.1037/fam0000469)
 37. Singh A, Misra N. Loneliness, depression and sociability in old age. *Ind Psychiatry J*. 2009;**18**(1):51–55. doi: [10.4103/0972-6748.57861](https://doi.org/10.4103/0972-6748.57861)
 38. Audigier A, Glass S, Slotter EB, Pantesco E. Tired, angry, and unhappy with us: poor sleep quality predicts increased anger and worsened perceptions of relationship quality. *J Soc Pers Relatsh*. 2023;**40**(12):3803–3831. doi: [10.1177/02654075231193449](https://doi.org/10.1177/02654075231193449)
 39. Marini CM, Martire LM, Jones DR, Zhaoyang R, Buxton OM. Daily links between sleep and anger among spouses of chronic pain patients. Sneed R, ed. *The Journals of Gerontology: Series B*. 2020;**75**(5):927–936. doi: [10.1093/geronb/gby111](https://doi.org/10.1093/geronb/gby111)
 40. Pressman SD, Jenkins BN, Kraft-Feil TL, Rasmussen H, Scheier MF. The whole is not the sum of its parts: specific types of positive affect influence sleep differentially. *Emotion*. 2017;**17**(5):778–793. doi: [10.1037/emo0000256](https://doi.org/10.1037/emo0000256)
 41. Tang NKY, Harvey AG. Effects of cognitive arousal and physiological arousal on sleep perception. *Sleep*. 2004;**27**(1):69–78. doi: [10.1093/sleep/27.1.69](https://doi.org/10.1093/sleep/27.1.69)
 42. Cohen S, Gianaros PJ, Manuck SB. A stage model of stress and disease. *Perspect Psychol Sci*. 2016;**11**(4):456–463. doi: [10.1177/1745691616646305](https://doi.org/10.1177/1745691616646305)
 43. Schuler RS. Definition and conceptualization of stress in organizations. *Organ Behav Hum Perform*. 1980;**25**(2):184–215. doi: [10.1016/0030-5073\(80\)90063-x](https://doi.org/10.1016/0030-5073(80)90063-x)

44. Blascovich J, Mendes WB. Social psychophysiology and embodiment. In: Fiske ST, Gilbert DT, Lindzey G, eds. *Handbook of Social Psychology*. Hoboken, NJ: John Wiley & Sons, Inc.; 2010:socpsy001006. doi: [10.1002/9780470561119.socpsy001006](https://doi.org/10.1002/9780470561119.socpsy001006)
45. Lazarus RS. *Psychological Stress and the Coping Process*. New York: McGraw-Hill; 1966.
46. Lazarus RS, Cohen JB. Environmental stress. In: Altman I, Wohlwill JF, eds. *Human Behavior and Environment: Advances in Theory and Research*. Volume 2. New York: Springer US; 1977:89–127. doi: [10.1007/978-1-4684-0808-9_3](https://doi.org/10.1007/978-1-4684-0808-9_3)
47. Gersons BPR, Carlier IVE. Post-traumatic stress disorder: the history of a recent concept. *Br J Psychiatry*. 1992;**161**(6):742–748. doi: [10.1192/bjp.161.6.742](https://doi.org/10.1192/bjp.161.6.742)
48. Falconier MK, Nussbeck F, Bodenmann G, Schneider H, Bradbury T. Stress from daily hassles in couples: its effects on intradyadic stress, relationship satisfaction, and physical and psychological well-being. *J Marital Fam Ther*. 2015;**41**(2):221–235. doi: [10.1111/jmft.12073](https://doi.org/10.1111/jmft.12073)
49. Proulx CM, Helms HM, Buehler C. Marital quality and personal well-being: a meta-analysis. *J Marriage Fam*. 2007;**69**(3):576–593. doi: [10.1111/j.1741-3737.2007.00393.x](https://doi.org/10.1111/j.1741-3737.2007.00393.x)
50. Bader K, Bauer C, Christen R, Schäfer V. Sleep after stress induction: the role of stressful memory reactivation. *Stress Health*. 2011;**27**(3):e143–e151. doi: [10.1002/smi.1348](https://doi.org/10.1002/smi.1348)
51. Germain A. Sleep disturbances as the hallmark of PTSD: where are we now? *Am J Psychiatry*. 2013;**170**(4):372–382. doi: [10.1176/appi.ajp.2012.12040432](https://doi.org/10.1176/appi.ajp.2012.12040432)
52. Huelsnitz CO, Simpson JA, Rothman AJ, Englund MM. The interplay between relationship effectiveness life stress, and sleep: a prospective study. *Pers Relatsh*. 2019;**26**(1):73–92. doi: [10.1111/pere.12266](https://doi.org/10.1111/pere.12266)
53. Wei M, Adler-Baeder F, McGill JM, Novak JR. Healthy couple, better sleep: exploring connections and changes in couple relationship education participants. *Fam Process*. Published online March 9, 2024. doi: [10.1111/famp.12987](https://doi.org/10.1111/famp.12987)
54. Jackson DB, Lynch KR, Testa A. Intimate partner violence, firearms, and sleep disturbances: the influence of coercive control and partner firearm ownership. *Sleep Health*. 2020;**6**(6):723–730. doi: [10.1016/j.sleh.2020.04.013](https://doi.org/10.1016/j.sleh.2020.04.013)
55. Woods SJ, Kozachik SL, Hall RJ. Subjective sleep quality in women experiencing intimate partner violence: contributions of situational, psychological, and physiological factors: predicting sleep quality. *J Trauma Stress*. 2010;**23**(1):141–150. doi: [10.1002/jts.20495](https://doi.org/10.1002/jts.20495)
56. Woods SJ. Prevalence and patterns of posttraumatic stress disorder in abused and postabused women. *Issues Ment Health Nurs*. 2000;**21**(3):309–324. doi: [10.1080/016128400248112](https://doi.org/10.1080/016128400248112)
57. Randall AK, Bodenmann G. Stress and its associations with relationship satisfaction. *Curr Opin Psychol*. 2017;**13**:96–106. doi: [10.1016/j.copsyc.2016.05.010](https://doi.org/10.1016/j.copsyc.2016.05.010)
58. Carnelley KB, Rowe AC. Repeated priming of attachment security influences later views of self and relationships. *Pers Relatsh*. 2007;**14**(2):307–320. doi: [10.1111/j.1475-6811.2007.00156.x](https://doi.org/10.1111/j.1475-6811.2007.00156.x)
59. Rowe A, Carnelley KB. Attachment style differences in the processing of attachment-relevant information: primed-style effects on recall, interpersonal expectations, and affect. *Pers Relatsh*. 2003;**10**(1):59–75. doi: [10.1111/1475-6811.00036](https://doi.org/10.1111/1475-6811.00036)
60. Sadikaj G, Moskowitz DS, Zuroff DC. Felt security in daily interactions as a mediator of the effect of attachment on relationship satisfaction†some of the results reported in this article were previously presented at the annual meeting of the society for interpersonal theory and research in Montreal, Canada (May 2012). *Eur J Pers*. 2015;**29**(2):187–200. doi: [10.1002/per.1988](https://doi.org/10.1002/per.1988)
61. Dahl RE. The regulation of sleep and arousal. *Dev Psychopathol*. 1996;**8**(1):3–27. doi: [10.1017/s0954579400006945](https://doi.org/10.1017/s0954579400006945)
62. Kent RG, Uchino BN, Cribbet MR, Bowen K, Smith TW. Social relationships and sleep quality. *Ann Behav Med*. 2015;**49**(6):912–917. doi: [10.1007/s12160-015-9711-6](https://doi.org/10.1007/s12160-015-9711-6)
63. Richter K, Adam S, Geiss L, Peter L, Niklewski G. Two in a bed: the influence of couple sleeping and chronotypes on relationship and sleep. An overview. *Chronobiol Int*. 2016;**33**(10):1464–1472. doi: [10.1080/07420528.2016.1220388](https://doi.org/10.1080/07420528.2016.1220388)
64. Wooldridge JS, Ranby KW. Influence of relationship partners on self-efficacy for self-management behaviors among adults with type 2 diabetes. *Diabetes Spectr*. 2019;**32**(1):6–15. doi: [10.2337/ds17-0069](https://doi.org/10.2337/ds17-0069)
65. Schlarb A, Kulesa G. Sleep characteristics, sleep problems, and associations of self-efficacy among German university students. *Nat Sci Sleep*. 2012;**4**:1–7. doi: [10.2147/NSS.S27971](https://doi.org/10.2147/NSS.S27971)
66. Feeney BC, Van Vleet M, Jakubiak BK, Tomlinson JM. Predicting the pursuit and support of challenging life opportunities. *Pers Soc Psychol Bull*. 2017;**43**(8):1171–1187. doi: [10.1177/0146167217708575](https://doi.org/10.1177/0146167217708575)
67. Tomlinson JM, Feeney BC, Van Vleet M. A longitudinal investigation of relational catalyst support of goal strivings. *J Posit Psychol*. 2016;**11**(3):246–257. doi: [10.1080/17439760.2015.1048815](https://doi.org/10.1080/17439760.2015.1048815)
68. Feeney BC, Thrush RL. Relationship influences on exploration in adulthood: the characteristics and function of a secure base. *J Pers Soc Psychol*. 2010;**98**(1):57–76. doi: [10.1037/a0016961](https://doi.org/10.1037/a0016961)
69. Weiser DA, Weigel DJ. Self-efficacy in romantic relationships: direct and indirect effects on relationship maintenance and satisfaction. *Pers Individ Dif*. 2016;**89**:152–156. doi: [10.1016/j.paid.2015.10.013](https://doi.org/10.1016/j.paid.2015.10.013)
70. Cohen S, Pressman SD. Positive affect and health. *Curr Dir Psychol Sci*. 2006;**15**(3):122–125. doi: [10.1111/j.0963-7214.2006.00420.x](https://doi.org/10.1111/j.0963-7214.2006.00420.x)
71. Deci EL, Ryan RM. The “What” and “Why” of goal pursuits: human needs and the self-determination of behavior. *Psychol Inq*. 2000;**11**(4):227–268. doi: [10.1207/s15327965plii1104_01](https://doi.org/10.1207/s15327965plii1104_01)
72. Byun E, McCurry SM, Opp M, Liu D, Becker KJ, Thompson HJ. Self-efficacy is associated with better sleep quality and sleep efficiency in adults with subarachnoid hemorrhage. *J Clin Neurosci*. 2020;**73**:173–178. doi: [10.1016/j.jocn.2019.12.010](https://doi.org/10.1016/j.jocn.2019.12.010)
73. Adams RN, Mosher CE, Cohee AA, et al. Avoidant coping and self-efficacy mediate relationships between perceived social constraints and symptoms among long-term breast cancer survivors: social constraints and cancer symptoms. *Psychooncology*. 2017;**26**(7):982–990. doi: [10.1002/pon.4119](https://doi.org/10.1002/pon.4119)
74. Jakubiak BK, Feeney BC. Daily goal progress is facilitated by spousal support and promotes psychological, physical, and relational well-being throughout adulthood. *J Pers Soc Psychol*. 2016;**111**(3):317–340. doi: [10.1037/pspi0000062](https://doi.org/10.1037/pspi0000062)
75. Reis, HT, Clark, MS, Holmes, JG. Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In: Mashek DJ, Aron A, eds. *Handbook of closeness and intimacy*. Mahwah, NJ: Routledge; 2004:201–225.
76. Gadassi R, Bar-Nahum LE, Newhouse S, et al. Perceived partner responsiveness mediates the association between sexual and marital satisfaction: a daily diary study in newlywed couples. *Arch Sex Behav*. 2016;**45**(1):109–120. doi: [10.1007/s10508-014-0448-2](https://doi.org/10.1007/s10508-014-0448-2)
77. Brummert BH, Babyak MA, Siegler IC, et al. Associations among perceptions of social support, negative affect, and quality of sleep in caregivers and noncaregivers. *Health Psychol*. 2006;**25**(2):220–225. doi: [10.1037/0278-6133.25.2.220](https://doi.org/10.1037/0278-6133.25.2.220)
78. Segal N, Fraley RC. Broadening the investment model: an intensive longitudinal study on attachment and perceived partner

- responsiveness in commitment dynamics. *J Soc Pers Relatsh.* 2016;**33**(5):581–599. doi: [10.1177/0265407515584493](https://doi.org/10.1177/0265407515584493)
79. Ruan Y, Reis HT, Clark MS, Hirsch JL, Bink BD. Can I tell you how I feel? perceived partner responsiveness encourages emotional expression. *Emotion.* 2020;**20**(3):329–342. doi: [10.1037/emo0000650](https://doi.org/10.1037/emo0000650)
 80. Rafaeli E, Cranford JA, Green AS, Shrout PE, Bolger N. The good and bad of relationships: how social hindrance and social support affect relationship feelings in daily life. *Pers Soc Psychol Bull.* 2008;**34**(12):1703–1718. doi: [10.1177/0146167208323742](https://doi.org/10.1177/0146167208323742)
 81. O'Neill AS, Mohr CD, Bodner TE, Hammer LB. Perceived partner responsiveness, pain, and sleep: a dyadic study of military-connected couples. *Health Psychol.* 2020;**39**(12):1089–1099. doi: [10.1037/hea0001035](https://doi.org/10.1037/hea0001035)
 82. Selcuk E, Stanton SCE, Slatcher RB, Ong AD. Perceived partner responsiveness predicts better sleep quality through lower anxiety. *Soc Psychol Pers Sci.* 2017;**8**(1):83–92. doi: [10.1177/1948550616662128](https://doi.org/10.1177/1948550616662128)
 83. Rusbult CE, Buunk BP. Commitment processes in close relationships: an interdependence analysis. *J Soc Pers Relatsh.* 1993;**10**(2):175–204. doi: [10.1177/026540759301000202](https://doi.org/10.1177/026540759301000202)
 84. Gordon AM, Chen S. The role of sleep in interpersonal conflict: do sleepless nights mean worse fights? *Soc Psychol Pers Sci.* 2014;**5**(2):168–175. doi: [10.1177/1948550613488952](https://doi.org/10.1177/1948550613488952)
 85. Anderson TL, Emmers-Sommer TM. Predictors of relationship satisfaction in online romantic relationships. *Commun Stud.* 2006;**57**(2):153–172. doi: [10.1080/10510970600666834](https://doi.org/10.1080/10510970600666834)
 86. Doerr JM, Klaus K, Troxel W, et al. The effect of intranasal oxytocin on the association between couple interaction and sleep: a placebo-controlled study. *Psychosom Med.* 2022;**84**(6):727–737. doi: [10.1097/PSY.0000000000001091](https://doi.org/10.1097/PSY.0000000000001091)
 87. Xie Y, Feeney BC. A narrative review of research linking non-sexual social touch to sleep quality. *J Sleep Res.* Published online February 21, 2024:e14174. doi: [10.1111/jsr.14174](https://doi.org/10.1111/jsr.14174)
 88. Gross JJ, Thompson RA. Emotion regulation: conceptual foundations. In: Gross JJ, ed. *Handbook of emotion regulation.* New York: Guilford Press; 2007:3–24.
 89. Fitzsimons GM, Finkel EJ. Interpersonal influences on self-regulation. *Curr Dir Psychol Sci.* 2010;**19**(2):101–105. doi: [10.1177/0963721410364499](https://doi.org/10.1177/0963721410364499)
 90. Keller PS, Haak EA, DeWall CN, Renzetti C. Poor sleep is associated with greater marital aggression: the role of self control. *Behav Sleep Med.* 2019;**17**(2):174–180. doi: [10.1080/15402002.2017.1312404](https://doi.org/10.1080/15402002.2017.1312404)
 91. Demichelis OP, Grainger SA, Burr L, Henry JD. Emotion regulation mediates the effects of sleep on stress and aggression. *J Sleep Res.* 2023;**32**(3):e13787. doi: [10.1111/jsr.13787](https://doi.org/10.1111/jsr.13787)
 92. Kirwan M, Svenson DW, Pickett SM, Parkhill MR. Emotion regulation as a mediator between sleep quality and interpersonal aggression. *Pers Individ Dif.* 2019;**148**:32–37. doi: [10.1016/j.paid.2019.05.018](https://doi.org/10.1016/j.paid.2019.05.018)
 93. Shi X, Qiao X, Zhu Y. Emotional dysregulation as a mediator linking sleep disturbance with aggressive behaviors: disentangling between- and within-person associations. *Sleep Med.* 2023;**108**:90–97. doi: [10.1016/j.sleep.2023.06.003](https://doi.org/10.1016/j.sleep.2023.06.003)
 94. Tangney JP, Baumeister RF, Boone AL. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *J Pers.* 2004;**72**(2):271–324. doi: [10.1111/j.0022-3506.2004.00263.x](https://doi.org/10.1111/j.0022-3506.2004.00263.x)
 95. Burnette JL, Davisson EK, Finkel EJ, Van Tongeren DR, Hui CM, Hoyle RH. Self-control and forgiveness: a meta-analytic review. *Soc Psychol Pers Sci.* 2014;**5**(4):443–450. doi: [10.1177/1948550613502991](https://doi.org/10.1177/1948550613502991)
 96. Zuo PY, Karremans JC, Scheres A, et al. A dyadic test of the association between trait self-control and romantic relationship satisfaction. *Front Psychol.* 2020;**11**:594476. doi: [10.3389/fpsyg.2020.594476](https://doi.org/10.3389/fpsyg.2020.594476)
 97. Christian MS, Ellis APJ. Examining the effects of sleep deprivation on workplace deviance: a self-regulatory perspective. *Acad Manag J.* 2011;**54**(5):913–934. doi: [10.5465/amj.2010.0179](https://doi.org/10.5465/amj.2010.0179)
 98. Thacher PV. University students and the “All Nighter”: correlates and patterns of students’ engagement in a single night of total sleep deprivation. *Behav Sleep Med.* 2008;**6**(1):16–31. doi: [10.1080/15402000701796114](https://doi.org/10.1080/15402000701796114)
 99. Kroese FM, De Ridder DTD, Evers C, Adriaanse MA. Bedtime procrastination: introducing a new area of procrastination. *Front Psychol.* 2014;**5**:611. doi: [10.3389/fpsyg.2014.00611](https://doi.org/10.3389/fpsyg.2014.00611). <https://www.frontiersin.org/articles/10.3389/fpsyg.2014.00611>. Accessed August 18, 2023.
 100. Nicassio PM, Mendlowitz DR, Fussell JJ, Petras L. The phenomenology of the pre-sleep state: the development of the pre-sleep arousal scale. *Behav Res Ther.* 1985;**23**(3):263–271. doi: [10.1016/0005-7967\(85\)90004-x](https://doi.org/10.1016/0005-7967(85)90004-x)
 101. Nolen-Hoeksema S, Wisco BE, Lyubomirsky S. Rethinking rumination. *Perspect Psychol Sci.* 2008;**3**(5):400–424. doi: [10.1111/j.1745-6924.2008.00088.x](https://doi.org/10.1111/j.1745-6924.2008.00088.x)
 102. Bevan JL, Hale JL. Negative jealousy-related emotion rumination as consequences of romantic partner, cross-sex friend, and sibling jealousy expression. *Commun Stud.* 2006;**57**(4):363–379. doi: [10.1080/10510970600945907](https://doi.org/10.1080/10510970600945907)
 103. Wuyts J, De Valck E, Vandekerckhove M, et al. The influence of pre-sleep cognitive arousal on sleep onset processes. *Int J Psychophysiol.* 2012;**83**(1):8–15. doi: [10.1016/j.ijpsycho.2011.09.016](https://doi.org/10.1016/j.ijpsycho.2011.09.016)
 104. Wood AM, Joseph S, Lloyd J, Atkins S. Gratitude influences sleep through the mechanism of pre-sleep cognitions. *J Psychosom Res.* 2009;**66**(1):43–48. doi: [10.1016/j.jpsychores.2008.09.002](https://doi.org/10.1016/j.jpsychores.2008.09.002)
 105. Waldeck D, Banerjee M, Jenks R, Tyndall I. Cognitive arousal mediates the relationship between perceived ostracism and sleep quality but it is not moderated by experiential avoidance. *Stress Health.* 2020;**36**(4):487–495. doi: [10.1002/smi.2946](https://doi.org/10.1002/smi.2946)
 106. Stoia-Caraballo R, Rye MS, Pan W, Brown Kirschman KJ, Lutz-Zois C, Lyons AM. Negative affect and anger rumination as mediators between forgiveness and sleep quality. *J Behav Med.* 2008;**31**(6):478–488. doi: [10.1007/s10865-008-9172-5](https://doi.org/10.1007/s10865-008-9172-5)
 107. Jiang Y, Poon KT. Stuck in companionless days, end up in sleepless nights: relationships between ostracism, rumination, insomnia, and subjective well-being. *Curr Psychol.* 2023;**42**(1):571–578. doi: [10.1007/s12144-021-01474-4](https://doi.org/10.1007/s12144-021-01474-4)
 108. Yi H, Shin K, Shin C. Development of the sleep quality scale. *J Sleep Res.* 2006;**15**(3):309–316. doi: [10.1111/j.1365-2869.2006.00544.x](https://doi.org/10.1111/j.1365-2869.2006.00544.x)
 109. Morin CM. *Insomnia: Psychological Assessment and Management.* New York: Guilford Press; 1993:**xvii**, 238.
 110. Palagini L, Petri E, Novi M, Caruso D, Moretto U, Riemann D. Adult insecure attachment plays a role in hyperarousal and emotion dysregulation in Insomnia Disorder. *Psychiatry Res.* 2018;**262**:162–167. doi: [10.1016/j.psychres.2018.01.017](https://doi.org/10.1016/j.psychres.2018.01.017)
 111. Reynolds S, Searight HR, Ratwik S. Adult attachment styles and rumination in the context of intimate relationships. *N Am J Psychol.* 2014;**16**(3):495–506.
 112. Carson CL, Cupach WR. Fueling the flames of the green-eyed monster: the role of ruminative thought in reaction to romantic jealousy. *West J Commun.* 2000;**64**(3):308–329. doi: [10.1080/10570310009374678](https://doi.org/10.1080/10570310009374678)
 113. Elphinston RA, Feeney JA, Noller P, Connor JP, Fitzgerald J. Romantic jealousy and relationship satisfaction: the costs

- of rumination. *West J Commun.* 2013;**77**(3):293–304. doi: [10.1080/10570314.2013.770161](https://doi.org/10.1080/10570314.2013.770161)
114. Jostmann NB, Karremans J, Finkenauer C. When love is not blind: rumination impairs implicit affect regulation in response to romantic relationship threat. *Cogn Emot.* 2011;**25**(3):506–518. doi: [10.1080/02699931.2010.541139](https://doi.org/10.1080/02699931.2010.541139)
 115. Chen HC, Lin CM, Lee MB, Chou P. The relationship between pre-sleep arousal and spontaneous arousals from sleep in subjects referred for diagnostic polysomnograms. *J Chin Med Assoc.* 2011;**74**(2):81–86. doi: [10.1016/j.jcma.2011.01.016](https://doi.org/10.1016/j.jcma.2011.01.016)
 116. Loft M, Cameron L. The importance of sleep: relationships between sleep quality and work demands, the prioritization of sleep and pre-sleep arousal in day-time employees. *Work Stress.* 2014;**28**(3):289–304. doi: [10.1080/02678373.2014.935523](https://doi.org/10.1080/02678373.2014.935523)
 117. Guastella AJ, Moulds ML. The impact of rumination on sleep quality following a stressful life event. *Pers Individ Dif.* 2007;**42**(6):1151–1162. doi: [10.1016/j.paid.2006.04.028](https://doi.org/10.1016/j.paid.2006.04.028)
 118. Carter CS. Oxytocin and sexual behavior. *Neurosci Biobehav Rev.* 1992;**16**(2):131–144. doi: [10.1016/s0149-7634\(05\)80176-9](https://doi.org/10.1016/s0149-7634(05)80176-9)
 119. Gordon I, Zagoory-Sharon O, Leckman JF, Feldman R. Oxytocin and the development of parenting in humans. *Biol Psychiatry.* 2010;**68**(4):377–382. doi: [10.1016/j.biopsych.2010.02.005](https://doi.org/10.1016/j.biopsych.2010.02.005)
 120. Insel TR, Young LJ. The neurobiology of attachment. *Nat Rev Neurosci.* 2001;**2**(2):129–136. doi: [10.1038/35053579](https://doi.org/10.1038/35053579)
 121. Schneider E, Hopf D, Aguilar-Raab C, et al. Affectionate touch and diurnal oxytocin levels: an ecological momentary assessment study. *Elife.* 2023;**12**:e81241. doi: [10.7554/eLife.81241](https://doi.org/10.7554/eLife.81241)
 122. Jain V, Marbach J, Kimbro S, et al. Benefits of oxytocin administration in obstructive sleep apnea. *Am J Physiol Lung Cell Mol Physiol.* 2017;**313**(5):L825–L833. doi: [10.1152/ajplung.00206.2017](https://doi.org/10.1152/ajplung.00206.2017)
 123. Lipschitz DL, Kuhn R, Kinney AY, Grewen K, Donaldson GW, Nakamura Y. An exploratory study of the effects of mind-body interventions targeting sleep on salivary oxytocin levels in cancer survivors. *Integr Cancer Ther.* 2015;**14**(4):366–380. doi: [10.1177/1534735415580675](https://doi.org/10.1177/1534735415580675)
 124. Ditzen B, Schaer M, Gabriel B, Bodenmann G, Ehlert U, Heinrichs M. Intranasal oxytocin increases positive communication and reduces cortisol levels during couple conflict. *Biol Psychiatry.* 2009;**65**(9):728–731. doi: [10.1016/j.biopsych.2008.10.011](https://doi.org/10.1016/j.biopsych.2008.10.011)
 125. Yu H, Miao W, Ji E, et al. Social touch-like tactile stimulation activates a tachykinin 1-oxytocin pathway to promote social interactions. *Neuron.* 2022;**110**(6):1051–1067.e7. doi: [10.1016/j.neuron.2021.12.022](https://doi.org/10.1016/j.neuron.2021.12.022)
 126. Melton KK, Larson M, Boccia ML. Examining couple recreation and oxytocin via the ecology of family experiences framework. *J Marriage Fam.* 2019;**81**(3):771–782. doi: [10.1111/jomf.12556](https://doi.org/10.1111/jomf.12556)
 127. Ditzen B, Nater UM, Schaer M, et al. Sex-specific effects of intranasal oxytocin on autonomic nervous system and emotional responses to couple conflict. *Soc Cogn Affect Neurosci.* 2013;**8**(8):897–902. doi: [10.1093/scan/nss083](https://doi.org/10.1093/scan/nss083)
 128. Aguilar-Raab C, Eckstein M, Geracitano S, et al. Oxytocin modulates the cognitive appraisal of the own and others close intimate relationships. *Front Neurosci.* 2019;**13**:714. doi: [10.3389/fnins.2019.00714](https://doi.org/10.3389/fnins.2019.00714). <https://www.frontiersin.org/articles/10.3389/fnins.2019.00714>. Accessed August 18, 2023.
 129. Fekete EM, Seay J, Antoni MH, et al. Oxytocin, social support and sleep quality in low income minority women living with HIV. *Behav Sleep Med.* 2014;**12**(3):207–221. doi: [10.1080/15402002.2013.791297](https://doi.org/10.1080/15402002.2013.791297)
 130. Magri F, Cravello L, Barili L, et al. Stress and dementia: the role of the hypothalamic-pituitary-adrenal axis. *Aging Clin Exp Res.* 2006;**18**(2):167–170. doi: [10.1007/BF03327435](https://doi.org/10.1007/BF03327435)
 131. Stephens MAC, Wand G. Stress and the HPA Axis. *Alcohol Res.* 2012;**34**(4):468–483.
 132. Pietromonaco PR, DeBuse CJ, Powers SI. Does Attachment get under the skin? adult romantic attachment and cortisol responses to stress. *Curr Dir Psychol Sci.* 2013;**22**(1):63–68. doi: [10.1177/0963721412463229](https://doi.org/10.1177/0963721412463229)
 133. Vgontzas AN, Bixler EO, Lin HM, et al. Chronic insomnia is associated with nyctohemeral activation of the hypothalamic-pituitary-adrenal axis: clinical implications. *J Clin Endocrinol Metab.* 2001;**86**(8):3787–3794. doi: [10.1210/jcem.86.8.7778](https://doi.org/10.1210/jcem.86.8.7778)
 134. Adam EK, Gunnar MR. Relationship functioning and home and work demands predict individual differences in diurnal cortisol patterns in women. *Psychoneuroendocrinology.* 2001;**26**(2):189–208. doi: [10.1016/s0306-4530\(00\)00045-7](https://doi.org/10.1016/s0306-4530(00)00045-7)
 135. Kiecolt-Glaser JK, Bane C, Glaser R, Malarkey WB. Love, marriage, and divorce: newlyweds' stress hormones foreshadow relationship changes. *J Consult Clin Psychol.* 2003;**71**(1):176–188. doi: [10.1037//0022-006x.71.1.176](https://doi.org/10.1037//0022-006x.71.1.176)
 136. Vgontzas AN, Chrousos GP. Sleep, the hypothalamic-pituitary-adrenal axis, and cytokines: multiple interactions and disturbances in sleep disorders. *Endocrinol Metab Clin North Am.* 2002;**31**(1):15–36. doi: [10.1016/s0889-8529\(01\)00005-6](https://doi.org/10.1016/s0889-8529(01)00005-6)
 137. Buckley TM, Schatzberg AF. On the interactions of the Hypothalamic-Pituitary-Adrenal (HPA) axis and sleep: normal HPA axis activity and circadian rhythm, exemplary sleep disorders. *J Clin Endocrinol Metab.* 2005;**90**(5):3106–3114. doi: [10.1210/jc.2004-1056](https://doi.org/10.1210/jc.2004-1056)
 138. Cernadas Curotto P, Sterpenich V, Sander D, Favez N, Rimmele U, Klimecki O. Quarreling after a sleepless night: preliminary evidence of the impact of sleep deprivation on interpersonal conflict. *Affec Sci.* 2022;**3**(2):341–352. doi: [10.1007/s42761-021-00076-4](https://doi.org/10.1007/s42761-021-00076-4)
 139. Hicks AM, Diamond LM. Don't go to bed angry: attachment, conflict, and affective and physiological reactivity. *Pers Relatsh.* 2011;**18**(2):266–284. doi: [10.1111/j.1475-6811.2011.01355.x](https://doi.org/10.1111/j.1475-6811.2011.01355.x)
 140. Kiecolt-Glaser JK, Newton T, Cacioppo JT, MacCallum RC, Glaser R, Malarkey WB. Marital conflict and endocrine function: are men really more physiologically affected than women? *J Consult Clin Psychol.* 1996;**64**(2):324–332. doi: [10.1037//0022-006x.64.2.324](https://doi.org/10.1037//0022-006x.64.2.324)
 141. Kiecolt-Glaser JK, Glaser R, Cacioppo JT, et al. Marital conflict in older adults: endocrinological and immunological correlates. *Psychosom Med.* 1997;**59**(4):339–349. doi: [10.1097/00006842-199707000-00001](https://doi.org/10.1097/00006842-199707000-00001)
 142. Tomfohr LM, Edwards KM, Madsen JW, Mills PJ. Social support moderates the relationship between sleep and inflammation in a population at high risk for developing cardiovascular disease. *Psychophysiology.* 2015;**52**(12):1689–1697. doi: [10.1111/psyp.12549](https://doi.org/10.1111/psyp.12549)
 143. Jolink TA, Way BM, Younge A, Oveis C, Algoe SB. Everyday co-presence with a romantic partner is associated with lower C-reactive protein. *Brain Behav Immun.* 2023;**107**:132–139. doi: [10.1016/j.bbi.2022.09.007](https://doi.org/10.1016/j.bbi.2022.09.007)
 144. Black PH. The inflammatory consequences of psychologic stress: relationship to insulin resistance, obesity, atherosclerosis and diabetes mellitus, type II. *Med Hypotheses.* 2006;**67**(4):879–891. doi: [10.1016/j.mehy.2006.04.008](https://doi.org/10.1016/j.mehy.2006.04.008)
 145. Kiecolt-Glaser JK, Loving TJ, Stowell JR, et al. Hostile marital interactions, proinflammatory cytokine production, and wound healing. *Arch Gen Psychiatry.* 2005;**62**(12):1377–1384. doi: [10.1001/archpsyc.62.12.1377](https://doi.org/10.1001/archpsyc.62.12.1377)
 146. Hologue C, Owusu JT, Feder KA, Spira AP. Sleep duration and C-reactive protein: associations among pregnant and

- non-pregnant women. *J Reprod Immunol*. 2018;**128**:9–15. doi: [10.1016/j.jri.2018.05.003](https://doi.org/10.1016/j.jri.2018.05.003)
147. Friedman EM. Sleep quality, social well-being, gender, and inflammation: an integrative analysis in a national sample. *Ann N Y Acad Sci*. 2011;**1231**(1):23–34. doi: [10.1111/j.1749-6632.2011.06040.x](https://doi.org/10.1111/j.1749-6632.2011.06040.x)
148. Green TRF, Ortiz JB, Wonnacott S, Williams RJ, Rowe RK. The bidirectional relationship between sleep and inflammation links traumatic brain injury and Alzheimer's Disease. *Front Neurosci*. 2020;**14**:894. doi: [10.3389/fnins.2020.00894](https://doi.org/10.3389/fnins.2020.00894). <https://www.frontiersin.org/articles/10.3389/fnins.2020.00894>. Accessed August 18, 2023.
149. Cho HJ, Seeman TE, Kiefe CI, Lauderdale DS, Irwin MR. Sleep disturbance and longitudinal risk of inflammation: moderating influences of social integration and social isolation in the Coronary Artery Risk Development in Young Adults (CARDIA) study. *Brain Behav Immun*. 2015;**46**:319–326. doi: [10.1016/j.bbi.2015.02.023](https://doi.org/10.1016/j.bbi.2015.02.023)
150. Friedman EM, Hayney MS, Love GD, et al. Social relationships, sleep quality, and interleukin-6 in aging women. *Proc Natl Acad Sci USA*. 2005;**102**(51):18757–18762. doi: [10.1073/pnas.0509281102](https://doi.org/10.1073/pnas.0509281102)
151. Wilson SJ, Jaremka LM, Fagundes CP, et al. Shortened sleep fuels inflammatory responses to marital conflict: emotion regulation matters. *Psychoneuroendocrinology*. 2017;**79**:74–83. doi: [10.1016/j.psyneuen.2017.02.015](https://doi.org/10.1016/j.psyneuen.2017.02.015)
152. Gibbons CH. Chapter 27 - Basics of autonomic nervous system function. In: Levin KH, Chauvel P, eds. *Handbook of Clinical Neurology*. Vol 160. Clinical Neurophysiology: Basis and Technical Aspects. Elsevier; 2019:407–418. doi: [10.1016/B978-0-444-64032-1.00027-8](https://doi.org/10.1016/B978-0-444-64032-1.00027-8)
153. Murray-Close D, Holland AS, Roisman GI. Autonomic arousal and relational aggression in heterosexual dating couples. *Pers Relatsh*. 2012;**19**(2):203–218. doi: [10.1111/j.1475-6811.2011.01348.x](https://doi.org/10.1111/j.1475-6811.2011.01348.x)
154. Sajjadih A, Shahsavari A, Safaei A, et al. The association of sleep duration and quality with heart rate variability and blood pressure. *Tanaffos*. 2020;**19**(2):135–143.
155. Holt-Lunstad J, Jones BQ, Birmingham W. The influence of close relationships on nocturnal blood pressure dipping. *Int J Psychophysiol*. 2009;**71**(3):211–217. doi: [10.1016/j.ijpsycho.2008.09.008](https://doi.org/10.1016/j.ijpsycho.2008.09.008)
156. de Zambotti M, Baker FC. Sleep and circadian regulation of the autonomic nervous system. In: Chokroverty S, Cortelli P, eds. *Autonomic Nervous System and Sleep: Order and Disorder*. Switzerland: Springer International Publishing; 2021:63–69. doi: [10.1007/978-3-030-62263-3_7](https://doi.org/10.1007/978-3-030-62263-3_7)
157. Hall M, Vasko R, Buysse D, et al. Acute stress affects heart rate variability during sleep. *Psychosom Med*. 2004;**66**(1):56–62. doi: [10.1097/01.psy.0000106884.58744.09](https://doi.org/10.1097/01.psy.0000106884.58744.09)
158. Krietsch KN, Mason AE, Sbarra DA. Sleep complaints predict increases in resting blood pressure following marital separation. *Health Psychol*. 2014;**33**(10):1204–1213. doi: [10.1037/hea0000089](https://doi.org/10.1037/hea0000089)
159. Gunn HE, Buysse DJ, Matthews KA, Kline CE, Cribbet MR, Troxel WM. Sleep-wake concordance in couples is inversely associated with cardiovascular disease risk markers. *Sleep*. 2017;**40**(1). doi: [10.1093/sleep/zsw028](https://doi.org/10.1093/sleep/zsw028)
160. Wanic R, Kulik J. Toward an understanding of gender differences in the impact of marital conflict on health. *Sex Roles*. 2011;**65**(5-6):297–312. doi: [10.1007/s11199-011-9968-6](https://doi.org/10.1007/s11199-011-9968-6)
161. Brissette I, Cohen S. The contribution of individual differences in hostility to the associations between daily interpersonal conflict, affect, and sleep. *Pers Soc Psychol Bull*. 2002;**28**(9):1265–1274. doi: [10.1177/01461672022812011](https://doi.org/10.1177/01461672022812011)
162. Sadeh A, Hauri PJ, Kripke DF, Lavie P. The role of actigraphy in the evaluation of sleep disorders. *Sleep*. 1995;**18**(4):288–302. doi: [10.1093/sleep/18.4.288](https://doi.org/10.1093/sleep/18.4.288)
163. Ko PRT, Kientz JA, Choe EK, Kay M, Landis CA, Watson NF. Consumer sleep technologies: a review of the landscape. *J Clin Sleep Med*. 2015;**11**(12):1455–1461. doi: [10.5664/jcsm.5288](https://doi.org/10.5664/jcsm.5288)
164. Haghayegh S, Khoshnevis S, Smolensky MH, Diller KR, Castriotta RJ. Accuracy of wristband fitbit models in assessing sleep: systematic review and meta-analysis. *J Med Internet Res*. 2019;**21**(11):e16273. doi: [10.2196/16273](https://doi.org/10.2196/16273)