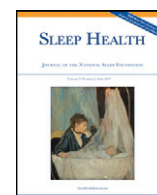




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Affiliative interpersonal behaviors during stress are associated with sleep quality and presleep arousal in young, healthy adults



Heather E. Gunn, PhD^{a,b,*}, Kenneth L. Critchfield, PhD^{a,c}, Julia E. Mackaronis, PhD^a, Holly K. Rau, PhD^a, Matthew R. Cribbet, PhD^{a,d}, Wendy M. Troxel, PhD^e, Paula G. Williams, PhD^a

^a Department of Psychology, University of Utah, Salt Lake City, UT, USA

^b Department of Psychiatry, School of Medicine, University of Pittsburgh, Pittsburgh, PA, USA

^c Department of Psychology at James Madison University, Harrisonburg, VA, USA.

^d Department of Psychology, Texas Tech University, Lubbock, TX, USA.

^e Department of Psychiatry, School of Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, USA and RAND Corporation, Pittsburgh, PA, USA.

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ABSTRACT

Objectives: This study examined the association between stress-related interpersonal behaviors, presleep arousal (PSA), and sleep quality.

Methods: Sixty-four participants (53% female) described a recent stressful interpersonal event that was coded for overall degree of affiliation (warmth vs hostility) and autonomy (independence vs interdependence). Cognitive and somatic PSA and sleep quality were examined using regression with affiliation and autonomy scores as predictors. Specific interpersonal behaviors that comprise overall affiliation were also examined.

Results: More affiliation (warmth) was associated with lower cognitive PSA ($\beta = -.32$) and better sleep quality ($\beta = -.28$). Autonomy was not associated with sleep quality or PSA. The specific behavior trust in others was associated with better sleep quality ($r_s = -.25$).

Conclusions: Behaviors during stress reflect underlying dimensions of interpersonal security.

Findings underscore importance of interpersonal frameworks for understanding associations between stress and sleep, and provide support for the anthropological theory that interpersonal security is necessary for healthy sleep.

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Humans are inherently vulnerable during sleep because of reduced awareness. Anthropological theory suggests that to protect against danger, early humans relied on affiliation with close-knit groups to “turn off” sensory processes and sleep.¹ Emerging research suggests that the need for interpersonal security (ie, affiliative connectedness or interdependence) for healthy sleep is likely still reflected in modern humans.^{2,3} According to attachment theory, stress activates the need for interpersonal security⁴; therefore, interpersonal behavior during stress (ie, degrees of affiliation and interdependence) likely represents one's sense of interpersonal security. Moreover, interpersonal insecurity during stress may explain associations between stress and sleep problems,^{5,6} including heightened

presleep arousal (PSA).⁷ At present, however, we know little about how interpersonal behaviors during stress relate to sleep.

Characteristics of interpersonal security are associated with better sleep, supporting anthropological theory. Individuals who report higher social support are less likely to have wakefulness after sleep initiation.⁸ Marital satisfaction, a form of interpersonal security, is associated with better sleep quality.⁹ Moreover, secure attachment styles (ie, affiliative and trusting) are associated with better sleep quality.¹⁰

Conversely, less affiliation and extreme independence, characteristics of interpersonal insecurity, are associated with poor sleep. Loneliness is associated with arousal and more nighttime wakefulness.¹¹ Insecure attachment styles are associated with less restorative sleep and increased sleep complaints.¹² Distress related to interpersonal sensitivity is associated with greater cognitive arousal.¹³ Finally, individuals with greater trait hostility (ie, cynicism and mistrust of others¹⁴) are more likely to experience sleep disruption after interpersonal stressors.⁶

* Corresponding author at: University of Pittsburgh, 3811 O'Hara St, Pittsburgh, PA, USA, 15213. Tel.: +1 412 864 1703; fax: +1 412 246 5300.
E-mail address: gunnh@upmc.edu (H.E. Gunn).

Overall, characteristics of interpersonal security, more affiliation and moderate interdependence, are associated with better sleep,¹⁰ whereas characteristics of interpersonal insecurity are associated with poorer sleep.¹² What is known about interpersonal behavior and sleep, however, is limited to global self-reports of interpersonal security (eg, attachment style); less is known about interpersonal behaviors during stress and their association with sleep. A contextual evaluation of interpersonal behaviors and their association with sleep is critical given that stress activates individuals' needs for warmth and interdependence.⁴ Therefore, interpersonal behavior specifically during stress may clarify associations between stress and PSA and the interpersonal environment and sleep.

This is a cross-sectional pilot study of sleep quality, PSA, and interpersonal behaviors during stress in college undergraduates, a population prone to insufficient sleep.¹⁵ Interpersonal behaviors described during a social stress interview were objectively rated for degree of affiliation (warmth vs hostility) and autonomy (independence vs interdependence). We predicted that greater affiliation (ie, warmth) would relate to better sleep quality and less PSA. Because loneliness is associated with poor sleep and anthropological theory suggests that closeness helps increase interpersonal security, we hypothesized that greater autonomy (independence) would relate to worse sleep quality and higher PSA.

Method

Study design and participants

This study was part of a larger study examining individual differences in stress regulation. A university institutional review board approved the study. Participants were 98 undergraduates (52% male; age mean = 22.97, SD = 5.8) who received course credit for participation. Participants self-identified as 77% white, 8% Asian, 4% African American, and 5% other (6% missing). We used 64 of the 98 individuals who described self-focused behaviors (see coding methods below). They did not differ from the larger sample in demographic or sleep outcome variables.

Interview procedure

Following informed consent, participants ranked 21 undergraduate stressors (eg, separation from family/friends, financial burdens, career and academic decisions, and breakups) derived from the Inventory of College Students' Recent Life Experiences¹⁶ from most to least stressful. Each individual's highest-ranked recent stressor was discussed using the Social Competence Interview (SCI¹⁷), an 8-minute, semistructured interview in which participants describe their own behavior and the behavior of others that occurred during the stressor. SCI-observed interpersonal behaviors are stable over time.¹⁷ Participants described memories of their top-ranked stressor. The video-recorded interviews thus provided evidence of an individual's interpersonal behaviors in response to stress.

Measures

Sleep outcomes

Sleep quality was assessed using the 20-item Pittsburgh Sleep Quality Index (PSQI¹⁸). Higher global scores (range = 0–21) indicate poorer sleep quality. Component scores (range = 0–3) assess sleep onset latency, sleep duration, and sleep efficiency (the ratio of total time in bed and total sleep time). Higher component scores indicate longer onset latency, shorter sleep duration, and worse sleep efficiency, respectively. The PSQI is a valid sleep quality assessment that reliably discriminates between good and poor sleepers, with good internal and test-retest reliability.¹⁸ Good internal reliability was demonstrated in the current study ($\alpha = .80$).

Participants also completed the 16-item Pre-Sleep Arousal Scale¹⁹ on 2 occasions, which reliably assesses cognitive (eg, racing thoughts, worries) and somatic (eg, heart racing, muscle tension) bedtime arousal. Cognitive and somatic subscale scores range from 8 to 40; higher scores indicate more arousal. Cognitive and somatic PSA scores from the 2 assessments were averaged to better approximate individuals' general tendencies toward PSA. Alpha was .90 and .73 for the cognitive and somatic subscales, respectively.

Objective ratings of interpersonal behaviors during stress

Three experts in the Structural Analysis of Social Behavior (SASB) coded SCI interviews²⁰ to assess subjects' stress-responsive affiliation and autonomy. The first step determined whether the behavior described was done to, for, or about another person (ie, Focus on Other) or whether the behavior was done to, for, or about the self (ie, Focus on Self). Most responses focused on the self in response to others, so this analysis was limited to self-focused behaviors of the SASB model (Fig. 1). The next step determined degree of affiliation from hostile (−9) to warm (+9), which corresponds to the horizontal dimension of Figure 1. The rater then determined the degree of autonomy from independent/separate (+9) to interdependent/submit (−9), which corresponds to the vertical dimension in Figure 1. Each complete thought participants expressed was assigned an SASB position based on autonomy and affiliation. For example, "I told my roommate how I was feeling" is moderately warm and independent. It conforms to the SASB model's upper right quadrant, *Disclose*. "I sought help about my career from a professor" is also warm but moderately interdependent and conforms to the lower right quadrant, *Trust*. The statement "I did what he said but was not happy about it" is moderately hostile and interdependent. It conforms to the SASB model's lower left quadrant, *Sulk*. Lastly, "I was upset [with roommate] but I just got quiet and didn't talk about it" is independent and moderately hostile and conforms to the upper left quadrant, *Wall off*. Twenty percent of videos were randomly selected for interrater reliability and yielded an average weighted κ of .70 (range from .56 to .81), which is acceptable for the analyses planned in this study and similar to the ranges found in previous studies using SASB content coding.^{21,22}

SASB variables

Hypothesis testing was conducted using overall affiliation and autonomy from SASB-coded from interviews, which are weighted summary scores of total affiliation and autonomy present in each participant's narrative. For affiliation, warm behaviors were assigned positive weights (eg, disclose = 7.8), and hostile behaviors received negative weights (eg, sulk = −7.8). Autonomy was calculated similarly; independent behaviors (eg, separate) received positive weights, and interdependent behaviors (eg, submit) received negative weights.²⁰

Analytical approach

Three regression analyses were conducted for cognitive and somatic PSA, and global sleep quality. Predictors were affiliation and autonomy scores. If overall affiliation, autonomy, or PSQI scores were significant, Spearman ρ correlations were computed for specific SASB behaviors (eg, disclose, trust, sulk, wall off) comprising affiliation and autonomy scores and for PSQI component scores (sleep onset latency, sleep duration, and sleep efficiency).

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