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Insecure Attachment is an Independent Correlate of Objective Sleep Disturbances in Military Veterans

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Abstract

Background—Sleep disturbances and interpersonal problems are highly prevalent in military veterans with post-traumatic stress disorder (PTSD) and are associated with substantial comorbidities and increased healthcare costs. This study examines the association between interpersonal attachment styles and sleep in a high-risk cohort of military veterans with PTSD symptoms.

Methods—Participants were 49 military veterans (85% male) enrolled in a treatment study of combat-related sleep disturbances. Data were collected at pre-treatment baseline. Attachment anxiety and avoidance, clinical characteristics, and subjective sleep quality were characterized via self-report. Polysomnographic (PSG) sleep measures were averaged from 2 nights of in-laboratory sleep studies and included: visually scored duration and continuity, the percentage of Stage 3 + 4 sleep and rapid eye movement (REM) sleep, and quantitative electroencephalographic (EEG) measures of delta and beta power during NREM and REM sleep. Linear regressions evaluated the relationship between attachment styles and sleep with adjustment for demographics, and PTSD and depressive symptoms.

Results—Greater attachment anxiety was associated with reduced percentage of Stage 3+4 sleep, ($\beta = -.36$, $p < .05$) and increased relative beta power during NREM sleep ($\beta = .40$, $p < .05$). In contrast, greater attachment avoidance was positively associated with delta power during NREM and REM sleep ($\beta = .35$ and .38, respectively, p`s $< .05$).

Conclusions—These findings suggest specific effects of interpersonal styles on physiological sleep measures. Elucidating both the neurobiological and psychological correlates of PTSD-related sleep disturbances is critical for developing future targeted intervention efforts aimed at reducing the burden of PTSD.

Keywords

Sleep; attachment; military; post-traumatic stress disorder; interpersonal styles; polysomnography

The affective state of insecurity, characterized by heightened vigilance and threat, is antithetical to the sleep state (1). Post-traumatic stress disorder (PTSD) is a psychiatric disorder which typifies this affective state, with sleep disturbances being a cardinal symptom of the disorder. Among military veterans with PTSD symptoms, sleep disturbances are highly prevalent and are associated with substantial comorbidities and increased healthcare costs (2;3). Moreover, evidence suggests that sleep disturbances early after trauma exposure predict the development of PTSD (4;5). Elucidating both the neurobiological and

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psychological correlates of PTSD-related sleep disturbances is critical for developing future targeted intervention efforts aimed at reducing the burden of PTSD for veterans and their families, and for identifying targets to enhance psychological resilience to stress in these populations. In particular, emerging evidence highlights the critical role of the close interpersonal context in predicting post-deployment adjustment, as marital instability and domestic violence are highly prevalent in veteran populations (6–10), whereas marital stability is a key protective factor, associated with reduced risk of psychiatric disorders and suicide in military populations (11).

Attachment theory provides a useful framework for considering how the socioemotional climate influences affect and arousal across the lifespan, and may be particularly important for understanding post-deployment adjustment in military veterans with PTSD symptoms. In brief, attachment theory suggests that early interactions with caregivers, or in the case of adult relationships, the romantic partner, leads to expectations concerning the degree to which the caregiver or partner will be consistently responsive, warm, and nurturing to one`s needs (12;13). In turn, these expectations are purported to play a key role in facilitating one`s capacity to organize experience and regulate distress when faced with stressful or threatening situations.

Recent evidence suggests that trait-level adult attachment can best be characterized within a two-dimensional structure representing anxiety (characterized by fears of abandonment and preoccupation with the physical and emotional availability of the partner) and avoidance (characterized by a tendency to value autonomy and suppress needs for closeness) (12;13). In accordance with this view, a number of studies have shown that attachment insecurity, as characterized by high levels of attachment anxiety and/or avoidance, is associated with poorer indices of well-being, including higher rates of depression, anxiety, loneliness, and hostility, more negative and mistrusting views of the social environment, and heightened physiologic and emotional responses to stressful situations (14–17), relative to those with secure attachment predispositions. Furthermore, in the context of exposure to a traumatic stressor, a number of studies have shown that attachment security is implicated in both short-term distress following the trauma and long-term adjustment (18–20). Finally, attachment style has been implicated in post-deployment adjustment and PTSD prognosis in military populations (21;22).

Recently, a handful of studies utilizing civilian populations have investigated the association between attachment style and sleep, with the notion that anxious attachment styles may predispose to sleep problems whereas non-anxious attachments may foster healthy sleep habits. That is, physiological hyperarousal combined with cognitive vigilance are implicated in the pathophysiology of insomnia (23;24) and are also evidenced in individuals with anxious attachments (25). Thus, anxious attachment styles, in particular, which are characterized by “hyperactivating” strategies during times of threat or stress, may predispose to sleep problems by influencing stress-arousal systems and cognitions related to the emotional and physical availability of the partner (26). In contrast, secure attachments (low levels on anxiety and avoidance dimensions) may promote deeper, more restorative sleep by providing a sense of safety and security and allowing the individual to physiologically and psychologically “unwind” from the stresses of the day or from residual stress that persist post-military deployment or operations. The sleep of avoidant individuals may be similarly protected because of their tendency to use “deactivating” strategies, including valuing autonomy and suppressing needs for closeness.

Indeed, the limited extant literature suggests that higher levels of attachment anxiety are associated with abnormalities in sleep architecture, including reductions in Stage 3 + 4 sleep in depressed women (27) and increased alpha intrusion into non-rapid eye movement

(NREM) sleep in fibromyalgia patients (28), reduced sleep efficiency (29), and poorer subjective sleep quality in healthy married couples (30), college students (31), and community-dwelling senior (32). To date, however, no study has examined attachment anxiety as a correlate of sleep in the context of military veterans with PTSD symptoms, despite the fact that attachment style has been implicated in the adjustment and prognosis in PTSD populations and that sleep disturbances are a cardinal symptom of PTSD.

Therefore, the purpose of the present study was to examine the association between attachment style and sleep disturbances in a population of military veterans with PTSD symptoms. Sleep disturbances were characterized according to self-report, using the most widely used and well-validated measure of subjective sleep quality (Pittsburgh Sleep Quality Index; PSQI; (33), and via polysomnography, utilizing both visually scored and quantitative electroencephalographic (QEEG) parameters to provide measures of sleep architecture and microarchitecture. Specifically, based on the limited extant literature showing that attachment anxiety is associated with poorer subjective sleep quality and continuity, as well as reductions in Stage 3 + 4 sleep, we predicted that in our sample of veterans, higher levels of attachment anxiety would similarly be associated with poorer sleep quality, reduced sleep efficiency, lesser visually scored Stage 3+4 sleep, and lower amounts of delta activity as quantified by spectral analysis of QEEG data. Moreover, based on the broader literature showing that psychosocial stress and mood disorders are most reliably associated with measures of sleep duration and continuity (e.g., total sleep time, sleep efficiency; (34;35), REM sleep, and indicators of hyperarousal during sleep (e.g., Beta activity; (36;37)), we further hypothesized that higher levels of attachment anxiety would be associated with shorter sleep duration, greater percentage of REM sleep, and higher Beta activity. For each of these hypothesized associations we sought to examine whether attachment anxiety exerts an independent influence on sleep outcomes, over and above the influence of demographic characteristics, psychiatric symptom severity (depression and PTSD symptoms), and medications that could influence sleep. In addition, consistent with recommendations for examining the influence of attachment (38), we simultaneously entered both attachment anxiety and avoidance into all statistical models.

Methods

Study Overview

Participants were 49 military veterans (87% male) drawn from a double-blind, randomized, controlled clinical trial of the efficacy and durability of prazosin or behavioral treatment versus placebo for sleep disturbances in military veterans with PTSD symptoms (PR054093-W81XWH-07; PI: Germain). Data for the current analyses including demographic, and clinical characteristics, military history, subjective and objective sleep characteristics, and attachment style were evaluated at pretreatment baseline, prior to study randomization. This study was approved by the University of Pittsburgh Institutional Review Board.

Participants

Military veterans between the ages of 18 and 60 were recruited from the general population via media advertisements and from the Pittsburgh VA Health Care System clinics and services.

Participants first completed a physical examination including blood work, electrocardiogram (EKG), and urine drug screen, as well as a series of clinician-administered interviews to assess PTSD, psychiatric history, and sleep disorders using the Clinician-Administered PTSD Scale (CAPS; (39)) and Structured Clinical Interview for DSM-IV (SCID; (40)), and a structured interview for sleep disorders developed locally, respectively. Participants then

completed one night in the sleep laboratory to rule out clinically significant obstructive sleep apnea. Participants were excluded if they presented with 1) an unstable medical condition or abnormal ECG findings; 2) resting blood pressure less than 90/60 during the physical examination at the physical examination, 3) a history of bipolar or psychotic disorder, current (< 3 months) substance/alcohol abuse or dependence; 4) current severe and untreated Axis I disorder; 5) positive drug screen; 6) unstable medical conditions; 7) were previously diagnosed with obstructive sleep apnea or were found to have sleep apnea after the in-lab screening sleep evaluation, as indicated by an apnea-hypopnea index (AHI) ≥ 16. Participants who presented with unanticipated or untreated findings were referred to their primary care physician for further care. Veterans who were using a beta-blocker or another alpha-1 antagonist were also excluded to limit the potential risk of synergic effects with prazosin and adverse cardiovascular side effects (e.g., orthostatic hypotension, syncope). Women were required to have a negative urine pregnancy test before the beginning of the treatment randomization, and agreed to use two contraception methods during the course of the study. Finally, veterans were instructed to refrain from taking phosphodiesterase 5 inhibitors.

Study eligibility required that participants were over the age of 18 years old and endorsed clinically meaning sleep disturbances as determined by a score > 3 of the sleep items of the CAPS.

Measures

Demographics/ Military History—Information regarding participants' age, racial/ ethnic identity, marital status, educational history, and military history were collected via self-report and screening questionnaires at the baseline assessment. Documentation of military service was obtained by the provision of veterans' DD Form 214, a form issued by the Department of Defense upon a military service member's separation from active-duty military.

Psychiatric/ Medical Assessment

PTSD symptom severity: We assessed lifetime history of PTSD symptoms, using the CAPS (39). The CAPS is a structured, clinician-administered interview to assess the frequency and intensity of the 17 DSM-IV PTSD diagnostic criteria. It also includes items to evaluate the severity of related social and occupational impairments. The CAPS has demonstrated excellent psychometric properties including high internal consistency (σ = . 94) and good convergent validity with other PTSD scales (39). The severity and intensity scores for all symptoms was summed to provide an overall severity score, with higher scores indicating more severe PTSD diagnosis. Scores in the 20–39 are considered in the mild PTSD/ subthreshold, 40–59=moderate PTSD/threshold, 60–79=severe PTSD symptomatology, ≥80=extreme PTSD symptomatology (41). Using the 1–2 scoring method, 46% of the sample met diagnostic criteria for current PTSD.

Depressive symptoms: The Beck Depression Inventory (BDI; (42)— is a 21-item self-report questionnaire used to assess the severity of depressive symptoms. The reliability, convergent validity, and criterion validity of this measure are well established (43).

Current medications: Information regarding participants' use of medications known to affect sleep or wake functions (benzodiazepines, hypnotics, antidepressants, antipsychotics, anxiolytics, stimulants, antihistamines, decongestants, corticosteroids, diuretics) was collected via self-report and included as a binary covariate (yes/no) in the analyses.

Attachment Style: Attachment style was measured using the Experiences in Close Relationships Inventory-Revised (ECR-R; (44)), a 36-item instrument designed to measure attachment-related anxiety and avoidance. This instrument has well-documented reliability and validity across different samples (45). Participants are asked to rate the extent to which each item accurately reflects how they typically feel in close relationships, using a 7-point scale ranging from "not at all" (1) to "very much" (7). Half of the items assess attachment anxiety and the remaining items assess attachment avoidance. In the current sample, attachment anxiety and avoidance were modestly correlated with Pearson's r of .33, $p < .05$.

Sleep

Subjective sleep quality: The Pittsburgh Sleep Quality Index (PSQI; (33)) is a widely used and well-validated measure of sleep quality. The PSQI consists of 19-item self-report items that assess seven components of sleep quality (i.e., subjective sleep quality, sleep latency, duration, efficiency, disturbances, use of sleep medication, and daytime dysfunction) from which a global sleep quality score can be derived with higher scores indicating poorer sleep quality. A cut-off score of 5 has been shown to discriminate between good and bad sleepers (33).

Objective sleep measures: Participants completed 3 nights of in-laboratory polysomnographic sleep studies during their habitual sleep-wake times, as determined by self-report sleep-wake diaries. PSG signals collected on each study night included bilateral central referential EEG channels (C3 and C4, referenced to A1 linked to A2), electro-oculogram (EOG), submentalis electromyogram (EMG), and electrocardiogram (EKG). In addition, on the first sleep study night, information was collected for the assessment of sleep disordered breathing (SDB) with nasal pressure cannula, oral-nasal thermistors, fingertip oximetry, and abdominal and thoracic respiratory effort, as measured by inductance plethysmography. The first night was used as a diagnostic study to rule-out the presence of sleep apnea (as defined by apnea-hypopnea index (AHI) > 15 per hour of sleep)) and to reduce well-documented adaptation ("first-night" effects; (46)).

Visual sleep stage scoring in 20-sec epochs was conducted by trained PSG technologists with established reliability, using standard scoring criteria (47) and American Academy of Sleep Medicine recommendations (48) for scoring the apnea-hypopnea index (AHI). Sleep outcomes in the current study were averaged over nights 2 and 3 and included: total sleep time (in minutes), sleep efficiency (i.e., ratio of time spent asleep/time spent in bed after sleep onset), percentage of time in rapid eye movement (REM) sleep, and percentage of time in Stage 3+4 sleep.

In addition, quantitative EEG analysis (49) was performed to quantify power in the delta (0.05–4.0 Hz) and beta (16–32 Hz) bands during NREM and REM sleep, given previous associations between visually-scored delta activity and attachment anxiety (27) and previous associations between increased beta activity and psychosocial stress and insomnia (37;50;51). Briefly, modified periodograms were computed using the Fast Fourier transform (FFT) of non-overlapping 4-sec epochs of the sleep EEG. This software includes a validated automated artifact rejection routine (49). EEG spectra were obtained for each artifact-free 4-sec epoch and were then aligned with 20-sec visually scored sleep stage data. Relative power (each band was divided by total power) was used in the present analyses in order to account for individual differences in overall EEG power (QEEG; (52)).

Statistical Analyses—Sleep variables with non-normal distributions were transformed prior to statistical analysis. Hierarchical linear regression analyses examined the independent relationship between attachment anxiety and avoidance (entered simultaneously) and sleep

outcomes, after statistical adjustment for demographic and clinical characteristics. The dependent variables included: visually scored sleep efficiency, total sleep time, percentage of Stage 3+4 sleep, percentage of REM sleep, and quantitative EEG measures of relative delta and beta power, and global PSQI score.

Results

As shown in Table 1, the sample (N=49) was predominantly white (85%) and male (87%) with a mean age of 41.4 years. The majority of participants served in the Gulf War conflicts (46% served in Operations Iraqi Freedom or Enduring Freedom and 17% in the Persian Gulf War). Depressive symptoms were in the minimal range of clinical severity, whereas PTSD symptoms were in the moderate/ threshold range of severity. Mean levels of attachment anxiety (M=3.5, SD = 1.2) and avoidance (M = 3.4, SD = 1.1) were consistent with published norms (53).

Table 2 shows the results for hierarchical linear regression models which examined the independent influence of attachment anxiety and avoidance (entered simultaneously) on sleep outcomes after statistically adjusting for demographic characteristics (age, sex, and marital status) and clinical characteristics (PTSD and depressive symptom severity). In the adjusted models, higher levels of attachment anxiety were associated with significantly lesser percentage of Stage 3+4 sleep ($\beta = -.36$, $p < .05$) and greater NREM sleep beta power ($\beta = .40$, $p < .05$). There were marginal associations between attachment anxiety and NREM delta power ($p = .06$) and REM beta power ($p = .08$), after statistical adjustment for covariates. Attachment anxiety was not associated with subjective sleep quality, sleep efficiency or duration, percentage of REM sleep, or REM delta power in the covariate adjusted models. Attachment avoidance showed significant, positive relationships with both NREM and REM delta power ($\beta = .35$ and .38, respectively, p `s< .05) and showed a marginal, inverse relationship with REM beta power ($p = .08$).

Given strong age-related changes in sleep and the large age range included in this sample, we conducted sensitivity analyses restricted to the sample less than age 45 (n=27), and the pattern of results was the same.

Discussion

For the past 20 years, a growing body of research has shown that individual differences in attachment style play a key role in regulating physiological and psychological responses to stressful or traumatic events. More recently, a handful of studies have documented links between attachment insecurity, particularly the anxious dimension of insecurity, and poorer quality of sleep in healthy populations, as well as specific sleep architectural anomalies (i.e, lower percentage of Stage 3+4 sleep or greater amount of alpha intrusions in NREM sleep) in women with recurrent depression (27) and women with fibromyalgia syndrome (28), respectively. The current study extends this burgeoning literature by being the first to examine attachment insecurity-sleep associations in a sample of male and female military veterans with PTSD symptoms, and by comprehensively examining sleep, using “gold-standard” subjective and objective indices of sleep. Specifically, this is the first study to incorporate global ratings of sleep quality utilizing the well-validated PSQI, and multiple nights of PSG sleep, with both visual scoring of EEG and quantitative analysis of QEEG data during NREM and REM sleep. We found that attachment anxiety was associated with significantly lesser percentage of Stage 3+4 sleep and greater beta activity during NREM sleep, and a trend towards lower NREM delta activity. We also found significant, *positive* associations between attachment avoidance and delta activity during NREM and REM sleep. These findings cohere with the hypothesis that attachment anxiety may predispose to sleep

problems through chronic physiological and cognitive hyperarousal, particularly with regard to the emotional and physical availability of the partner, whereas the sleep of avoidant individuals may be relatively "protected" due to their tendency to use deactivating strategies during times of stress or perceived threat, including valuing autonomy and suppressing needs for closeness with others.

Animal studies (54) and recent human neuroimaging studies have implicated various brain regions and networks in affective arousal modulation and in reward processing, such as the amygdala, hippocampus, anterior cingulate cortex and medial temporal paralimbic regions, as well as the striatum (55–57). Although these brain regions are not directly involved in sleep-wake regulation, they nevertheless share close bi-directional connections with sleep- and arousal-promoting brain regions (see (58) for review). As such, it is possible that trait-like attachment styles supported by specific brain networks forebrain, limbic, and paralimbic regions can directly affect and modulate brain activity in sleep- and arousal regulation structures and networks during sleep.

Contrary to hypotheses, attachment anxiety was not associated with subjective sleep quality or PSG measures of sleep efficiency and duration. This lack of association is somewhat surprising, given that problems with sleep quality, continuity, or duration are the most salient sleep disturbances with insomnia—a clinical syndrome that is highly comorbid with PTSD and depression. In theory, these insomnia-related sleep disturbances should be linked with attachment anxiety, via chronic physiological and cognitive hyperarousal (36;59). On the other hand, this lack of a statistically significant association between attachment anxiety and these specific sleep parameters may reflect the overall high rates of insomnia-related sleep disturbances in this clinical population and the specific inclusion criteria which required endorsement of clinically significant sleep problems on the CAPS. Similarly, in Troxel and colleagues' (27), they also did not observe significant differences in sleep quality according to attachment style in a sample of women with recurrent depression, which they attributed to the overall high rates of sleep disturbance in that clinical population. Stated differently, in clinical populations in which there is substantial comorbidity with insomnia-related sleep differences, there may be insufficient variability in sleep quality, continuity, and duration to observe statistically significant relationships with attachment anxiety (i.e., a ceiling effect).

Also, consistent with Troxel and colleagues' study, we found that higher attachment anxiety was associated with lesser percentage of Stage 3+4 sleep in the current, predominantly male sample with combat-related PTSD symptoms. Moreover, we extended this attachment-sleep depth association, by documenting a marginal association between attachment anxiety and the NREM EEG delta power. Finally, the significant, positive relationship between attachment anxiety and elevated NREM EEG beta power is consistent with prior reports linking beta power with primary insomnia and chronic psychological stress (36;60). Notably, the significant relationships between attachment anxiety and sleep architecture and microarchitecture were evidenced even after controlling for the influence of demographic characteristics, clinical symptom severity, and attachment avoidance, suggesting that attachment anxiety is an independent correlate of lack of sleep depth and central arousal during sleep, even after accounting for these known risk factors. In contrast, the finding that attachment avoidance was associated with significantly increased delta activity during both NREM and REM periods suggests the possibility that, at least with regard to sleep, there may be relative benefits of this relational style in this population.

Thus, in aggregate, these findings suggest that attachment insecurity-sleep associations are not merely a general indicator of distress or clinical symptom severity. Rather, the specific associations with sleep architectural anomalies and central indicators of hyperarousal may

reflect a shared, neurobiological pathway linking attachment with sleep. Indeed, as shown in Table 2, there were relatively large, independent effects of attachment anxiety and avoidance on Stage 3+4 sleep and microarchitectural variables, with R^2's ranging from 9 to 18%.

Conclusions from this study are strengthened by the comprehensive assessment of sleep using gold standard measures of subjective and objective sleep disturbances, inclusion of a clinical sample of military men and women with PTSD symptoms—a population at high-risk for both sleep disturbance and interpersonal problems, and assessment of both dimensions of attachment insecurity using a well-validated instrument.

Several study limitations must are also notable. Based on the cross-sectional nature of this data, we cannot make inferences regarding causality or directionality. Indeed, given previous evidence that sleep disturbances can adversely affect mood and indices of interpersonal functioning, it is also possible that sleep disturbances led to changes in the individual's perception of the interpersonal context, including the individual's attachment style. However, this possibility is somewhat unlikely given that attachment is considered a relatively stable, trait-like characteristic (61). Given the relatively small sample size we did not have statistical power to examine the potential moderating influence of relationship status. However, previous evidence suggests that attachment anxiety is most likely to manifest in the context of close relationships. For instance, Troxel et al. (27) found that depressed women who had experienced a relationship rupture (through divorce or separation) evidenced the lowest levels of Stage 3+4 sleep.

In conclusion, we found that both attachment anxiety and avoidance are independently linked with specific sleep architectural anomalies in a sample of military veterans with PTSD symptoms. Future studies are needed to examine the degree to which attachment-sleep associations are influenced by the nature and timing of the traumatic event. These findings contribute to our understanding of how attachment security may regulate affect and arousal both day and night in veterans with PTSD--a population at high-risk for both sleep and relationship problems, and suggest that disruptions in sleep and attachment relationships may share common neurobiological pathways.

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Abbreviations

PTSD	post-traumatic stress disorder
NREM	non-rapid eye movement
REM	rapid eye movement
PSQI	Pittsburgh Sleep Quality Index
PSG	polysomnography
QEEG	quantitative electroencephalographic

EKG	electrocardiogram
EMG	electromyogram
CAPS	Clinician Administered PTSD Scale
AHI	apnea-hypopnea index
BDI	Beck Depression Inventory
FFT	Fast Fourier Transformation

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Table 1

Sample Characteristics (N=49)

	Mean	SD
Sociodemographics		
Age	41.4	13.5
	N	**%**
Married	21	39
Caucasian	45	85
Female	7	13
Clinical Characteristics	**Mean**	**SD**
PTSD symptoms severity	41.3	22.2
Depressive symptoms	10.9	8.2
Sleep measures		
PSQI	10.8	3.4
SL (minutes)	26.5	26.2
SE (%)	82.7	10.8
WASO (minutes)	47.0	37.9
TST (minutes)	354.8	76.8
% STAGE 3+4 SLEEP	4.9	5.4
%REM SLEEP	24.5	4.7
NREM DELTA ACTIVITY	0.8	0.070
NREM BETA ACTIVITY	0.01	0.007
REM DELTA ACTIVITY	0.61	0.07
REM BETA ACTIVITY	0.06	0.03
Attachment Security		
Attachment avoidance	3.4	1.1
Attachment anxiety	3.5	1.2
Source of Conflict	**N**	**%**
Bosnia	2	3.7
Korean	1	1.9
No Conflict	9	16.7
OIF/OEF	25	46.3
Persian Gulf	9	16.7
Vietnam	8	14.8

Note. PSQI= Pittsburgh Sleep Quality Index; SL= sleep latency; SE= sleep efficiency; WASO= wakefulness after sleep onset; TST= total sleep time.

Table 2

Sleep outcomes regressed on attachment anxiety and avoidance with statistical adjustment for demographic and clinical covariates (N =49).

	PSQI	SE^	TST	%STAGE 3+4^	%REM	NREM DELTA ACTIVITY^	NREM BETA ACTIVITY^	REM DELTA ACTIVITY^	REM BETA ACTIVITY^
Step 1: ΔR^2	.19	.23	.21	.21	.19	.25	.23	.12	.19
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
AGE	.10 (.05)	.49 (.01)**	−.46 (.94)*	−.37 (.02)*	−.02 (.06)	−.47 (.00)*	.31 (.003)#	.11 (.001)	−.30 (.003)#
MARRIED	.18 (.98)	−.27 (.16)#	.24 (20.58)#	−.10 (.32)	.27 (1.31)#	.10 (.01)	−.20 (.07)	.10 (.02)	−.02 (.06)
SEX	−.07 (1.50)	−.12 (.24)	.001 (31.67)	.18 (.49)	.03 (2.02)	.04 (.02)	−.24 (.10)	−.10 (.03)	−.26 (.09)#
MEDICATIONS	.17 (.99)	−.11 (.16)	−.11 (20.97)	−.12 (.32)	−.08 (1.34)	.07 (.01)	.08 (.07)	−.08 (.02)	.33 (.06)*
PTSD SYMPTOMS	.17 (.03)	.13 (.01)	−.37 (.63)#	.08 (.01)	.22 (.04)	−.06 (.00)	−.24 (.002)	−.19 (.001)	−.18 (.002)
DEPRESSIVE SYMPTOMS	.23 (0.7)	−.14 (.01)	.30 (1.50)#	−.17 (.02)	.15 (.10)	−.26 (.001)	.27 (.01)	−.05 (.001)	.08 (.01)
STEP 2: ΔR^2	.05	.00	.00	.18	.06	.13	.13	.13	.09
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
ATTACHMENT ANXIETY	.19 (.44)	.01 (.07)	.05 (9.42)	−.36 (.15)**	.25 (.60)	−.28 (.01)#	.40 (.03)*	−.21 (.01)	.26 (.03)#
ATTACHMENT AVOIDANCE	−.21 (.47)	.05 (.07)	−.07 (9.48)	−.17 (.15)	.06 (.61)	.35 (.01)	−.13 (.03)	.38 (.01)*	−.27 (.03)#

Note:

^Variable transformed prior to analysis. PSQI= Pittsburgh Sleep Quality Index (higher scores indicate poorer sleep quality); SE= Sleep efficiency. TST= total sleep time.

#p < .10:

*p<.05,

**p<.01.