

A LITTLE SLEEP AND SYMPATHY: POOR SLEEP IS POSITIVELY CORRELATED WITH INCREASED SYMPATHY

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Abstract

Sleep is important for emotional regulation and social cognition. Insufficient or disturbed sleep is associated with increased emotional reactivity, negative affect, increased negative situation appraisal, and instability in emotion processing. Prior work examining sleep and empathy (the ability to share another's emotional state) found that decreased sleep is associated with decreased empathy. No research on sleep and sympathy (concern for another's suffering accompanied by a motivation to alleviate it, without mirroring the other's feelings) has been conducted. Sympathy requires social evaluation of another's situation that includes determination of a lack of fault, feelings of love as well as sadness, and a desire to correct the distressing situation. Given previous work on sleep and empathy, it was hypothesized that poor sleep would be associated with decreased sympathetic feelings.

Methods: Data from the publicly available Midlife in the United States (MIDUS) study were obtained from the ICPSR repository and analyzed as secondary data (MR1P4 dataset). Participants included 790 adults (clinic visit age range 26–78 years; $M = 52.74$, $SD = 13.44$; 419 women, 371 men). Sleep was assessed via the Pittsburgh Sleep Quality Index (PSQI). Sympathy was measured using the total score on the Sympathy Scale (TSS; Expanded). Pearson correlations were conducted between Global PSQI scores, PSQI subscales, and the TSS score; t tests assessed sex differences, and multiple regressions examined the predictive value of the PSQI measures, sex, and age on Sympathy scores.

Results: Higher Global PSQI (indicating poorer sleep quality) was positively correlated with TSS score ($r = .098$, $p = .006$). Women reported poorer sleep across all measures, and more sympathy ($x=4.78$, $sd=.57$) than men ($x=4.50$, $sd=.61$, independent t -test $p<.0001$). Age ($\beta=.005$, $t=2.99$ $p=.003$) and sex ($\beta=.14$, $t=6.77$ $p<.0001$) were significant predictors, and Global PSQI was a marginally significant predictor ($\beta=.012$, $t=1.93$, $p=.05$) of sympathy.

Discussion: Contrary to expectations, poor sleep was associated with increased sympathy. Sleep loss related emotional instability and negativity bias may heighten sensitivity to suffering, leading to perception of hardship as more salient or distressing, even with the reduced perspective taking (e.g.: decreased empathy) reported in another research. Sleep disruption, by amplifying negative emotional processing, may result in sympathetic concern. Results support that poor sleep may impact interpersonal interactions, situational evaluations, and possibly prosocial behaviors.

Keywords: Sleep, sympathy, PSQI, emotional assessment.

1. Introduction

Sleep is a biological process that supports multiple functions, including emotional regulation and social behavior. Insufficient or disrupted sleep has been consistently associated with heightened emotional reactivity and increased negative affect, reflecting impaired regulation of emotional responses (e.g.: Walker & van der Helm, 2009; Yoo et al., 2007). These affective consequences of sleep loss have led researchers to examine sleep's impact on socio-emotional cognition, including interpersonal responding.

Recently, research has demonstrated that sleep disruption adversely affects empathy. Empathy refers to the capacity to understand and share another person's emotional state and is commonly conceptualized as being comprised of both cognitive (e.g., perspective taking) and affective (e.g., empathic concern) components (Tempesta et al., 2014). Evidence indicates that sleep loss undermines empathy. For example, physicians working night shifts show reduced empathy for patients' pain, prescribing fewer pain medications on the night shift, compared to those working day shifts (Choshen-Hillel et al., 2022). Similarly, Gordon-Hecker et al. (2025) reported that poorer global sleep quality, reduced sleep efficiency,

and shorter sleep duration were associated with lower empathic concern, as measured by the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983). Decreased sleep efficiency was additionally associated with diminished perspective taking. Experimental sleep interruption was also shown to causally reduce empathic responding and to attenuate perceptions of others' pain. Together, findings indicate that sleep disruption impairs both affective and cognitive components of empathy.

Importantly, empathy-related measures such as the IRI assess multiple constructs, including sympathy, which is conceptually distinct from empathy. Sympathy involves feelings of concern for another's suffering and a motivation to alleviate that suffering, without necessarily experiencing the same emotional state (Eisenberg et al., 2010; Tempesta et al., 2014). While sympathy is often embedded within broader empathy scales (e.g., the Empathic Concern subscale of the IRI; Davis, 1980, 1983), no studies have examined sympathy as a distinct construct in relation to sleep.

The present study addresses this gap by examining the association between sleep and sympathy specifically, using a 10-item scale derived from the Sympathy Scale developed by Uchida and Kitayama (2001), as implemented in the Midlife in the United States (MIDUS; <https://midus.wisc.edu/>) study. This measure allows for a targeted examination of concern for others' suffering, independent of emotional sharing or other empathy constructs. We hypothesized that poorer sleep quality would be associated with lower levels of sympathy, consistent with prior findings linking sleep disruption to reduced empathic concern. We also examined whether sex moderated this relationship. Based on prior work showing no sex differences in empathy and no moderating effect of sex on the relationship between sleep and empathic responding (Gordon-Hecker et al., 2025), we hypothesized that sex would similarly not moderate the association between sleep and sympathy.

2. Methods

2.1. Participants

Publicly available data from the Midlife in the United States (MIDUS) study was used for this research (<https://midus.colectica.org/>). The 863 participants from the MIDUS Refresher Biomarker Project (data set MR1P4) completed the surveys described below. Data and documentation about this dataset are publicly available via ICPSR (<https://www.icpsr.umich.edu/sites/icpsr/home>). In addition to the surveys used in analyses here, the MR1P4 data also include additional biological, physiological, self-report, and other data. For additional details about the MR1P4 dataset see the Field Report included with the MR1P4 (2011-2014) documentation (Weinstein, Ryff, & Seeman, 2019).

The analytic sample consisted of 790 adults (419 women, 371 men) aged 26 - 78 years during the Refresher survey phone interview ($M = 52.74$, $SD = 13.44$) who completed all parts of the surveys described below.

2.2. Materials

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989). The PSQI yields a global score and seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. Higher scores on all measures indicate or reflect poorer sleep quality.

Sympathy was measured using ten questions derived from the Sympathy Scale (Uchida & Kitayama, 2001) as used by, and reported in, the MIDUS data set. Participants indicated whether they agreed, on a seven point scale ranging from 'strongly disagree' to 'strongly agree', with ten statements evaluating how sympathetic they are to others. Scores were summed across the ten items to produce a Total Sympathy Score (TSS), with higher scores indicating more sympathy.

3. Statistical analyses

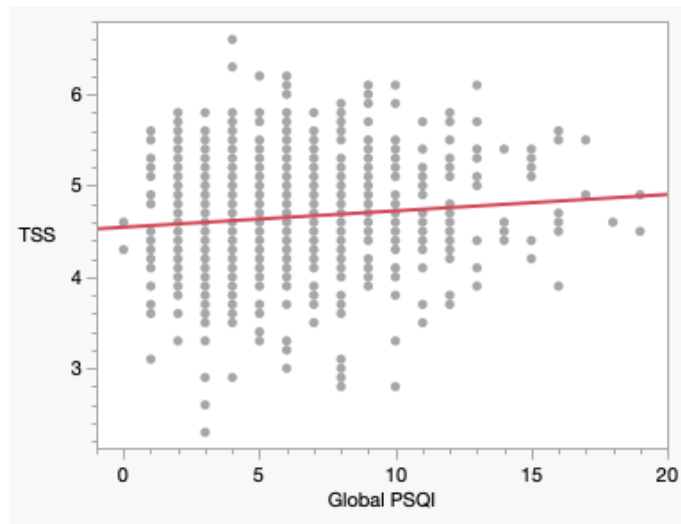
Pearson correlations were conducted between the eight PSQI variables (Global PSQI and seven subscores) and the TSS. Independent-samples *t* tests assessed sex differences. Effect sizes were calculated using Cohen's *d*. To account for multiple comparisons across eight PSQI measures, a Bonferroni-corrected alpha level of $p < .00625$ was applied. Multiple regressions examining the predictive value of the PSQI measures, sex, and age on TSS were also conducted.

4. Results

4.1. Sleep quality and sympathy

Poorer global sleep quality (Global PSQI) was significantly associated with greater sympathy ($r=.098, p=.006$). Significant positive associations were also observed between TSS and sleep latency ($r=.10, p=.0031$), sleep disturbance ($r=.10, p=.0032$), and habitual sleep efficiency ($r=.07, p=.05$). However, when applying a Bonferroni correction ($\alpha=.00625$), only the association between global sleep quality and sympathy remained statistically significant (See Figure 1).

Figure 1. Scatterplot and Best Fit Line between Global PSQI and TSS.



4.2. Sex Differences in sleep and sympathy

Women reported significantly poorer sleep than men across all sleep measures, and significantly higher sympathy (see Table 1).

Table 1. Sex Differences in Sleep Quality and Sympathy.

Measure	Men (M ± SD)	Women (M ± SD)	p	Cohen's d
PSQI Global Score	5.36 ± 3.13	6.42 ± 3.41	< .0001	0.32
Subjective Sleep Quality	0.93 ± 0.65	1.05 ± 0.66	.0075	0.18
Sleep Latency	0.85 ± 0.84	1.03 ± 0.91	.0046	0.20
Sleep Duration	0.72 ± 0.72	0.85 ± 0.84	.0171	0.17
Habitual Sleep Efficiency	0.38 ± 0.76	0.54 ± 0.85	.0055	0.20
Sleep Disturbance	1.20 ± 0.55	1.35 ± 0.58	.0004	0.27
Daytime Dysfunction	0.80 ± 0.73	0.91 ± 0.71	.0337	0.15
Use of Sleep Medication	0.48 ± 1.00	0.69 ± 1.15	.0063	0.19
Sympathy (Total Score)	4.50 ± 0.61	4.78 ± 0.57	< .0001	0.48

4.3. Sex and age

A regression analysis, using all seven PSQI subscales, sex, and age as predictors of TSS was significant ($F[9,780]=7.54, p<.0001, R^2=.08$). Increased age was associated with increased sympathy ($\beta=.0046, t=2.85, p=.004$). Sex was also significantly related to sympathy; replicating the t-tests, men scored lower on sympathy ($\beta=.145, t=6.74, p<.0001$). Increasing sleep latency was additionally associated with increased sympathy ($\beta=.06, t=2.11, p=.035$). A multiple regression using the global PSQI score, sex, and age as predictors of TSS was also significant ($F[3,786]=19.63, p<.0001, R^2=.07$). Again, age ($\beta=.005, t=2.99, p=.003$) and sex ($\beta=.14, t=6.77, p<.0001$) were both significantly predictive of sympathy in the model. Global PSQI was a marginally significant predictor of TSS ($\beta=.012, t=1.93, p=.05$).

5. Discussion

The present findings indicate that poorer sleep is associated with increased sympathy, contrary to prior research demonstrating poorer sleep and decreased measures of empathy (e.g.: Choshen-Hillel et al., 2022; Gordon-Hecker et al., 2025; Guadagni, Burles, Ferrara, & Iaria, 2014). However, supporting the present work, at least one previous study reported a positive correlation between empathy measured via the IRI and global PSQI score, with increased empathy associated with increased poor sleep (Guadagni, Umilta, & Laria, 2020). IRI also positively correlated with insomnia symptoms. Here, although some sleep–sympathy associations did not survive correction for multiple comparisons, indicating that these effects should be interpreted cautiously, the consistent directionality of effects across multiple sleep measures supports the interpretation that poor sleep is associated with increased sympathy, and at the very least that sleep plays a meaningful role in sympathetic responding. Sleep therefore plays a role in socio-cognitive processes, and it is possible that such impacts could extend more broadly to waking prosocial behavior, an under-examined area of research.

It is difficult to reconcile the contradictory findings across studies examining empathy constructs. Participant characteristics may play a role, and one direction for future research may be to explicitly consider personality correlates of empathy and their interaction with sleep.

It is interesting to note that both Guadagni, Umilta, & Laria (2020) and Gordon-Hecker et al. (2025) reported positive correlations between poor sleep and personal distress. Guadagni, Umilta, and Laria, (2020) found that personal distress, measured via the subscale of the IRI, was positively correlated with global PSQI, sleep latency, sleep duration, and symptoms of insomnia. These findings are aligned with Gordon-Hecker et al. (2025), who reported increased personal distress as being associated with increased global PSQI score. At a neurobiological level, the overarching pattern of increased sympathy and increased personal distress (this latter as reported in other studies) both being associated with poorer sleep is consistent with models suggesting that sleep loss amplifies emotional reactivity by weakening prefrontal regulatory mechanisms. Such a condition might result in increased responsiveness to emotionally salient stimuli (Walker & van der Helm, 2009) while reducing cognitive processing. That is, increased emotional circuit activity in response to poor sleep might result in increased sympathy and personal distress, while at the same time being associated with decreased cognitively-mediated sharing via reduced frontal lobe activity (e.g.: empathetic ‘putting oneself in another’s shoes’).

Women reported poorer sleep and greater sympathy than men. These findings replicate previous work on sleep (e.g.: Guadagni, Burles, Ferrara, & Iaria, 2014; Tang et al., 2017) and empathy (e.g.: Guadagni, Burles, Ferrara, & Iaria, 2014; Rueckert & Naybar, 2008). In contrast to Gordon-Hecker et al.’s (2025) work on empathy, here sex contributed to the models of the relationship between sleep and sympathy. However, the association between poor sleep and heightened sympathy operates similarly across sexes, even in the presence of baseline sex differences in sleep and affective functioning. Increased sympathy associated with increasing age, demonstrated via increased empathic concern via the ISI in previous research, also is aligned (Sze et al., 2012).

6. Limitations

Several limitations should be noted. First, the cross-sectional design precludes causal inference regarding the directionality of the relationship between sleep and sympathy. As mentioned, it is possible that individual characteristics impact this association. Second, although multiple significant correlations were observed, only the relationship between global sleep quality and sympathy survived correction for multiple comparisons, indicating that some findings may reflect Type I error. Third, all measures were self-reported, raising the possibility of self-report bias. Future research should incorporate objective sleep measures and experimental sleep manipulation to clarify causal mechanisms and to resolve conflicting reports from the literature.

7. Conclusion

Poor sleep is associated with increased sympathetic concern, suggesting that poor sleep may heighten emotional sensitivity rather than uniformly impair social functioning. These findings highlight the importance of distinguishing sympathy from empathy, suggesting that these constructs rely on different, albeit overlapping, neural mechanisms. Finally, the findings here underscore that sleep is a meaningful contributor to socioemotional processes.

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