The Relationship Between Stress and Sleep Sufficiency in the Context of Varied Workplace Social Support

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Objective: Sufficient sleep is essential for well-being. We examined the relationship between work-related social support, work stress, and sleep sufficiency, predicting that workers with higher social support would report higher sleep sufficiency across varying levels of work stress. **Methods:** The data set analyzed in the present study included 2213 workers from approximately 200 small (<500 employees) businesses in high, medium, and low hazard industries across Colorado. **Results:** Perceived social support variables moderated the relationship between work stress and sleep sufficiency such that employees reporting higher levels of social support reported higher sleep sufficiency when work stress was low or moderate but not high. **Conclusions:** Although preventing work stress is optimal, in cases where employers cannot apply primary interventions to prevent stress (eg, eliminating/reducing night shifts), employers should attempt to increase social support or other more relevant resources for employees.

Keywords: sleep, work, nonwork, stress, perceived support

LEARNING OUTCOMES

Upon completion of this article, readers should be able to accurately summarize past findings regarding the relationship between stress and sleep sufficiency, as well as how this relationship depends on workplace social support variables.

Upon completion of this article, readers should be able to evaluate under what contexts (eg, workplace stress can be prevented or not) that social support is best able to offer an alternative, secondary intervention approach.

In the last decade, scholars in organizational psychology, occupational medicine, and management have demonstrated the relevance and importance of linking workers' sleep and worker outcomes. [1–3] For example, impaired sleep is associated with numerous negative outcomes, such as increased absenteeism, depression, and anxiety, as well as more accidents on the job. [4] Broadly defined, sleep is the temporary reduction of perception of one's environment. [5] We define sleep as having two subcomponents: sleep quantity and sleep quality. [3] Sleep quantity is the amount of time spent sleeping. [3] Sleep quality refers to how well one sleeps, such as how quickly one falls asleep, how well sleep is maintained through the night, and the degree to which one feels rested after sleep. [3] One important component of sleep quality is sleep sufficiency, which refers to the degree to which one feels rested after sleep. [6] Insufficient sleep is associated with negative health outcomes such as obesity, hypercholesterolemia, and hypertension. [7]

Previous research has consistently found relationships between the variables of sleep, stress, and social support. For instance, previous research has found a negative relationship between workplace stressors (eg, long hours, working night shifts, role ambiguity) and sleep. [4] Relatedly, previous research has also consistently found perceived stress is negatively associated with sleep. [8–9] Prior research has found that anxiety and depression partially mediate the relationship between stress and reduced sleep. [8] Past research has also found that perceived social support is associated with reduced sleep quality. [10–11] Perceived social support from the workplace in particular has also been found to be negatively associated with sleep quality. [4] Furthermore, social support has been found to be negatively associated with stress. [12–13]

In the current study, perceived social support and related variables such as perceived organizational support are not synonymous. [14] In prior literature, perceived social support in the workplace generally refers to support from multiple sources within the broader organization, including peers, supervisors and upper management. [15–17] In contrast, perceived organizational support refers to support from the organization and in particular from upper management. [15] Perceived supervisor support refers to support from one's direct supervisor. [17–18] Although these forms of social support only partially overlap (eg, perceived social support in the workplace include both perceived organizational and perceive supervisor support), all three of these types of workplace social support can be regarded as potential resources or buffers against stress according to the Job Demands-Resources model, discussed next.

Although previous research demonstrates consistent negative relationships between social support variables and stress, the Job Demands-Resources (JDR) model offers further support for hypothesizing that workplace social support could buffer against the potential influence of work stress on sleep sufficiency more specifically. [19] According to the JDR model, when workers lack adequate resources to handle the demands they experience, workers experience stress, and potentially burnout. Demands may refer to physical (eg, workload, time pressure), social (eg, an angry customer), or organizational aspects of a job (eg, low autonomy) that drain physical or mental effort. [18] Conversely, resources refer to physical (eg, proper equipment to get work done), social (eg, support from a supervisor, coworkers, and/or upper management), or organizational aspects of a job (eg, task variety) that aid in achieving work goals, reduce job demands, or stimulate growth. [19]

However, the JDR model predicts that for a resource, such as social support, to optimally buffer against a demand, such as work stress, the resource must appropriately match said demand. [20] Thus, in cases of work stress predicting sleep sufficiency such as in the current study, it is likely that workplace social support variables would buffer against work stress, because the type of resource (workplace social support) matches the type of demand (eg, work stress). However, in cases of a nonmatching type of demand (eg, nonwork stress) and resource

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TABLE 1. Means, Standard Deviations, and Correlations Among Study Variables

Variable	Items	α	M	SD	1	2	3	4	5
Sleep sufficiency	1	N/A	3.19	0.99					
Perceived social support	5	0.85	4.06	0.64	0.32*				
Perceived org. support	3	0.95	3.70	1.01	0.37*	0.63*			
Perceived sup. support	1	N/A	4.70	0.96	0.33*	0.61*	0.59*		
Work stress	1	N/A	3.02	0.66	−0.43*	−0.18*	−0.64*	−0.01	
Nonwork stress	1	N/A	2.83	0.81	−0.24*	−0.02	0.01	−0.02	0.22*

*$P < 0.05$. Variables measured on a scale of 1–5. $N = 2,213$.
M, mean; N/A, not available; SD, standard deviation.

(eg, workplace social support) as in the current study, it is less likely that workplace social support would buffer against stress. This is because the resource type (workplace social support) and demand type (nonwork stress) do not match, and thus, the potential buffering of workplace social support against nonwork stress is suboptimal. [20] Consequently, our hypotheses for the current study were as follows.

Hypothesis 1: The relationship between work stress and sleep sufficiency will be moderated by perceived social support such that employees reporting higher social support will report higher sleep sufficiency across levels of work stress.

Hypothesis 2: The relationship between work stress and sleep sufficiency will be moderated by perceived organizational support such that employees reporting higher organizational support will report higher sleep sufficiency across levels of work stress.

Hypothesis 3: The relationship between work stress and sleep sufficiency will be moderated by perceived supervisor support such that employees reporting higher supervisor support will report higher sleep sufficiency across levels of work stress.

Hypothesis 4 The relationship between nonwork stress and sleep sufficiency will not be moderated by perceived social support.

Hypothesis 5: The relationship between nonwork stress and sleep sufficiency will not be moderated by perceived organizational support.

Hypothesis 6: The relationship between nonwork stress and sleep sufficiency will not be moderated by perceived supervisor support.

METHOD

Study Design

This cross-sectional study used archival data collected from small businesses in different regions from the state of Colorado. Data collection occurred in 2017. Employers were recruited to participate through key partnering organizations (eg, Colorado Small Business Administration, local chambers of commerce) via member communications, networking events, and direct outreach. Employees completed all measures online.

Sample

The current study included 2213 workers from approximately 200 small (<500 employees) businesses in high, medium, and low hazard industries across Colorado. Workers' ages range from 18 to 80. There were no exclusion criteria based on individual characteristics.

Variables

All variables used during data collection were measured via self-report. The predictor variables were work stress and nonwork stress. The moderator variables included perceived social support, organizational support, and supervisor support. The criterion variable was sleep sufficiency.

Perceived Work Stress

Perceived work stress was measured using one item, "*How often do you have feelings of stress because of your work?*" with a five-point Likert-type scale (1 = never; 5 = always). Higher scores indicated greater stress. [21]

Perceived Nonwork Stress

Perceived nonwork stress was measured using one item, "*How often do you feel stress because of family issues/your home life?*" with a five-point Likert-type scale (1 = never; 5 = always). Higher scores indicated greater stress. [21]

Perceived Social Support

Perceived social support was measured with five items using the Work Design Questionnaire. [22] The component of the Work Design Questionnaire that measures perceived social support, and which was used in the current study, includes five items such as, "*people I work with are friendly*." Employees responded to each item using a five-point Likert-type response scale (1 = strong disagree; 5 = strongly agree). Higher scores indicate greater perceived social support. The internal consistency reliability for this measure using Cronbach α is acceptable (α = 0.82). [22]

Perceived Organizational Support

Perceived organizational support was measured using three items such as "*the organization shows a lot of concern for me*" with a five-point response scale (1 = strong disagree; 5 = strongly agree). Higher scores indicate greater perceived organizational support. [15]

Perceived Supervisor Support

The single perceived supervisor support item (*I can count on my supervisor/manager for support when I need it*) had a five-point response scale (1 = strong disagree; 5 = strongly agree). [23]

Sleep Sufficiency

For the sleep sufficiency item ("*I woke up feeling fresh and rested"*), responses options were *At no time*, *Some of the time*, *Less than half of the time*, *More than half of the time*, and *Most of the time*. [24]

TABLE 2. Perceived Social Support Moderating the Work Stress-Sleep Sufficiency Relationship

Independent Variable	β	SE	Standardized β
Work stress	−0.40	0.03	0.13
PSS	0.35	0.03	0.47*
WS*PSS interaction term	−0.13	0.03	−0.48*
Constant	3.20	0.02	

*$P < 0.01$.
WS/PSS = work stress * perceived social support; SE, standardized error.

RESULTS

The sample comprised 2213 workers with an overall mean age of 41.94 years (SD = 13.01 years, range = 18–80). The average number of hours worked per week was 39.51, with 87.8% working full time. Approximately 82.3% reported working one job, 17.4% reported working more than one job and 0.3% did not reply. Only 14.8% reported working shift work with 84.6% reporting no shift work, and 0.6% not responding. A majority 56.6% reported working in nonsupervisor roles, with the remaining respondents working in supervisor roles ranging from first-level supervisor to president/CEO. Means, standard deviations, and reliability estimates of key variables as well as relationships between key variables are represented in Table 1.

To investigate whether perceived social, organizational, and supervisor support moderated the relationship between work stress and sleep sufficiency, simple moderation analyses were performed using SPSS (released 2021, IBM SPSS Statistics for Windows, Version 28.0; IBM Corp, Armonk, NY). The same simple moderation analyses were conducted while replacing work stress with nonwork stress to assess whether perceived social, organizational, and supervisor support moderated the relationship between nonwork stress and sleep sufficiency. Perceived social, organizational, and supervisor support significantly moderated the relationship between work stress and sleep sufficiency, such that workers with higher scores on social support reported higher sleep sufficiency. However, this was only at low and moderate levels of work stress. At high levels of work stress, workers tended to experience similar lower levels of sleep sufficiency regardless of how much social, organizational, or supervisor support they reported. Results are shown in Tables 2 to 4 and Figures 1 to 3. However, perceived social, organizational, and supervisor support were not significant moderators of the relationship between nonwork stress and sleep sufficiency. Results are shown in Tables 5 to 7.

DISCUSSION

As would be predicted by the JDR model and other previous empirical literature, the current study found that all three workplace social support variables (eg, perceived social support, perceived organizational support, perceived supervisor support) moderated the relationship between work stress and sleep sufficiency, but not the relationship between nonwork stress and sleep sufficiency. According to the JDR model of stress, a resource (eg, social support) is more likely to buffer against a demand (eg, stress) when the resource and demand match (eg, workplace social support aiding against work stress, but not against nonwork stress). [19–20]

However, as can be seen in Figures 1 to 3, social support variables only appeared to buffer against the influence of work stress on sleep sufficiency when work stress levels were low to moderate. At high levels of work stress, those with high, medium, and low scores on social support variables seemed to differ little in their sleep sufficiency. Thus, while perceived social support may buffer against the influence of work stress on sleep sufficiency at low to moderate levels of work stress, this potential buffering disappears at high levels of work stress.

There may be several explanations for these results. The first and most basic explanation may be that the negative influence of work stress on sleep sufficiency simply overpowers the positive influence of social support on sleep sufficiency. Accordingly, as can be seen in Table 1, the negative correlation between work stress and sleep sufficiency (−0.43) was stronger than the positive relationship between social support (0.32) and sleep sufficiency, as well as the positive relationships between organizational support (0.37), or supervisor support (0.33) and sleep sufficiency. Put another way, it may be that work stress is more potent than social support at influencing sleep sufficiency and this difference in potency only becomes noticeable as work stress appears and increases, as can be seen in Figures 1 to 3.

As mentioned, for a resource to optimally compensate for a demand, the resource and demand must be well matched. [20] It may be that certain types of resources, such as tangible resources (eg, hearing protection), provide more protection against certain types of work stress or demands (eg, a loud working environment) compared with intangible resources such as workplace social support. In such cases, intangible resources such as perceived social support would not be a well-matched resource for the demand at hand and may only buffer against the demand/stressor when levels of the demand are low. In fact, in using an archival data set for the current study, we found some measures lacked specificity. For example, our work stress item only measured work stress more broadly, but did not measure sources of work stress, or whether the sources of work stress were tangible or intangible.

However, our hypotheses that workplace social support would not moderate the relationship between nonwork stress and sleep sufficiency were correct, because there was a mismatch between the type of resource (eg, workplace social support in contrast from nonwork social support) and the type of demand (eg, work stress). Our results also fit within the context of previous empirical literature, which has found that workplace stress is negatively related to sleep [4] as well as that social support is both negatively associated with stress and positively associated with sleep. [11–14]

Overall, our study further supports the potential benefits organizations and their employees may reap from organizations offering greater social support to employees, at least when work stress is low to moderate. The best solution for work stress it to prevent it, but in many cases, preventing work stress may not be feasible (eg, healthcare workers experiencing difficult-to-avoid stressors such as overnight shifts). [22] In these cases, organizations should attempt to provide greater social support, particularly social support that will match the type of stressor employees report experiencing at work. For example, if employees report stress from working overnight shifts, managers may explore how these shifts can be more conveniently rotated among staff, as well as ask employees and brainstorm with employees on how the stress from such shifts may be alleviated. In cases where work stress is especially high and unpreventable, though, organizations should recognize social support may no longer buffer against work stress. In these cases, organizations should attempt to offer additional resources that especially match work demands.

The results of the current study contribute to the literature on sleep and the workplace in several ways. First, although research has tested the moderating role of social support more broadly on the relationships between each work stress [14] and nonwork stress [25] and sleep,

TABLE 3. Perceived Organizational Support Moderating the Work Stress-Sleep Sufficiency Relationship

Independent Variable	*B*	SE	Standardized *B*
Work stress	−0.36	0.02	−0.06
POS	0.28	0.02	0.51*
WS/POS interaction term	−0.08	0.02	−0.30*
Constant	3.20	0.02	

*$P < 0.01$.
WS/POS, work stress * perceived organizational support; SE, standardized error.

TABLE 4. Perceived Supervisor Support Moderating the Work Stress-Sleep Sufficiency Relationship

Independent Variable	*B*	SE	Standardized *B*
Work stress	−0.38	0.02	−0.07
PSS	0.26	0.02	0.42*
WS/PSS interaction term	−0.07	−0.03	−0.29*
Constant	3.2	0.02	

*$P < 0.01$.
WS/PSS, work stress * perceived supervisor support; SE, standardized error.

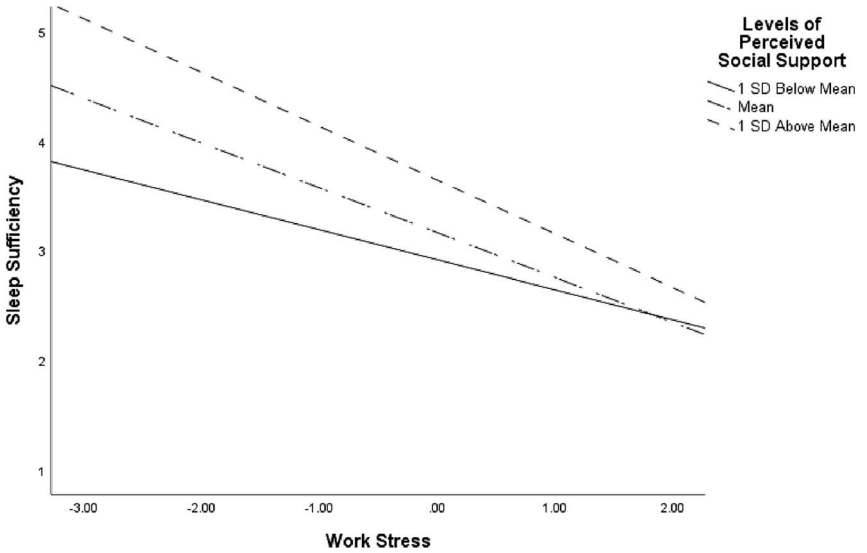

FIGURE 1. Significant interaction between levels of perceived social support, work stress, and sleep sufficiency.

our study is the first we are aware of that has tested whether workplace social support in particular moderates the relationship between work stress (and nonwork stress) and sleep sufficiency. The finding that workplace social support may buffer against the negative effects of work stress on workers' sleep sufficiency is significant given that employees spend approximately one third of their lives at work. Relatedly, the current study has greater generalizability than other studies that have investigated the role of social support as a moderator between stress and sleep for workers in a particular occupation (eg, paramedics [17]) given that our sample consisted of workers from across occupations and industries.

Theoretical Implications

The findings from the current study extend upon the JDR model of stress [18] as well as the stress buffering model. [26] As noted, the JDR model would predict that a potential resource such as social support in the workplace would buffer against demands if said demands (eg, work stress vs nonwork stress) are more appropriately matched by the type of resource offered (eg, workplace social support matched to work stress vs nonwork support matched to work stress). However, our findings also extend upon the stress buffering model, which suggests perceived social support buffers against stress by facilitating individuals' coping and enhancing their perceived control over their environment. [27–28] The current study extends upon the stress buffering model by testing whether specific types of workplace social support, such as perceived social support, perceived organizational support, and supervisor support likely buffer against stress.

Practical Implications

Recognizing sleep sufficiency as the criterion variable in the present study, if organizations want to help employees experience greater sleep sufficiency, they should either attempt to improve employees' sleep directly, reduce work stress that interferes with employees' sleep, or attempt to provide more robust social support when the first two steps are not feasible. Regarding attempting to improve employees' sleep, employers may attempt to reduce employees' shift work, excess work hours, and stress, which are some of the most common barriers for employees to achieve quality sleep. [29–30] In cases where these strategies are less feasible (eg, healthcare, which requires 24-hour care), then educating employees about healthy habits that improve sleep sufficiency may be beneficial. For example, the sleep literature suggests that many

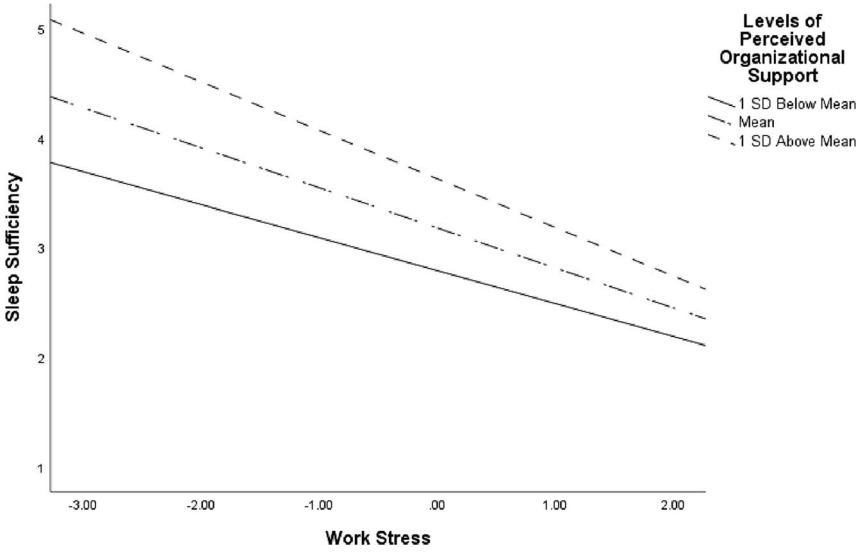

FIGURE 2. Significant interaction between levels of perceived organizational support, work stress, and sleep sufficiency.

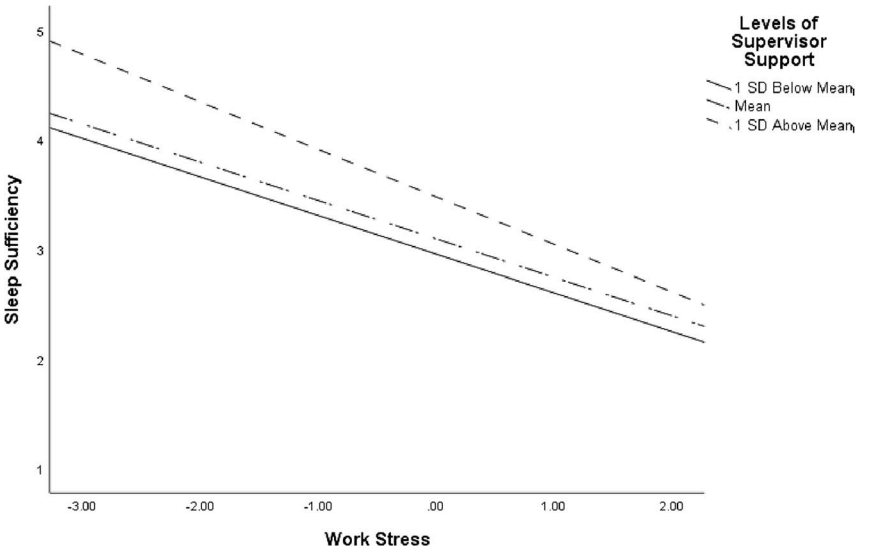

FIGURE 3. Significant interaction between levels of perceived supervisor support, work stress, and sleep sufficiency.

behaviors workers can do to obtain greater sleep, such as creating a consistent bedtime routine, avoiding the use of screens in bed, as well as sleeping in a dark, cool, and comfortable environment. [31]

In addition, employers may attempt to prevent or reduce employees' work stress or increase the social support they provide to employees. For example, employers may best reduce employees' stress by removing common causes of stress in the workplace, including role ambiguity, long work hours, and low job control/autonomy. [5] In cases where improving employees sleep or reducing employees' stress are not as feasible, employers may offer greater social support to employees. Employees tend to perceive greater organizational support when they feel cared for and know their contributions are valued by their organization. [19] Employers may also provide increased social support in light of the variables previously mentioned as target variables (eg, employees' sleep and stress) by brainstorming with employees on how employers may attempt to help assist with employees' sleep or stress and then implementing resulting action steps to carry out to support employees.

Limitations

There were several limitations in the current study. First, given this was a cross-sectional study, causal inferences cannot be made. Relatedly, the observed relationships between variables such as stress and sleep sufficiency may be explained by confounding variables. For example, it may be that instead of stress impairing sleep, it may be that a confounding variable (eg, shift work) is influencing both stress and sleep. Research using intervention methods can help aid in the directionality of the relationships between stress, sleep, and social support.

The current study may also have a limitation in its measurement. Specifically, our measure of sleep sufficiency was narrow because it only measured a single subcomponent of sleep quality, namely, sleep sufficiency. In addition, according to prior literature, more objective measures of sleep such as polysomnography are the most accurate measures of sleep quality and quantity, especially as participants may not accurately recall when or how often they woke through the night in their self-reports. [32–33] Our measures also lacked specificity. For instance, our work stress item measured work stress more broadly but did not measure sources of work stress. Similarly, our social support measures measured perceived social, organizational, and supervisor support more broadly but did not measure types of support (eg, instrumental vs emotional support). In addition, with self-report measures using the same scales, relationships between variables may be inflated because of common method bias. [34] Future studies may benefit from using more robust measures of sleep such as electroencephalogram measurements or sleep tracking measurements worn by the participant.

Future Research

In the future, researchers should use measures of work stress and social support that have greater specificity, which could measure sources of work stress or types of social support to investigate if, for example, the moderating role of social support on the relationship between work stress and sleep sufficiency may differ with different types of work stress. Researchers should also examine potential mechanisms for the relationships found in the current study. Mediation analyses investigating the potential paths through which stress could inhibit sleep sufficiency (or vice versa) could shed light on plausible causal explanations.

In addition, given that the current study was cross-sectional, future longitudinal research may investigate if changes in one variable (eg, perceived social support from the workplace) are followed by subsequent changes in another variable (eg, sleep sufficiency), such as in an intervention to improve workers' sleep. Such temporally ordered

TABLE 5. Perceived Social Support Moderating the Nonwork Stress-Sleep Sufficiency Relationship

Independent Variable	*B*	SE	Standardized *B*
Nonwork stress	−0.41	0.16	−0.32*
PSS	0.40	0.11	0.25*
NWS/PSS interaction term	0.03	0.04	0.10
Constant	2.87	0.44	

*$P < 0.01$.
NWS/PSS, nonwork stress * perceived social support; SE, standardized error.

TABLE 6. Perceived Organizational Support Moderating the Nonwork Stress-Sleep Sufficiency Relationship

Independent Variable	*B*	SE	Standardized *B*
Nonwork stress	−0.23	0.1	−0.19*
POS	0.42	0.07	0.41*
NWS/POS interaction term	−0.02	0.02	−0.07
Constant	3.38	0.26	

*$P < 0.01$.
NWS/POS, nonwork stress * perceived organizational support; SE, standardized error.

TABLE 7. Perceived Supervisor Support Moderating the Nonwork Stress-Sleep Sufficiency Relationship

Independent Variable	*B*	SE	Standardized *B*
Nonwork stress	−0.12	0.11	−0.1
PSS	0.47	0.08	0.41*
NWS/PSS interaction term	−0.04	−0.03	−0.17
Constant	2.06	0.33	

*$P < 0.01$.

NWS/PSS, nonwork stress * perceived supervisor support; SE, standardized error.

changes may provide evidence for the direction of causality. Relatedly, there is an established literature on workplace interventions that improve sleep, [35] there is an opportunity to conduct prospective interventional studies to test for causation, improve our understanding of mechanism, and test whether social support interventions can, in fact, improve employee sleep sufficiency.

Researchers may also test whether the moderating relationship of workplace social support on the stress and sleep sufficiency relationship is dependent on context. For example, if employees frequently telework and/or have very little contact with their supervisors, the moderating role of social support may be mitigated. Whether workplace social support moderates the relationship between stress and sleep sufficiency may also depend on individual difference variables. For example, trait resiliency buffers against stress. [36] Consequently, if workers are higher in resilience and experiencing less stress, perceived social support may not play as strong of a moderating role given that these employees are already more self-sufficient and therefore experiencing less stress anyway. Research testing for such relationships may be informative for whether managers should especially focus on giving extra social support to employees who are not yet as resilient as other employees.

SUMMARY AND CONCLUSIONS

Previous research and the current study have used the JDR model and stress buffering model to test hypotheses regarding the relationships between stress, sleep, and perceived social support. Although causality and its direction in this relationship still must be investigated, there is nonetheless evidence that work stress is associated with impaired sleep sufficiency and this relationship is moderated by social support in the workplace. This finding is relevant for scientists and practitioners, as it demonstrates a possible way (eg, offering increased workplace social support) organizations may attempt to protect employees' health when preventative/primary interventions against workplace stressors are less feasible, such as healthcare workers who work night shifts.

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