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ARTICLE

The Effect of Sleep on Workplace Interpersonal Conflict: The Mediating Role of Ego Depletion

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ABSTRACT

This study aimed to investigate the relationship between sleep and workplace interpersonal conflict and the role of ego depletion as the mediating mechanism. A survey was conducted daily for two weeks using an experience sampling method. A sample of 79 employees from the East Coast of China was collected. A multilevel regression analysis was conducted to test the proposed hypotheses. Results indicated that higher sleep quantity was associated with lower daily ego depletion at noon and lower workplace interpersonal conflict. Moreover, ego depletion mediated the effects of sleep quantity on workplace interpersonal conflict. The findings identified the adverse effects of insufficient sleep on daily interpersonal interactions and provided a valuable perspective on workplace interpersonal conflict management. Furthermore, the study broadened the scope of antecedents that impact how employees experience daily workplace interpersonal conflict and assessed the mediating role of ego depletion in this relationship.

KEYWORDS

Sleep; workplace interpersonal conflict; ego depletion

1 Introduction

Sleep plays a vital role in individual perception, affect, and behavior [1]. The critical role of sleep in employees' workplace behavior and job performance has been acknowledged by researchers. In terms of the working population, sufficient sleep implies better cognitive and affective performance, such as signal perception, social interaction, and deviant behavior inhibition [2], which helps employees meet short-or long-term goals in the workplace. Prior research shows that insufficient sleep may cause adverse workplace outcomes [3], including increases in unethical behaviors and injuries at work [4]. However, these studies only assessed insufficient sleep when employees were treated as independent individuals rather than in a scenario of workplace interpersonal interaction.

With the broader deployment of working units and multi-function group cooperation, interpersonal interaction has become inevitable in daily work. In response to this trend, increasing research has focused on the quality and consequences of relationships between people in the workplace [5]. As a workplace interpersonal interaction variable, workplace interpersonal conflict has been identified as a predictor of adverse organizational and health-related outcomes [6]. For example, a study of an American construction

firm reported an average cost of 5.25 payable hours for every interpersonal conflict incident [7]. A meta-analysis highlighted that interpersonal conflict could lead to poor psychological outcomes, such as depression, decreased self-esteem, and somatic symptoms [8]. Unsurprisingly, these all cause significant losses for organizations.

Regarding the antecedent variables, studies have usually paid more attention to organizational-level variables compared to the individual variables. Yet, given that the term is "interpersonal" conflict, the question remains as to the nature of the role individual status plays in workplace conflict. As mentioned above, insufficient sleep impairs individual cognitive and emotional functions and negatively affects individual behaviors. It may also increase the risk of workplace interpersonal conflict and cause significant losses to the organization. Therefore, exploring the role and mechanism of sleep in workplace interpersonal conflict is crucial for both organizational and conflict management.

The self-regulation model has been indicated to be the primary theoretical framework for understanding the effects of sleep [9]. Thus, organizational psychology researchers have applied this framework when conducting empirical studies regarding employees' sleep and work outcomes from a self-regulation resource perspective. In addition, research has provided significant support for the framework [1]. Accordingly, the present study aimed to explore the effect of sleep, an individual-level attribution, on workplace interpersonal conflict, focusing on ego depletion as a mediating mechanism. Specifically, we conducted a study using an experience sampling method to observe the daily relationship between sleep, ego depletion, and workplace interpersonal conflict.

This study is expected to contribute to the existing sleep and occupational health psychology literature in the following three ways. First, our work explores sleep as an antecedent of interpersonal conflict, which provides a new perspective in defining workplace interpersonal conflict. Second, our study enriches the research on sleep and ego depletion in organizational psychology by expanding the work outcomes from an individual behavior to an interactive, interpersonal behavior perspective. Third, our findings may shed light on new intervention methods for workplace interpersonal conflict management in terms of sleep and ego depletion.

2 Theory and Hypotheses

2.1 Workplace Interpersonal Conflict

Workplace interpersonal conflict, ranging from psychological aggression to physical assault, is regarded as one of the most detrimental sources of job stress [10]. The term was initially used in occupational stress literature as a job-related stressor that could lead to adverse work-related outcomes and employee health problems [11]. Workplace interpersonal conflict was regarded as a phenomenon describing disagreements and physical assaults among co-workers. Theories and research of workplace interpersonal conflict emphasized the role of involved parties in shaping conflicts. Role stressors (e.g., workload, role conflict, and role ambiguity), leadership style, and personality variables are considered the most common sources of workplace interpersonal conflict. Spector et al. [12] summarized extant studies and found that interpersonal conflict is closely related to other organizational-level job stressors, such as role conflict ($r = 0.40$, 8 studies), role ambiguity ($r = 0.29$, 12 studies), and negative emotions ($r = 0.33$, 6 studies).

In recent decades, researchers have started regarding interpersonal conflict in the workplace as a process. In this process, the interaction experience between individuals and others, including cognitive (e.g., perceived incompatibility), behavioral (e.g., physical or verbal assault), and affective (e.g., negative affect) function, will lead to conflict [13]. According to the process model, workplace interpersonal conflict occurs within the context of a latent condition of conflict, depending on the individuals' appraisal of the situation, and subsequent feelings, cognitions, and actions in response to the conflict [14]. Further, the process model highlights the roles of perception and affect in conflict. For example, given that a

person's interpretation could be influenced by cognitive bias and infused with affective reactions, workplace interpersonal conflict is perceived as related to employees' self-regulation abilities. Moreover, studies on interpersonal interactions also imply that trait self-control is highly related to interpersonal conflict [15].

2.2 Sleep and Workplace Interpersonal Conflict

Although sleep is regarded as a period of physical inactivity, increasing research has indicated its importance in the restorative process necessary for brain function [16]. The prefrontal cortex and amygdala, critical components involved in regulating behaviors and emotions in the workplace, are considered to be highly susceptible to sleep deprivation [17]. The prefrontal cortex is responsible for executive function and other high-order cognitive abilities, such as foresight, problem-solving, and decision-making [18]. The amygdala is the brain's emotion center and is closely connected with emotion regulation. Many studies have indicated a relationship between sleep deprivation and deviant social behavior [19]. Therefore, we proposed that sleep deficiency may increase interpersonal conflict in the present study.

Insufficient sleep is associated with increased negative affect and decreased positive affect [20]. Kahn-Greene et al. [21] found that individuals suffering from sleep loss are likely to experience and display greater hostility, anger, suspicion, and aggression toward others during interactions. When provoked, individuals with sleep loss have shown increased emotional activity and a higher anger level than individuals with sufficient sleep [22]. Additionally, sleep loss may lead to less empathic behavior and threat generalization [23], leading to communication errors, hindering understanding between group members, and increasing tendencies to exact revenge in conflict situations.

Sleep restrictions lead to a decrease in cognitive function [24]. Individuals who get less sleep or experience sleepiness have difficulty accurately understanding situational stimuli and events due to a decline in cognitive function. Evolutionary theory proposes individuals are used to adhering to the adaptive principle "better safe than sorry," especially when they feel vulnerable. Thus, in conflict situations, they are more likely to interpret ambiguous stimuli or events as threatening rather than benign. In prehistory, humans were comparatively easy targets for wild animals and were vulnerable to hostile environmental conditions. Thus, being prepared to attack or handle the worst possible outcomes increased an individual's chances of survival. We argue that sleepiness also makes people feel vulnerable, so they are more likely to interpret ambiguous or neutral signals as threats [3], resulting in cognitive bias [25]. Prior research indicated that individuals with sleep loss are more likely to show negative cognitive bias, such as incorrectly recognizing emotions and being more reactive to adverse events [26]. Further, sleep-deprived individuals can show less trust in others and are more likely to make emotionally driven decisions [27]. Accordingly, we predicted that employees with low sleep quantity would be more likely to misunderstand their colleagues' behaviors and opinions at work, be more sensitive to negative information during workplace interactions, and experience more interpersonal conflict.

Furthermore, insufficient sleep also influences impulse control. The ability to control our impulses is based on our self-awareness and self-monitoring [28]. Self-monitoring refers to observing, regulating, and controlling one's behavior in response to others, and is guided by social and situational cues [29]. Individuals with high self-monitoring are more likely to change their behavior to adapt to different situations and control their desires and instinct-driven behavior. However, sleep loss impairs self-monitoring functioning and impulse control [30]. Sleep-deprived individuals can show increased aggression and reduced tendencies to accept blame [21]. Thus, employees with insufficient sleep may be more likely to lose their temper and engage in workplace interpersonal conflict.

Work, nonwork, and sleep (WNS) conceptual framework has been recently introduced to understand the associations among the three crucial aspects of life. The WNS model suggests that sufficient sleep is essential

for day-to-day performance and health [31], providing theoretical support for our assumptions. Accordingly, we hypothesized the following:

Hypothesis 1: Sleep quantity is negatively associated with workplace interpersonal conflict.

2.3 Sleep and Ego Depletion

Ego depletion refers to a state in which individuals have less cognitive resources after self-regulation activities [32]. This term was introduced by Baumeister et al. [33] in the strength model of self-regulation. They argued that self-regulation resources were not unlimited, and individuals would experience a depleted state after a series of self-regulation activities. When their ego is depleted, individuals are more likely to fail in subsequent self-regulation activities [34]. For example, ego depletion was suggested to be related to impaired attention control [35], increased aggression [36], and violation of social norms [37].

Following research on ego depletion, the link between sleep and ego depletion is well supported [38]. Insufficient sleep decreases one's self-regulation reservoir. Thus, individuals have fewer self-regulation resources "in stock" and experience ego depletion more easily. Further, from a resource-replenishment perspective, sleep can also reduce ego depletion. Good rest, especially overnight sleep, is one of the most common ways to replenish depleted self-regulation resources [39]. Sleep loss, however, may disrupt recovery processes and lead to inappropriate behavior that usually requires self-regulation to constrain it [1].

Other research has explored the effects of ego depletion caused by insufficient sleep from a cognitive viewpoint. For example, sleep physiology research indicates that sleep loss compromises neural pathway function, which is critical in utilizing working memory [40]. Other researchers have inferred that executive functions, such as alertness and attention allocation, risk analysis, and decision-making, that require self-regulatory energy are impaired by reduced sleep quantity (for reviews, see [41]). Furthermore, several studies addressing the mediating role of ego depletion in the relationship between sleep and various outcomes have reported the predictive role of sleep quantity on ego depletion [38].

Given that sleep quantity is a direct measure of sleep sufficiency [42], we posited that employees who sleep less would experience more ego depletion, as fewer resources are supplemented and restored.

Hypothesis 2: Sleep quantity is negatively associated with ego depletion.

2.4 Sleep, Ego Depletion, and Workplace Interpersonal Conflict

2.4.1 Ego Depletion and Workplace Interpersonal Conflict

The strength model of self-regulation suggests self-regulation capacity is dependent on limited internal resources [43]. When these resources are depleted from prior instances of suppressing thoughts, emotions, or behaviors, individuals' emotional and cognitive functions are more likely to be impaired. This impairment leads to reduced behavioral inhibition [44].

Prior research has shown that ego depletion impairs emotion regulation [45]. In the workplace, especially in interpersonal interactions, individuals must exert active emotion regulation to fit into a social setting and display appropriate affect [46]. This restraint involves suppressing negative emotions and enhancing positive emotions [34]. As continuous emotion regulation requires energy, ego-depleted individuals may display poor emotion regulation abilities. For example, ego depletion is related to impaired control of negative affect and angry rumination [47], which are common factors in interpersonal conflict.

Other research has indicated that ego depletion leads to impaired cognitive function. Individuals experiencing ego depletion may spontaneously shift their attention away from cues that imply discrepancies between their goals and the current situation, which could help people adjust their behaviors to achieve assigned goals [48]. For example, individuals experiencing ego depletion prefer

information consistent with their own beliefs and may exclude or be dissatisfied with conflicting information [49]. Additionally, an individual's mindset, as an executive function that aids their tendency to respond in a manner congruent to situational cues, can also be negatively influenced by ego depletion [50].

Ego depletion leads to lowered impulse control. Ego depletion leaves individuals in a state of exhaustion; thus, they cannot apply the necessary resources to inhibit negative behaviors. Ego depletion may also drive individuals to be less motivated to suppress such behaviors [48]. Therefore, ego-depleted individuals have been shown to undermine others more frequently and display more use of force and aggressive behaviors, which are considered to be manifestations of interpersonal conflict. Another study found that emotional exhaustion could predict employees' displaced aggression toward supervisors, coworkers, and family members [51].

Interpersonal conflict is regarded as the process of perception of incompatibility or differences between individuals [52]. Therefore, we predicted that employees who experience ego depletion, due to reduced emotional and cognitive regulation, will be less competent in managing negative emotions and more susceptible to experiencing them when their ideas are challenged by others, which will lead to experiencing more anxiety in interpersonal relationships. Further, employees experiencing ego depletion would be more likely to behave aggressively. Accordingly, we proposed the following hypothesis:

Hypothesis 3: Ego depletion is positively associated with workplace interpersonal conflict.

2.4.2 Ego Depletion as a Mediator

Research has consistently indicated that ego depletion may mediate between sleep and various outcome variables. Barnes integrated sleep literature and organizational psychology literature and proposed a model of sleep self-regulation to explain how employees' sleep influences workplace outcomes via self-regulation [1]. He indicated that insufficient sleep (sleep quantity) would influence employees' cognition, affect, and behavioral outcomes through the mechanism of self-regulation depletion.

Studies showed poor sleep to be associated with ego depletion [53], workplace cognitive failures (such as interpretive bias [4]) and impaired emotional control (such as perception of hostility [54]). Additionally, a series of workplace studies supported the proposition that ego depletion mediates the relationship between sleep and unethical behavior [38], workplace deviance behavior [9]. Researchers explained the effect of sleep on workplace interpersonal interactions via ego depletion, such as abusive [3] or deceptive behavior [55]. Therefore, we believe that the effect of sleep on workplace behavior is based on self-depletion. Insufficient sleep will lead to a more ego-depleted state, which explains the cognitive and emotional function impairment. Overall, we predicted that employees who have reduced sleep quantity would engage in more interpersonal conflict at work due to more significant ego depletion. Thus, we proposed the following hypothesis:

Hypothesis 4: Ego depletion mediates the effect of sleep quantity on workplace interpersonal conflict.

3 Method

3.1 Sample and Procedure

The snowball sampling technique was used for participant recruitment. Initial participants were recruited from a weekend course at a university on the East Coast of China. It was a general psychology course in which one of the researchers was a course instructor. Students were advised that the study was about sleep and work behavior and were encouraged to post the study invitation on their social network profiles. The requirements for eligible participants were as follows: (1) working as a full-time employee, Monday through Friday, and having good interpersonal interactions with colleagues during work; (2) no diagnosis of insomnia or another chronic sleep disorder in the past six months; and (3) willing to abide by all the procedures during the two-week study period.

Participants joined the study voluntarily without guaranteed financial compensation. Researchers offered individual feedback reports concerning participants' sleep status and work behaviors during the study upon request, in gratitude for the participants' time and effort. Before the study, informed consent forms, personal demographic data, and contact information were collected. In addition, each participant was given a specified identification code in the study to protect confidentiality.

A two-week daily survey (ten consecutive workdays) was conducted using an experience sampling method, according to Wheeler and Reis's [56] suggestion that a two-week period is a generalizable sample of an individual's life. Participants were asked to complete three surveys each day during the study period. A morning survey measured sleep quantity for the previous night and positive affect. Participants were asked to complete it on awakening, no later than before starting work. A noon survey was used to measure participants' ego depletion, which was to be completed before lunch. Finally, an afternoon survey was used to measure the frequency of workplace interpersonal conflicts during the workday, to be complete after work and no later than midnight. The prescribed temporal precedence measured sleep quantity and ego depletion earlier than workplace interpersonal conflict strengthened the hypothesized relationship.

We utilized Wechat, the most popular instant messaging application in China to publish and collect surveys. Every workday, the researchers sent survey links to participants' mobile phones via Wechat at 10 pm (morning survey for the next day), 10 am (noon survey), and 5 pm (afternoon survey). Participants were asked to set alarm notifications as survey reminders according to their daily schedules. Research assistants would check the surveys two hours after the time assigned for completion and remind participants individually to complete missing questionnaires. We received 749 complete daily surveys in total, with a response rate of 94.8%.

Due to unexpected travel, physical illness, and reluctance to continue, 79 individuals (30 men) finished the study, out of 90 qualified participants. The mean participant age was 31.02 years ($SD = 5.86$ years). Of the participants, 17.7% were between 22 and 25 years, 39.2% between 26% and 30%, 20.3% between 31% and 35%, and 22.8% between 36 and 43. All participants were employed full-time, with an average organizational tenure of 7.46 years ($SD = 6.19$ years). Concerning education level, 3.8% had an associate degree, 41.8% had a bachelor's degree, and 54.4% had a graduate degree. Participants reported their current employer as one of the following: a state-owned enterprise (20.3%), a private enterprise (34.2%), a joint venture (27.8%), a government agency (15.2%), or other types of organizations (2.6%).

After data collection, feedback reports were completed by the researchers and sent to participants via email.

3.2 Measures

3.2.1 Sleep Quantity

The present study measured subjective sleep quantity using Pittsburgh Sleep Diary [57]. Participants were asked to report the time they went to sleep, how long they were awake during the night after initially falling asleep, and the time they woke up in the morning. The time spent awake after initially falling asleep is referred to in sleep physiology literature as "wakefulness after sleep onset" (WASO), which should not be counted as sleep time. Total sleep time was calculated by subtracting WASO minutes from reported sleep time. For example, if a participant's sleep onset time was 11 pm, wake-up time was 7 am, and WASO time was 30 min, the total sleep time would be 450 min. This approach imitates objective measurements of sleep quantity, and literature has indicated that the calculated total sleep time correlates well with objective measures [58].

3.2.2 Workplace Interpersonal Conflicts

The questionnaire used in this study measured how often workplace interpersonal conflicts were experienced or perceived at work. The eight items were adopted from Conflicts Scale [59] and adjusted to be used as daily self-report items, which comprised three dimensions: three items on relationship conflicts (e.g., "Today I got angry with him/her"), three on task conflicts (e.g., "Today other people had disagreements about the task I was working on"), and two on process conflicts (e.g., "Today I disagreed about working resource allocation"). Items were rated on a 4-point scale: 0 = "none," 1 = "once," 2 = "twice," and 3 = "three times and more." Cronbach's alpha coefficients for relationship conflicts, task conflicts, process conflicts, and the full scale were 0.75, 0.83, 0.91, and 0.91, respectively, for the current sample.

3.2.3 Ego Depletion

To measure ego depletion, we used the 10-item State Self-Control Capacity Scale [60], which was back-translated to Chinese following the cross-cultural adaptation procedure. Items were rated on a 5-point scale ranging from "strongly disagree" to "strongly agree." Participants were asked to indicate their level of agreement with each item. Example items included "I can hardly resist temptation" and "I feel mentally exhausted." Cronbach's alpha for the scale was 0.90 in the current sample.

3.2.4 Control Variables

Studies have shown that demographic characteristics have an impact on workplace interpersonal conflicts. For example, Ng et al. [61] found that age was significantly negatively related to interpersonal conflicts. Canary et al. [62] found that men were more likely to compete with others in conflict situations than women. Additionally, as Tittle et al. [63] found that individual self-control ability was related to gender and age, we included them as control variables. Furthermore, positive affect is believed to reduce hostility and increase integrative problem-solving ability, reducing one's perception of workplace interpersonal conflict. We measured positive affect in the morning survey using six items from the brief Positive and Negative Affect Schedule [64]. Additionally, workplace interpersonal conflict from the previous day was included as a control variable.

4 Results

4.1 Descriptive Statistics and Correlations

Table 1 shows the means, standard deviations, and correlations among the variables. As shown, sleep quantity was significantly related to ego depletion ($r = -0.11$, $p < 0.01$) and workplace interpersonal conflict ($r = -0.12$, $p < 0.01$). Ego depletion was positively associated with workplace interpersonal conflict ($r = 0.31$, $p < 0.01$), relationship conflict ($r = 0.29$, $p < 0.01$), task conflict ($r = 0.26$, $p < 0.01$), and process conflict ($r = 0.32$, $p < 0.01$).

The data had a hierarchical structure. Daily sleep quantity, ego depletion, and workplace interpersonal conflict were all measured at a lower level (within-individual) of analysis, which was nested in control variables (between-individual). Therefore, we used multilevel modelling techniques using Mplus 7.4 [65] for the analysis. Null models with no predictors are helpful to estimate the within-and between-individual variance in within-individual level variables. Specifically, 77% of the variance in sleep quantity, 95% of the variance in ego depletion, and 91% of the variance in workplace interpersonal conflict were explained by within-individual differences. These analyses suggested that multilevel modeling was appropriate for our sample, and there was sufficient within-individual variance to predict.

4.2 Hypothesis Testing

Hypothesis 1 stated that sleep quantity negatively relates to workplace interpersonal conflict. We tested this hypothesis by regressing workplace interpersonal conflict on sleep quantity, while controlling for age,

gender, positive affect, and workplace interpersonal conflict during the previous day. Sleep quantity was associated with lower workplace interpersonal conflict (B = –0.49, $p < 0.001$). Thus, the findings, presented in Table 2, supported Hypothesis 1.

Table 1: Means, standard deviations, and correlations

Variable	Mean	*SD*	1	2	3	4	5	6	7	8	9
1. Gender	-	-	-								
2. Age	31.02	5.86	0.23**	-							
3. Sleep quantity	430.97	66.21	0.15**	0.01	-						
4. Ego depletion	2.24	0.69	−0.01	−0.10**	−0.11**	-					
5. Positive affect	2.92	0.93	−0.08*	0.06	0.10**	−0.32**	-				
6. Interpersonal conflict	1.30	0.48	−0.12**	−0.77*	−0.12**	0.31**	−0.09*	-			
7. Relationship conflict	1.26	0.47	−0.10**	−0.74*	−0.13**	0.29**	−0.10**	0.89**	-		
8. Task conflict	1.41	0.59	−0.14**	−0.05	−0.10**	0.26**	−0.07	0.91**	0.77**	-	*
9. Process conflict	1.22	0.56	−0.07	−0.09*	−0.47	0.32**	−0.10**	0.81**	0.64**	0.63**	-

Notes: $n = 749$ observations nested within 79 individuals. Correlations at the within-individual level are indicated below the diagonal; correlations at the between-individual level are indicated above the diagonal.
* $p < 0.05$, ** $p < 0.001$.

Table 2: Regression results predicting ego depletion and interpersonal conflict

	Ego depletion		Interpersonal conflict	
	B	*SE*	*B*	*SE*
Intercept	1.12*	0.48	8.88	39.91
Between-individual level				
Gender	0.80	0.64	0.68	2.27
Age	−0.31	0.55	−0.56	2.56
Within-individual level				
Previous interpersonal conflict	0.16	1.55	0.01	0.01
Positive affect	0.95	0.30	−0.55	0.12
Sleep quantity	−0.47***	0.07	−0.11	0.07
Ego depletion			0.63***	0.10

Notes: $n = 749$ observations nested within 79 individuals.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Hypothesis 2 posited that sleep quantity would be negatively related to ego depletion. Consistent with this prediction, we controlled the same variables as for Hypothesis 1 and found that sleep quantity was negatively associated with ego depletion ($B = -0.47$, $p < 0.001$). Thus, Hypothesis 2 was supported.

Hypothesis 3 indicated a positive relationship between ego depletion and workplace interpersonal conflict. As shown in Table 2, ego depletion was positively correlated with workplace interpersonal conflict ($B = 0.63$, $p < 0.001$). Thus, Hypothesis 3 was supported.

Hypothesis 4 stated that ego depletion would mediate the relationship between sleep quantity and workplace interpersonal conflict. To ascertain whether the mediating effect was statistically significant, we conducted 1–1–1 multilevel mediation modeling [66]. We estimated the indirect impact and conducted a Monte Carlo simulation with 20,000 replications to obtain a confidence interval (CI) around the indirect effect. Monte Carlo simulation was considered appropriate because it produces confidence intervals that account for the non-normal sampling distribution of the indirect impact [67]. The estimate for the indirect effect of sleep quantity on workplace interpersonal conflict via ego depletion was −0.012, and the biased corrected 95%CI [−0.025, −0.002] did not include zero. Thus, Hypothesis 4 was supported.

4.3 Further Analysis

For exploratory purposes, we examined the effects of sleep quantity on different dimensional levels of workplace interpersonal conflict. As mentioned above, we conducted a Monte Carlo simulation and tested the indirect effects of sleep quantity on the three types of workplace interpersonal conflicts mediated by ego depletion. The indirect effects of sleep quantity on process conflict (*indirect effect* = −0.018%, 95%CI [−0.035, −0.006]) and relationship conflict (*indirect effect* = −0.006%, 95%CI [−0.011, −0.002]) were significant, while the indirect effect on task conflict was not (*indirect effect* = −0.055%, 95%CI [−0.208, 0.060]).

5 Discussion

The current study examined the effect of sleep quantity on workplace interpersonal conflict and the mediating role of ego depletion. The findings supported the hypotheses that employees with less sleep quantity experienced more daily ego depletion and, consequently, more interpersonal conflicts in the workplace. These findings suggested that sleep quantity might be an important factor for both employees and organizations. Concerning employee well-being, workplace interpersonal conflict often leads to adverse outcomes, such as burnout [68], frustration, and withdrawal from work [12]. Furthermore, workplace interpersonal conflict may lead to workplace bullying, resulting in physical injury and psychological trauma, such as depression and anxiety [69].

Regarding organizational interests, workplace interpersonal conflict is highly related to low work satisfaction, poor job performance, and less effective communication [70]. Notably, in the present study, workplace interpersonal conflict was measured as the employees' experience or perceception of daily conflict; thus, insufficient sleep time could make employees more sensitive to workplace interpersonal conflict, which may lead to more negative outcomes. The statistical results also suggested a mediating mechanism in which ego depletion played a role in linking sleep quantity to workplace interpersonal conflict. While the sleep self-regulation model has been examined previously [1], our study strengthened this model by adopting an experience-sampling design and multilevel modeling techniques, thus capturing the dynamic nature of sleep quantity, ego depletion status, and workplace interpersonal conflict at the within-individual level.

We examined the indirect effects of sleep quantity on the three dimensions of workplace interpersonal conflict—process, relationship, and task conflict—and found differences. The indirect effects of sleep quantity on process conflict and relationship conflict were mediated by ego depletion; however, no indirect effect was found for sleep quantity and task conflict. This difference was unexpected, but plausible. Next, we try to understand the mechanism underlying the sleep–ego depletion–relationship conflict path explained above.

Regarding the relationship between sleep quantity and process conflict, theory of conservation of resources [71] may provide perspective. When people are depleted of ego resources, they feel vulnerable and will try to conserve resources and avoid losing more. If they are asked to input their resources into achieving work tasks, it will be regarded as a threat. This may explain the indirect relationships between sleep quantity and process and relationship conflict via ego depletion found in the present study.

The insignificant indirect relationship pathway of sleep–ego depletion–task conflict could be partly attributed to the diminished cognitive function caused by ego depletion. Task conflict usually pertains to disagreement of ideas and opinions about a task, demanding profound thinking, instant reflection [72], and a willingness to engage in intensive communication [73] from the involved parties. However, employees with insufficient sleep, who are also highly ego-depleted, have already devoted their limited resources to understanding the content of work tasks, thus depriving them of the ability to further reflect on disagreements. Even if they perceive disagreements, they are likely will choose not to address them at that time, so they can preserve their resources as far as possible for processing priority tasks.

5.1 Theoretical Implications

First, our study broadened the understanding of antecedents by identifying a more individual-level impact on how employees experience daily workplace interpersonal conflict. We also examined the extent to which ego depletion works as a mediator in the relationship between employees' daily sleep and workplace interpersonal conflict. Previous research either considered interpersonal conflict a static occupational stressor or focused on organizational-level antecedents of interpersonal conflict. However, our study addressed workplace interpersonal conflict as an outcome caused by potential occupational health risks. Moreover, we found that employees who slept less the previous night suffered more ego depletion by noon and experienced more workplace interpersonal conflicts throughout the day, thus introducing sleep and ego depletion in conflict research for the first time.

Second, our study enriched current research on employee sleep in an organizational context. Previous research provided has evidence on how sleep influences employees' cognitive abilities and work-related behaviors [2]. Our study explored the relationship between sleep and employees' workplace social interactions. Given that social stressors have been considered some of the most critical in the workplace [74], our findings identified other adverse effects caused by insufficient sleep. Furthermore, our study contributed to research on work–life balance. Similar to the WNS conceptual framework [31], we intended to determine if sleep, as associated with an individual's daily attitude, behavior, and affect, impacts employees' workplace experiences. Sufficient sleep can impact work outcomes, such as safety and burnout [4,75]. Our study extended current research by identifying the negative effect of sleep on workplace interpersonal conflict. Specifically, an imbalance between work and life is harmful to work outcomes and daily interactions with colleagues.

5.2 Practical Implications

Several practical implications, both for organizations and individuals, are derived from the study findings. First, our findings provide a valuable perspective on workplace conflict management. Specifically, our study explored sleep as a dynamic antecedent of workplace interpersonal conflict, which implied that an individual's daily sleep status might influence interpersonal interactions. Given that several approaches have been shown to improve employees' sleep, organizations can consider applying some activities in health promotion campaigns to improve both sleep health and interpersonal relationships for employees. For example, some studies have shown that an individual-level approach in which employees received cognitive-behavioral therapy for insomnia [76] helped them recover from work-related stressors [77]. Additionally, mindfulness training in the workplace to improve sleep has yielded positive results [78].

Second, as we found a mediating effect of ego depletion, activities to replenish the depleted ego are also encouraged in order to reduce employees' workplace interpersonal conflict when suffering from sleep insufficiency. For example, self-control training effectively increases participants' self-control abilities [79]. Further, within-day work breaks offer an alternative way to recover self-regulation resources. A study suggested that within-day work breaks, including relaxation, nutrition-intake, social, and cognitive

activities, enhanced employees' positive affect and decreased fatigue and negative affect caused by ego depletion [80]. Similar results have been found for lunch break activities and break autonomy [81]. Furthermore, health promotion activities should include stress management, considering the relationship between stress and ego depletion and workplace behavior [82]. For example, psychological detachment from work, positive stress-coping, and social support-seeking skills are recommended [83].

Finally, our findings suggest that healthy sleeping habits that guarantee sufficient sleep time would benefit an employee's career development. Workplace interpersonal conflict is one indicator that reflects an employee's work performance [6]. Interpersonal competence is increasingly important in workplaces of today and may significantly impact an individual's career path [8]. For example, working well within teams and building good interpersonal relationships is highly appreciated during recruitment and selection, especially for managerial positions. Thus, our study has implications for the employees' personal growth.

5.3 Limitations and Future Research

Several limitations of the current study should be noted. The first limitation is related to our sample. Our study was conducted within a single cultural context; thus, the generalizability of the findings needs to be considered. Other studies have indicated that cultural variability influences face maintenance, emotional responses, conflict styles, and conflict management [84]. Therefore, future research should assess the generalizability of our findings in different cultural and organizational contexts.

The second limitation concerns the aggregate measurement of workplace interpersonal conflict. As early as Kasl [85], interpersonal conflicts with supervisors and coworkers were proposed to be qualitatively different, and it was deemed necessary to measure them separately. Futhermore, another study has implied that these two types of interpersonal conflicts might be related to various psychological outcomes, respectively [8]. However, due to the sampling method, our study did not employ a measurement that could distinguish between types of workplace interpersonal conflict with a supervisor *vs.* a coworker. In future research, more delicate designs should be applied to achieve this.

Finally, further research should consider objective sleep quantity and quality measurement tools, such as wrist-worn devices [1]. Self-reported sleep quantity is widely used to measure sleep outcomes in organizational psychology, is convenient, and significantly correlates with objective measures [86]. However, new ways to measure sleep need to be considered, and objective measures of sleep outcomes are effective indicators. Further research should combine both subjective and objective sleep quantity and quality measures and assess the differences between the two methods.

6 Conclusion

The present study captures the dynamic nature of sleep quantity and workplace interpersonal conflict via ego depletion. Specifically, employees who reported less sleep experienced more ego depletion and more daily interpersonal conflicts in the workplace. Our study contributes to the current understanding of how sleep quantity leads to workplace interpersonal conflict, and the role of ego depletion in this process. Our findings extend current theories about sleep in organizational psychology and provide a new perspective on workplace conflict management.

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