

Job insecurity and subjective sleep quality: The role of spillover and gender

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Abstract

Perceived job insecurity is a critical job stressor that creates the conditions for negative health and performance outcomes for workers while potentially increasing health-related costs for employers. Sleep quality, an important proxy of health, has been understudied in relation to the impact of perceived job insecurity. Using job stress concepts and a perseverative cognition model, this study examines the association between perceived job insecurity and subjective sleep quality while considering negative work spillover as a mediator. We expand our analysis to consider gender as a moderator of the job insecurity–sleep quality relationship, predicting the relationship will be stronger for men than for women. Study 1 uses a nationally representative sample from the Midlife Development in the United States National Survey Refresher study consisting of 1031 working adults and a multi-group path analysis to test our hypotheses. Results show that negative work spillover mediates the relationship between perceived job insecurity and subjective sleep quality. Study 2 uses a sample of 152 working adults who participated in three biweekly surveys. The mediating role of negative work spillover is replicated in Study 2. In both studies, no gender moderation is found. Theoretical and methodological contributions, limitations and future research directions are discussed.

KEYWORDS

gender, negative work spillover, perceived job insecurity, subjective sleep quality

1 | INTRODUCTION

Over the past few decades, an overwhelming number of workers have experienced a decline in their job security (Farber, 2010; Hacker, 2007; Kalleberg, Reskin, & Hudson, 2000). Among the reasons frequently cited to explain declining job security are rapid organizational changes, transformative technology, globalization and organizational restructuring and downsizing (Caroli & Godard, 2016; Silla, De Cuyper, Gracia, Peiró, & De Witte, 2009). Workers' job insecurity is also associated with a host of negative organizational outcomes, such as increased turnover intention, the psychological withdrawal of employees, decreased organizational commitment, lower levels of trust in top management, lower work motivation and

job dissatisfaction (Böckerman, Ilmakunnas, & Johansson, 2011; Brockner, Grover, Reed, & Dewitt, 1992; De Gilder, 2003; Greenhalgh & Sutton, 1991; Sverke, Hellgren, & Näswall, 2002).

Beyond the significant organizational costs, job insecurity is also detrimental to individual workers—especially to their health and well-being. Previous studies on the association between perceived job insecurity and different physical health outcomes have shown that job insecurity is related to lower self-rated health (Ashford, Lee, & Bobko, 1989; De Witte, Pienaar, & De Cuyper, 2016; Ferrie, Shipley, Newman, Stansfeld, & Marmot, 2005; Urbanaviciute, De Witte, & Rossier, 2019), coronary heart disease (S. Lee, Colditz, Berkman, & Kawachi, 2004), hypertension (Levenstein, Smith, & Kaplan, 2001) and obesity (Ferrie et al., 2005; Muenster, Rueger,

Ochsmann, Letzel, & Toschke, 2011). Moreover, existing research has shown that perceived job insecurity may lead to the development of continued fears of potential job loss, depression, emotional exhaustion and anxiety (Ashford et al., 1989; Llosa, Menéndez-Espina, Agulló-Tomás, & Rodríguez-Suárez, 2018; Piccoli & De Witte, 2015; Virtanen et al., 2005), psychiatric morbidity (Ferrie et al., 2005; Rugulies, Bültmann, Aust, & Burr, 2006) and sleep problems (Burgard & Ailshire, 2009; Kim et al., 2011; Kinnunen & Nätti, 1994; Palmer et al., 2017), influencing many facets of general well-being. In turn, any potential decline in the health of an employee imposes both direct and indirect costs on employers, such as greater healthcare costs, increased insurance premiums, higher rates of absenteeism, lower productivity and turnover among other possible penalties (European Agency for Safety and Health at Work, 2014; McTernan, Dollard, & LaMontagne, 2013).

Sleep as a critical health outcome has received increasing attention from both physicians and public health scholars (e.g., Atlantis, Chow, Kirby, & Singh, 2006; Cho et al., 2013; Rosekind et al., 2010; Sivertsen et al., 2006; Steffen et al., 2015; Swanson et al., 2011; Uehli et al., 2014). In recent years, researchers in the field of organizational behaviour and organizational psychology have also started to examine the effects of sleep on workers' health outcomes. Previous studies have consistently shown that workplace experiences and demands can manifest as stressors, which negatively affect sleep (e.g., Åkerstedt et al., 2002; Burgard & Ailshire, 2009; Kalimo, Tenkanen, Härmä, Poppius, & Heinsalmi, 2000; Knudsen, Ducharme, & Roman, 2007; Linton, 2004). Studying sleep as an outcome variable is therefore important for individuals as a correlate of health and life quality, and also for employers who have witnessed the relationship between sleep problems and higher absenteeism, decreased productivity, unethical behaviour, abusive supervision, work-family conflict and the attendant healthcare costs that are inevitably triggered by all these potential problems as a result (Barnes, Lucianetti, Bhawe, & Christian, 2015; Barnes, Schaubroeck, Huth, & Ghumman, 2011; Barnes, Wagner, & Ghumman, 2012; Hui & Grandner, 2015; Mullins, Cortina, Drake, & Dalal, 2014). In this study, we expand upon the current literature by moving forward with a deeper examination of the specific relationship between job insecurity and sleep outcomes.

As a topic, job insecurity and its effect on sleep remains underdeveloped and relatively unexplored in the literature. In the public health domain in particular, studies on job insecurity and sleep quality remain for the most part atheoretical. Some public health research has shown a conjunctive relationship between job insecurity and sleep (Burgard & Ailshire, 2009; Gosling, Batterham, Glozier, & Christensen, 2014; Virtanen, Janlert, & Hammaström, 2011). The assumptions made in these studies about the attendant negative effects of perceived job insecurity on sleep quality relies heavily on previous medical findings regarding negative somatic health outcomes as reactions to work stress. Based on these findings, the relationship between job insecurity and sleep is hypothesized almost intuitively: a worker who perceives a threat to their job security is more likely to suffer from poor sleep. Although at first glance

such a statement might seem both assumed and obvious, there are arguably more nuanced aspects to this relationship that go beyond the inevitable effects of anxiety caused by a potential job loss. These include both the timing and conditions under which poor sleep may arise in some instances, and not in others, as well as other possible variables which create the conditions under which poor sleep is experienced. This study provides a more robust theoretical rationale for the relationship between job insecurity and sleep quality, deepening our understanding of potential mechanisms behind the job insecurity-sleep relationship. Even though researchers have found some mechanisms (e.g., rumination and worrying) linking job stressors and sleep outcomes (e.g., Berset, Elfering, Lüthy, Lüthi, & Semmer, 2011; Rodríguez-Muñoz, Notelaers, & Moreno-Jiménez, 2011), other mechanisms remain unexplored and the literature lacks compelling theoretical explanations.

In addition to the lack of framework surrounding discussion of these issues, it is still unclear as to whether the potential effect of job insecurity applies equally to men's and women's well-being. With the increase in women's labour force participation and share of household income (Women's Bureau of U.S. Department of Labor, 2017), it is important to examine differences in men's and women's well-being as it relates to job insecurity. Gender differences may be anticipated because job insecurity is a perceptual phenomenon, and men and women are more likely to possess different perceptions of their job insecurity based on their socially shared gender role expectations (Corrigan & Konrad, 2006; Eagly, 1987; Platt & Polavieja, 2016) and employment experiences (Kelan, 2008). Past research has shown gender differences in the relationship between job insecurity and well-being (Cheng & Chan, 2008; De Witte, 1999; Richter, Näswall, & Sverke, 2010), but sleep quality has yet to be studied. Different demands and roles for each gender may provide contextual influences on the relationship between job insecurity and sleep quality while reflecting a more realistic, holistic understanding of the determinants of sleep quality.

This study's contributions are therefore twofold. First, it broadens our understanding of the relationship between work and sleep by providing a mechanism that can be used to expand the nomological net of perceived job insecurity and sleep quality, thus informing research on the relationship between work and health in general. Existing studies have accurately identified perceived job insecurity as stressful, and therefore justifiably associated this stress effect with negative health outcomes. This study takes the issue of work and sleep a step further and develops a theoretical rationale that explains this association and considers specific characteristics of perceived job insecurity and its psychological impact via job stress theory and the perseverative cognition model (Brosschot, Gerin, & Thayer, 2006; Brosschot, Pieper, & Thayer, 2005; Brosschot, Verkuil, & Thayer, 2013). More specifically, our work addresses the phenomenon of negative work spillover, a form of perseverative cognition, and how it can act as a mechanism linking perceived job insecurity and subjective sleep quality.

Second, this study offers a more comprehensive model by taking into account gender as a contextual factor affecting the relationship

between job insecurity and subjective sleep quality. Here, we assume, based on gender role socialization theory (Eagly, 1987; Eagly, Makhijani, & Klonsky, 1992), that men are more vulnerable to job insecurity than women because of social expectations regarding paid work and breadwinning (Camgoz, Ekmekci, Karapinar, & Guler, 2016; Inanc, 2018). This comprehensive approach allows researchers to better identify who may be more vulnerable to job insecurity and provide interventions that treat the mechanism between job insecurity and subjective sleep quality, an outcome that will benefit both organizations and employees (Cheng & Chan, 2008).

2 | THE EFFECT OF PERCEIVED JOB INSECURITY ON SLEEP QUALITY

This study follows Sverke et al. (2002, p. 243) definition of perceived job insecurity, 'an overall concern about the continued existence of one's job in the future'. Researchers have used both unidimensional and multidimensional approaches to measure perceived job insecurity with no consensus about which of the two better captures the construct (Ashford et al., 1989; Probst, 2008; Reisel & Banai, 2002). The unidimensional approach has been applied more frequently by job insecurity researchers (C. Lee, Huang, & Ashford, 2018). For example, Davy, Kinicki, and Scheck (1997, p. 323) define perceived job insecurity as 'one's expectations about continuity in a job situation'. Other definitions from various researchers (e.g., Heaney, Israel, & House, 1994; Sverke et al., 2002) have also focused on the potential perceived threat to the continuity of one's job. Different definitions do share some commonalities: they define job insecurity as concerning an existing job, a subjective perception of the job as being threatened and uncertainty about the future, all of which leads to a frequent use of the global approach to measuring job insecurity (C. Lee et al., 2018).

Researchers who offered a multidimensional construct attempt to measure a more granular construct. For example, Greenhalgh and Rosenblatt (1984) define job insecurity along two dimensions: perceived severity of the threat and perceived powerlessness to resist the threat. Ashford et al. (1989) have measured perceived job insecurity by perceived powerlessness to resist the threat of job loss and the importance of job features (e.g., opportunities for promotion and freedom to schedule work). De Witte (2005) has also defined perceived job insecurity using two dimensions, focussing on the perceived threat of job loss and the concomitant worries associated with this threat. Still, some researchers argue that various factors, such as powerlessness and the desire for continuity, act as moderators in the relationship between perceived job insecurity and its outcomes—and are not part of the construct itself (e.g., Probst, 2003).

Regardless of the definition, researchers have regarded perceived job insecurity as an antecedent of workers' prolonged stress (De Witte, 2005; Greenhalgh & Rosenblatt, 1984; Probst, 2008). Work stress and strain symptoms are affected by an understanding of various events, the capacity to predict events, as well as control over them in the work environment (Heaney et al., 1994; Sutton & Kahn, 1986). Perceived job insecurity means, by definition,

that workers have a limited degree of self-determination over their employment conditions. Therefore, perceived job insecurity may decrease workers' psychological well-being because of its hampering effect on an individual's ability to anticipate or prepare for any possible threats to their job (De Witte et al., 2016). Workers who experience a lack of control over their employment status are therefore predicted to be negatively affected physiologically, and hence suffer from lower well-being.

This study focusses on one of the essential components of well-being: sleep. Sleep is dependent on external factors that fluctuate during a worker's life, like the presence of stressors and demands that are inevitably imposed by work at certain points during the life cycle. Stressors can negatively affect sleep quantity and quality. Sleep quantity includes quantifiable components of sleep, such as sleep latency and sleep duration, whereas sleep quality is usually measured using qualitative indicators of the overall evaluation of sleep (M. Ohayon et al., 2017; Park & Sprung, 2015; Pilcher, Ginter, & Sadowsky, 1997). The two components overlap moderately—sleep quantity is one component of sleep quality—but they are qualitatively different and sometimes yield quite different or opposite patterns in correlations with each other, as well as their associations with the same antecedents (e.g., depression and sedentary behaviour) and outcomes (e.g., health outcomes; Bassett, Lupis, Gianferante, Rohleder, & Wolf, 2015; Benham, 2010; Jean-Louis, Kripke, & Ancoli-Israel, 2000; Kakinami et al., 2017; Pilcher et al., 1997). This study focusses on sleep quality because between the two components, sleep quality was found to be a better predictor of individuals' well-being and positive attitudes and behaviours. For example, poor sleep quality is more strongly related to physical health complaints, anxiety, depression, anger, fatigue, an increase in cortisol stress responses and aggression, decrease in prosocial attribution tendencies, life satisfaction and positive affect than sleep quantity (Barker, Ireland, Chu, & Ireland, 2016; Bassett et al., 2015; Benham, 2010; Lavidor, Weller, & Babkoff, 2003; Pilcher et al., 1997). Sleep quality encompasses multidimensional aspects reflecting the difficulty falling asleep and staying asleep, the frequency of awakening during the night and feeling unrested upon waking (Barnes, 2012; Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008; Jenkins, Stanton, Niemcryk, & Rose, 1988).

Sleep quality can be subjectively measured by study participants' self-report and objectively evaluated by using diagnostic tests such as actigraphy and polysomnography. Objective measures of sleep quality are popularly used in clinical studies, and subjective measures are also frequently used beyond the clinical field especially when objective measures are not easily applicable. Evidence from previous studies support the external validity of subjective sleep quality, especially for the short-term evaluation of sleep quality, by showing significant associations between subjective and objective sleep quality (Argyropoulos et al., 2003; Boudebesse et al., 2014; Unruh et al., 2008). Here, we investigate subjective (i.e., self-report) sleep quality that is more commonly measured in non-clinical research.

Sleep quality has been cited frequently as a health outcome of work-related stress (Sonntag, Casper, & Pinck, 2016). For example,

it is well established that psychological stressors from the workplace hinder sleep quality (Burgard & Ailshire, 2009; Ota et al., 2005; Winwood & Lushington, 2006). More specifically, previous studies have shown that stress from work demands, such as work overload, role conflict and repetitive tasks are associated with poorer sleep quality, manifested in experiencing difficulty in initiating and maintaining sleep, and leading to non-restorative sleep (Knudsen et al., 2007). Some work contexts (e.g., telepressure) are positively related to poor sleep quality (Barber & Santuzzi, 2015), with shift work and strenuous physical labour also being associated with sleep quality (Åkerstedt et al., 2002). Studying the stress–sleep relationship more closely, researchers have shown that psychological stress is related to the development of insomnia, a representative symptom of poor sleep quality (Espie, 2002; Morin, Rodrigue, & Ivers, 2003).

The few empirical studies dedicated to addressing the relationship between workers' perceived job insecurity and sleep quality have shown mixed findings. For example, Kim et al. (2011) and Palmer et al. (2017), using logistical regression, found that workers reported high level of job insecurity are more likely to have sleep problem. However, in their study on sleep disturbances that highlight and contrast differences between stressful events at home and at work, Burgard and Ailshire (2009) have found inconsistent results between perceived job insecurity and sleep quality across different time periods, while Gosling et al. (2014) find a negative association, but only between perceived job insecurity and intermittent sleep disturbance and not chronic sleep disturbance. One possible explanation of the mixed findings is the measurement quality of poor sleep. For example, Burgard and Ailshire (2009) measured sleep quality by a single item, which originated from a depression scale, and they dichotomized the responses of poor sleep with the use of a logistic regression. Specifically, they asked: 'During the past week my sleep was restless: most of the time, some of the time, or hardly ever' and merged the responses from 'some' and 'most' of the time to troubled sleep. The dichotomization of continuous responses without clear theoretical and methodological rationale may lead to results that lack accuracy compared to those using a continuous indicator (DeCoster, Iselin, & Gallucci, 2009). Another possible explanation of these mixed findings could be a confounding effect. For example, Gosling et al. (2014) have selected only participants who were 40–44 years old at the beginning of a three-wave longitudinal study with data collected in 2001, 2004 and 2008. Therefore, the results only represent midlife population and furthermore, the findings may confound an age-specific intervention effect (Bijlsma et al., 2015; French, Sargent-Cox, & Luszcz, 2012; Sacker & Wiggins, 2002). Furthermore, the different measures of sleep quality may be one of the key factors in explaining the mixed findings across the studies. Still, based on perceived job insecurity and well-being research, it seems that a negative relationship between perceived job insecurity and sleep quality is expected. Therefore, we suggest the following hypothesis.

Hypothesis 1 *Perceived job insecurity will be negatively related to subjective sleep quality.*

3 | THE EFFECT OF PERCEIVED JOB INSECURITY ON SUBJECTIVE SLEEP QUALITY VIA NEGATIVE WORK SPILLOVER

A worker's ongoing cognition of job insecurity is not bound strictly to the work domain and is likely to spill over into non-work domains. Work-to-home spillover refers to the transfer of work situations 'to the non-work domain through emotional interference' (Greenhaus & Parasuraman, 1987, p. 44); in the case of job insecurity, work spillover is expected to be negative. Negative spillover from work to non-work domains entails a continuous, stressful work situation—even well after individuals may have physically left their workplace—but are unable to mentally and psychologically detach themselves from its associated stress. In this study, we focus on the effect of negative spillover from work to non-work, or negative work spillover, to one's health and well-being.

3.1 | Perseverative cognition model

The perseverative cognition model (Brosschot et al., 2005, 2006, 2013) expands previous stress theories by looking at one's responses to stressful events after and even before the events happen. Therefore, it provides an explanation not only for how one's rumination after stressful events can affect health and well-being, but also for how anticipatory stress can affect somatic symptoms. Perseverative cognition refers to 'the repeated or chronic activation of the cognitive representation of one or more psychological stressors' (Brosschot et al., 2006, p. 114). Because specific stressors are mentally represented long before a given stressful event may actually materialize, the cognitive representation of such an event persists within an individual's mental map and thought process. This in turn may eventually harm their psychological well-being, regardless of the actual occurrence of the stressful event (Brosschot et al., 2013). The perseverative cognition model emphasizes that if a stressor originates from a factor over which an individual has less control, such as the perception of job insecurity, the stressor will become a critical source of perseverative cognition of the stressor. In turn, this prolonged cognition of the stressor will activate negative physiological and psychological outcomes.

3.2 | Perceived job insecurity and negative work spillover

Work-related experience can be a critical source of perseverative cognition, and which may introduce prolonged stress from ones' work domain to their non-work domain. For example, existing studies found that day-to-day job demands (e.g., workload, distressing shifts, work pace, work effort and conflicting demands) were positively associated with ones' perseverative cognition regarding their work (Radstaak, Geurts, Beckers, Brosschot, & Kompier, 2014; van Laethem et al., 2018). These studies also found

that perseverative cognition was a mechanism of the negative association between job demands and sleep quality. Likewise, a type of work-related stressor that is not happening yet, but anticipated, can provoke the process of perseverative cognition. Perceived job insecurity is especially relevant in this process: if individuals anticipate that their employment status is threatened, they may continuously cognize about this job threat regardless of whether they are at the workplace, or at home. This ongoing contemplation may not only spillover from the work-related stress to the home domain, but also reduce the individual's level of energy and emotional resources (Brosschot et al., 2005; Debus & Unger, 2017). Therefore, the negativity generated from the perceived job insecurity may spillover to negatively affect the individual's quality of their non-work life, including a decrease in their energy to perform satisfactorily in family-related activities or their emotional willingness to participate in such activities.

Furthermore, perceived job insecurity may increase the degree of overall work stress and tiredness, which is also likely to spillover to non-work domains. Some researchers argue that perceived job insecurity may increase withdrawal behaviours, resulting in lower work engagement and performance, turnover intention and absenteeism because individuals feel an imbalance in the exchange between their loyalty and investment at work, and the job security that employers are expected to offer in exchange (Camgoz et al., 2016; Cheng & Chan, 2008; Jiang & Lavaysse, 2018). Other researchers argue, however, that perceived job insecurity may result in promoting employees' work efforts in order to maintain their jobs when they believe that their higher performance will increase the organization's capability to provide the security to employees, or the layoff criterion is their performance (Brockner et al., 1992; Gilboa, Shirom, Fried, & Cooper, 2008). Fearing for their job, workers may expect that their endeavouring to perform well will increase the likelihood of keeping their job. Along with this expectation, they may perceive pressure to exert more effort on the job, which eventually may increase their level of tiredness because of their greater investment of physical and psychological resources. The stress and tiredness from the hard-working efforts will be transferred to one's life domains outside of work. As a result, not only will the stress from perceived job insecurity itself will spillover to affect one's non-work domain, but also the overall exertion of effort and resources will result in negative spillover.

3.3 | Negative work spillover and health

The negative spillover of stress from the work domain to non-work domains has been shown to affect different facets of health. For example, studies demonstrate that work stress cannot be easily cast aside once a worker arrives home and may result in poor general health, depressive symptoms and negative health behaviours, such as substance abuse (Goodman & Crouter, 2009; Grzywacz & Marks, 2000). Work-home interference and work-home conflict, which share the concept of negative work-home spillover, are also found to be antecedents of poor health outcomes such as

self-reported poor health and increased exhaustion (Peeters, de Jonge, Janssen, & van der Linden, 2004; van der Heijden, Demerouti, & Bakker, 2008).

As such, in addition to the direct relationship between job insecurity and subjective sleep quality, we argue that this relationship may be mediated by negative work-to-home spillover. Poor subjective sleep quality can be a consequence of the transference of work reactions to the home domain. For example, sleep deprivation (Geurts, Rutte, & Peeters, 1999), sleep disruption (Maume, Sebastian, & Bardo, 2009) and sleep complaints (van Hooff, Geurts, Kompier, & Taris, 2006; van Veldhoven & Beijer, 2012) are reported as results of work and family spillover and conflict. It is important to note that this is in contrast to physical exhaustion, which has often been shown to share links to the occurrence of higher quality sleep (e.g., Passos et al., 2010, 2011; Reid et al., 2010). Based on the above, we postulate that negative work spillover will mediate the relationship between perceived job insecurity and subjective sleep quality.

Hypothesis 2 *The relationship between perceived job insecurity and subjective sleep quality will be mediated by negative work spillover.*

4 | THE MODERATING ROLE OF GENDER

Studying gender as a moderator is important because, while both men and women are likely to experience some level of job insecurity, gendered societal expectations and work-related identity (Mauno & Kinnunen, 2002) and gender-specific coping mechanism (Menéndez-Espina et al., 2019) may lead to a different relationship between job insecurity, negative work-to-family spillover (hereafter referred to as negative work spillover) and sleep quality among men and women. Past research on the role of gender in the relationship of job insecurity and individual and work outcomes has demonstrated mixed findings, with the vast majority of research concluding that there is a greater sensitivity to job insecurity among men than among women (e.g., De Witte, 1999; Ferrie, Shipley, Stansfeld, & Marmot, 2002; Levenstein et al., 2001; Richter, 2011). For example, job insecurity has been shown to be associated with psychological distress and hypertension in men, but not in women (e.g., De Witte, 1999; Levenstein et al., 2001) and men experienced a stronger effect of job insecurity on different facets of well-being than women (Ferrie et al., 2002). Previous findings such as these support the argument that a socially constructed gender role is operating within the context of issues pertaining to job insecurity; there are greater expectations from men to support their families by working for pay and maintaining their breadwinner status, while the expectations from women, who often suffer from higher levels of job insecurity (Mauno & Kinnunen, 2002), are often mixed, comprising both work-related expectations and expectations about prioritizing unpaid work. The few studies that report greater sensitivity of women to job insecurity than men offer a more nuanced story. For example, women older than 50 may be more sensitive to job insecurity than men

(Kalil, Ziol-Guest, Hawkey, & Cacioppo, 2010) and poorer occupational mobility among women may account for these findings (Greenhalgh & Rosenblatt, 1984; Rosenblatt, Talmud, & Rubio, 1999). Another meta-study (Cheng & Chan, 2008) found no significant gender difference in the effect of job insecurity on psychological (e.g., anxiety and psychological distress) and physical health (e.g., headache and back pain), but these results may be attributed to the few outcomes that were examined.

Still, gender role expectations may be an important moderator of the relationship between perceived job insecurity and sleep. Notably, gender roles are normative expectations about the 'proper' roles for men and women (Eagly, 1987; Eagly, Karau, & Makhijani, 1995) and incongruence between actual roles and expected roles can negatively affect well-being (Motro & Ellis, 2017). Men's well-being may be more strongly affected by an incongruence of work-related gender role expectations because men's identity is more strongly related to their work than that of women (Bertrand, Kamenica, & Pan, 2015; De Witte, 1999; Russell, 1999; Wajcman & Martin, 2002). Specifically, men are more likely than women to take work roles as being crucial to their self-esteem and identity, and women are more likely than men to take family roles as central to their self-esteem and identity (Gaunt & Benjamin, 2007; Richter, 2011).

Research has consistently shown that this holds true even when both men and women participate in work and family domains, as is the case for many modern dual-earner families; this is even so when women out-earn their spouses (Barnett & Hyde, 2001; Bertrand et al., 2015; Gaunt & Benjamin, 2007; Kramer & Kramer, 2016; Richter, 2011). And, although gender egalitarianism has been on the rise, the notion that work roles should be the primary domain of men, and that family roles be the primary domain of women, are still endorsed by as many as 40% of men and 37% of women in the United States (Galinsky, Aumann, & Bond, 2011) and the rates at which men are likely to position the importance of paid work responsibilities as central to their identity are higher than that of women (Wajcman & Martin, 2002). Likewise, men still spend more time at paid work and women still spend more time in housework and childcare (Sayer, 2016). As a result, job insecurity may especially affect men more than women as it produces a greater threat to their identity stability.

In summary, because of the societal expectations of men and the importance of work to men's identity relative to women, men's stress from job insecurity will be more likely to spill over into their non-work domain than that of women. Moreover, men's prolonged concerns regarding their job security may be of greater detriment to sleep quality than it will be for women's sleep quality. Men's well-being has been largely associated with the work domain, and so it follows that the stress derived from any threat to their employability may affect men's health outcomes more negatively than for the health outcomes of women. Supporting this notion, Richter (2011) finds that men report more health issues as a result of job insecurity than women do. This seems to be especially true among men who are responsible for a higher proportion of the family's income. In contrast, women's well-being has been associated more strongly with

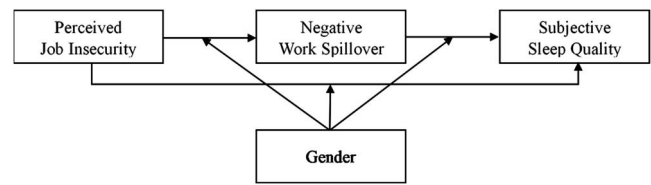


FIGURE 1 Hypothesized paths

the family domain and stress derived from this sphere may be more negatively associated with women's health outcomes than that of men (Richter, 2011). We therefore argue that the negative effects of job insecurity will be stronger for men than for women.

Furthermore, we expect the negative effect of work-to-home spillover on sleep quality to be stronger for men than for women. Stress from negative work-to-home spillover increases the likelihood of individuals' unhealthy behaviours, such as unhealthy eating, drinking alcohol and smoking (see Moen, Fan, & Kelly, 2013 for a review). Although the gender differences in drinking and smoking are continuously decreasing, men still tend to engage in these unhealthy behaviours more than women do (Wilsnack, Wilsnack, Gmel, & Kantor, 2018). These behaviours impair ones' health and well-being, including their sleep quality. For example, drinking alcohol and smoking are critically detrimental for sleep quality (Ebrahim, Shapiro, Williams, & Fenwick, 2013; Jaehne et al., 2012; Wetter & Young, 1994). Therefore, men's negative work spillover is more likely to result in lower sleep quality than women's. Therefore, we hypothesize similar moderating effects of gender on the mediated relationship between job insecurity and sleep, where negative work spillover will be stronger for men than for women (see Figure 1).

Hypothesis 3 *Gender will moderate the strength of the mediated relationships between perceived job insecurity and subjective sleep quality via negative work spillover, such that the expected positive relationship between perceived job insecurity and negative work spillover will be stronger for men than women, the expected negative relationship between perceived job insecurity and subjective sleep quality will be stronger for men than women, and the expected negative relationship between negative work spillover and subjective sleep quality will be stronger for men than women.*

5 | METHOD

Two studies were conducted to test the hypotheses presented in this research. Study 1 utilizes data from the Midlife Development in the United States National Survey (MIDUS Refresher) from 2012. These data provide us with greater external validity and with a nationally representative sample of the US population. However, the MIDUS data are cross-sectional and have some deficiencies in its measures (e.g., a single-item job insecurity measure). In Study 2, we collected data from 152 participants at three time points and included higher quality measures (e.g., multiple-item job insecurity). We provide more details on each study below.

5.1 | Study 1: Method

5.1.1 | Participants

Data for Study 1 came from the MIDUS Refresher and were collected beginning in 2012 by the Institute on Aging at the University of Wisconsin-Madison. Respondents were selected using random digit dialling from the 48 contiguous US states to constitute a nationally representative sample of adults. The respondents first completed a phone interview focussing on sociodemographic and psychosocial assessments. Next, those respondents completed a mailed set of self-administered questionnaires (SAQs) that included assessments of their health, employment, income and psychosocial measures (Delaney, 2014; Kirsch & Ryff, 2016; MIDUS Refresher website [http://midus.wisc.edu/refresher]). Overall, data included 3577 respondents who participated in the survey.

5.1.2 | Inclusion criteria

A subsample of the MIDUS Refresher is used for the purpose of this study. Those who completed SAQs were included in our subsample because some key variables (e.g., job insecurity, subjective sleep quality and negative work spillover) were only asked about and answered via SAQs. Among SAQ respondents, we included individuals who were at least 18 years old, working for pay at a full-time job (i.e., 35 h or more in an average week at their primary jobs) and not self-employed. This criterion was chosen to avoid possible 'healthy worker bias'—part-time workers are more likely to report better health because they have, on average, more time and opportunities to unwind their tension and stress. Therefore, they are more likely to report better subjective sleep quality as a result of negative work spillover than full-time workers (Nylén, Melin, & Laflamme, 2007). The final sample included 1031 individuals, 583 men (56.5%) and 448 women (43.5%), ranging in age from 23 to 75 ($M = 45.43$, $SD = 11.68$), 754 participants (73.1%) were married or in a marriage-like relationship, 602 participants (58.4%) had 4-year college degree or above and 364 participants (35.3%) had children under 14 years old currently living in their household. Participants in our sample were working 46.18 h per week on average ($SD = 10.03$) within a range of 35–129 weekly hours.

5.1.3 | Measures

Dependent variable

Subjective sleep quality. Subjective sleep quality was measured using a 4-item scale from the Sleep Problems Questionnaire (SPQ) developed by Jenkins et al. (1988). The SPQ has been used frequently in clinical and management studies in order to measure sleep quality, as well as respondents' symptoms of potential insomnia (e.g., Barber, Taylor, Burton, & Bailey, 2017; Barnes, Miller, & Bostock, 2017; Chasens, Twerski, Yang, & Umlauf, 2010; Huyghebaert, Gillet, Beltou,

Tellier, & Fouquereau, 2018; Scott & Judge, 2006; Yuan, Barnes, & Li, 2018). A sample question is: 'How often do you wake up during the night and have difficulty going back to sleep?' Participants responded using a 5-point Likert scale (1 = never and 5 = almost always). Responses were reverse coded and averaged, with higher scores indicating better subjective sleep quality. The Cronbach's alpha of this scale is 0.78.

Independent variables

Perceived job insecurity. Perceived job insecurity was measured using a global measure that has been used in job insecurity research (e.g., Fullerton & Wallace, 2007; Narisada & Schieman, 2016; Reisel & Banai, 2002; Schieman, Milkie, & Glavin, 2009). Respondents were asked: 'If you wanted to stay in your present job, what are the chances that you could keep it for the next 2 years?' (1 = excellent, 2 = very good, 3 = good, 4 = fair and 5 = poor).

Negative work spillover. Negative work spillover was measured using a 4-item Negative Work-Family spillover scale that was designed by the survey team of MIDUS Refresher at the University of Wisconsin-Madison through their preliminary factor analytic work (Grzywacz & Marks, 2000). A sample question is: 'In the past year, how often have job worries or problems distracted you when you were at home?' (1 = all of the time, 2 = most of the time, 3 = some of the time, 4 = rarely and 5 = never). This scale has been used in previous studies that focus on negative work spillover (e.g., Goodman & Crouter, 2009; Grzywacz & Marks, 2000; Moen, Kelly, & Hill, 2011; Moen, Kelly, & Huang, 2008; Williams, Franche, Ibrahim, Mustard, & Layton, 2006). Responses were reverse coded and averaged, with higher scores indicating greater negative work spillover. The Cronbach's alpha of this scale is 0.81.

Gender. Gender was self-reported by participants (1 = female and 0 = male).

Control variables. We controlled for age in all models because sleep patterns and quality evolve across the human life span (Burgard & Ailshire, 2009; M. M. Ohayon, Carskadon, Guilleminault, & Vitiello, 2004; Williams et al., 2006).

5.1.4 | Analytical strategy

Using Stata 15.1, we ran a path analysis to test our hypotheses. We centred independent variables to alleviate potential multicollinearity problems when using interaction terms (Cohen, Cohen, West, & Aiken, 2013). The path model was tested using maximum likelihood estimation. Our mediation hypothesis (i.e., Hypothesis 2) was subjected to bootstrapping tests for a more direct and rigorous investigation of indirect effects (Preacher & Kelley, 2011).

We conducted confirmatory factor analysis (CFA) for measures of negative work spillover and subjective sleep quality as well as multi-group CFA for a measurement model before testing Hypothesis 3. We refer to the following criteria when determining unacceptable model fit: root mean square error of approximation (RMSEA) > 0.10, standardized root mean squared residual

(SRMR) > 0.10, comparative fit index (CFI) < 0.90 and Tucker–Lewis index (TLI) < 0.90 (Browne & Cudeck, 1993; Cheung & Rensvold, 2002; Vandenberg & Lance, 2000).

5.2 | Study 1: Results

5.2.1 | Preliminary analyses

Means, standard deviations and correlations among study variables are presented in Table 1. As expected, perceived job insecurity ($r = -0.09$, $p = 0.006$) and negative work spillover ($r = -0.25$, $p < 0.001$) are negatively correlated with subjective sleep quality while perceived job insecurity and negative work spillover are positively correlated ($r = 0.19$, $p < 0.001$).

We conducted CFA to affirm the distinctiveness of our measures of negative work spillover and subjective sleep quality. While χ^2 was significant, other fit statistics showed that a two-factor model fits better ($\chi^2 [19] = 232.38$, $p < 0.001$, CFI = 0.92, TLI = 0.89, RMSEA = 0.11, SRMR = 0.06) than one-factor model ($\chi^2 [20] = 1214.39$, $p < 0.001$, CFI = 0.57, TLI = 0.40, RMSEA = 0.25, SRMR = 0.15, $\Delta\chi^2 [1] = 982.02$, $p < 0.001$). Although the TLI and RMSEA values showed marginal differences compared to the aforementioned model fit criteria, the overall set of reported fit values meet the criteria for acceptable model fit (West, Taylor, & Wu, 2012). Therefore, we confirmed that our measures represent distinct constructs.

In order to determine if the items measuring negative work spillover and subjective sleep quality were invariant across the male and female groups, multi-group CFA was conducted with a measurement model that tested for invariant factor loadings, covariances, error variances and intercepts across the comparison groups (Acock, 2013; Aguinis & Gottfredson, 2010). Compared to the model with no constraints on groups ($\chi^2 [38] = 265.00$, $p < 0.001$, RMSEA = 0.11, SRMR = 0.07, CFI = 0.92, TLI = 0.88), the constrained model in which factor loadings, error variances and covariances were assumed to be equal resulted in a better model fit ($\chi^2 [55] = 288.27$, $p < 0.001$, RMSEA = 0.09, SRMR = 0.08, CFI = 0.92, TLI = 0.92, $\Delta\chi^2 [17] = 23.27$, $p = 0.141$). Therefore, it was confirmed that using the same items for men and women was appropriate.

5.2.2 | Hypotheses testing

Figure 2 shows the results of the path analysis. Perceived job insecurity was significantly related to negative work spillover ($\beta = 0.19$, bootstrapped SE = 0.03, $p < 0.001$), but did not significantly affect subjective sleep quality ($\beta = -0.04$, bootstrapped SE = 0.03, $p = 0.245$). In addition, negative work spillover was significantly related to subjective sleep quality ($\beta = -0.25$, SE = 0.03, $p < 0.001$). The model explained 6% and 9% of the variance in negative work spillover and subjective sleep quality, respectively.

For the significance tests of indirect effect, maximum likelihood bootstrap procedure was applied with 1000 bootstrapped samples (Shrout & Bolger, 2002). As a result, a small but significant indirect effect from perceived job insecurity to subjective sleep quality was found (estimate = -0.04 , bootstrapped SE = 0.01, $p < 0.001$). The results showed that although perceived job insecurity did not directly affect subjective sleep quality as proposed in Hypothesis 1, the results supported Hypothesis 2 showing that negative work spillover mediates the relationship between perceived job insecurity and subjective sleep quality.

Hypothesis 3 states that the mediating effect of negative work spillover on the relationship between perceived job insecurity and subjective sleep quality would be different for male and female participants. We conducted multi-group path analysis for women and men and a Wald test to find any significant gender differences in each path in the mediation model. The results of multi-group path analysis and the Wald test are presented in Table 2. The Wald test results showed that there were no significant gender differences in path coefficients. Therefore, Hypothesis 3 was not supported.

5.3 | Discussion of Study 1

Using a nationally representative sample, we found that the association between perceived job insecurity and subjective sleep quality was mediated by negative work spillover. While we found a significant correlation between perceived job insecurity and subjective sleep quality, there was no significant direct effect between perceived job insecurity and subjective sleep quality. In addition, gender was not a contingent factor in the mediated relationship between job insecurity, negative work spillover and subjective sleep quality. The lack of the gender moderation effect suggests that a threatened job loss generates a critical degree of stress that does not differ in degree between men and women.

Some limitations should be considered when interpreting these results. First, the use of cross-sectional, self-report data limits any causal inferences from Study 1 because of potential common method bias. Second, the use of a single item to measure perceived job insecurity may underestimate the residual variance of the population effect sizes (Sverke et al., 2002). Instead, the use of multi-item scales for perceived job insecurity may better explain variance of the outcomes and effect sizes. To address these issues, we adapted a longitudinal study design with a measure of perceived job insecurity including multiple items in our Study 2.

5.4 | Study 2: Method

5.4.1 | Participants

Participants were American employees recruited using Qualtrics, a third-party organization that maintains research panels of full-time employees. All participants provided informed consent before

Variable	Mean	SD	1	2	3	4	5
1. Age	45.43	11.68	-	-	-	-	-
2. Gender	0.43	0.50	0.04	-	-	-	-
3. Perceived job insecurity	1.65	0.99	0.03	0.01	-	-	-
4. Negative work spillover	2.75	0.71	-0.12***	0.05	0.19***	0.81	-
5. Subjective sleep quality	3.52	0.83	-0.04	-0.14***	-0.09**	-0.25***	0.78

TABLE 1 Study 1 descriptive statistics, correlations and Cronbach's alphas

Notes: $n = 957$ – 1031 . Cronbach's alphas are presented in boldface text along the diagonal. Gender was coded as: 1 = female, 0 = male.

** $p < 0.01$; *** $p < 0.001$.

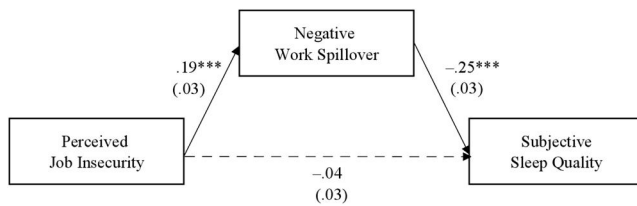


FIGURE 2 Results from the path analysis of the mediation model ($n = 954$). Standardized coefficients are presented. For simplicity, path coefficient of control variables (i.e., age and gender) and covariances among exogenous variables are not presented. Solid lines represent that the path coefficients are significant. Bootstrapped standard errors are reported within parentheses. *** $p < 0.001$

participation. We targeted employees who were working for pay at full-time jobs (i.e., 35 h or more in an average work week) in the United States, except those who were self-employed, and who were at least 18 years old. Three biweekly surveys were designed and participants were asked to complete the repeated surveys. Survey participants were compensated for each completed survey according to a formula used by Qualtrics. A description of the procedure deployed by Qualtrics was provided by Li, Lee, Mitchell, Hom, and Griffeth (2016), which details how the integrity of the responses and the accuracy of panelists' information is established and maintained. Overall, 620 participants completed the first survey, 416 participants completed the second survey and 182 participants completed the third survey. Among the entire three-wave responses, valid responses from 152 participants were used to construct a panel data set. Among the 152 participants, 79 participants (52.0%) were female, 73 participants (48.0%) were male and the average sample age was 46.07 years ($SD = 12.25$). Of these, 102 participants (67.1%) were married or in a marriage-like relationship, 116 participants (76.3%) had a 4-year college degree or above, 27 participants in wave 1 and 3 (17.8%) and 26 participants in wave 2 (17.1%) had children 13 years of age or younger living at home, and participants were working an average of 42.9 h/week ($SD = 5.61$).

5.4.2 | Measures

Because we planned to test the same research model between Study 1 and Study 2, the scales used therein are the same for the variables

of subjective sleep quality ($\alpha_{\text{Study 2, average over time}} = 0.89$) and negative work spillover ($\alpha_{\text{Study 2, average over time}} = 0.91$). The only difference was the measure of perceived job insecurity: in the MIDUS Refresher, a single item measure of job insecurity was used, and in Study 2, perceived job insecurity was measured using five items of the original 10-item scale of the Job Insecurity Scale developed by Ashford et al. (1989). The scale has been often used in job insecurity research (e.g., Boswell, Olson-Buchanan, & Harris, 2014; Hewlin, Kim, & Song, 2016; Westman, Etzion, & Danon, 2001), and measures the concern of an individual about losing their existing job in the future, which reflects the definition of perceived job insecurity as it is used in this study. A sample item is: 'Thinking about the future, how likely is it that each of these events might actually occur to you in your current job? Answer—Lose your job and be laid off permanently' (1 = very unlikely, 2 = unlikely, 3 = neither likely nor unlikely, 4 = likely and 5 = very likely). The average Cronbach's alpha over time is 0.87. In addition, we controlled for age as in Study 1.

5.4.3 | Analytical strategy

Because time is nested within individuals, we used a multi-level structural equation modelling (MSEM) using Mplus version 8.3 (Muthén & Muthén, 2019). The benefit of using MSEM is that the between-person and within-person effects are distinguished, whereas the traditional multi-level modelling estimates only one mean slope that conflates the two effects and yields biased indirect effects (Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010). By using MSEM, we aim to find unbiased between-person effects—for example, how between-person differences in perceived job insecurity associated with between-person differences in their subjective sleep quality (i.e., the effect of one's mean level of perceived job insecurity on subjective sleep quality). Although we did not mainly hypothesize them, MSEM uncovers within-person effects as well (i.e., the effect of biweekly variations from one's mean level of perceived job insecurity on subjective sleep quality). We find that in null models, a significant amount of the variance in negative work spillover and subjective sleep quality was explained by within-person variance: 73.4% of the total variance in negative work spillover and 83.6% of the total variance in subjective sleep quality were within individual.

TABLE 2 Study 1 multiple-group path analysis results

	Female (n = 420)		Male (n = 534)		Wald test (df = 1)	
	Standardized path coefficient	Bootstrapped SE	Standardized path coefficient	Bootstrapped SE	χ^2	$p > \chi^2$
Negative work spillover						
Age	-0.12*	0.05	-0.14**	0.04	0.03	0.862
Perceived job insecurity	0.17***	0.04	0.21***	0.04	0.66	0.416
Subjective sleep quality						
Age	-0.02	0.05	-0.06	0.04	0.33	0.568
Perceived job insecurity	-0.03	0.05	-0.04	0.04	0.05	0.820
Negative work spillover	-0.18***	0.05	-0.32***	0.05	3.87	0.049
Indirect effect	-0.03*	0.01	-0.06***	0.01	-	-
R ² negative work spillover	0.04		0.06		-	
R ² sleep quality	0.03		0.11		-	

Notes: The p -value of the Wald test of the relationship between negative work spillover and subjective sleep quality (i.e., 0.049) becomes 0.059 if tested using maximum likelihood estimation with robust standard errors.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

To estimate the between- and within-level of indirect effects respectively, we tested a 1-1-1 multi-level mediation model with a random intercept and fixed slopes (Preacher et al., 2010). We used Monte Carlo simulation to test the significance of indirect effects in R software (Preacher & Selig, 2010). Considering the relatively small sample size of Study 2, we applied a sandwich estimator to compute more robust standard errors of the coefficients in our multi-level modelling (Maas & Hox, 2004).

We conducted multi-level confirmatory factor analysis (MCFA) for the measures of perceived job insecurity, negative work spillover and subjective sleep quality before hypothesis testing. Because of the hierarchical structure of the data, a disaggregated single-level CFA will deteriorate the model fits (Pornprasertmanit, Lee, & Preacher, 2014). When determining the acceptable model fit, we refer to the same criteria in Study 1. We further tested the measurement invariance assumption across the three time points.

5.5 | Study 2: Results

5.5.1 | Preliminary analyses

Table 3 presents means, standard deviations and correlations. As we assumed, perceived job insecurity ($r_{\text{within}} = -0.24$, $p < 0.001$, $r_{\text{between}} = -0.26$, $p = 0.001$) and negative work spillover ($r_{\text{within}} = -0.68$, $p < 0.001$, $r_{\text{between}} = -0.73$, $p < 0.001$) are negatively correlated with subjective sleep quality. Perceived job insecurity and negative work spillover are positively correlated ($r_{\text{within}} = 0.21$, $p < 0.001$, $r_{\text{between}} = 0.26$, $p = 0.001$).

We conducted MCFA to affirm the distinctiveness of our measures of perceived job insecurity, negative work spillover and

subjective sleep quality. While χ^2 was significant, other fit statistics showed that a three-factor model fits the data better ($\chi^2 [124] = 365.56$, $p < 0.001$, CFI = 0.90, TLI = 0.87, RMSEA = 0.07, SRMR_{within} = 0.06, SRMR_{between} = 0.11) than a two-factor model, which combined negative work spillover and subjective sleep quality ($\chi^2 [128] = 527.86$, $p < 0.001$, CFI = 0.83, TLI = 0.79, RMSEA = 0.08, SRMR_{within} = 0.08, SRMR_{between} = 0.12) and a one-factor model ($\chi^2 [130] = 975.09$, $p < 0.001$, CFI = 0.64, TLI = 0.57, RMSEA = 0.12, SRMR_{within} = 0.17, SRMR_{between} = 0.20).

In addition, we tested if the three-factor model exhibited measurement invariance across the three occasions (Chan, 1998). We compared a measurement model in which factor loadings and intercepts were constrained equal over time ($\chi^2 [663] = 1004.69$, $p < 0.001$, CFI = 0.92, TLI = 0.91, RMSEA = 0.06, SRMR = 0.09) to the one without any constraints ($\chi^2 [627] = 983.33$, $p < 0.001$, CFI = 0.92, TLI = 0.90, RMSEA = 0.06, SRMR = 0.09). To compare the unconstrained and constrained models with a better approximation of the chi-square, we used the scaling correction of Satorra and Bentler (2010) for the difference test of chi-square statistics. The scaled difference of the chi-square was not significant ($\Delta\chi^2 = 27.83 [36]$, $p = 0.833$). Therefore, we concluded that there were no significant differences among factor loadings and intercepts in the three survey administrations.

5.5.2 | Hypotheses testing

The results of MSEM are presented in Table 4.¹ Perceived job insecurity was significantly related to negative work spillover ($\beta_{\text{between}} = 0.34$, SE = 0.13, $p = 0.003$) and negative work spillover was significantly related to subjective sleep quality ($\beta_{\text{between}} = -0.76$, SE = 0.07,

TABLE 3 Study 2 correlations and descriptive statistics

Variable	Mean	SD ^a	SD ^b	1	2	3	4	5
1. Age	46.07	12.22	12.25	-	-0.26***	-0.02	-0.10*	-0.02
2. Gender	0.52	0.50	0.50	-0.26**	-	-0.18***	0.11*	-0.13**
3. Perceived job insecurity	1.71	0.74	0.65	-0.02	-0.21*	-	0.21***	-0.24***
4. Negative work spillover	2.56	0.84	0.77	-0.11	0.12	0.26**	-	-0.68***
5. Subjective sleep quality	3.28	0.91	0.86	-0.02	-0.14 [†]	-0.26**	-0.73***	-

Notes: Within-individual correlations are presented over the diagonal ($n = 456$) and between-individual ($n = 152$) correlations are presented below the diagonal. Within-individual scores were averaged across waves to calculate between-individual correlations. Gender was coded as: 1 = female, 0 = male.

^a Within-individual.

^b Between-individual.

[†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

$p < 0.001$). However, perceived job insecurity did not significantly affect subjective sleep quality ($\beta_{\text{between}} = -0.09$, $SE = 0.08$, $p = 0.175$). The significance of indirect effects was tested based on 20,000 Monte Carlo replications with a 95% bias-corrected bootstrap confidence interval (CI). The between-person indirect effect of perceived job insecurity on subjective sleep quality was -0.34 , and this was significant based on 95% CI that ranged from -0.59 to -0.11 . The result of these analyses is consistent with the results obtained in Study 1.

In Hypothesis 3, we postulated that gender will moderate the mediated relationship. To investigate potential gender effects more precisely, we conducted multilevel multi-group path analyses to examine if the mediating relationship would differ between male and female participants. The path coefficients in the model appeared to be different for male and female participants, but none of the differences were statistically significant based on the Wald test (Table 5). In summary, Hypothesis 3 was not supported.

5.6 | Discussion of Study 2

As in our Study 1, we find that perceived job insecurity negatively affects subjective sleep quality via negative work spillover. The size of the indirect effect was larger in Study 2 than in Study 1, which is a result that may potentially be attributed to the multi-item measure of perceived job insecurity used in our Study 2, which tends to show a stronger effect than a single-item measure like the one used in Study 1 (Sverke et al., 2002). Regardless, the consistent results of the mediation analysis in Study 1 and Study 2 affirm the critical role of negative work spillover as a mechanism between perceived job insecurity and subjective sleep quality, such that a perseverative concern regarding employment status is associated with workers' sleep difficulties at home.

Similar to our findings in Study 1, gender was not a significant moderator of any hypothesized paths. This consistent finding is therefore not a result of the single-item measure of perceived job insecurity that was used in Study 1. The lack of a moderating gender effect draws attention to different gender arguments regarding the relationship between work stressors and sleep outcomes, which we will discuss and elaborate upon in the following general discussion section.

6 | GENERAL DISCUSSION

For a number of years, job insecurity in the United States has been on the rise (Farber, 2010; Hacker, 2007) and, as a result, an ever-increasing number of workers who perceive their work as insecure have experienced a host of negative outcomes. In this study, we focussed on one outcome—subjective sleep quality—which by many different measures is an important indicator of health and well-being (Atlantis et al., 2006; Cho et al., 2013; Rosekind et al., 2010; Sivertsen et al., 2006; Steffen et al., 2015; Swanson et al., 2011; Uehli et al., 2014). Furthermore, we developed a theoretical model to promote a better understanding of the relationship between perceived job insecurity and workers' sleep quality while considering negative spillover as a mediator of this relationship. Taking a more holistic approach (Kramer & Chung, 2015), we explore gender as a moderating factor in these relationships. We found a significant negative association between perceived job insecurity and subjective sleep quality that was mediated by negative work spillover. We also discovered that gender was not a moderator of the relationship to the mediation model. These findings will be further discussed below.

6.1 | Theoretical contributions

This study's findings make important theoretical contributions to existing research on job insecurity and the attendant implications of this insecurity for health and general well-being. This is a pioneering study to explain how perceived job insecurity translates directly into various sleep quality conditions. We identify one such mechanism, negative work spillover, as a key channel through which a perception of threat to one's current work spills over to affect one's sleep. We do that by utilizing job stress concepts and the perseverative cognition model as previous research suggested to consider them to find the linking mechanisms between job stressors and sleep (e.g., Radstaak et al., 2014; van Laethem et al., 2018). Perceived job insecurity is a type of stressor that has characteristics of unpredictability and uncontrollability affecting workers' sleep quality, and we theorize that this process occurs by way of prolonged cognition of

TABLE 4 Multi-level path analysis results^a

	Estimate	SE	Standardized path coefficient
Between-person level			
Negative work spillover			
Intercept	1.93***	0.37	-
Age	0.00	0.01	-0.06
Gender	0.25*	0.12	0.16*
Perceived job insecurity	0.40**	0.13	0.34**
Subjective sleep quality			
Intercept	6.19***	0.25	-
Age	-0.01*	0.00	-0.13*
Gender	-0.17	0.10	-0.10
Perceived job insecurity	-0.11	0.08	-0.09
Negative work spillover	-0.86***	0.07	-0.76***
Within-person level			
Negative work spillover			
Perceived job insecurity	0.03	0.06	0.03
Subjective sleep quality			
Perceived job insecurity	-0.12*	0.05	-0.09*
Negative work spillover	-0.30***	0.06	-0.28***
Indirect effect—between-person	-0.34 (0.12), [-0.59, -0.11]		
Indirect effect—within-person	-0.01 (0.02), [-0.04, 0.02]		
AIC	2353.72		
BIC	2432.04		
Pseudo-R ² —negative work spillover	0.09		
Pseudo-R ² —subjective sleep quality	0.53		

Notes: $n_{\text{within-person}} = 456$. $n_{\text{between-person}} = 152$. Values in parentheses are standard errors and in brackets are 95% bootstrapped confidence intervals. Pseudo-R² was calculated by using Snijders and Bosker's (1999) formulas. Gender was coded as: 1 = female, 0 = male.

Abbreviations: AIC = Akaike information criterion; BIC = Bayesian information criterion.

^a We also tested a 2-1-1 mediation model, assuming that perceived job insecurity of individuals was constant but negative work spillover and subjective sleep quality were not during the time we assessed them. The results were similar to the findings from the 1-1-1 mediation model, showing that perceived job insecurity was significantly related to negative work spillover ($B_{\text{between}} = 0.40$, $SE = 0.13$, $p = 0.002$, $\beta_{\text{between}} = 0.34$) but not subjective sleep quality ($B_{\text{between}} = -0.13$, $SE = 0.09$, $p = 0.115$, $\beta_{\text{between}} = -0.10$). In addition, negative work spillover was significantly related to subjective sleep quality both at the between-person level ($B_{\text{between}} = -0.86$, $SE = 0.07$, $p < 0.001$, $\beta_{\text{between}} = -0.76$) and within-person level ($B_{\text{between}} = -0.31$, $SE = 0.06$, $p < 0.001$, $\beta_{\text{between}} = -0.28$). Like the 1-1-1 mediation model, between-person indirect effect of perceived job insecurity on subjective sleep quality in the 2-1-1 mediation model was significant (estimate = -0.34, $SE = 0.12$, 95% bootstrapped CI [-0.59, -0.12]).

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

the stressor that facilitates the negative spillover of stress from work to the non-work domain (perseverative cognition model). This theoretical model also supports a broader argument, which encourages greater focus being put on negative work spillover as a central mechanism connecting job stressor from the work domain to home domain in terms of a definitive outcome: the compromising of sleep quality. Because job insecurity is intrinsic to the nature of some jobs

and types of employment for many individuals, future studies may explore how different organizational interventions may treat spillover as a method for mitigating the negative impact of growing job insecurity on life outside work.

In addition, our finding of the spillover mechanism is an extension of the perseverative cognition model. Worry and rumination have been studied as major explanatory mechanisms of the relationships

TABLE 5 Multilevel path analysis results—By gender

	Female (n = 79 _(between-person) , 237 _(within-person))		Male (n = 73 _(between-person) , 219 _(within-person))		Wald test (df = 1)	
	Estimate	SE	Estimate	SE	χ^2	$p > \chi^2$
Between-person level						
Negative work spillover						
Intercept	2.46***	0.55	1.72***	0.49	-	-
Age	-0.07	0.01	-0.06	0.01	0.00	0.960
Perceived job insecurity	0.18	0.24	0.45**	0.16	0.88	0.348
Subjective sleep quality						
Intercept	6.27***	0.37	5.92***	0.35	-	-
Age	-0.18*	0.01	-0.07	0.01	0.97	0.325
Perceived job insecurity	-0.07	0.13	-0.11	0.12	0.04	0.844
Negative work spillover	-0.77***	0.08	-0.76***	0.11	0.40	0.526
Within-person level						
Negative work spillover						
Perceived job insecurity	0.02	0.07	0.04	0.10	0.05	0.824
Subjective sleep quality						
Perceived job insecurity	-0.11*	0.07	-0.07	0.08	0.37	0.542
Negative work spillover	-0.33***	0.08	-0.21*	0.09	1.59	0.207
Indirect effect—between-person	-0.21 (0.22), [-0.65, 0.22]		-0.41 (0.15), [-0.74, -0.14]		-	-
Indirect effect—within-person	-0.01 (0.03), [-0.06, 0.04]		-0.01 (0.02), [-0.05, 0.04]		-	-
AIC	2355.56				-	-
BIC	2495.72				-	-
Pseudo-R ² —negative work spillover	0.03		0.16		-	
Pseudo-R ² —sleep quality	0.51		0.55		-	

Notes: Except for intercepts, estimates indicate standardized path coefficients. Values in parentheses are standard errors and in brackets are 95% bootstrapped confidence intervals.

Abbreviations: AIC = Akaike information criterion; BIC = Bayesian information criterion.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

between stressors and health by researchers using the perseverative cognition model (Brosschot, Verkuil, & Thayer, 2010). However, little research has attempted to theorize the perseverative cognition model by emphasizing the cross-domain nature of the stressor. By introducing negative work spillover as one of manifestations of perseverative cognition, this study emphasizes that the prolonging trait of stressors should be explained by showing how stressors can continually influence one's well-being across multiple domains.

Finally, this study has found that job insecurity and negative work spillover affect employees' sleep problems regardless of gender: the effects are found equally for men and women. This lack of gender moderation effect may affirm some previous studies, which have argued that the threat of job loss is a stressful event for both men and women, and their well-being is affected regardless of gender (Cheng &

Chan, 2008; Keim, Landis, Pierce, & Earnest, 2014). For example, stable employment matters for both men and women—not only to make ends meet or to confirm their identity as a responsible, successful adult—but also to satisfy psychological needs for self-determination, autonomy, competence and relatedness that accompanies the experience of belonging to a professional group for the period of time desired (Campbell et al., 2015; Ryan & Deci, 2000; Silla et al., 2009). In addition, an employee can bring pleasant experiences into one's life such as self-esteem, positive emotion and a sense of fulfilment by engaging in a professional role (Rothbard, 2001). Taken together, a threat to one's employment status may be detrimental to both men and women's well-being despite previous suggestions in the literature about a gendered response to such insecurity. It is also possible that researchers should revisit their perceptions of work centrality (and family centrality) as

men and women of even younger generations perceive the importance of work to their identity similarly, a phenomenon that will indubitably change over time and possibly increase in the future.

6.2 | Practical implication

The importance of individual sleep quality is vital for both individuals and organizations. The evidence suggests that sleep quality is associated with significant economic costs that go well above and beyond the health costs to individuals who experience poor sleep and negative repercussions on their sense of well-being (Kessler et al., 2011). For example, recent estimates suggest that the prevalence of insomnia is 23.2% and that an equivalent of 7.8 days of work performance per year are lost due to lower performance as a result of insomnia (Kessler et al., 2011). Our findings suggest that organizations can mitigate this cost if they are willing to invest in different policies that serve to address job insecurity and negative spillover. For example, training employees in techniques to develop psychological detachment from work and mindfulness may foster positive results, including improvements in individual well-being and better sleep (Bartlett et al., 2019; Crain, Schonert-Reichl, & Roeser, 2017; Hülshager et al., 2014; Sonnentag & Fritz, 2015). Specifically, employers may provide mindfulness-based programs (MBPs) that facilitate employees' meditation experiences (e.g., body scan, sitting meditation and mindful movement) to help them explore better ways to respond to stressful experiences. Instructors in class of the MBPs should be capable of engaging employees in the different responses to negative experiences. The length of meditation class can vary to specific work environment. Most importantly, MBPs should be structured in a way that addresses employees' concerns and needs, and the programs should be easily and flexibly accessible to, even outside the work (Bartlett et al., 2019; Crane et al., 2017). In addition, exercise has been shown to be related to healthy sleep habits (Spreitzer, Fritz, & Lam, 2016) and organizations may consider the initiation or improvement of existing wellness programs, and how they address health sleep habits more. These activities may enable employees to contemplate threats to their job security a little less while developing healthy lifestyle patterns that are beneficial even beyond their professional lives and may alleviate any deleterious influences from work on sleep quality.

Perhaps most importantly, perceived job insecurity is frequently unjustified or exaggerated. Some employees may perceive their jobs to be insecure when, in fact, their perceptions are a result of poor organizational communication and management. Other organizations may deliberately develop a competitive organizational culture where no one feels that their job is safe, believing that such culture promotes higher performance (Connelly, Tihanyi, Crook, & Gangloff, 2014). We therefore suggest that sleep quality is also an employers' concern and that they, too, should be taking into account the effects of sleep quality on individual performance, interpersonal conflict and other organizational costs that are sometimes wasted because of withdrawal and disengagement. Employers may take two suggestive

approaches: first, organizations and managers can engage in active communication about organizational changes to reduce uncertainty about employees' job security; and second, managers can provide social support via trustworthy interactions with subordinates to enhance their psychological safety, as well as enhance trust in organizational decision-making more generally. Poor communication regarding particular changes in the work environment, and in the organization or even the job itself, may increase an employee's sense of threat from potential job loss (Mauno & Kinnunen, 2002). Managers and other organizational functions, such as human resources, should be accessible to employees and allow them to obtain relevant information about organizational changes and decisions. The absence of efficient communication and management, lack of informational and interpersonal interactions with supervisors and other organizational functions may negatively affect employees' sleep (Greenberg, 2006). Furthermore, managers' interactions with their subordinates may provide employees with emotional support to buffer stress reactions from potential threats and sometimes even with instrumental resources (Greenberg, 2006). Managers who are able to convey interpersonal (e.g., kindness and truthful manner) and informational support (e.g., provide thorough explanations about decisions) within their work group may not only alleviate employees' sleep problems, but also promote their organizational citizenship behaviours and other organizational attitudes and perceptions (Greenberg, 2006; Moorman, 1991).

6.3 | Limitations and future research directions

Some limitations should be considered when interpreting the results of this study. The use of a nationally representative sample survey in Study 1 not only corresponds to the Big Data revolution, but also increases external validity, reduces the possibility of sampling error and decreases standard errors compared to experiments (Barnes, Dang, Leavitt, Guarana, & Uglmann, 2018). However, the self-report survey design of Study 1 and Study 2 exposes the results to a risk of common method bias. We argue that the risk is relatively less of a concern in this study for several reasons. First, the CFA result in Study 1 and the MCFA result in Study 2 demonstrated that the variables had construct validity, which alleviates any major concerns about common method bias (Conway & Lance, 2010). Second, we implemented a longitudinal study design in Study 2 to replicate the findings from the cross-sectional data in Study 1.

Still, future research can adopt more robust remedies to address the potential bias. For example, this study can be replicated with additional alternative measurement sources, such as more objective measures of sleep quality (Sonnentag et al., 2016). Although self-reported and objectively measured responses are widely accepted as valid measures of different sleep parameters, both measures may reflect different aspects of sleep quality (Campanini et al., 2017). More specifically, adding actigraphy as a measure may capture objective sleep disruptions, such as frequency of waking during night

time, which is difficult to measure using self-reported sleep data (Landry, Best, & Liu-Ambrose, 2015).

Furthermore, future research can replicate the model using different measures of sleep quality. While SPQ is a widely used measure, another sleep quality measure, Pittsburgh Sleep Quality Index (PSQI), is dominantly used in sleep research (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Lallukka, Dregan, & Armstrong, 2011). While previous studies found that the two measures were highly correlated (e.g., $r = 0.65\text{--}0.75$) (Duruöz, Erdem, Gencer, Ulutatar, & Baklacioğlu, 2018; Duruöz et al., 2019), it will be appealing for sleep researchers to study if the findings are replicated when using PSQI.

Furthermore, future research is necessary to examine if different gender-related conditions may change the relationships among job insecurity, spillover and sleep. In addition to gender itself, for instance, researchers may take a look at individuals' gender role identity, which refers to 'the degree to which traits stereotypical of the same or opposite sex are expressed and is therefore relevant to participation in domains which are gender-stereotyped' (Colley, Gale, & Harris, 1994, p. 130). Traditional idea of gender role is men as a family's breadwinners and women as a family's caregiver (Eagly, 1987), but contemporary workforce may not necessarily follow this notion. Therefore, it would be interesting to explore if men and women who adhere to more traditional gender role identity show different patterns of their job insecurity, spillover and sleep quality from those who have less conventional gender role identity.

At last, future research may explore if there are any cultural variations in the effects of job insecurity to workers' sleep quality. For example, Japanese workers enjoy more job stability from their seniority system compared to the US workers (Kambayashi & Kato, 2017). The difference in their employment systems may develop dissimilar expectations of job insecurity between the two groups of workers that may differently influence their sleep quality.

In addition to any suggested future research opportunities, we promote the idea that scholars should expand upon this study to investigate organizational effects of the mediation model. Future research should examine how workers' poor sleep quality and career-related decisions and behaviours may be associated with organizational performance and costs. Particular attention must also be paid to non-work domains, which should be the subject of more careful, attentive and rigorous observation. Knowledge about workers' lives beyond the workplace is of increasing importance in terms of what it can tell researchers about the abundance of possible factors affecting people's productivity, health and well-being. The pursuit of a more balanced life, and better well-being in general, has come to be strongly valued not only among workers, but also among employers and society more generally. That workers must inevitably grapple with the inevitable economic forces frequently dictating cycles of employment and insecurity is, of course, an important issue; but the tools and resources available to employers that can help to facilitate the resiliency and the adaptive qualities of their workforce to preserve well-being are also worthy of study and analysis and certainly deserve more urgent attention from the perspective of both managers and scholars.

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ENDNOTE

¹ Another way to obtain unbiased effects is using a random intercept cross-lagged panel model (RI-CLPM). We tested our mediation model using RI-CLPM without control variables and the results showed that among all path coefficients, only the one from perceived job insecurity_{wave1} to subjective sleep quality_{wave2} was significant ($B_{\text{within-person}} = -0.39$, $SE = 0.11$, $p < 0.001$). However, the estimated path coefficients and their significance may be imprecise because of our small sample size ($n = 152$). In general, RI-CLPM requires larger sample sizes because RI-CLPM estimates a number of parameters with high uncertainty (Hamaker, 2018). For example, Masselink et al. (2018) found that they needed a sample size of 1500–2000 within a three-wave study to find small significant direct effect (e.g., -0.11 and -0.12) from the predictor (i.e., self-esteem) to the outcome (i.e., depressive symptoms).

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