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Safety climate, hardiness, and musculoskeletal complaints: A mediated moderation model

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ABSTRACT

This study explores the mechanisms linking the psychosocial characteristics of the workplace with employees' work-related musculoskeletal complaints. Poor safety climate perceptions represent a stressor that may elicit frustration, and subsequently, increase employees' reports of musculoskeletal discomforts. Results from an employee sample supported that when employees' perceived safety was considered a priority, they experienced less frustration and reported fewer work-related upper body musculoskeletal symptoms. Psychological hardiness, a personality trait that is indicative of individuals' resilience and success in managing stressful circumstances, moderated these relationships. Interestingly, employees with high hardiness were more affected by poor safety climate.

1. Introduction

Work-related musculoskeletal disorders (WRMSDs) refer to a broad range of inflammatory and degenerative conditions that affect the body's muscles, tendons, ligaments, joints, and blood vessels (Punnett and Wegman, 2004). In the US, almost 70 million physician office visits each year can be attributed to WRMSD-related complaints and the economic burden resulting from these complaints, including costs associated with workers' compensation, and lost wages and productivity, is estimated at $45 to $54 billion annually (Research Council and Institute of Medicine, 2001). Moreover, in the US and other countries (e.g., Canada, Sweden), WRMSDs lead to more work absenteeism and disability than any other disease group (Punnett and Wegman, 2004). In 2011, WRMSDs accounted for 33% of all workplace injuries and illnesses that required employees to take days off from work (Bureau of Labor Statistics, 2012). Employees with WRMSDs took a median of 11 days to recuperate before resuming work (Bureau of Labor Statistics, 2012). WRMSDs represent a significant threat to the health and quality of life of individuals employed in a wide range occupations (e.g., nursing, clerical work, airplane baggage handling, cleaning, truck driving, firefighting) and industries (e.g., service, construction, transportation, manufacturing) (Bureau of Labor Statistics, 2012; Punnett and Wegman, 2004). In 2011, nursing assistants had the highest number of WRMSD cases (25,010) of any occupation, and heavy and tractor-trailer truck drivers needed the most days away from work (median of 21) to recuperate (Bureau of Labor Statistics, 2012). Beyond taking time off from work to recuperate, employees may choose a more permanent solution such as changing jobs or retiring (Long et al., 2012).

Studies on WRMSDs have traditionally focused on how physical job demands can lead to WRMSD complaints by generating biomechanical strain (for reviews, see Muggleton et al., 1999; National Institute for Occupational Safety and Health [NIOSH], 1997). For example, repetitive work, handling heavy materials, working in awkward positions (e.g., working above shoulder level, kneeling), and frequently using vibrating tools are physical aspects of job tasks that have been associated with greater risk of WRMSDs (e.g., Engels et al., 1996; Hansson et al., 2000; Latza et al., 2000; Simon et al., 2008; Sobeih et al., 2006; Yassi et al., 1995). However, there is increasing evidence that psychosocial stressors at work can serve as additional risk factors for WRMSDs (e.g., Hauke et al., 2011; Kraatz et al., 2013; Lang et al., 2012; Simon et al., 2008; Sobeih et al., 2006). Psychosocial factors typically refer to aspects of the psychological and social (as opposed to physical) work environment that elicit a mental stress response in workers (Marras et al., 2009; Warren, 2001). High workload, time pressure, and monotony, and low job clarity, autonomy, social support, and job security are examples of psychosocial factors associated with increased WRMSD symptoms (Bongers et al., 1993; Lang et al., 2012; NIOSH, 1997; Sobeih et al., 2006). A meta-analysis by

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Hauke et al. (2011) estimated that adverse psychosocial working conditions increase the risk of WRMSDs in various body regions by 15–59%.

Unfortunately, the mechanisms linking psychosocial factors to WRMSD symptoms are not well understood. Even though multiple theoretical models (e.g., Bongers et al., 1993; Faucett, 2005; Melin and Lundberg, 1997; Sauter and Swanson, 1996) articulate these mechanisms, research provides inconsistent support for the pathways these models propose (e.g., Kjellberg and Wadman, 2007; Larsman et al., 2011; Swanson and Sauter, 2006; Wadman and Kjellberg, 2007). Certain limitations in many of the studies in this area may have contributed to contradictory findings. First, although the stress process as conceptualized by the transactional job stress framework (e.g., DeLongis et al., 1988; Lazarus and Folkman, 1984) is relatively well accepted by stress researchers (Mark and Smith, 2008), few studies in the area of WRMSDs directly test the hypothesized pathway of stressor-strain-physical symptoms that this framework implies (for an exception, see Eatough et al., 2012). Instead, effects of stressors (e.g., qualitative job demands, role conflict, lack of control) are often examined in conjunction with those of strain (e.g., job dissatisfaction, negative mood, physical stress symptoms; e.g., Latza et al., 2002; Smith et al., 2004; Yip, 2002), making it difficult to evaluate their relative impact on employees' WRMSD symptoms. Likewise inconsistent with the transactional job stress framework, studies typically examine only the bivariate relationships between psychosocial factors and musculoskeletal symptoms, as opposed to hypothesizing more complex processes.

Second, many studies have used single-item measures written specifically for the study (e.g., Bigos et al., 1991; Smith et al., 2004; Swanson and Sauter, 2006) to assess psychosocial stressors or strain (see Davis and Heaney, 2000 for a review). The use of single-item measures can result in lower reliability, greater imprecision, and narrower scope than the use of established, multiple-item measures (Spector, 1992). Third, although physical job demands are a significant risk factor in the development of WRMSDs (Muggleton et al., 1999; NIOSH, 1997), studies sometimes fail to control for physical demands when examining the effects of psychosocial stressors (e.g., Kjellberg and Wadman, 2007; Larsman et al., 2011). Finally, a lot of studies that examined the effects of psychosocial factors on WRMSDs failed to consider potentially important individual difference variables (e.g., self-efficacy, optimism, hardiness) that may influence employees' responses to psychosocial stressors (e.g., Kjellberg and Wadman, 2007; Larsman et al., 2011). Thus, some of the inconsistency in findings could stem from not separating out the effects of stressors from those of strain, using measures with poor psychometric properties, failing to control for physical job demands, and not taking individual differences into consideration.

The current study provides a direct test of a model based on the transactional stress framework (Lazarus and Folkman, 1984), uses established measures of psychosocial stressors, strain, and WRMSD symptoms, controls for the effects of physical workload, and examines the role of an important individual difference variable in the stressor-strain-WRMSD symptoms process. The study aims to contribute to researchers' understanding of the mechanisms linking psychosocial stressors with WRMSD complaints. As shown in Fig. 1, we propose that when employees perceive poor psychological safety climate, such perceptions may function as a psychosocial stressor and elicit frustration. Frustration, in turn, may be associated with increased reporting of WRMSDs. Moreover, we explore employees' psychological hardiness, an individual difference variable that characterizes how employees handle stressful situations, as a moderator of the effect of poor safety climate perceptions on WRMSD complaints via frustration.

In the paragraphs that follow, we provide an overview of the transactional job stress framework, explain how psychological safety could influence WRMSD complaints via frustration, and introduce psychological hardiness as a potential buffer of the effects of poor safety climate. We will present our hypotheses for this study, explain the methodology that was pursued, and summarize the findings. We will conclude the paper by discussing the implications and limitations of current findings, and providing a number of directions for future research.

1.1. Transactional job stress framework

The classic model of occupational stress postulates stress as the process describing how work-related factors contribute to

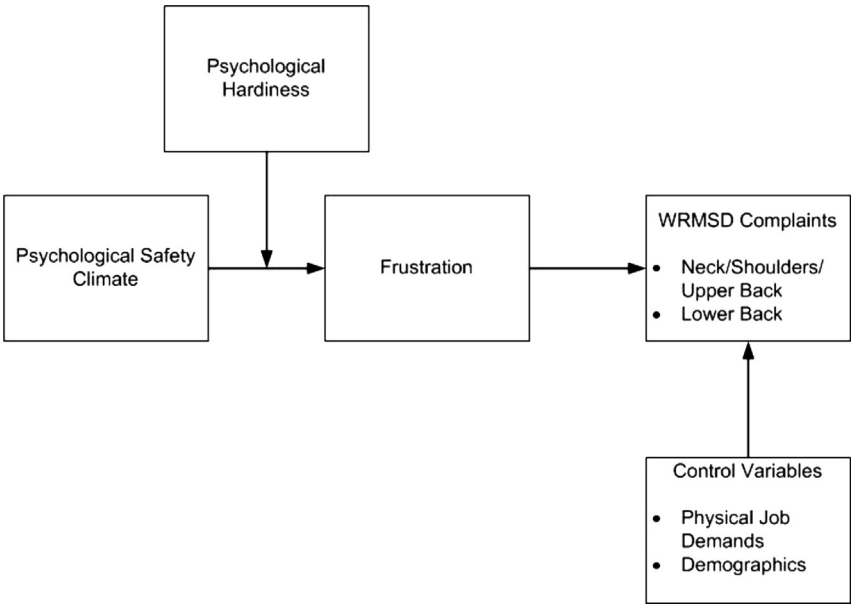

Fig. 1. Schematic model of stressor-strain-WRMSD complaint relationships.