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Ergonomics Climate Assessment: A measure of operational performance and employee well-being

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ABSTRACT

Ergonomics interventions have the potential to improve operational performance and employee well-being. We introduce a framework for *ergonomics climate*, the extent to which an organization emphasizes and supports the design and modification of work to maximize both performance and well-being outcomes. We assessed ergonomics climate at a large manufacturing facility twice during a two-year period. When the organization used ergonomics to promote performance and well-being equally, and at a high level, employees reported less work-related pain. A larger discrepancy between measures of operational performance and employee well-being was associated with increased reports of work-related pain. The direction of this discrepancy was not significantly related to work-related pain, such that it didn't matter which facet was valued more. The Ergonomics Climate Assessment can provide companies with a baseline assessment of the overall value placed on ergonomics and help prioritize areas for improving operational performance and employee well-being.

1. Introduction

To maximize success, organizations must have a climate that supports operational performance (e.g., production efficiency, product or service quality) as well as employee well-being (e.g., health and safety). Researchers (e.g., Aryee et al., 2012; Pousette et al., 2008) have examined operational performance and employee well-being climates individually; however, few studies have considered how to simultaneously promote a climate for both performance and well-being. One comprehensive way to demonstrate both of these values is by promoting a systems approach as is frequently done in ergonomics. The field of ergonomics aims to increase efficiency by designing or modifying the job to eliminate non-value added processes and hazards that increase the risk of employee injury (Wickens et al., 2004). Professionals who use ergonomic principles adapt work tasks to the physical and mental capabilities of the workers. Implementing ergonomic principles in an occupational environment can directly benefit the worker and the organization by reducing physical and mental strain, lowering the risk of occupational related injuries and illnesses and improving work performance (Sanders and Mccormick, 1993). By embracing the principles of ergonomics, and establishing a positive *ergonomics climate*, organizations can enhance both operational performance and employee well-being.

Ergonomics climate represents employee perceptions of the extent to which the organization emphasizes and supports the design and modification of work such that both performance and well-being are maximized. We use “performance” here to refer to an organization's successful functioning in an economic context, which can include (but is not limited to): maximizing productivity and efficiency, quality of product or service, sustainability as a company, maintaining a competitive edge in the market, and completing the tasks necessary for the organization to succeed (Drucker, 1991). Employee well-being often refers to a focus on ensuring that employees are happy and healthy, which can include (but is not limited to): reducing their risk for injuries and illnesses, addressing quality of work life issues, improving job satisfaction, and supporting work-life balance (e.g., Cotton and Hart, 2003; Sears et al., 2013). Although some efforts to design or modify work target only performance or only safety, we argue that a positive ergonomics climate reflects a value for *both* improved process and safety outcomes, consistent with the traditional values of the field of ergonomics. Thus, a company with a positive ergonomics climate promotes the design and modification of work to support both types of outcomes, rather than favoring one over the other.

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In this paper, we outline the development and use of a novel measure of ergonomics climate. We conducted focus groups to qualitatively assess the framework of ergonomics climate, developed and pilot tested an ergonomics climate measure (the Ergonomics Climate Assessment), and obtained preliminary criterion-related validity evidence for the measure by examining the association between ergonomics climate and self-reported work-related pain. Further, we examined the effect of perceived differences in emphasis between performance and well-being, to test our contention that the best outcomes should result for organizations that emphasize both.

1.1. The relationship between performance and well-being

Although the importance of both operational performance and employee well-being for organizational success are intuitive, organizations often perceive a conflict between them. For example, there is some evidence that employees who are more productive are also increasingly unsafe (Allen et al., 2007; Probst, 2002). In addition, safety climate and productivity may be negatively related (Wallace and Chen, 2006). However, other researchers have suggested that safety and productivity are independent (Hofmann and Tetrick, 2003; Wallace et al., 2005), suggesting that the relationship between safety and productivity depends on the organizational context (Jackson and Mullarkey, 2000). If the climate of an organization is supportive of both safety and process quality goals, employees can be safe while producing a quality product (Gehring et al., 2013; Landsbergis et al., 1999). Thus, the context, or the climate, of an organization, can impact the relationship between performance and employee well-being.

1.2. Developing a systems orientation through ergonomics climate

Within the field of ergonomics, many view the facets of operational performance and well-being as not only compatible, but inextricably linked. Ergonomics aims to simultaneously improve outcomes such as productivity, efficiency, quality, and safety (Wilson et al., 2009). The ergonomics field is committed to a systems orientation in which nothing exists in isolation and each element has the potential to impact another (Sanders and Mccormick, 1993). Ergonomic interventions, for example, are often designed to promote both performance and well-being simultaneously (Genaidy et al., 2007; Goggins et al., 2008). Maudgalya et al. (2008) reported that following ergonomics initiatives, there was an average increase of 66% in productivity, 44% in quality, 82% in safety records, and a 71% average decrease in workers compensation costs. Taking a systems approach wherein operational performance and employee well-being are simultaneously valued has many benefits for organizations (Hofmann and Tetrick, 2003).

The climate of an organization helps employees understand and interpret organizational norms, and employees shape their behavior based on their perceptions of what is valued by the organization (Schein, 1990). Although there is little research on the concept of an "employee well-being" climate, there is a body of research on safety climate (e.g., Neal and Griffin, 2006; Pousette et al., 2008; Zohar, 2002) as well as performance climates (Aryee et al., 2012; Cappelli and Neumark, 1999; Wriston, 2007). Although there are some exceptions (e.g., Allen et al., 2007; Probst, 2002; Wallace et al., 2006), most climate research has not examined performance and well-being simultaneously. For example, safety climate is often conceptualized as a company's value for *only safety* on the job. Various dimensions related to safety are measured, such as management commitment to safety, the safety system, and risk (Flin et al., 2000). Safety climate by itself does not reflect a company's simultaneous value for both employee well-being and performance. Ergonomics climate also relates to employee safety; however, ergonomics climate is a more robust construct that reflects broader values. Ergonomics climate reflects a perceived value for employee well-being, which includes worker health and safety, quality of work life, and job satisfaction. Ergonomics climate also reflects the perceived value that management places on operational performance. Thus, employees responding to ergonomics climate measures will be asked to refer to practices that affect both their well-being and operational performance.

Therefore, we propose ergonomics climate as one example for how an organization may seek to balance performance and well-being objectives. It is possible that an organization might use ergonomics principles to improve one, but not both, of these facets. In doing so, they do not take full advantage of ergonomic principles. Thus, we expect the best outcomes for organizations that value both facets, consistent with the holistic, systems-oriented philosophy of ergonomics.

2. Qualitative analysis of ergonomics climate

If organizations that foster a positive and balanced ergonomics climate should reap the greatest outcomes from ergonomics initiatives, then organizations who use (or intend to use) such initiatives should benefit from assessing, tracking, and understanding their ergonomics climates. We therefore sought to develop a measure for ergonomics climate. We began with two focus groups ($N = 12$) at a manufacturing facility to discuss how an understanding of the relative priorities of performance and employee well-being might be useful to the company. To analyze the qualitative data from the focus groups, we used open coding and content analysis processes (Janis, 1965; Weber, 1990; Woike, 2009). Inter-rater agreement of the measure was not assessed, because only one researcher coded the responses. The coder read transcripts to identify common themes that occurred while the group discussed what an ergonomics climate could look like. This resulted in a total of eight core themes extracted from the focus groups (Table 1). We then outlined, from a range of resources, the "best practices" in occupational ergonomics. The resources included a review of the National Institute for Occupational Safety and Health's (NIOSH) Elements of an Ergonomics Program, the Occupational Safety and Health Administration's (OSHA) Voluntary Protection Program, the rescinded federal ergonomics standard promulgated by OSHA, and state ergonomics guidelines (Washington and California). Following this review, we examined research literature related to ergonomics, occupational health and well-being, productivity, and organizational climate, as outlined in Table 1. The combined results from the focus groups, national resources and literature review revealed four common factors central to organizational climates that involve ergonomics: management commitment, employee involvement, job hazard analysis, and training and knowledge (see Table 1). These four factors have been identified many times in a range of literatures, with the most relevant being the safety climate literature. Although researchers have yet to agree on a single factor structure of safety climate (Cox and Cheyne, 2000; Coyle et al., 1995; Vinodkumar and Bhasi, 2009), many measures share the common factors of management commitment (e.g., Brown and Holmes, 1986; Cooper and Phillips, 2004; Griffin and Neal, 2000; Probst, 2004; Zohar, 1980), employee involvement (Cheyne et al., 1998; Cox and Cheyne, 2000; Dedobbeleer and Beland, 1991; Neal and Griffin, 2004), job hazard analysis (Cheyne et al., 1998; Cox and Cheyne, 2000; Griffin and Neal, 2000; Probst, 2004), and training and knowledge (e.g., Cooper and Phillips, 2004; Evans et al., 2007; Griffin and Neal, 2000; Lu and Tsai, 2008). Thus, we acknowledge that the four factors described here are similar to