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Abstract and Keywords

Occupational health and safety reflects the effect of the work environment on employees, groups and work units in organizations, and organizations as a whole. This chapter provides an overview of the research on workplace safety and specifically discusses safety training, regulatory focus, safety climate, leadership, and job design as they relate to safety. Additionally, the literature on occupational health, drawing heavily on the occupational stress literature, discusses the employee-employer relationship from a psychological contract perspective, including climate for sexual harassment, collective burnout and its contagion, recovery, and organizational wellness programs. Particular attention is given to primary interventions to enhance safety, health, and well-being of employees and to eliminate the harmful effects that may arise through individual characteristics, group/work unit factors, and aspects of the organization.

Keywords: safety, health, occupational health psychology, accident proneness, leadership

Introduction

Industrial and organizational psychology has incorporated a concern for health and safety from its outset as a field within psychology, although some have suggested that in the early days of industrial and organizational psychology, the emphasis was more on efficiency than on worker well-being (Zickar, 2003). Many factors have brought a more balanced approach between well-being and efficiency over the past couple of decades, but one factor that we suggest for this shift is the global emergence of occupational health psychology (OHP) in the mid-1990s as a distinct field. OHP applies psychological theory and research for the purpose of improving the quality of work life for workers and to protecting and promoting the safety, health, and well-being of workers. According to the *Journal of Occupational Health Psychology*, there are three major domains of OHP: the work environment; the individual; and the interface between work and non-work relative to employees' safety, health, and well-being. OHP takes a primary prevention perspective, focusing on the elimination of risks to employees' safety and health (Quick & Tetrick, 2003) and, more recently, countervailing interventions that, rather than aiming to prevent illness and injury, seek to enhance development and to promote growth and positive experiences (Kelloway, Hurrell, & Day, 2008). Thus the major emphasis of OHP is on the development of a safe and healthy work environment, recognizing that individual differences may interact with an individual employee's specific context to enhance or worsen the individual's safety and well-being. We will take an OHP perspective in this chapter on occupational safety and health.

Health and Well-being

Before proceeding, it is important to briefly consider the ultimate criterion for OHP—that is, what is meant by *health and well-being*. Consistent with the World Health Organization's definition of *health*, OHP has adopted a definition of *health* to mean more than simply the absence of illness. *Health* refers to optimal functioning (Hofmann & Tetrick, 2003; Tetrick, 2002; Tetrick, Quick, & Quick, 2005). Taking this approach, OHP has extended beyond the medical model of health to include not only the physical and mental health model from an "ill-health" perspective but from a positive health perspective. As such, OHP should not be limited to protecting workers from illness and accidents or to restoring health, but also should deal with the promotion of health, well-being, and flourishing (Hofmann & Tetrick, 2003; Macik-Frey, Quick, & Nelson, 2007; Schaufeli, 2004). Second, it should explicitly consider and promote healthy workplaces as contexts where people may use their talents and gifts to "achieve high performance, high satisfaction, and well-being" (Quick, 1999, p. 82). Third, an individual approach must be complemented by the collective one, paying attention to promote healthy organizations and to analyze cross-level interactions (Peiró, 2008). Fourth, time perspective needs to be considered in a more comprehensive manner, combining short- versus long-term goals and outcomes (Hofmann & Tetrick, 2003), and a proactive and anticipatory approach is needed to enhance prevention (Peiró, 2008); further, close consideration of the dynamics of risk prevention and health promotion is required. Fifth, there needs to be explicit attention to work phenomena outside the work place (such as unemployment, work-family issues, cultural context, etc.) and, finally, the broader societal context, including legislation, policies, juridical issues, and the role of social agents, deserves attention (Brotherton, 2003). This is a more comprehensive approach to health and well-being than is often considered in research on safety and health.

The Origins of OHP

Given the recent development of OHP as a field, it may be helpful to provide a brief history of OHP. One might argue that the health and well-being of workers has been of concern to industrial and organizational psychologists since the studies carried out at the Western Electric Company at

Hawthorne (Mayo, 1933; Roethlisberger & Dickson, 1939) or Taylor's (1911) work; however, these early works were primarily focused on productivity, performance, and efficiency and were not explicitly concerned with workers' health and well-being. Perhaps as a result of the findings of the Hawthorne studies, researchers and theorists in both the United States and Europe began to expand the focus on employee behavior from a relatively myopic, short-term perspective on performance to a more holistic perspective of human potential that includes a long-term perspective.

These developments are reflected in Maslow's (1943) conceptualization of self-actualization and the explicit recognition of the importance of considering the psychological well-being of employees in the design of jobs (Trist & Bamforth, 1951). During the 1960s and 1970s, additional theoretical perspectives of the role of the work environment in workers' well-being emerged, including the job characteristics model (Hackman & Oldham, 1980), the job demands and control model of occupational stress (Karasek, 1979), and the recognition of the role of the psychosocial work environment in understanding worker health (Levi, 1971). During the last decades, the European Union and its country members, as well as the United States, established institutes for the specific purpose of advancing healthy and safe work environments for employees. The National Institute of Occupational Safety and Health was established in the United States in 1970; in Europe, the European Foundation for the Improvement of Living and Working Conditions was created in 1975 and the European Agency for Safety and Health at Work in 1996. European countries also have established institutes such as the Finnish Institute of Occupational Health. In addition, a number of research centers have been initiated, such as the Karolinska Institute in Sweden, and the Institute of Work, Health & Organisations at the University of Nottingham (for a more complete history of OHP, see Barling & Griffiths, 2003). These institutes and affiliated universities have supported research and theoretical development toward understanding the link between work and employee well-being. Additionally, they have trained professionals in occupational medicine, occupational nursing, industrial hygiene, safety engineering, occupational health psychology, and other disciplines, primarily from a public health perspective. Raymond, Wood, and Patrick (1990) are generally recognized as the first to apply the term *occupational health psychology* to the study of work environment factors contributing to employee health and well-being from this multidisciplinary perspective. Since then, the scientific community in the discipline has been growing and institutionalizing. Specialized journals in the field, such as *Work and Stress* and the *Journal of Occupational Health Psychology*, are well established. Scientific associations have been created in the last decade (the European Academy of Occupational Health Psychology and the Society for Occupational Health Psychology), and specialized conferences are organized by these associations biannually on both sides of the Atlantic.

This history and developments in OHP help to explain the body of knowledge that has been drawn upon in understanding workers' safety, health, and well-being, with much of the theorizing and empirical research in OHP focusing on safety, stress, and, more recently, the interface between work and non-work, with the work-family interface receiving the most attention to date. The remainder of this chapter will be organized around safety and health (readers are referred to chapter 34 on work-family issues in this handbook). Within each of these substantive areas, it has been recognized that contextual effects within the work environment exhibit multilevel influences on employees' health and well-being. Therefore, we will specifically discuss individual, group/work unit, and organizational factors influencing safety and stress.

Safety

As mentioned above, much of the early industrial and organizational psychology literature, such as Taylor's (1911) principles of scientific management, took a short-term perspective on workers' immediate performance and productivity. This may explain, at least in part, why much of the safety literature has focused on physical safety and, more specifically, accidents and acute injuries, rather than cumulative injuries and occupational illnesses arising from long-term exposure to toxins and pathogens. The literature on safety has a decidedly human factors orientation, incorporating a concern for the human-machine interface, a focus on physical work environment hazards, and the protection of workers from these physical hazards. OHP has advanced this approach to safety by extending the conceptualization of safety to include psychosocial factors in the work environment that facilitate safe behavior or discourage or create barriers to safe behavior.

Much of the safety literature has taken the perspective that a safe work environment is the responsibility of the employer. In fact, the United States' Occupational Safety and Health Act of 1970 explicitly indicated that organizations are responsible for providing a safe and healthy workplace. The European Framework Directive (Council Directive 89/391) established similar responsibilities that have been conveyed through specific legislation in every member state. The legislation in the United States and Europe recognized that workers frequently are exposed to hazards in the workplace involuntarily and may not even be aware of the risks to which they are exposed.

In reviewing the safety literature, three broad perspectives emerge. These roughly parallel the level of analysis, with perspectives that focus on the individual, those that focus on the unit and immediate supervisor, and those that focus on organizational factors. There have been relatively few examinations of both the group and organizational levels within studies; therefore, for the purpose of this chapter, group/unit and organizational levels are considered jointly.

Individual Factors in Safety

The first broad perspective on safety, which one might call the industrial psychology approach, traditionally sought to identify accident-prone individuals and then to prevent accidents and injuries by not selecting accident-prone individuals for jobs where there are identifiable hazards. This approach resulted in considerable research attempting to relate individual characteristics, especially personality characteristics as reflected by stable traits, to accident involvement, thus reflecting accident proneness. As Hansen in his 1988 review of the literature suggested, there were differences in how accident proneness was defined, but generally the definitions implied that accident proneness was a unitary trait, which was innate and stable over time. This trait "caused" individuals to be involved in accidents, and these individuals therefore would have repeated accidents. However, Hansen (1988) concluded that the research findings did not support these conditions of accident proneness.

Based on an examination of the literature from the early 1970s to late 1980s, Hansen (1988) concluded that there was evidence of certain personality and individual characteristics that were associated with accident involvement. These included external locus of control, extroversion, aggression, social maladjustment, general neurosis, anxiety, depression, and impulsivity. Based on the evidence that discredited accident proneness theory,

Hansen (1988) did conclude that a differential accident liability approach might be useful, recognizing that there are individual differences that may be related to accidents, but that these individual differences are not necessarily stable over time. Additionally, there are other characteristics such as "intellectual capabilities and aptitudes, perceptual-motor abilities, physical capabilities such as strength and endurance, current health status, susceptibilities to disease …" that contribute to accident involvement (Smith, Karsh, Carayon, & Conway, 2003, p. 39). This differential accident liability approach posits that the few people who are involved in accidents are actually a shifting population; therefore, selection decisions made on the notion of accident proneness become less useful over time.

Interestingly, the debate continues about the existence of accident proneness as a construct that is descriptive of individuals and can predict accident involvement over time. A recent meta-analysis (Visser, Pijl, Stolk, Neeleman, & Rosmalen, 2007) found that, despite the differences in operationalizations of accident proneness, the number of individuals involved in repeated accidents is higher than what would be expected by chance, compared to the distribution of the number of individuals in the population involved in accidents. This at least provides some suggestion that there are individual differences operating. However, the differences in operationalizations of accident proneness and the differences in populations and organizational settings—only a small number of the studies included in Visser et al.'s (2007) meta-analysis involved work settings—definitely constrain any firm conclusions about our ability to select "out" people who are accident prone. A more fruitful approach might be to focus on malleable individual differences, such as knowledge, skills and abilities.

In fact, there is a large literature examining interventions to improve safety performance at the individual level. These individual behavior-based interventions for improving the safety performance of individuals have focused on changing individuals' behavior through the identification of critical safety behavior, feedback and reinforcement, goal setting, and communication among employees and supervisors. These interventions rely directly on major motivation theories, such as reinforcement, feedback, and goal theory. However, for the most part, they have not engaged self-regulatory theories and instead have drawn heavily on leadership as a mechanism for directing these behaviors (Ford & Tetrick, 2008). In this section, we will focus on training and regulatory focus theory as two individual-level safety interventions; training because it is a widely used safety intervention, and regulatory focus theory because this relatively recent motivational theory promises to inform safety interventions.

Training

Safety training is considered by many managers to be an important, if not the most important, activity for improving workplace safety (Huang, Leamon, Courtney, Chen, & DeArmond, 2007). Whether this is because managers believe that engineering solutions have been exhausted, whether they recognize that most workplace accidents have a human error component (Reason, 1990), or whether the managers are committing the fundamental attribution error is not clear, and perhaps it is not even relevant. There is evidence that safety training can improve workplace safety (e.g., Burke, Sarpy, et al. 2006; Colligan & Cohen, 2004) in a variety of settings and occupational groups, such as restaurant wait staff (Scherrer & Wilder, 2008), agricultural workers (Anger et al., 2006), and older workers (Wallen & Mulloy, 2006). Safety training programs, to date, have relied heavily on reinforcement theory, social learning and action regulation theory, and stage theories of learning.

Burke, Sarpy, et al. (2006) concluded, based on their meta-analysis, that safety training programs that engaged participants more were more effective. Burke, Scheuer, and Meredith (2007) and Burke, Holman, and Birdi (2006) argued that typical behavioral modeling and practice fall short. They suggest that applying a dialogic learning perspective to the development of safety skills and behaviors enhances safety training. The dialogic learning perspective includes structured interpersonal dialogue and intrapersonal dialogue (i.e., reflection) and leads to greater understanding. This dialogue thus can increase the effectiveness of safety training. Empirical tests of Burke and colleagues' propositions relative to the usefulness of dialogic learning theory are needed to more clearly demonstrate the mechanism(s) by which dialogue may increase training effectiveness, as well as the effect size of dialogue on training effectiveness relative to other components of safety training.

Regulatory Focus Theory

Apparent in much of the safety literature is the implicit, if not explicit, assumption that employee motivation is important for safety behavior. In fact, this is the underpinning of much of the safety training literature. A recent theoretical development not covered by Burke et al. (2007) is Higgins's (1997, 2002, 2006) regulatory focus theory. Regulatory focus theory posits that individuals can take a prevention or promotion perspective relative to a given goal (see Tetrick & Ford, 2008, for a review). A prevention focus is characterized as seeking to avoid pain and loss, with individuals taking a vigilance orientation. A promotion focus, on the other hand, is characterized as seeking gains and approaching a task eagerly. Initially, Higgins (1997) proposed regulatory focus as a malleable characteristic reflecting a state in which individuals' strategies are prevention or promotion focused. In fact, he suggested that the two foci are independent such that one could be pursuing a promotion focus and a prevention focus simultaneously. Subsequently, Higgins (2002, 2006) proposed that, in addition to the state regulatory focus, individuals have a chronic regulatory focus in which they tend to approach goals or adopt strategies for achieving goals with a prevention focus or promotion focus.

Regulatory focus theory has been studied almost exclusively in laboratory settings and has only recently been extended to explaining safety behavior. In one of the few applied studies examining the relation of regulatory focus and safety, Wallace and Chen (2006) found that safety climate was positively related to a prevention regulatory focus and negatively related to a promotion regulatory focus, and a prevention regulatory focus was positively related to safety performance. These results suggest that it is possible to activate a prevention regulatory focus to enhance safe behaviors. In laboratory studies, this activation has been accomplished by framing the task or, as implied in Wallace and Chen (2006), by creating a strong safety climate (the latter intervention would be more of a group-level intervention; see section on safety climate below).

There have not been many empirical investigations of regulatory focus conducted in the field, and most of the studies that have been conducted in the field have tended to focus on chronic regulatory focus rather than state regulatory focus. Chronic regulatory focus is a more stable characteristic, and one might argue that it is not malleable, as it is a relatively enduring characteristic of individuals. The literature on regulatory focus suggests, however, that a match between an individual's chronic regulatory focus and the situationally invoked regulatory focus may result in an enhanced effect of either chronic or state regulatory focus alone (Higgins, Idson, Freitas, Spiegel, & Molden, 2003). Therefore, a match on prevention focus would be expected to

enhance the effectiveness of safety training, and a mismatch might lessen the effectiveness of safety training. To date, this aspect of regulatory focus theory has not been empirically examined with respect to safety training.

Group, Unit, and Organizational Factors

As stated earlier, safety behavior is a function of individual factors, but it is also a function of group, unit, and organizational factors. In the safety literature, one approach for enhancing safety that clearly takes a group, work unit, or organization-level approach is that of engineering solutions. This approach seeks to first remove hazards; if this is not possible, then block access to hazards; if this is not possible, then change the physical work environment, especially the tools and/or equipment used; if this still does not block injuries, then warn employees of hazards; and, as a course of last resort, train employees on how to avoid hazards. Indeed, this engineering approach to safety has been widely adopted and has reduced accidents and injuries. For example, the redesign of injection needles used in medical settings, including needleless systems, guarded fistula needles, and safety syringes, have effectively removed the risk of accidental sticking by medical personnel (Tuma & Sepkowitz, 2006). However, it is not always possible to remove the hazard or to shield employees from hazards by an engineering solution. In these cases, employees need to have the knowledge and skills to perform their work safely, and they need to have the motivation to adhere to safety guidelines and to actually perform safely (Ford & Tetrick, 2008).

The engineering approach to safety focuses primarily on the physical environment. There is a growing recognition that organizations and work units' psychosocial environments also have an impact on workers' safety. Recognizing that group and/or work units comprise individuals sharing the same perceptions of the policies, procedures, and practices relative to safety (i.e., climate for safety), working for the same supervisor, and performing the same or similar jobs, we have chosen to include safety climate, leadership, and job design as three group/organization-level factors affecting safety.

Safety Climate

Zohar (1980) pioneered research on safety climate by arguing that employees develop a shared sense of the relative importance of safety in the work environment. This seminal work identified the perceived importance of safety training programs as one of the dimensions of safety climate, although Zohar (1980) concluded that the most important dimension of safety climate was management's attitude toward safety. Subsequent research on safety climate has converged to demonstrate that safety climate does predict safety behavior and accident experience (Johnson, 2007), and management's attitude toward safety is the key driver of safety climate, although safety training also has been demonstrated to be one of the major aspects of safety climate (Evans, Glendon, & Creed, 2007; Huang, Ho, Smith, & Chen, 2006; Lu & Tsai, 2008; Wu, Liu, & Lu, 2007).

A recent meta-analysis of the relationship between safety climate and safety performance (Clarke, 2006) found that a positive safety climate was related to safety compliance, defined as adherence to safety rules and regulations, and also with safety participation, defined as engaging in safety behaviors that went beyond simple adherence to safety procedures, such as helping coworkers and promoting the safety program. The results of this meta-analysis found that a positive safety climate was more strongly related to safety participation behaviors than with the compliance behaviors. In addition, Clarke (2006) found that the relation between a positive safety climate and fewer accidents overall was weak. However, study design was found to moderate this relation such that when the assessment of safety climate preceded the measurement of accidents, the link between a positive safety climate and a reduction in accidents was stronger.

Clarke (2006) suggests that there may be additional moderators of the relations found between safety climate and safety performance. One moderator that Clarke (2006) proposed was whether safety climate was assessed at the individual level (psychological climate) or at the group/unit or organization level. She posited that specific leadership practices and priorities, group processes, and strength of the safety climate may moderate the relation between safety climate and safety performance; however, there were insufficient numbers of studies to examine these potential moderators. More research in these areas may enhance our understanding of the mechanism by which safety climate affects accidents.

With the relation between safety climate and safety performance established, research has turned to other outcomes of safety climate. For example, Tucker, Chmiel, Turner, Hershcovis, and Stride (2008) examined one component of safety participation as defined by Clarke (2006)—that of employee safety voice, which was defined as speaking out against unsafe working conditions. Rather than focusing on safety climate per se, Tucker et al. (2008) posited that perceived organizational support was related to safety participation, based on social exchange theory. They found that coworker support for safety was an important social influence on speaking out about safety issues, with coworker support for safety mediating the relation between perceived organizational support for safety and voice. This supports Clarke's (2006) suggestion that group processes may impact the effect of organization-level safety climate and further demonstrates the importance of social influences on safety performance.

Researchers are beginning to examine more macro-aspects of safety climate. For instance, Probst, Brubaker, and Barsotti (2008) examined organization-level safety climate's effect on the underreporting of organizational injury rate. Safety climate data were obtained from employees of the participating construction companies and were related to Occupational Safety and Health Administration logs. They found that organizations with poorer safety climates had substantially higher rates of underreporting of occupational injuries. Therefore, safety climate appears to affect organizations' "behavior" as well as individual employees' behavior and may reflect an organizational culture in which safety of employees may or may not be valued.

Leadership

The role of the leader in safety behavior has been examined in numerous studies (see Hofmann & Morgeson, 2004, for a review). Leader behavior is a core aspect of safety climate, as management (organizational leadership) is a core dimension of safety climate (Zohar, 1980). Kelloway, Mullen, and Francis (2006) examined the relation of safety-specific transformational and passive leadership to safety climate. They found that transformational leadership was positively related to safety climate and safety consciousness (i.e., safety knowledge and safety behavior), and passive leadership was negatively related to both safety climate and safety consciousness. But leadership and safety consciousness did not have a direct effect on

safety performance, whereas safety climate did have a direct effect on safety performance, reducing the number of negative safety events and injuries. Similarly, Zohar and Tenne-Gazit (2008) found that transformational leadership was positively related to safety climate strength and the extent of agreement among employees within the unit. However, based on social network analysis, they found that the density of the group communication network mediated the relation between transformational leadership and the strength of the safety climate. This supports the importance not only of leadership per se but also the role of coworkers in safety.

Taking a more behavioral approach, Luria, Zohar, and Erev (2008) investigated the effect of leader visibility on safety performance. In this intervention study, it was found that the more visible the supervisor (leader) was, the greater the interaction between the supervisor and the employees on safety-related behaviors and, subsequently, the greater safety performance. Perhaps more important, department-level effects were found such that in departments where supervisors were more visible, there were more safety-related exchanges between supervisors and employees and higher levels of safety performance.

Although most of the empirical research has examined the effects of leadership and safety climate at the individual level of analysis, support is accumulating for group/unit- and organization-level effects of leadership on safety performance (Hofmann & Stetzer, 1996; Zohar & Tenne-Gazit, 2008). The empirical evidence supports the role of leadership in creating a climate for safety, as well as having direct effects on employees' safety performance. These effects can arise from leaders' values, practices, and priorities. However, the literature also indicates that coworkers and social networks may be critical. There have been only a few studies of social networks and coworker support for safety in conjunction with leadership support for safety, so it is still underdetermined whether the group effects fully mediate the effects of the leader or complement the effects of the leader. Future research integrating the effects of leaders and coworkers on safety climate, climate strength, and safety performance is needed.

Job Design

There is a long history of the importance of job design in accidents and injuries. The human factors, ergonomics, and industrial engineering literatures are replete with examples and principles of design intended to simplify tasks within jobs to reduce cognitive interference in safely performing the required tasks. As stated above, much of this literature has taken the approach of attempting to design out hazards from the job by taking into consideration the person-machine interface with respect to physical characteristics and principles of memory and learning. For example, standardization of the locations for brakes and accelerator pedals on motorized vehicles serves to prevent negative transfer when moving from operating one vehicle to another. Over the past decade or so, there has been a growing recognition that we need to take a more integrative, multidisciplinary approach to work design to integrate the mechanistic models with the psychosocial aspects of work design (Genaidy, Salem, Karwowski, Paez, & Tuncel, 2007; Parker & Wall, 1998; Sauter, Murphy, & Hurrell, 1990).

A recent meta-analysis by Humphrey, Nahrgang and Morgeson (2007) reviewed several motivational characteristics, social characteristics, and work contexts and their effects on behavioral outcomes, attitudes, role perceptions, and well-being outcomes. Unfortunately, they did not specifically include safety outcomes. Nevertheless, this meta-analysis did find that work context (physical demands, working conditions, and ergonomics) was negatively related to well-being and role perceptions. This relation was primarily due to working conditions and physical demands. Further, work context did predict stress and burnout beyond that accounted for by motivational characteristics and social characteristics. The results of this meta-analysis, although not directly assessing safety performance, are consistent with the conclusions drawn about safety climate and leadership. Work context may play a part in safety, but psychosocial factors may enhance or offset the effects of the physical work environment.

There are two specific aspects of job design that seem to be especially relevant in today's employment context. These are shift work and musculoskeletal injuries. Both are reflective of the increased use of technology and the movement to a 24-hour society, as well as the globalization of work. Working night shifts has been associated with increased occupational injuries and, to some extent, occupational illness (Smith, Folkard, Tucker, & Evans, 2011). Shift work may be especially difficult for older workers and although older workers do not experience as many accidents and injuries on the job, when they are injured it takes longer for them to recover. Folkard (2008) expresses a concern about our lack of knowledge of the impact of shift work on older individuals, especially given the aging population and the trend toward people continuing to work longer. This is a significant gap in the literature.

Accompanying the increasing age of the working population, the increasing use of technology, especially computers and other devices that require workers to interact with equipment over long periods of time, appears to be associated with the rising incidence of musculokeletal injuries. This has been accompanied by increasingly sedentary jobs, especially in the information age. The combination of longer periods of work with little physical activity is expected to result in negative health consequences. Jobs may need to be redesigned to actually increase physical activity (Straker & Mathiassen, 2009), contrary to prior attempts to design physical risks out of jobs by reducing physical work load. Increasing physical activity as long as it does not increase the risk of accidents and injuries may enhance well-being. Alternatively, physical activity may need to be enhanced through non-job-related activities, such as engagement in health promotion programs. The empirical literature is relatively silent, however, as to how much physical activity, under what circumstances, is optimal for employees' health and well-being.

Health

Employee health typically has been viewed from the medical model perspective, focusing on ill-health or occupational illnesses. Indeed, there is a literature that links exposure to elements in the work environment to the development of illnesses such as cancer, pulmonary diseases, and cardiovascular diseases, for example (e.g., Belkic, Landsbergis, Schnall, & Baker, 2004). These elements historically were focused on physical toxins, but in the last few decades there has been an increasing recognition that psychosocial toxins also exist in the work environment that result in ill-health. The underlying mechanism for many of the effects of work environment factors on employees' health has been based on theories of occupational stress. In fact, occupational stress has been one of the core mechanisms, if not "the" core mechanism, by which the work environment has been understood to negatively affect workers' health and well-being. Certainly, many of the early contributors to OHP were researchers who demonstrated a

link between work, stress, and health (e.g., Robert Karasek, Lennart Levi). Despite the fact that Selye (1976) described stress as being both positive and negative (e.g., eustress and distress, respectively), the occupational stress literature has more frequently examined employee ill-health as indicated by anxiety, depression, and psychosomatic complaints than considering positive health (e.g., optimal functioning and flourishing).

The occupational stress literature has generated a vast literature on the antecedents and consequences of occupational stress. A search of PSYCINFO using the keywords *job stress, occupational stress*, and *burnout* resulted in over 15,000 references. Clearly, an exhaustive review of this literature is beyond the limits of this chapter, but it is possible to summarize the major findings. Before considering the antecedents of occupational stress from a multilevel perspective, it is important to review the literature on the consequences of occupational stress.

Consequences of Occupational Stress

Perhaps one of the first reviews of the consequences of occupational stress appeared in *Personnel Psychology* (Beehr & Newman, 1978). This literature review, based on theory and empirical work, concluded that occupational stress resulted in the following consequences on individuals' health: anxiety, tension, depression, dissatisfaction, boredom, somatic complaints, psychological fatigue, feelings of futility, inadequacy, low self-esteem, cardiovascular disease, gastrointestinal disorders, dispensary visits, and drug use and abuse (including alcohol, caffeine, and nicotine). In addition, Beehr and Newman's (1978) framework and review also suggested that occupational stress resulted in feelings of alienation, psychoses, anger, repression, suppression of feelings and ideas, loss of concentration, respiratory problems, cancer, arthritis, headaches, bodily injuries, skin disorders, physical/physiological fatigue or strain, death, over- or under-eating, nervous gesturing, pacing, risky behavior (e.g., reckless driving, gambling, aggression, vandalism, stealing), poor interpersonal relations (with friends, family, coworkers), and suicide or attempted suicide, although at the time there had not been empirical evidence to support these consequences. Similarly, the work-related consequences that had been empirically demonstrated at the time that Beehr and Newman (1978) were writing their review were changes in quantity of work, decreases in the quality of job performance, and increases or decreases in withdrawal behaviors (absenteeism, turnover, and early retirement). Other organizational consequences that they suggested, based on their theoretical analysis (although lacking empirical evidence at the time), were changes in profits, sales, earnings, changes in ability to recruit and retain quality employees, changes in ability to obtain raw materials, increase or decrease in control over environment, changes in innovation and creativity, changes in quality of work life, increase or decrease in employee strikes, changes in level of influence of supervisors, and grievances. Beehr and Newman (1978) did note that the empirical studies that did examine the link between job stress and consequences had serious methodological concerns, such as reliance on self-report and cross-sectional designs, that restrict the ability to make causal inferences.

In the almost four decades since Beehr and Newman's (1978) article was published, empirical research has filled in the gaps for many of these consequences of job stress, although some still have little or no empirical evidence to support them as being the consequences of job stress. In some instances, the association between job stress and some of the consequences mentioned by Beehr and Newman (1978) have become better understood. For example, a recent meta-analysis by Darr and Johns (2008) found that there was a weak positive association between stress and absence. They found support for this association being mediated by physical and psychological symptoms such that stress was positively related to physical and psychological symptoms, which were in turn related to absence. Another example is the demonstrated link between stress and sleep disturbances. Armon, Shirom, Shapira, and Melamed (2008), for example, found in a prospective study that burnout predicted new cases of insomnia over an 18-month period.

In some instances, new research has tended to question some of the outcomes included in Beehr and Newman's (1978) framework. For example, under the category of gastrointestinal disorders, ulcers have been identified as being the result of a virus, although perhaps there may still be some more distal link to stress. Therefore, while progress may have been slow, many of the employee and organizational outcomes of occupational stress included in Beehr and Newman (1978) have received some empirical support. The prior limitations of the study designs continue to exist, with an overemphasis on cross-sectional, self-report methodologies, but the quality of the study designs has been improving, with more intervention studies being reported and new methodologies such as experience sampling (Sonnentag & Zijlstra, 2006) becoming more prevalent.

Antecedents of Occupational Stress

Kelloway and Day (2005), in a special issue of the *Canadian Journal of Behavioural Science* on building healthy workplaces, summarize what we know empirically that is unhealthy. They suggest that there are six categories of stressors in the work environment that are related to ill-health of employees: work overload and too great a work pace; role stressors including role conflict, role ambiguity, and interrole conflict; career concerns such as job insecurity, fear of job obsolescence, under- and over-promotion, and lack of career development; timing of work to include rotating shifts and night shifts; poor interpersonal relationships including lack of support from supervisor and peers, workplace aggression, bullying, and incivility; and jobs whose content is too narrow or individuals have too little control and autonomy. As was the case with safety, there are individual- and group-level factors influencing employees' experience of stress and the subsequent ill-health outcomes.

Individual-Level Stressors

There have been a number of individual differences that have been identified as relevant to the experience of stress, such as resilience, tolerance for ambiguity, and perceptions of control (Parkes, 1994). Some individual differences appear to have direct effects on the experience of work stress (Ferris, Sinclair, & Kline, 2005), and others have been found to moderate the relation between stressors and the experience of stress or the relation between the experience of stress and the negative consequences of this experience of stress (Xie, Schaubroeck, & Lam, 2008). In addition to specific individual differences, there is a large literature on person-environment fit that recognizes the interaction between individual characteristics, such as values, attitudes, preferences, and abilities, and characteristics of the work environment (Edwards & Rothbard, 2005). A lack of fit, according to the person-environment fit model, or a mismatch between chronic regulatory focus and state regulatory focus (Higgins et al., 2003), as mentioned above, can result in stress.

Rather than review the literature on individual differences and person-environment fit, however, two more recent advances in our understanding of occupational stress and employee health—recovery and organizational wellness programs are discussed in this section. These two lines of inquiry take a somewhat more positive approach to employee well-being in the workplace.

Recovery

Much of the literature on occupational stress, as indicated above, focused on the negative effects of stressors on employees' health and well-being. Recently, a line of research has emerged positing that there is a need for recovery from the demands of work. The concept of need for recovery from the demands of work recognizes that work expends individuals' physiological and psychological resources and that these resources need to be replenished after work in order for individuals to be able to return to work the following day (Sonnentag & Fritz, 2007; Sonnentag & Zijlstra, 2006). Failure to recover to pre-stressor levels prior to returning to work results in fatigue and a reduction in well-being. The recovery experiences of psychological detachment from work, relaxation, mastery experiences, and freedom from non-work stress (Fritz & Sonnentag, 2006; Sonnentag, Binnewies, & Mojza, 2008) have been shown to be related to enhanced sleep quality, positive activation rather than negative activation, serenity, reduced fatigue, and well-being. These effects have been observed for evening recovery experiences as well as vacation effects. Therefore, recovery experiences have been related to employees' well-being as a function of on-the-job effects and off-the-job activities.

This emerging literature suggests potential stress interventions at the individual level to alleviate the negative effects of work, but also may provide the theoretical underpinning for an intervention to enhance the positive experiences of work. Additionally, the emerging literature on recovery recognizes that the interaction between work and non-work is important for employees' health and well-being, along similar lines to the work-family literature, reinforcing the notion that the lines between work and non-work are porous, at least with respect to health and well-being. Further research integrating the literature on recovery with the work-family literature may be a useful pursuit in understanding positive and negative effects of work, family, and the interface between the two domains.

Organizational Wellness Programs

Organizational wellness programs are included as an individual-level factor that seeks to improve employees' health because they typically are based on individual participation and focus on the individual. It could be argued, however, that they are actually an organization-level phenomenon in that they are typically offered to all employees and reflect organizational policies and practices. Organizational wellness programs have been in existence since the 1970s, and it has been argued that one of the major incentives to organizations was to reduce expenditures on employee health care costs by encouraging individuals to change modifiable health risk factors associated with their lifestyles (Rothstein, 1983). Organizational wellness programs are not monolithic, but typically they focus on fitness, nutrition and weight management, smoking cessation, health education, and stress management. These programs are believed to increase productivity, enhance morale, and reduce absenteeism (Parks & Steelman, 2008; Shurtz, 2005).

Surprisingly, empirical evidence of the effects of organizational wellness programs on employees' health is still somewhat limited, but Shurtz (2005) suggested that the return on investment of organizational wellness programs based on health care expenditures ranged from $1.49 to $4.91. Parks and Steelman's (2008) meta-analysis found that participation in an organizational wellness program was positively related to job satisfaction and negatively related to absenteeism. They did not directly examine the relation of participation in an organizational wellness program and health per se; however, job satisfaction has been treated as a lack of strain in the occupational stress literature, and absence can be indicative of ill-health and strain. Some of the challenges in determining the effectiveness of organizational wellness programs are getting employees to participate in the programs, especially the employees who are most in need of the programs being offered, as well as the complexities of conducting evaluation research in organizations (Parks & Steelman, 2008). More evidence of the impact of organizational wellness programs, based on strong intervention evaluation designs, is needed.

Group and Organization-Level Stressors

To the extent that organizational policies and practices and employer-employee relationships are a source of stress, then one can conceptualize an organization-level effect on employees' experience of stress and subsequent health. For example, based on Kelloway and Day's (2005) review, there appear to be several potential organization-level or group-level stressors, and these stressors tend to affect all employees or groups of employees, at least under the assumption that the policies apply equally to all employees. Poor organizational financial health may signal job insecurity to employees; poor job design can result in overload, time pressure, and under-utilization, and the literature has shown that job insecurity, overload, time pressure, and under-utilization can contribute to individual employees' stress levels (Barling, Kelloway, & Frone, 2004; Quick & Tetrick, 2003, 2011). Shiftwork, especially rotating shiftwork, has been long recognized to be a source of stress and ill-health (Smith, Folkard, & Fuller, 2003). However, most of the research examining the relation of these stressors and employees' health has been conducted at the individual level of analysis only and has neglected the cross-level effects of either work group or organization. Admittedly, policies and practices espoused at the organizational and group levels do not necessarily indicate the enacted policies and practices that individual workers may experience (Schein, 1992), and thus individual-level effects should not be automatically ignored. Recently, occupational stress researchers have specifically posited group-level phenomena; three of these concepts are: the employee-employment relationship in the form of psychological contracts, climate for sexual harassment, and burnout contagion.

Employee-Employer Relationships

Stress has been often conceptualized from the perspective of (mis)fit between demands and control, or demands and resources of the individual. An outstanding theoretical model in this tradition is the demands-control model (Karasek, 1979). However, alternative views have been derived from the exchange theory (Blau, 1964; Rupp & Cropanzano, 2002), in which concepts such as fairness, reciprocity, and justice play an important role. This approach is especially relevant when we aim to analyze employer-employee relationships, organizational support, and human resources practices as potential significant source of stress. All these phenomena may have negative health effects when an imbalance in the exchange between employer and employee occurs (Siegrist 1996). In many instances, the interpretations that employees make about this type of exchange are influenced by the

promises they have received from their employer and by the breaches and violations of those promises that they perceive.

There is evidence showing that violation experiences are followed by employees' negative emotional reactions, such as disappointment, frustration, and distress or strain, together with feelings of anger, resentment, bitterness, indignation, and outrage. These feelings may deteriorate well-being and health (Gakovic & Tetrick, 2003). Recently, a large cross-national study carried out by the Psycones International Research team has evaluated the relations between psychological contract and well-being and health in a sample of 5,288 employees in six European countries (Sweden, Spain, UK, Germany, Belgium and the Netherlands) and Israel (Guest, Isaksson, & De Witte, 2010). It was found that all seven dimensions of the psychological contract considered (content, fulfillment, violation, trust, and fairness relative to employers' obligations perceived by the employees, plus content and fulfilment concerning employees' obligations to their employers as perceived by themselves) had a significant association with one or more of a broad array of outcomes considered (occupational self-efficacy, positive work-life influence, anxiety, depression, irritation, sick leave, sick presence, accidents, harassment and violence, job satisfaction, organizational commitment, intention to quit, perceived performance, general health, and life satisfaction). Interestingly enough, violation of the psychological contract was the feature that showed the strongest association with most of the outcomes (Guest & Clinton, i2010).

Given that perceptions of psychological contract were obtained from both employers and employees, mutuality and reciprocity in psychological contracts were also explicitly incorporated in the study. Mutuality refers to agreement on the promises and commitments shaping the content of the psychological contract, while reciprocity is defined as agreement on the fulfillment of the mutual commitments. Mutuality and reciprocity both had a significant influence on the outcomes mentioned above, after controlling for country sector and a broad array of organizational, individual, and work-related variables. However, when three fairness measures (HRM practices, a direct measure of fairness perception, and violation of the contract) were included in the analyses, mutuality and reciprocity often were not significant. These results points out the "need to be cautious in interpreting existing studies of mutuality and reciprocity if they do not take account of perceptions of fairness. . . . It is the state of the psychological contract, reflected in the quality of the relationship in terms of perceptions of fairness of treatment that has the major influence on outcomes" (Isaksson, Gracia, Caballer, & Peiró, 2010, p. 183). Violation of the psychological contract had important effects on health and well-being at work and in general. In sum, the employee-employer relationship, as viewed from psychological contract theory, plays a significant role in employees' health and well-being. Future research needs to consider the physiological and psychological mechanisms that account for these effects.

Climate for Sexual Harassment

Fitzgerald, Drasgow, Hulin, Gelfand, and Magley (1997) proposed that sexual harassment in organizations was a result of organizational characteristics that formed a climate for sexual harassment. A test of this model supported the claim that climate for sexual harassment is an antecedent of sexual harassment and the subsequent negative effects associated with sexual harassment. This model was extended by Bergman and Henning (2008), in which gender and ethnicity were considered as moderators of the effects of climate for sexual harassment on sexual harassment and of the effects of sexual harassment on health. Support was found for the proposed moderating effects of gender on the relation between climate for sexual harassment and sexual harassment, with the relation being stronger for women than men, but ethnicity was not a moderator; additionally, neither gender nor ethnicity moderated the relation between the experience of sexual harassment and health outcomes.

These two studies provide evidence that organizational climate may impact employees' health and well-being either directly or indirectly. Bergman and Henning (2008) also suggested that the climate for sexual harassment may be extended to climates for bullying and workplace violence and, in fact, Kessler, Spector, Chang, and Parr (2008) have provided support for the concept of an organizational climate for violence. This is clearly an emerging area of research, and more work remains to be done. To date, the analytic approach taken has primarily remained at the individual level of analysis, relying on perceptions of climate, rather than a multilevel approach. Taking a multilevel approach is needed to strengthen the support for linking an organizational climate for sexual harassment or violence and effects on employees' health and well-being.

Collective Burnout and Burnout Contagion

Another recent development that acknowledges the embeddedness of individuals within their work organization are the concepts of collective burnout (Moliner, Martinez-Tur, Peiró, Ramos, & Cropanzano, 2005) and burnout contagion (Bakker & Schaufeli, 2000). Individuals may work in organizations or work units where burnout experiences are generalized among their members, thus becoming a collective phenomenon. This contextual factor posits individuals working in it to be at higher risk of burnout, essentially through a social comparison process (Buunk, Zurriaga, & Peiró, 2009; Carmona, Buunk, Peiró, Rodriguez, & Bravo, 2006). In one of the first investigations of burnout contagion, Bakker and Schaufeli (2000) found that perceived burnout complaints of coworkers were the most important predictor of both individual- and unit-level burnout, supporting their hypothesis that burnout is contagious. In two subsequent studies with different professional groups, additional support has been obtained, suggesting that emotional contagion from one colleague to another can account for individual levels of burnout as well as group levels of burnout (Bakker, Le Blanc, & Schaufeli, 2005; Bakker, Schaufeli, Sixma, & Bosveld, 2001). Therefore, evidence is accumulating that it is not only the objective characteristics of organizations and units (e.g., policies, procedures, and practices) within organizations that have negative consequences for employees' health, but there are psychosocial factors and group processes (i.e., social climates) operating as well.

Research Evidence from Evaluations of Interventions

Not only is there a need for more evaluation research of organizational wellness programs as indicated above, there is a paucity of research on interventions to reduce the negative effects of the work environment or to enhance the positive effects of the work environment on employees' health and well-being. Much of the literature on occupational safety and health continues to rely on cross-sectional, mono-method, correlational research designs. However, we are seeing an increase in experiments and quasi-experiments. Plus, field studies and case studies are increasingly being accumulated using meta-analytic and systematic review techniques, which help to summarize findings, although these techniques cannot correct for

the weaknesses in the research designs per se.

An empirical investigation carried out by Kompier, De Gier, Smulders, and Draaisma (1994) offered a perspective of the situation during the late 1980s and early 1990s about the practices concerning interventions to prevent work stress in five European countries. Out of this research, the authors found differences across countries in terms of the attention paid to work stress and to its prevention and/or correction. The practices used, when they existed, were characterized as focusing on the individual rather than on the organization as the main target, being concentrated disproportionally on reducing the effects of stressors rather than reducing the presence of stressors at work, and were mostly oriented to the management of stress.

One decade later, Van der Klink, Blonk, Schene, and Van Dijk (2001) reviewed 48 experimental studies seeking to determine the effectiveness of the occupational stress-reducing interventions; 43 were focused on individuals, while only 5 were organization based. In these studies, a moderate effect was found for cognitive-behavioral interventions and for multimodal interventions on the outcome criteria, including several strain indicators such as complaints or quality of work life. A significant but small effect was shown for relaxation. No significant effect was found for organizational interventions.

Subsequently, Semmer (2003) reviewed job stress interventions and organization of work factors, paying attention to task and technical interventions, changes in working conditions (such as ergonomics, time, and workload), improvements in role clarity, and social relationships. He also included interventions with multiple changes. Results were complex, not only because of the wide variety of interventions and contextual contingencies but because the diversity of outcome criteria, and measures were more or less distant from the immediate intervention in a chain that aims, first, to identify if they change the intended workers' experiences (e.g., more autonomy), and second, if they do or do not affect measures of health and well-being. In any case, "it is not very reasonable to expect all indicators of well-being and health to show changes in means after a specific time following intervention" (p. 341). Semmer (2003) also pointed out that "trade-offs" in the process of improving working conditions need to be taken into account when changes are introduced. In some cases, even after acknowledging the value of the new system, the preference may be for the old one because the costs of the improvement to be implemented are too high. Semmer (2003) concludes that "the state of the affairs seems less pessimistic than it appears at first. . . . There are many positive findings, many null effects but not very many negative ones—although intervening in a complex system will always run the risk of negative effects" (Semmer, 2003, p. 345). However, he suggested several methodological improvements for the evaluation of interventions (Semmer, 2006). Semmer (2003, 2006) points out that attention should not only focus on the design of the interventions, but also on the process. Careful documentation of the process during the intervention is needed, followed by subgroup analyses to better understand the situation and conditions of the different individuals within an intervention's targeted group.

More recently, additional meta-analyses offer empirical evidence about the effects of occupational stress interventions and wellness programs. Richardson and Rothstein (2008) reported significant medium to large effects of interventions on psychological rather than on physiological or organizational outcomes. Again, cognitive-behavioral programs produced larger effects than relaxation or organizational interventions. However, when other interventions were included (e.g., multimodal), the cognitive-behavioral interventions effect was reduced. Parks and Steelman (2008), as mentioned above, found that participating in organizational wellness programs was related to decreased absenteeism and increased job satisfaction.

There are some areas where interventions have been less frequent than in others, and evaluation of the efficacy of these interventions is more difficult. More empirical evidence is needed for interventions at the organizational level, especially relative to the interface between external and organizational realities influencing occupational health, safety, and well-being (Schaufeli, 2004). Moreover, methodologies need to be improved to obtain more rigorous data and results of the evaluations and their external validity.

Professional interventions in psychosocial risk prevention and health promotion imply designing and developing models, strategies, and tools based on research and theory. Organizational development and organizational design provide a rich armamentarium that may help in health protection and promotion. Moreover, the implementation of changes requires the incorporation of theories of organizational change and change management. In fact, professionals who want to contribute to risk prevention and health promotion (Tetrick, 2008) need to be competent in change planning and management as well as in program evaluation. In this context, it is especially important that they pay attention to the human and social side of organizational change (psychosocial dynamics, synergies, and resistance to change) and to the analysis of stakeholders, agents, and relevant audiences. The dynamics of change deserve important attention, balancing both short- and long-term perspectives about maintaining the process, as well as assessing substantive outcomes.

Summary and Future Directions

The empirical evidence is clear that workplace factors are directly related to the health and safety of employees. These factors may be physical attributes of the work environment, such as working conditions and activities such as repetitive movements required by individuals to do their jobs, but there are also numerous psychosocial factors that can either result in lack of safety and ill-health, or actual safety and positive health. These psychosocial factors include such factors as climate for safety, climate for sexual harassment, interpersonal relations, coworker support, and leadership. In the discussion above, we have identified some gaps in the literature and have made suggestions for areas in need of continued or new investigations. In closing, we would like to offer some additional, perhaps more future directions to enhance the safety, health and well-being of employees.

Much of the theorizing and research on occupational safety and health has actually focused on lack of safety and ill-health. Additionally, much of this work has been conducted in workplaces that are far different from today's dynamic, global, service/knowledge-oriented occupations. We recommend that future work on occupational safety and health should: (a) incorporate the realities of today's work environments, and (b) integrate a positive approach with countervailing interventions (Kelloway et al., 2006), so as not to just focus on prevention but also on enhancement and development of workers, the work environment, and the interaction between workers and the environment. Such an orientation would expand our understanding of occupational demands and the experience of those demands as either positive stress or distress.

Taking a positive approach to occupational health and safety will require more complete conceptualizations of positive health. There is general agreement that positive health is not just the absence of illness, but beyond this there does not appear to be consensus. Health is viewed as optimal functioning, although the exact operationalization of this is not clear. Further, the literature is not clear regarding the relation between health and safety. It has been recognized that ill-health can be related to lack of safety, and one logically might argue that if one is not safe, it might result in ill-health. However, the literature has not directly addressed these relations (either in the negative health realm or the positive health realm) and definitely has not sought to examine these empirically.

The literature on occupational safety and health has primarily focused on explanatory studies, which is important in theory development. However, the accumulated evidence is such that it is now time to focus more on the design and implementation of interventions and on the evaluation of the effectiveness of these interventions to enhance and maintain occupational safety and health. Intervention design (based on theory and empirical evidence), implementation, and evaluation are challenging in the field, and often the strongest designs must be modified to meet organizational constraints. Nevertheless, intervention studies are critical in actually creating safe and healthy work environments that can be adopted in organizations.

Innovations in research design, such as experience sampling methods, can provide us with much richer and more complete pictures of the experience of employees. Additionally, reliance on self-report measures has limited the strength of much of the research on occupational safety and health. Future research adopting observational and physiological measures promises to advance our understanding of occupational safety and health.

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