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The Impact of Technology on Employee Stress, Health, and Well-Being

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THE IMPACT OF TECHNOLOGY ON EMPLOYEE STRESS, HEALTH, AND WELL-BEING

Ever advancing technological developments are altering the very nature of work life, impacting how, when, and where we work. Traditional work schedules, established during the industrial revolution, are beginning to be left behind in favor of more efficient, modern alternatives. In particular, information and communication technologies (ICTs) such as laptops, cellular phones, Blackberries®, smart phones, tablet computers, and PDAs have made it possible for employees to conduct their work tasks while remaining in touch with a central office from remote locations. Remote work has been examined under a variety of names, such as virtual work, telework, telecommuting, and technology-assisted supplemental work (TASW) to name a few. Whereas collaborative work efforts conducted at different locations is not a recent development, the sophistication and speed at which it occurs, as well as the extent to which it is practiced, far exceeds what remote workers could have expected prior to modern technological advances (e.g., Brooks, 1976; Chandler, 1962).

Along with these changes in the nature of work, we must update our understanding of how employees' stress, health, and well-being are impacted by remote work through the use of ICTs. The increasing use of ICTs and the unique manner in which ICTs are used by today's workforce allows for employees to constantly be connected to their work, and for employers to be constantly connected to their employees. Moreover, employees work in an array of settings, often physically and psychologically

isolated from their central offices. Our current understanding of work stressors and well-being of employees must be expanded to account for these increasingly prevalent experiences. Furthermore, our theoretical understanding of how work experiences affect employee health, stress, and well-being must be refined to adequately capture and represent the current state of work. The goal of this chapter is to provide and describe a revised theoretical model for the job stress process based on the control theory of job stress (Spector, 1998). To this end, we discuss prominent ways in which ICTs are used in traditional and nontraditional work arrangements, how these modern adaptations related to employee control and well-being, as well as important future endeavors.

ICTS AND THE CHANGING NATURE OF WORK

Telecommuting

Telecommuting broadly refers to alternative work arrangements in which employees perform work tasks in locations other than a central office, facilitated by the use of electronic media to interact with co-workers and clients, for some portion of their work schedule (Bailey & Kurland, 2002; Baruch, 2001; Gajendran & Harrison, 2007; Feldman & Gainey, 1997). This definition is inclusive of several distributed work constructs, including telework and virtual work. Telecommuters may work in remote offices or telework centers, but they often work from home (Davis & Polonko, 2001; Hill et al., 1998) with the proportion of telecommuters working from home increasing as this form of distributed work increases (WorldatWork, 2009). Telecommuting arrangements can vary in the amount of time the telecommuters spend outside of the office setting. For instance, fewer than 10 percent of telecommuters reported working from a remote location on a full-time basis (Davenport, 2005), with most telecommuters engaged in part-time arrangements (Qvortrup, 1998; Standen, Daniels, & Lamond, 1999). Furthermore, telecommuting is often engaged in on a voluntary basis, and is often considered a benefit or reward for employees (WorldatWork, 2011). Employers who utilize telecommuting arrangements report that they only offer the option of telecommuting to just over one-third of their employees (WorldatWork, 2011). Although involuntary telecommuting is expected to increase along with voluntary telecommuting, this proportion of the telecommuting population is

expected to remain minimal compared to voluntary telecommuting (Mokhtarian & Salomon, 1996).

The use of telecommuting arrangements has previously grown rapidly throughout the United States and across the globe (Davis & Polonko, 2001). In the United States alone, an estimated 33.8 million employees telecommuted for some portion of their scheduled work time in 2008, although this number fell to 26.2 million in 2010, potentially due to increased unemployment rates and job insecurity during this time frame (WorldatWork, 2011). Worldwide, senior-level executives report that their staff was engaged in telecommuting in approximately two-thirds of their global offices (AT&T, 2004). There are several purported benefits to telecommuting that contribute to its widespread use. First, telecommuting allows for organizations to reduce costs associated with real estate and office overhead expenses (e.g. Apgar, 1998; AT&T, 1997; Dannhauser, 1999). Second, providing telecommuting arrangements can assist organizations with the recruitment and retention of high quality employees (Davenport & Pearlson, 1998). Some employees might prefer the flexibility of telework and see it as a benefit of working for a particular company. Furthermore, employees able to telecommute would not have to relocate to take a position with an out-of-town company. Third, telecommuting can serve to facilitate organizations' ability to comply with government regulations, legislation, and memorandums aimed at improving employee opportunities (e.g., the Americans With Disabilities Act of 1990; U.S. Equal Employment Opportunity Commission, 2005), transportation difficulties (e.g., Department of Transportation and Related Agencies Appropriations Act of 2000), and work–family balance (e.g., U.S. Office of Personnel Management, 2005). Finally, telecommuting has been touted as a way to enable employees to save commuting costs and adjust their schedule to better meet their non-work and family needs (HR Focus, 2002; Nickson & Siddons, 2004).

Technology-Assisted Supplemental Work

Technology-assisted supplemental work (TASW) has been defined "as the performance of role-prescribed job tasks by full-time employees with the aid of advanced information and telecommunications technology" (Fenner & Renn, 2004, p. 179). This can occur away from the central office, during or after work hours, and even on vacation. Like telecommuting, TASW represents a form of distributed work conducted through electronic means. However, while telecommuting refers to employees spending a certain

amount of their scheduled work time away from a central office, TASW more specifically targets how employees discretionarily extend their workday at home after hours. The TASW literature is an extension of Venkatesh and Vitalari's (1992) research on supplemental work, specifying the role that technology will have in altering how and when supplemental work will occur, as well as the type of supplemental work that can be completed away from work.

TASW is conducted through advanced digital and information technologies, such as laptops, cellular phones, Blackberries®, smart phones, tablet computers, and PDAs. Accompanying these technologies is the expectation that employees will work longer hours, whenever and wherever they are required. The growing adoption of TASW is associated with changes in organizational norms and climate, requiring the constant connectivity of employees to achieve organizational goals (Fenner & Renn, 2010). Indeed, 10.3 million employees in the U.S. reported performing around seven hours per week of additional job related work such as with telecommuting (United States Department of Labor, 2005) at home, without a formal agreement. The use of TASW is rapidly increasing as these technologies become more accessible and ubiquitous. For example, a study with a large nationally representative sample found that 62 percent of employees reported being connected while away from a central office by cellular phones, laptops, Blackberries®, or similar devices; while 45 percent reported using these devices to work at home during the evenings or on the weekends (Madden & Jones, 2008). Furthermore, 49 percent of this sample reported that TASW contributed to their overall stress and work–family conflict.

There are several important distinctions between telecommuting and TASW that have implications for how employees will be affected by these forms of distributed work. First, telecommuting is often an arrangement that employees in particular jobs are offered, often voluntarily, whereas TASW is becoming an expectation of all employees through changing psychological climates. Second, telecommuting refers to a portion of an employee's scheduled work time that is conducted in a remote location, while TASW refers to work that is conducted outside of an employee's scheduled work. Whereas telecommuting can offer the employee more flexibility in work place and time that can reduce some of the burden of work, TASW expands working time and can increase the burden. Furthermore, telecommuting can in many cases increase the employee's autonomy by allowing employees more choice in working place and time, and taking them out from under a supervisor's direct vision. Of course,

there are systems that do the opposite by monitoring employee actions, such as software that keeps track of time spent logged into a computer system, or supervisors who listen in on telephone conversations with customers. In the remainder of this chapter we will discuss features of technology that can serve to either increase or decrease the stressful nature of work and how that might affect health and well-being. Much of this concerns the extent to which technology can enhance or inhibit employee autonomy and control, which are vital elements in the stress process.

THE CONTROL MODEL OF JOB STRESS

Researchers have long understood the centrality of control in the job stress process that links environmental conditions and events to physical health and psychological well-being (e.g. Evans & Carreré, 1991; Ganster & Fusilier, 1989). The control theory of stress was proposed by Spector (1998) to depict a more complex role for control in the job stress process, as the more simplified moderating role of control in earlier models such as Karasek's (1979) demand/control model had received inconsistent support (de Lange et al., 2003). The job stress process that underlies Spector's model, and indeed most theoretical frameworks, proposes a stimulus-response process in which job stressors lead to strains. The control theory posited that control has effects in several stages in the job stress process. The lack of control itself can act as a job stressor that leads to employee strain directly. Additionally, control may have a moderating effect on employee health and well-being as it could affect how an employee perceives the work environment, thus operating to mitigate or exacerbate an employee's strain response to a stressor (Spector, 1998). This model is depicted in Figure 11.1.

The Job Stressor-Strain Process

Job stressors were initially conceptualized as conditions or situations at work that require an adaptive response on the part of the employee (Beehr & Newman, 1978), although this definition is unclear as to what an adaptive versus non-adaptive response would be, nor does it address how to differentiate between stressors at work and any other situations at work. The control model of the job stress process addresses these concerns by narrowing this definition to include only those conditions or situations at work that elicit negative emotional responses from employees (Spector,

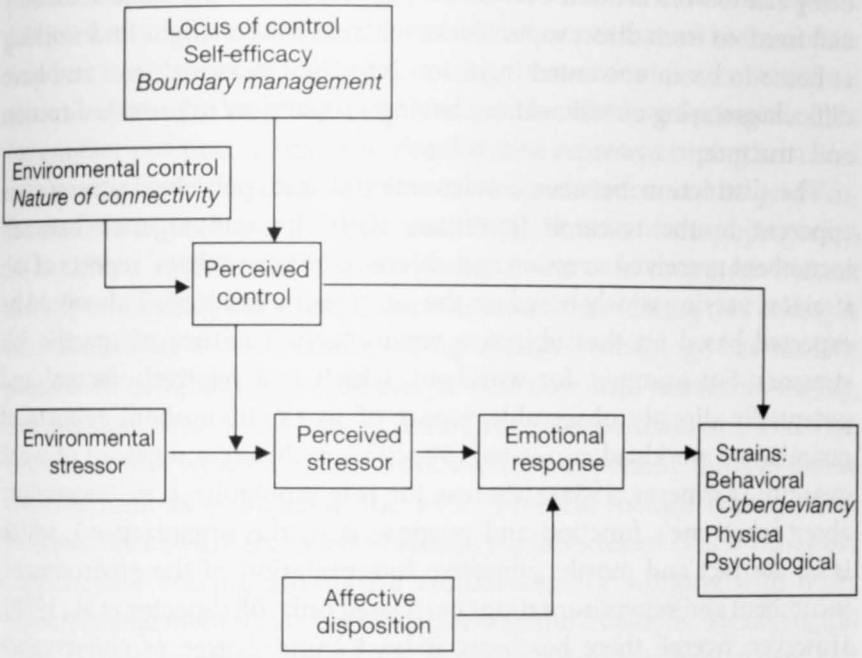

FIGURE 11.1
The control model of the job stress process

1998). Common emotional reactions to perceived job stressors can include anger, frustration, and anxiety. The positive relationship between perceived job stressors and negative emotional reactions has been well supported empirically (e.g., Jackson & Schuler, 1985; Jex & Beehr, 1991; Spector & Jex, 1998), although the type and intensity of the emotion felt may vary by individual (Keenan & Newton, 1985).

An important element of this model is the distinction that is made between objective environmental and perceived job stressors (Parasuraman & Alutto, 1981). Not all employees will perceive the same environmental conditions as job stressors, a process that is impacted by employees' appraisal of environmental conditions (Lazarus, 1991). The appraisal process requires that the employee must perceive the environmental condition, as an unperceived environmental condition is not likely to invoke a negative emotional reaction. Furthermore, during the appraisal process, the perceived environmental conditions must also be interpreted as stressful by the employee. Thus, not all environmental conditions that could be stressors will be stressors for all employees, making objective measures of environmental stressors more difficult to assess and interpret than perceived job stressors. For example, some employees might enjoy

being able to work at home because they appreciate the increased autonomy and freedom from direct supervision, whereas others might find working at home to be an unwanted intrusion into their personal lives and have difficulties staying on task without having a supervisor to provide direction and structure.

The distinction between environmental and perceived stressors is apparent in the research literature, with the convergence between incumbent perceived stressors and objective or even others' reports of job stressors varying widely based on the job stressor assessed. This would be expected based on the subjective versus factual nature of specific job stressors. For example, for workload, which is a relatively factual and potentially directly observable aspect of work, incumbent reports of quantitative workload correlated .59 with an objective measure of work quantity (Kirmeyer, 1988), whereas for role ambiguity (i.e., uncertainty about what one's function and purpose is in the organization), which is an abstract and mostly subjective interpretation of the environment, incumbent and supervisor ratings correlated only .08 (Spector et al., 1988). However, overall there has been at least some degree of convergence identified between incumbent perceptions and other measures of stressors, suggesting that perceptions are linked to objective experience.

Negative emotional reactions are thought to mediate the relationship between perceived job stressors and employees' reactions to these job stressors, referred to as job strains. Job strains can vary in timeframe, including immediate short-term strains that happen with little time lag, intermediate-term strains that might take a few hours or days, and long-term strains that can unfold over months and even years. Furthermore, strain responses have been conceptualized as three broad categories of reactions, specifically psychological, behavioral, and physical (Jex & Beehr, 1991). Psychological strains refer to emotional responses to stressors, including immediate short-term strain reactions such as anxiety or frustration, as well as intermediate-term attitudinal responses to stress, such as job dissatisfaction and lower organizational commitment. Due to the immediate nature of emotional responses to a job stressor, this model posits that these strains occur prior to and mediate the relationship between job stressors with all other intermediate and long-term strains, including attitudinal reactions in addition to behavioral and physical strains. Empirical support has been found for the relationship between negative emotions and long-term psychological, behavioral and physical strains (Spector & Jex, 1998), as well as for the mediating role of negative emotions on the job stressor–strain relationship (Fox & Spector, 1999; Yang & Diefendorff, 2009).

Behavioral strains are actions or instances of behavior elicited in response to a job stressor. These strains can include behaviors that are an immediate response to a stressor, such as an act of aggression or violence. Behavioral strains can also be long-term in nature, such as leaving the organization for another position. These behavioral strains represent coping behaviors on the employee's behalf, which can be emotion-focused or problem-focused in nature (Lazarus & Folkman, 1984). Emotion-focus coping refers to behaviors that reduce the emotional reaction to a stressor without directly addressing the stressor, such as emotional venting to a colleague or withdrawing from work by being absent. Technology has made it possible to complain to a colleague in real time with instant messaging, text messages, and even venting to entire Facebook communities. Likewise, employees may withdraw from work while being present, through online communications or "surfing the web." Problem-focused coping refers to behaviors that are intended to reduce the job stressor. These behaviors may include seeking alternative employment or working with other organizational members to try to resolve stressful situations. Technological advances have improved employees' ability to obtain new employment, and organizations have the opportunity to use electronic means to help employees resolve situations they find stressful.

Behavioral strains can also represent counterproductive work behaviors (CWB; Spector & Fox, 2005) or organizational citizenship behaviors (OCB; Organ & Konovsky, 1989). CWBs are acts at work that interfere with organizational functioning and efficiency, such as gambling online while at work, sabotaging another employee by locking his or her computer, or sabotaging the organization by downloading a computer virus. OCBs are extra-role behaviors that contribute to organizational goals and objectives, including behaviors such as helping a co-worker with new software or working late to complete work. Emotion-focused coping behavior tends to be counterproductive to organizational goals, although this is not always the case. For instance, withdrawing from work through navigating to non-work related websites is generally thought of as counterproductive as employees are not contributing to organizational functioning. However, employees may use the brief time not working to rest and recover, returning to their work more capable of performing their tasks than if they had not taken a brief internet break. Problem-focused coping often aligns with OCBs, as employees attempting to resolve stressful situations can improve overall organizational functioning. However, employees leaving the organization, a problem-focused coping strategy for the individual, can have a hindering effect on productivity for the organization thus functioning as

a CWB. The relationships between job stressors with OCB/CWBs, as well as the mediating role of negative emotions, have received empirical support (Bruk-Lee & Spector, 2006; Spector & Fox, 2002; Fox, Spector, & Miles, 2001; Yang & Diefendorff, 2009).

Physical strains can include a large number of both short-term and long-term physiological responses (Frese & Zapf, 1988). Short-term strains are physiological reactions, such as increases in blood pressure or suppressed immune system functioning (Cohen & Herbert, 1996; O'Leary, 1990), that result from the experience of a job stressor immediately following exposure to the stressor (Nixon et al., 2011). Intermediate-term physical strains can include noticeable symptoms such as headaches, gastrointestinal problems, or difficulty sleeping. Long-term strains refer to physical illnesses such as cardiovascular disease or irritable bowel syndrome (Landsbergis et al., 2003).

The Role of Control

Control refers to an employee's ability to select their actions from two or more potential options (Ganster & Fusilier, 1989). The control theory of the job stress process particularly focuses on behavioral control, as opposed to cognitive control (Averill, 1973), specifying employees' ability to control work conditions that directly relate to perceived job stressors as critical to understanding the job stress process (Spector, 1998). As with job stressors, it is important to distinguish between environmental and perceived control. Environmental control is the autonomy employees are technically given by their work situation or supervisors, whereas perceived control is the amount of choice the employees believe that they have. Technology can increase control by enabling employees to accomplish tasks from almost any location at any time, but an employee who is uncertain about how to use that technology might not perceive himself or herself to have that control.

Perceived control is expected to moderate the relationship between environmental stressors and perceived stressors, such that, when an employee has control over an environmental condition that could act as a stressor, it is less likely to be perceived as a stressor by that employee. For example, if an employee is assigned a task on a tight deadline, having access to needed information through technology might enhance feelings of control over the workload and thus reduce the extent to which the deadline is perceived as a stressor. Likewise, when an employee does not have control over an environmental condition that could act as a stressor, it is

more likely to be perceived as a stressor by that employee (see Figure 11.1). For example, not having access to required information to complete a task would increase the extent to which a deadline is perceived as a stressor. It is important to note that environmental control, or actual control that an employee may have over their work and work tasks, and perceived control are expected to be imperfectly related to one another. As a further caveat, the perceived control must be specifically over the job stressor to effectively moderate the relationship between environmental and perceived stressors. For example, the use of telecommuting, representing a form of scheduling control, may help reduce conflict arising from employees' work–family interface, but it will probably not help reduce role ambiguity.

Indirect evidence for the moderating role of perceived control on the environmental-perceived job stressor relationship can be drawn from research testing the demand/control model. Specifically, examinations of this model that have drawn on subjective appraisal of job stressors tend to find less support for the model than research examining objective measures, which are intended to capture environmental stressors (Landsbergis et al., 1995; Wall et al., 1996). The moderating role of control between the objective and perceived job stressor measures would explain these findings. Despite this indirect evidence, research directly examining the moderating role perceived control plays in the job stress process is scant (Fox & Spector, 2006).

Even though control is most frequently thought of as a mechanism through which employees can minimize stressors at work, in some cases control also functions as a job stressor (Houston, 1972; Frankenhaeuser & Lundberg, 1982). For instance, the added responsibility that often accompanies control can be perceived of as a job stressor to many employees. For example, when employees initiate a telecommuting arrangement, they increase their control over work by integrating flexibility through where and, quite often, when they work. However, these employees also acquire the responsibility of effectively managing their work time and pace, without the formal parameters established in an office setting. Additionally, these telecommuters may experience more work–life conflict because their work is now intruding into their home life, which will be further discussed later. Furthermore, when employees experience a problem over which they have some control (e.g., a computer malfunction), they will often make attempts to overcome the problem. If these attempts are unsuccessful, employees must then deal with the initial job stressor, the effort required to use their control, as well as the failure of those efforts, increasing their perceived

stressors and negative emotional responses. This problem might be reduced in an office setting in which nearby colleagues might be more readily available to assist in fixing the problem, or where one might access another machine while the malfunctioning computer is repaired by a technician. In scenarios where control is ineffective, control would seemingly increase employee strains, rather than function as a buffer of strains.

Beyond its role in moderating the relationship between environmental and perceived stressors or contributing directly to employee strains, control further helps explain how employees' will react to perceived stressors. Specifically, control is expected to impact employees' choice between emotion and problem-focused coping behavior such that employees who perceive high control are more likely to engage in problem-focus coping (e.g., fixing an equipment malfunction), with the intent of reducing strains through actually reducing or removing the job stressor. When employees' feel they have little control, they are expected to engage in more emotion-focused coping, which will not productively alter their environment and can have counterproductive outcomes, such as withdrawal or acts of aggression at work (Spector, 1997). Related research evidence broadly supports these propositions, in that individuals reporting lower control were more likely to respond to stressors with unproductive or counter-productive behaviors, such as acts of aggression, sabotage, or complaining (i.e., Hurrell & Murphy, 1991; Perlow & Latham, 1993; Storms & Spector, 1987); although the majority of research in this area examines the related dispositional construct of locus of control, which is discussed next, rather than situational-based perceived control.

The Role of Individual Differences

There are two individual difference variables that are important for understanding perceived control: locus of control and self-efficacy. As Spector (1998) points out, employees' locus of control and self-efficacy impact perceptions of control independent of the actual environmental control. Locus of control refers to people's tendency to believe that they control over their rewards or punishments (Rotter, 1954). Individuals with external locus of control, or externals, tend to believe that rewards and punishments are more the consequence of fate or the action of powerful others than of their own actions, thus they are likely to perceive limited control across a variety of situations. Conversely, individuals with internal locus of control, or internals, tend to believe that they can directly impact their rewards and punishments through their own actions, leading to

stronger perceptions of control. Thus, when individuals are presented with situations in which they have equivalent environmental control, internals are more likely to perceive control than externals. Empirical evidence can be found to support the relationships between perceived control and locus of control, particularly research examining autonomy, a form of workplace control. Researchers have identified that internals report greater autonomy than externals (Spector, 1988; Spector & O'Connell, 1994) and have more positive attitudes about computing technology (Coovert & Goldstein, 1980), which may have important implications for strain responses to telecommuting and TASW.

Self-efficacy refers to the belief that one is capable of effective performance in specific domains (Bandura, 1977), such that individuals may have high self-efficacy for some of their work tasks (e.g., data analysis), but low self-efficacy for other tasks (e.g. public speaking). In this way, self-efficacy is more specific than the broad tendencies captured by locus of control, yet it is theoretically expected to affect individuals' perceptions of control in a similar manner. The belief that one cannot effectively perform a task essentially aligns with the belief that one cannot control one's own task performance; it is a perception of low control in this particular domain of work. Consequently, high and low self-efficacy function similarly to internal and external locus of control, respectively. As with internal locus of control, high self-efficacy has been found to be associated with higher reports of autonomy (Cohrs, Abele, & Dette, 2006). Within the control model of the job stress process, both internal locus of control and high self-efficacy serve to increase employees perceived control thus reducing the likelihood that an environmental condition will be perceived as a stressor by the employees. Conversely, employees with external locus of control and low self-efficacy will feel less capable of successfully handling environmental stressors and therefore react to these environmental conditions with negative emotions and strains.

Beyond individual differences in locus of control and self-efficacy, the entire job stress process will be affected by individual differences in affective dispositions such as negative affectivity, which is the tendency to experience negative emotions across situations and time. For instance, individuals with dispositions toward negative affectivity in general (Watson & Clark, 1984) or trait anxiety (the tendency to experience anxiety; Spielberger, 1972) in particular may have more negative emotional reactions to environmental conditions than individuals who are low on these traits. According to the control model of the job stress process, the heightened negative emotional reactivity of employees with higher negative activity and trait anxiety will

lead to increased intermediate and long-term strains. These types of affective dispositions function independently of control in that they do not affect employees' perceptions of control, rather affective disposition influence employees' interpretations and reactions to perceived job stressors. While negative affectivity and trait anxiety have been found to be particularly relevant to the job stress process (Spector et al., 2000), many affective disposition constructs could play a role in how stressors are perceived and responded to.

Integrating ICTs into the Control Model of the Job Stress Process

Technological advancements have affected several aspects of the control model of the job stress process. We will discuss three of these changes that have important implications, including how ICTs have impacted the distinction between environment and perceived control, how ICTs have opened the door to new forms of CWBs, and how more individual differences (i.e., boundary management) must be taken into account when considering how modern work is conducted. First, we posit that ICT use and the nature of connectivity directly impacts environmental control, as the integration of ICT use in organizations has simultaneously augmented (i.e., telecommuting) and restricted (i.e., TASW) employees' control over work related conditions, particularly with regard to scheduling and work–life balance.

Telecommuting, as a form of distributed scheduled work, typically represents increased control for an employee over scheduling by providing flexibility in the specific places and times an employee can work. In some situations, however, the employee's use of technology to accomplish tasks is closely monitored, which can decrease control. In terms of work–family issues, a meta-analytic examination of 19 studies suggested that telecommuting is negatively related to work–family conflict (Gajendran & Harrison, 2007), in other words, individuals who telecommute at home experience fewer problems coordinating demands of work and family. In fact, telecommuting has a beneficial bidirectional effect, such that it seems to help employees reduce work demands interfering with family demands as well as family demands interfering with work demands (Gajendran & Harrison, 2007).

Conversely, the unscheduled supplemental work conducted through TASW is likely to reduce employees' control over scheduling and total working hours, as well as reduce employees' control over restricting

work from interfering with family obligations. Indeed, researchers have consistently found positive relationships between TASW and subjective stress (Duxbury, Higgins, & Thomas, 1996) as well as incumbent and other reports of work–family or work–life conflict (Boswell & Olson-Buchanan, 2007; Duxbury, Higgins, & Thomas, 1996; Fenner & Renn, 2010). Thus this research seems to support the proposition that the nature of ICT connectivity will directly affect employees' perceived control over how and when they do work.

In regard to how technology has broadened the scope of employee strains, increasing efficiency and accessibility to ICTs has expanded the domain of counterproductive behavior to include cyberdeviant behaviors that can be enacted remotely or at work. Cyberdeviant behavior or cyberdeviancy is generally conceptualized as forms of ICT misuse, which can be further broken down into behaviors that range from withdrawal from work, such as spending work time surfing the internet instead of performing work tasks (e.g., Cyberloafing; Lim, 2002) to interpersonal behaviors, such as sexual harassment or fraud (e.g., Cyberaggression; Weatherbee & Kelloway, 2006). Cyberloafing, along with other terms used to describe production deviance conducted through ICTs (e.g., Cyberslacking; Marron, 2000; Cyberbludging; Mills et al., 2001), has been further categorized based on the types of behavior engaged in and the potential harm to the organization (Mastrangelo, Everton, & Jolton, 2006). Counterproductive computer use refers to behaviors that can expose an organization to liability, such as downloading illegal software or distributing pornography. Non-productive computer use refers to behaviors that do not expose organizations to liability, but lead to a loss of productivity, as they are not work related, such as sending personal e-mails. Additionally, cyberloafing has been associated with one's perceived ability to hide cyberloafing, which could have important implications for teleworks and those engaged in TASW (Askew et al., 2011). While cyberdeviance is a relatively new area of research, there is some initial evidence that the antecedents and outcomes of these behaviors align with similar, non-ICT based CWBs (Blau, Yang, & Ward-Cook, 2006; Lim, 2002; Weatherbee, 2007). Therefore, cyberdeviancy, like CWBs, seems likely to be associated with job stressors (e.g., Bruk-Lee & Spector, 2006; Spector & Fox, 2002; Fox, Spector, & Miles, 2001; Yang & Diefendorff, 2009). However, this contention needs to be assessed.

Finally, boundary management is an individual difference variable that is related to ICT use and must be considered in the job stress model. Boundary management broadly refers to how individuals navigate the

multiple roles they hold in various domains of life. Boundary theory posits that individuals occupy these various roles and that these roles can be separated by physical, temporal, or psychological boundaries (Ashforth, Kreiner, & Fugate, 2000; Clark, 2000, Nippert-Eng, 1996). Boundaries can vary in the amount of flexibility and permeability that exists between roles (Ashforth, Kreiner, & Fugate, 2000; Clark, 2000). When an employee engages in telecommuting so that they can determine when and where they work, the employee is said to have a flexible work and non-work boundary. Alternatively, when an employee responds to work e-mails while at home with their family, the work and non-work boundary is permeable. Permeable boundaries increase the likelihood of interference between work and non-work roles (Ashforth, Kreiner, & Fugate, 2000; Kossek, Lautsch, & Eaton, 2006), which leads to role stress through work–life conflict. When individuals' boundaries are inflexible and impermeable, they tend to segment their work and non-work roles, while individuals whose boundaries are flexible and permeable tend to integrate their work and non-work roles. ICTs allow for greater integration of work and non-work roles, allowing the boundaries between these roles to blur (Batt & Valcour, 2003; Chesley, Moen & Shore, 2003; Fenner & Renn, 2004; Valcour & Hunter, 2005). Thus, individuals' boundary management dispositions can impact how use of ICTs will impact their perceived control over job stressors, particularly work–family and work–life stressors.

Currently, a limited amount of research has examined the role boundary management may play in understanding how ICT use impacts work–family balance. In one study, which examined integrating and segmentation boundary management approaches as a continuum, Kossek, Lautsch, and Eaton (2006) found that telecommuters who tend to integrate their home and work boundaries had greater family to work conflict. Boundary management also affects how TASW relates to work–family conflict. Particularly in the TASW literature, boundary creation around the use of ICTs has recently become an area of investigation, moving more specifically into examining how TASW may relate to work–family conflict. While this is a new area of investigation, researchers have found that employees who integrate work and nonwork or family roles do not establish boundaries regarding the use of ICTs at home while not working, and experience more work and family or non-work conflict (Olson-Buchanan & Boswell, 2006; Park, 2009). Likewise, employees who segregate their work and family or non-work lives are more likely to create boundaries about ICT usage away from work and experience less work and non-work conflict.

IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

In this chapter, we have expanded the control model of the job stress process to include constructs that have become relevant to understanding employee well-being and health as technology continues to impact employees' daily work life. Specifically, we identified two prominent ways in which technology impacts the daily work life of employees; both through allowing employees increased flexibility in their work schedule and location (i.e., telecommuting) and through extending employees' work day by expectations of constant connectivity (i.e., TASW). Additionally, we have extended the control model of the job stress process to include individual differences (i.e., boundary management) and strains (i.e., cyberdeviancy) that are particularly relevant to technological advancements. However, while prior research provides support for the proposed role of these variables, their inclusion in the job stress model requires further investigation. It is critically important that we, as occupational researchers, fully understand differences that may exist between these technological advancements and traditional workplace stressors on employee well-being, as these technology supported alternative work arrangements are becoming increasingly ubiquitous globally.

As we noted earlier, technology is allowing increased flexibility in how, when and where people work, and it is enabling employees to be constantly connected to their work. In some workplaces, virtually all employees have personal cell phones that can be used for work-related communication. The spread of technology is occurring not only in the developed world, but in the developing world as well, as access to cell phones and the internet continues to expand. As the world becomes increasingly connected, issues about the effects that will have on health and well-being become of concern. Clearly, we need to better understand conditions under which technology might have positive versus negative effects. Control is a particularly important element that has the potential to both increase and decrease stressors at work.

In the future, researchers must further examine distinctions between telecommuting and TASW with regard to job stress and strain, beyond the impact of work–family balance, as employees may experience a multitude of other stressors by engaging in telework and TASW that have previously been neglected. For example, it would be important to determine the impact of these technology-enabled practices on workloads and the impact

those workloads might have on strains. Likewise, boundary management should be further examined to see if it has a direct influence on perceived control, and, if so, whether this influence buffers employees from a variety of job stressors, as this construct has been examined primarily within the work–family conflict domain. Finally, cyberdeviancy represents a broad field of novel employee misbehavior, and this area requires further investigation to establish a more thorough understanding of the types of behaviors that fall under the umbrella of cyberdeviancy, as well as better understand the antecedents and consequences of these deviant behaviors.

The model presented in the chapter is not exhaustive; rather, it is merely a snapshot of what is currently proposed and substantiated with regard to research concerning ICTs supported alternative work arrangements. In the future, there are numerous opportunities for investigating other potential stressors that have not received much attention in the occupational stress literature, including social effects of distributed work. For example, research has recently immerged connecting social isolation theory to distributed work (Marshall, Michaels, & Mulki, 2007), which offers a promising area for further research. Likewise, understanding how cyberdeviancy that is conducted in the form of cyberbullying or cyberincivility impacts other employees engaged in teleworking arrangements could provide valuable information about job stressors related to telework aggression spirals, or incidents where reciprocity norms encourage employees to respond to acts of aggression with further acts of aggression, leading to escalated aggression over time.

An additional area of future potential research could include investigating how technology, through telecommuting and TASW, may impact an individual's coping behavior with regard to technology based job stressors. Technology has the potential to enhance both emotion-focused and problem-focused coping. On the emotion-focused side, technology can facilitate several forms of behavior that may be beneficial to employees, but often at the expense of the organization. First, enhanced communication technology can allow an employee to seek emotional support by sharing feelings and venting with family and friends. This could occur through e-mail, phone calls, and texting during work while the employee is experiencing emotional strain. Occasional use of technology for this purpose might be productive if it enables an employee to better cope with stressful conditions and maintain productivity, but if overdone it could take away from time spent on job tasks and adversely affect job performance. Second, technology might provide additional avenues for work withdrawal. The increased autonomy from telecommuting might allow an employee

to more easily avoid working than when at an employer's facility with other employees and supervisors. Furthermore, an employee could use the technology for nonwork activities in order to escape the demands of the job, such as playing games or web surfing. Finally, an employee might cope with emotional strain by engaging in cyberdeviance as a means of venting anger and other negative feelings.

Problem-focused coping can be facilitated by technology. Enhanced communication can provide needed information to aid in problem solving, and allow better coordination of activities among work colleagues. Technology can increase efficiency, for example, by allowing one to find needed information on the web rather than having to physically go to a library, or by enabling a video conference rather than having a physical meeting that might require travel. Of course, an employee's decision to use technology for problem-focused rather than emotion-focused coping is largely affected by perceived control of the situation and technology. To remain problem-focused employees need more than access to technology, but also the appropriate skill and training to use it effectively. Beyond that, they need high levels of technology self-efficacy so they are not reluctant to choose problem-focused approaches in which technology is used to facilitate performance rather than escape it.

As technology continues to rapidly advance, the global workforce will continue to experience change, not just in how we conduct work at the office, but in the very nature of our daily work life. In the future, we will see even greater shifts toward telecommuting and TASW. It is imperative that we understand the job stress process for employees engaged in work supported by ICTs. Through our research efforts to understand how technology relates to employee health and stress, we can offer leadership and guidance for organizations, providing the knowledge necessary to achieve a healthy and productive workforce.

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