

**“WHO’S RUNNING THE MACHINE?” A THEORETICAL  
EXPLORATION OF WORK STRESS AND BURNOUT OF  
TECHNOLOGICALLY TETHERED WORKERS**

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**ABSTRACT**

A recent survey of the mental health of Canadian workers has suggested that the use of information and communications technologies (ICTs) such as wireless e-mail devices either maintains or increases employees’ level of stress. This article explores this finding in more detail and concludes that individual coping strategies employed by workers to minimize the impact of stress are threatened by the ubiquitous communication delivered by ICTs. This in turn can have a negative impact on employee mental health and consequently may lead to negative organizational outcomes. The concept of the technologically tethered worker is introduced, and several propositions are developed for future empirical study.

In a recent survey of the health of Canadian workers commissioned by Desjardins Financial Security it was reported that 62 percent of workers claimed they had some form of information and communications technology (ICT) such as a cell phone, wireless e-mail device, personal computer, or pager that allowed the employer to reach them at any time [1]. Furthermore, 54 percent of these workers reported that the use of ICTs maintained their existing stress level, while 29 percent reported an increase in their level of stress through the use of this technology [1]. Given that stress has a direct impact on the mental health of

workers with a resulting impact on organizational and individual outcomes, the specific findings of the Desjardins Financial Security survey raise some more general human resource management issues that do not appear to have been sufficiently explored in the literature. In particular, this article suggests that the normal coping strategies employed by workers to minimize the impact of stress are threatened by the ubiquitous communication delivered by ICTs. This in turn can have a negative impact on employee mental health and consequently may lead to negative organizational outcomes.

To demonstrate this effect, we first define mental health and illness, establishing a link between mental illness and negative work outcomes. The literature on stress and coping is reviewed, and some of the psychological impacts of stress such as burnout and exhaustion are explored. An examination of the existing and emerging uses of ICTs in the workplace are detailed, and a distinction drawn between individuals having a choice about the use of ICTs in their work and those without such choices. We suggest that a new term is needed to describe the latter of these groups: technologically tethered workers. We will propose that the use of ubiquitous ICTs may attenuate the effectiveness of stress-coping strategies among technologically tethered workers through the introduction of a previously unknown stressor: the inability to switch off. A tentative research agenda is suggested to further explore the relationships between ICTs, stress, coping, and human resource management.

## **MENTAL ILLNESS IN HUMAN RESOURCE MANAGEMENT**

The *American Heritage Dictionary* defines mental illness as a disabling neurosis that causes emotional or mental disorders arising from no apparent organic change [2]. Researchers have defined mental health as being comprised of effectiveness, success, happiness and excellence of functioning based on a combination of their behaviors, perceptions and feelings [3].

Workers often underrepresent the magnitudes of mental health issues in the workplace, perhaps due to lack of acknowledgment. It is estimated that approximately 25 percent of workers at some point experience emotional disturbances [4] and that between 50 percent to 60 percent of all employee absences can be related to an emotional disorder [5]. Two key goals to maintaining good mental health are lowering stress levels by setting realistic, attainable goals [6], and finding congruence within the workplace fit [7].

## **STRESS**

Workers often create for themselves a desired level of accomplishment and a defined state of job completion. When there is a difference between this desired state and the perceived conditions in the work environment, a pressure is felt;

stress is experienced [8]. Stress-related pressures are divisible into two forms. Eustress refers to positive stress-pressure experiences that heighten situations, leading to an improvement in both efficiency and effectiveness. Distress is a form of negative or destructive stress-pressure [4, 9] that can lead to work exhaustion [10], physical ailments, and mental illness. Karasek's job strain model highlights the pressures that can develop when situations of high job demands meet lower levels of job decision latitude [7].

When experienced over a period of time, distress can bring a person close to, or beyond, his/her coping threshold [9]. Job stress occurs when choices need to be made; meeting the demands in one area or role can make it very difficult to meet the demands of other areas [11]. Physically, the human body responds in a predictable sequence to stress. The cause of stress is called the alarm stage, which creates an imbalance in the human equilibrium. This is closely followed by the reaction stage, during which a balancing effect is enacted to return the system to balance. Finally, the human body enters the recovery stage, after the stressful event and reaction have passed [4]. The reactions of stress on the physical body serve as a heuristic that provides a better understanding of the sequential processing of stress in the mind.

A critical aspect of this sequence is that recovery will only occur if the initial cause of stress has encountered a balancing response. That is, in the absence of an appropriate response, exhaustion will eventually occur. In the case of the human body, this exhaustion manifests itself as fatigue [4]. Should this stress sequence follow a similar pattern with regard to the mental systems as it does the body, emotional exhaustion would result. Consequences of excess stress can include detachment, alienation, absenteeism, and burnout [4, 12].

A critical work-related variable leading to stress and mental anxiety is work overcommitment [13, 14]. This variable and its corresponding outcomes are equally influential regardless of gender. An increase in the quantity of time spent on work functions leaves less time available for leisure and other life activities and subsequently decreases opportunities of decompression from building pressures. In addition to workload, both frequency and intensity of work [11, 15] serve as critical stressors influencing work and family roles.

## **ROLE CONFLICT**

Individuals are rarely unifocused, but rather multifaceted, with the ability to maintain multiple and separate domains simultaneously. Pressures from stress are not confined to only one domain but instead occur in each of the separate domains we maintain. The two largest domains are work and family [6]. When commitment to one role dominates and negatively affects the other role, it is common for conflict to arise [16]. Based on immediacy, each domain will, at times, place greater time-based demands on the individual, thereby creating tension in the other domains [17]. This natural inequity tends to find a natural equilibrium over time;

however, if the worker is more strongly committed to one area over another, a chronic issue of job strain develops [18], including anxiety, frustration, and dissatisfaction [19].

Maintaining a balance between these areas of life can prove challenging, yet maintaining a commitment to both areas can moderate some of the conflicts that occur between them [17]. Individuals with low levels of control, or self-efficacy, will have greater challenges managing work-family interferences [18]. As individual perception of control increases, so does work-family effectiveness [20]. Furthermore, as the integration of work and family continues, boundary theory suggests negative outcomes from the continual switching of roles [21].

### **COPING MECHANISMS**

People encounter stress in both their work and family roles; decisions are constantly made in each domain, and the decision-making process is always stressful [7]. In the work environment, Karasek proposed a job-strain model which identifies psychological strains that can result from a combination of high job demands and low job-decision latitude or control in the workplace [7].

As a reaction to stress, individuals attempt to cope through efforts that minimize the impact of stress on their well-being. To fully understand coping, it is important that stressors such as role ambiguity, situational constraints, lack of perceived control, and hours are distinguished from strains such as job dissatisfaction, anxiety, turnover intent, and frustration [19]. In other words, strains are the physical and/or psychological manifestations in the individual resulting from stress.

To combat stress, people maintain a set of coping mechanisms that include social support networks and perceptions of control. Coping techniques are implemented to reduce the negative aspects of stress on a person's state [8]. Social support networks include any form of emotional, systemic, or information-based assistance that is gained through personal interactions [15]. This includes maintaining positive work communication channels as well as work friendships. Coping responses include efforts to conform to the pressures of role expectations, to change demand pressures, or to evade stressful situations [8]. Perceived control encompasses two key areas, that of personal autonomy at work and the maintenance of self-efficacy [15], meaning a sense that a level of control is being maintained over the environment [22]. Employee participation initiatives and structures can have a positive influence on self-efficacy levels, and these are normally implemented by the organization. Evidence exists that workers who maintain positive attitudes have better results when combating stress [12].

Edwards proposed four mechanisms of coping that may reduce stress through modifications of the discrepancies between perception and desires that are suggested to cause stress [8]. The first involves changing physical or social factors, such as minimizing negative performance information or limiting psychological

impact through mechanisms such as repression and denial. The second mechanism attempts to better align desires with perceptions, thereby minimizing the discrepancy causing stress. The third technique minimizes the importance associated with the discrepancy between perception and desires, while the fourth relies on modifying the impact of stress through external means such as alcohol, medication, or relaxation techniques [8].

Whatever strategy is selected, it seems that the use of a coping mechanism is triggered by the individual's perception that a limit has been reached or exceeded in his/her ability to meet the demands of the situation. To borrow a term from ecology, when an individual's task-carrying capacity has been met or exceeded, coping is initiated. Bandura terms this task-carrying capacity self-efficacy [23]. Therefore, those with high self-efficacy would tend to continue to work in the face of a high number of stressors [24]. However, while it has been established that a relationship exists between self-efficacy beliefs and individual performance [19], job-related stressors also tend to lower self-efficacy, thereby reducing the magnitude of stress that an individual can sustain [25].

In Karasek and Theorell's demand-control-support (DCS) model of individual stress, demand is defined as the amount of workload, while control is the ability to decide how to order and implement assigned work [26]. The former is a predictor of stress, and the latter predicts well-being. Kossek, Lautsch, and Eaton presented evidence supporting a concept of psychological flexibility of control containing two elements [20]. The first element is the individual's perception of how s/he can control the time, place, and method of his/her work, while the second element is the separation of work and nonwork roles [20]. Although these studies diverge in focus, their results demonstrate that workers with greater psychological job control have lower rates of work/nonwork conflict, intentions to quit and incidences of depression.

## SEGMENTATION AND SPILLOVER

Martin and Schermerhorn in their stressor-health path analysis model, identified a similar relationship between job and life satisfaction [6]. They projected that a clear separation of job and life dimensions creates balance, whereas a spillover of work-related feelings detrimentally affects life satisfaction [6]. Edwards and Rothbard described the uniqueness of work and nonwork demands and wrote that an active role is often required to maintain a separation between roles [27]. The model developed by Martin and Schermerhorn stressed the importance of boundary creation between these two roles in order to maintain equilibrium [6]. Leakages can develop between role boundaries as responsibilities in one area spill over to others. When workers are unable to maintain balanced, separate role responsibilities between work and family, the likelihood for conflict between the two role areas increases [28]. Research shows that spillover and stress can adversely affect mental health [27].

## THE IMPACT OF THE GROWTH OF COMMUNICATIONS TECHNOLOGY ON BURNOUT

The use of electronic mail and the underlying technology designed to transmit messages is continually increasing [29, 30]. Various predictions have been made in the literature about the positive and negative impacts of e-mail and ICTs on the organization, the individual, and human resource management [30-32]. In particular, the emergence of teleworking, or the ability to work away from the office as facilitated by ICTs, was predicted as early as 1975 by Nilles [33]. This was envisioned as a means of improving various individual and organizational conditions such as the reduction of office space costs, improving work-family balance and ensuring better employee control over work conditions [31, 34].

As the scope of reliable communications expands, a greater number of individuals are choosing to work in nontraditional or virtual locations, such as home offices and satellite locations [35]. The key aspects related to workers choosing to conduct business virtually are increased work-time flexibility [36] and personal control of work environments [37]. Employees' sense of autonomy can naturally increase when they have control over aspects of their environment. Virtual work removes the physical boundaries of a traditional workspace and allows a greater degree of control over one's work environment. As such, self-efficacy, or confidence in one's ability to complete tasks, increases; self-efficacy and autonomy serve as coping mechanisms during times of stress [38]. Virtual workers retain control over their work periods and gain the ability to creatively balance work and family pressures.

However, the creep of ICTs into working life seems to have proceeded along a path that has produced both positive and negative results. A positive impact of telework has been the observation that it can reduce turnover intentions and increase commitment to the organization [34]. On the negative side, Duxbury, Higgins, and Thomas suggested that a distinction needs to be drawn between virtual and supplementary work; the former constitutes normal work tasks completed using technology outside the physical parameters of a traditional office, while the latter illustrates additional work tasks and responsibilities completed at home or elsewhere, aided and abetted by ICTs [32]. The authors suggested that rather than reducing work-home conflict and increasing job control, ICTs are enablers of uncompensated supplementary work outside of the office, and this in turn leads to more stress [32].

The existence of virtual workers and teleworkers is a relatively well-known concept in the literature. However, we suggest that a gap exists between that concept and workers who intensively use ICTs in almost any setting. Therefore, we propose a new definitional construct: the technologically tethered worker.

### **TECHNOLOGICALLY TETHERED WORKERS**

Although the use of technological devices has greatly increased, not all employees who use these devices have the option of adjusting their work locations to the virtual environment. Observers have noted that rather than enabling workers to move their office to their home or to another location they choose, ICTs are complicit in the transition to work that may now occur everywhere: in airport lounges, between meetings, while in transit, or during personal time [31]. Workers who use multiple types of technology to stay in contact with their work are working as if they were still confined to their traditional, physical work environments and thus are not working virtually. We propose that workers who are traditionally structured yet remain accessible at all hours be considered "technologically tethered." Attachment is derived from the expectations created when communication devices are provided by the organization as a job requirement and also required to be in the possession of the employee at most times. As the boundaries of time when work is conducted become blurred, employers infer a greater right to monitor the actions of their employees through the attached technologies, justifying the increased monitoring under the guise of job-related activities [39]. Technologically tethered workers fail to receive the benefits of increased autonomy and self-efficacy that come through virtual work. They are required to conform to external frameworks, including when and where work is conducted. Additionally, boundaries between work and family roles become blurred when employees receive work communications during nonwork hours.

### **REDUCTION OF COPING MECHANISMS**

It is suggested that ICTs' facilitation of ubiquitous work threatens many of the coping mechanisms that would normally be employed by workers to deal with stress. Duxbury, Higgins, and Thomas demonstrated that the number of working hours and the amount of stress increase for workers performing computer-supported supplementary work at home. In this case, computers become a vehicle that legitimizes extra work at home [40] and leads to greater work-family conflict, role overload, and stress. It is not difficult to imagine how these results might be extended to a work environment that can follow the worker no matter where s/he goes. Technologically tethered workers are assigned to devices with action-monitoring capabilities, and their expectations of privacy in public places are continually reduced [41]. Cumulatively, this leads to the proposition that technologically tethered workers will experience diminished perceived control and a reduction in self-efficacy.

Kidwell and Bennett discuss the dimensions of employees withholding of effort through shirking and social loafing [42]. Shirking is the avoidance of tasks; while in a group setting, social loafing enables the individual to hide in a crowd. Though presented as a negative construct somewhat akin to absenteeism,

in the context of technologically tethered workers, it would seem that the withholding of effort might instead be viewed as a coping mechanism. The ability to shirk or to hide in the organization enables the employee to avoid excessive tasks, exert control in his/her environment, and thus reduce stress. Somewhat paradoxically, Kidwell and Bennett also attributed the prevalence of these mechanisms to imperfect employee monitoring [42]; however, with ubiquitous communications technology as a de-facto monitoring device, the ability to monitor increases and thus reduces the ability of individuals to shirk or loaf. As a result, we suggest that shirking and social loafing will be prominent behavior options used by technologically tethered workers to cope. However, we also propose that these coping mechanisms will be only moderately effective, as ubiquitous ICTs improve employee monitoring and consequently limit the effectiveness of shirking and social loafing.

The demand-control-support (DCS) model of individual stress suggests that a worker's amount of control over how to implement work is a predictor of well-being, while demand, as measured by workload, predicts stress [26]. For the technologically tethered worker, ubiquitous communications severely restrict or eliminate the worker's ability to exercise control. Therefore, coping under this model is also limited. In addition, Kossek, Lautsch, and Eaton's concept of psychological flexibility of control is also limited in the case of technologically tethered workers [20]. In their model, control is separated into an individual's perception of how s/he can dictate the time, place and method of his/her work [20]. The separation of work and nonwork roles is also critical to ensuring that employees experience low rates of work/nonwork conflict, intentions to quit and incidences of depression. For the technologically tethered worker, the technology dictates the time, place, and method of work. Furthermore, work and nonwork roles meld together as the office becomes limited only by the availability of cellular phone coverage.

Thus far, we have proposed some linkages between ubiquitous ICTs and workplace stress for technologically tethered workers. It has also been suggested that the particular nature of ubiquitous ICTs diminishes the coping mechanisms used by individuals to deal with stress. As a result, there should be physical and/or psychological manifestations of stress in the technologically tethered worker. One manifestation of stress is burnout.

## **BURNOUT**

Burnout can be defined as the continuous negative response to differences between job requirements and the perceived ability to meet those requirements [43] or one's inability to continuously function in one's work environment [4]. Burnout can occur when valuable resources, human or otherwise, are inadequate to meet the demands placed on the work assignment [44]. Al-Assaf and Taylor identify three distinct consequences of burnout [4]. The first consequence of



burnout is the threat to the stability or equilibrium of the employee in his/her work environment. Changes or events can often create a sense of imbalance and yet, in a healthy environment, the return to balance through a counterbalancing response happens relatively fast. The second consequence is when the sense of imbalance moves from a temporary state to a chronic situation. Strain develops when an individual's belief that s/he can return the situation to a balanced state is shattered. The third consequence of burnout is frustration and lack of confidence, which damages a person's sense of control over the situation [4].

Burnout is commonly described using the three-component conceptualization developed by Maslach [45]. The components in this construct include emotional exhaustion, depersonalization, and a decreased sense of personal accomplishment. Emotional exhaustion describes a state where a person feels fatigued when expressing emotions, lacks energy to emotionally contribute to an interaction, or when one's emotional resources are depleted [46]. This type of exhaustion is related to the frustration felt when a worker no longer believes that s/he can effect change in their work situation [4]. Demands placed on workers, including increased role ambiguity, role conflict, role stress, and increased workloads [47] can all contribute to higher levels of emotional exhaustion, increasing depersonalization and diminishing personal accomplishments [45].

Depersonalization, as a component of burnout, comes when workers are seen as objects rather than people, creating a detachment in the necessary emotional investment required on the part of the worker [46]. This has been correlated in a number of studies with increased role ambiguity, conflict, stress, and increased workloads [47].

A final characteristic of burnout consists of diminished personal accomplishments, competence and success [46]. This is strongly associated with the level of perceived control that workers have over the environment, their contributions to and participation in decision-making, their work autonomy, and the level of social support that exists for them in their work environment. When pressures increase on available resources to accomplish job tasks, this influences the level of both depersonalization and perceived personal accomplishments in a negative direction. A positive correlation does exist between the quality of social support systems and levels of positive perceived job competence [47].

### **A MODEL OF TECHNOLOGICALLY TETHERED WORKERS**

The blurring of work-boundary roles through the use of ICTs denies the worker an opportunity to release work-related stresses. The use of integrative and communication devices to essentially tether employees to their work environment compounds the pressures felt, thereby increasing strain (see Figure 1). As employee stress increases, the propensity toward burnout also increases [4]. Normally, stressful situations can be mitigated through a series of coping

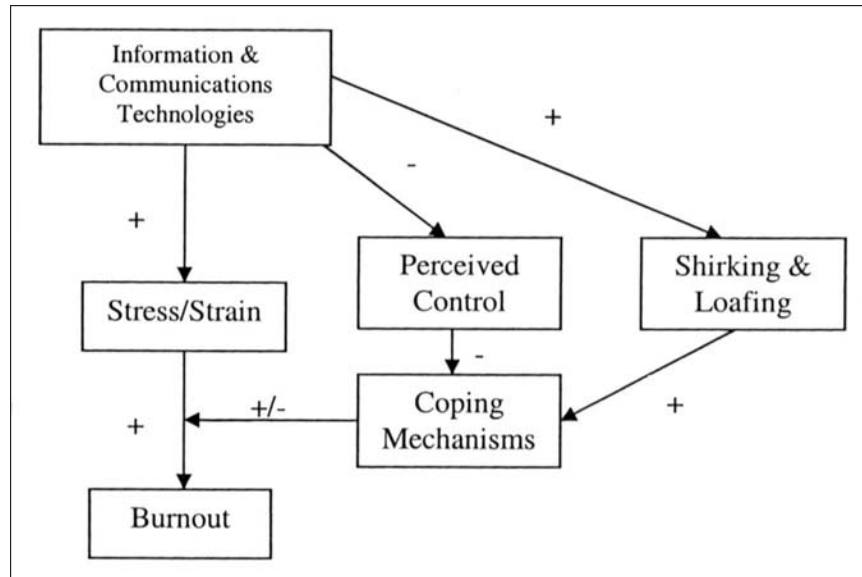


Figure 1. Technologically tethered worker model.

mechanisms designed to release pressures and avoid a burnout outcome. However, the use of ICTs in combination with the worker's inability to "switch off" produces a compounding effect, increasing stress directly while simultaneously reducing the effectiveness of coping mechanisms. In addition to this linear progression stemming from ICT usages and the inability to "switch off" to increased burnout, the use of ICTs may negatively affect an employee's coping mechanisms through the removal of perceived controls of workload and work boundaries. In an effort to reclaim self-efficacy in their work environments and to balance the loss of perceived control stemming from ICTs, employees may choose to socially "loaf" or withhold personal effort, thus strengthening their coping mechanisms, which have been structurally removed by attachment to technological devices.

### CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This article has examined stress in the workplace, focusing on the impact on individual workers of what we term ubiquitous information and communications technology. We conclude that having the ability to communicate and work anywhere and at any time results in workers' inability to maintain appropriate barriers between different spheres of their lives. We have labeled these workers

“technologically tethered workers” to distinguish them from individuals already described in the literature as virtual workers or teleworkers. While teleworkers have a choice in the use of ICTs, technologically tethered workers do not enjoy this right to the same extent.

Conceptually, the technologically tethered worker is younger, in an entry-level position in an organization that endorses informal normative behaviours. As an example, consider a junior consultant in an international management consulting firm. This worker is sometimes striving for a professional designation (such as an accountant seeking a CPA designation) at the organization’s expense. By engaging in a high degree of impression management through long work hours, performing tedious tasks, or agreeing to frequently be absent from home, the worker attempts to show his/her value and commitment to the organization. The use of ubiquitous ICTs by this worker would further demonstrate his/her organizational commitment by extending this work availability beyond the office and on a 24/7 basis.

Another example can be found by examining the work environment of IT professionals. Perlow’s study of software engineers indicates how managers attempt to bind the engineers’ work environment by influencing them to work longer hours [48, 49], thus creating work/family conflict. To achieve this goal, managers are using tools including behavior modeling and physical monitoring of employees’ behaviors [48]. Individuals best able to adapt in this work environment are single, have few outside work responsibilities, or have spouses who carry the burden of family responsibilities [48]. The infusion of ubiquitous ICTs into the workplace may further exacerbate the already strained work environment of the information technology (IT) professional. For the technologically tethered worker, monitoring extends beyond the physical and effectively transcends the barrier between work and nonwork locations.

Several propositions are offered as topics for future empirical research; these are illustrated in Figure 1. The first is that technologically tethered workers will experience diminished perceived control and a reduction in self-efficacy as highlighted in Karasek’s [7] job-strain model. Second, that shirking and social loafing will be prominent behavior options used by technologically tethered workers in an effort to cope. Related to this second proposition, we suggested that this coping mechanism would be only moderately effective, as ubiquitous ICTs improve employee monitoring and limit the possibility of shirking and social loafing.

In addition, we recommend measuring the impact of ubiquitous ICTs on workers. We propose that a new stress construct and measure be developed: the inability to “switch off.” This construct is analogous to Martin’s development of the inability to leave construct [6]. However, the underlying assumption of inability to leave their present employment is altered to more directly refer to the employees’ inability to leave the technology that binds them to their work; in other words, these workers cannot freely choose to turn off the ICTs. The inability

to leave represents a negative organizational commitment when the desire of a worker to leave is internally rejected based on the costs associated with the decision to exit [50, 51]. The measurement of the construct relies on capturing employees' beliefs about whether they could quit, or turn off, and the extent to which their job demands additional time across more varied contexts. This proposed measure of the impact of ICTs on technologically tethered workers needs further development.

Finally, researchers should investigate human resource issues, such as examining the increased incremental impacts of employer control into the blurred, nonwork time of employees. The pressure on the individual and responses from organized labor movements [41] can be further investigated. Additionally, Schlosser suggested that it would be important for human resource management research to investigate the directionality of the relationship between ubiquitous communications and the nature of the economic and social spheres in which it operates [30]. Do the devices that enable communications precipitate an avalanche of messages, or would the volume of information exist independent of the technology as a result of increasing business requirements? In short, who really is running the machine?

## ENDNOTES

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