The Bright and Dark Sides of Technostress: An Empirical Study of Healthcare Workers

Research-in-Progress

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Abstract

Healthcare workers are reporting instances of psychological stress induced by healthcare information technology. IS researchers have established a valuable research program on which to study psychological technostress in healthcare workers. This research stream considers technostress a "dark side" of technology associated with negative perceptions and harmful effects. However, extant literature suggests that psychological stress can be perceived positively (as eustress) and negatively (as distress), and can have positive and negative impacts on individuals and organizations. The objective of this manuscript is to present the first part of a three-part multi-method and cross-cultural research program on technostress in healthcare workers. The program reframes technostress in terms of techno-eustress and techno-distress, and reveals its "bright sides" and "dark sides". This paper presents the results of an analysis of a survey distributed to nurses employed in four USA hospitals. We also discuss the contributions of our paper and our plans for the future.

Keywords: healthcare IT, technostress, techno-eustress, techno-distress, survey

Introduction

Healthcare information technology (HIT) is on pace to radically transform the healthcare systems of many countries (Agarwal et al. 2010; Romanow et al. 2012; Venkatesh et al. 2011). In the United States, HIT is viewed as a means by which to "improve all aspects of patient care, including safety, effectiveness, patient-centeredness, communication, education, timeliness, efficiency, and equity" (ONCHIT 2014). While this promise, if realized, is immensely valuable, empirical evidence to support it is inconclusive. For example, HIT has been found to increase revenue streams and lower mortality rates (Ayal and Seidman 2009), and also to increase mortality rates and medical errors (Han et al. 2005). Indeed, such a diverse set of outcomes induced by HIT can be expected to affect the care providers who use these systems regularly. Early research suggests that care providers have mixed feelings towards HIT (Bhattacherjee and Hikmet 2007). On the one hand, they welcome HIT, given its potential to deliver safer patient care (Jamoom et al. 2012). On the other hand, they view HIT as cumbersome to use and as a major factor in their job dissatisfaction (Friedberg et al. 2013). Such mixed perceptions are likely contributing to a common theme in these reports: the presence of psychological stress associated with HIT (Friedberg et al. 2013). Though, little is known about why HIT induces such stress, what impacts such stress has on care providers and subsequently on hospitals, and how hospitals can manage such stress.

The information systems (IS) discipline has established a valuable research program on which to study psychological stress associated with HIT. Early IS research on stress was mostly conducted on IS managers or employees in technology companies, and the "technology stress" was framed in a negative light (e.g., Baroudi 1985; Bostrom 1980). More contemporary IS research on stress, known as research on *technostress*, has continued to study why technology induces harmful psychological stress as well as its associated negative organizational outcomes (e.g., Ayyagari et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2007, 2010-11). Consequently, technostress is now widely acknowledged as an *unintended negative consequence of technology* associated with technology's 'dark side' (Ayyagari et al. 2011; Tarafdar et al. 2011).

However, in allied disciplines, technology has been associated with good *and* bad stress (e.g., Sethi et al. 1987), not just with harmful stress. This research stems from the psychological stress literature which argues that individuals can cognitively appraise stressful situations positively *and* negatively, and that such appraisals strongly impact how individuals respond to stressful situations (Le Fevre et al. 2003; McVicar 2003). This research characterizes two primary types of stress perceptions (1) *eustress*, or the positive perception of a stressful situation, and (2) *distress*, or the negative perception of a stressful situation (Le Fevre et al. 2003; Little et al. 2007; Selye 1983). Likewise, stressful situations induced by technology have been given the terms *techno-eustress* and *techno-distress* (Sethi et al. 1987). Techno-eustress has been associated with stress that is "beneficial or has a positive effect on the functioning of the individual," and techno-distress has been associated with stress that has a "negative impact on the individual's functions with a consequent negative effect on the overall organizational productivity" (Sethi et al. 1987). Following this literature, we reason that care providers can cognitively appraise HIT in terms of both techno-eustress and techno-distress, and such stress can have both positive *and* negative effects on care providers and hospitals.

Although researchers in several disciplines acknowledge the importance of understanding both eustress and distress, in the IS discipline, to our knowledge, no study examines the antecedents and outcomes of both techno-eustress and techno-distress, particularly in the context of healthcare. Moreover, while previous technostress research has operationalized and investigated the impact of several technostress creators, no research exists on the impact of such negative stressors, or "*distress*ors," in a healthcare context. Likewise, no research exists on the good stressors associated with technology, or "*eustress*ors," that may induce techno-eustress. Furthermore, it is unknown how hospitals can manage techno-eustress and techno-distress.

Given the dualistic view in the broader literature about technology being a source of eustress and distress, and the lack of understanding in IS on this view, this study attempts to investigate the antecedents and outcomes of techno-eustress and techno-distress in the context of HIT. Specifically, we draw on seminal stress and technostress literature to understand the impacts of several distressors and eustressors in the context of HIT, as well as understand the impacts of techno-eustress and techno-distress on job satisfaction and turnover intention. We also investigate the impact of several organizational mechanisms

on techno-eustress and techno-distress, and specifically highlight how such mechanisms accentuate and/or reduce techno-eustress and techno-distress. To accomplish these goals, we develop a research model founded on concepts in psychological stress and technostress literature, and empirically validate the model through an analysis of survey data provided by 402 registered nurses employed in the United States.

The paper makes several contributions to literature on stress, technostress, and healthcare by (1) introducing the concepts of techno-eustress and techno-distress to the IS discipline, (2) underscoring that the importance of one's perception of a stressor—that is, viewing the stressor as eustress or distress—can significantly impact how he or she responds to a technology-induced stressor, (3) revealing how several organizational mechanisms impact registered nurses' positive and negative perceptions of technostress, and (4) extending research on technostress into a healthcare context. Below, we discuss our theoretical foundation, present our research method and hypotheses, and highlight our contributions.

Theoretical Foundation: Stress & Technostress

Stress has been defined as "individuals' perceptions of the demands being made on them and their perceptions of their capabilities to meet those demands" (McVicar 2003). In this sense, the *perceptions* of individuals are extremely important. In organizational stress literature, the nature of stress is normally treated as negative (Cooper et al. 2001; Le Fevre et al. 2003). When treated this way, stress is assumed to be negatively perceived by individuals and harmful to individuals and organizations. However, researchers note that stress does not have to be inherently harmful, and that individuals can perceive stress in terms of eustress and distress (McVicar 2003). Researchers agree that eustress is associated with the "positive perception of stressors" and that distress is associated with the "negative perception of stressors" (Le Fevre et al. 2003). In healthcare, eustress has been positively associated with engagement, excitement, hope, meaningfulness, self-efficacy, and positive affect (Little et al. 2007; McVicar 2003), while distress has been positively linked to feelings of negative affect, burnout, revenge, and exhaustion, and depersonalization (Little et al. 2007; McVicar 2003).

There are three primary theories of stress: control theory, cybernetic theory, and person-environment (P-E) fit theory (Le Fevre et al. 2003). In cybernetic and control theory, the perceptions of stressful situations are emphasized, though their sources are ambiguously defined (Le Fevre et al. 2003). P-E fit theory argues that stress occurs when a 'misfit' occurs between an environmental demand and an individual's perception of meeting the demand (Ayyagari et al. 2011). While P-E fit theory is less ambiguous on identifying the stressful situations, it overlooks the potential of individuals to *perceive* stressful situations (Le Fevre et al. 2003). In this sense, to research how healthcare workers such as nurses perceive stressful situations induced by technology, and the impact of such perceptions on outcome variables, we adopt the organizational stress cycle (McGrath 1976) and the cognitive behavioral approach (Lazarus and Folkman 1984; Little et al. 2007) as our conceptual foundations of stress, both of which are steeped in ideas prevalent in cybernetic theory, control theory, and P-E fit theory.

As a brief overview, our conceptual foundation of the study of stress is comprised of five aspects: (1) a situation, (2) a perceived situation, (3) a response selection, (4) an outcome, and (5) organizational mechanisms. First, a *situation* (i.e., a demand or a stressor) is a stressful situation imposed on an individual. The organizational stress cycle identifies three primary sources from which a stressful situation can induce stress: the physical-technological environment (PTE), the social-interpersonal environment, and the person-system of an individual. We focus our study on the impact of situations that are engendered from the PTE, which we refer to as technology-induced stressful situations, stressful situations, or simply situations. Second, an individual *perceives the situation*, or in other words, cognitively appraises whether a situation is a positive or negative source of stress (Cooper et al. 2001; Lazarus 2001; Little et al. 2007; McGrath 1976). If an individual perceives a situation negatively, he or she experiences distress and perceives the situation as threatening or harmful (Little et al. 2007). Conversely, if an individual appraises a situation positively, he or she experiences eustress and perceives the situation as hopeful or as preserving well-being (Little et al. 2007). Third, an individual *responds to a perceived situation* by selecting how to react to the situation based on his or her perception of the situation. This psychological response occurs cognitively inside an individual's mind. In previous research, psychological responses have included job satisfaction, organizational commitment, and turnover intention (e.g., Ragu-Nathan et al. 2008). If an individual experiences eustress, he or she should have positive response

selections (e.g., high job satisfaction). If an individual experiences distress, he or she should have negative response selections (e.g., high turnover intention). Fourth, an *outcome* represents the actual behaviors of an individual (external to the individual's mind). These outcomes are strongly influenced by how an individual chooses to respond to a perceived situation. For example, if an individual elects to respond to a stressful situation in terms of intending to leave his or her job, the outcome could be absenteeism or actual turnover. Last, *organizational mechanisms*, such as training and social support, can directly impact how an individual perceives a stressful situation (Brod 1982, 1984; Ragu-Nathan et al. 2008). In other words, organizational mechanisms can be associated with changing one's perception of a stressful situation. While organizational mechanisms can theoretically moderate the impact of situations on perceived situations, empirically, research suggests that such effects are inconsistent (Ragu-Nathan et al. 2008). We therefore focus on the direct impact of the organizational mechanisms on one's perceived situations (eustress and distress).

Technostress is commonly framed in a negative light (Brod 1984; Tarafdar et al. 2011). Empirically, technostress has been operationalized into several technostress creators, which are stressful situations influenced by technology that induce harmful stress and harmful outcomes (Tarafdar et al. 2007). These include techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Research employing technostress creators has empirically linked them with role stress (Tarafdar et al. 2007), job satisfaction, organizational commitment, and continuance commitment (Ragu-Nathan et al. 2008). This literature also cites three technostress inhibitors, which are situational factors that may reduce the impact of one's perception of a stressful situation and response selection. These situational factors include involvement facilitation, literacy facilitation, and technical support (Ragu-Nathan et al. 2008). Several characteristics of technology have also been researched in terms of technostress (Ayyagari et al. 2011). These characteristics include technology's usefulness, reliability, presenteeism, and pace of change, which have been associated with work-home conflict, invasion of privacy, work overload, and role ambiguity, and job insecurity (Ayyagari et al. 2011).

Using the organizational stress cycle, the cognitive behavioral approach, and research on technostress, we reframe technostress to include a bright side *and* a dark side in terms of techno-eustress and techno-distress, respectively. In reframing technostress, we consider technostress (as a whole) arising from a process that is dependent on stressful situations induced by technology, perceptions of these situations, psychological responses to these situations, and actual outcomes linked to such responses (Le Fevre et al. 2003; McGrath 1976). We argue that technostress creators (Ragu-Nathan et al. 2008) and technology characteristics (Ayyagari et al. 2011) conceptually represent the technology-induced stressful situations that inhabit the physical-technological environment (McGrath 1976). In doing so, we acknowledge that individuals have the ability to cognitively appraise, or perceive, the technology-induced stressful situations in the form of techno-eustress and techno-distress (Cooper et al. 2001; Lazarus and Folkman 1984; Little et al. 2007; Sethi et al. 1987). In this sense, techno-eustress and techno-distress can be expressed as an individual's perception of the stressful situations induced by technology, with techno-eustress being the positive perception of technology-induced stressful situations, and techno-distress being the negative perception of technology-induced stressful situations (Le Fevre et al. 2003; Sethi et al. 1987). How an individual elects to psychologically respond to a technology-induced stressful situation is therefore shaped by how the individual perceives the technology-induced stressful situation (O'Sullivan 2011). While we do not measure actual outcomes (e.g., actual turnover), we consider the relationship from response selections to outcomes very important, as response selections are strongly linked to actual behaviors (McGrath 1976). Moreover, we acknowledge the importance of organizations in managing how individuals perceive stressful situations induced by technology through several organizational mechanisms. Such mechanisms can have a positive or a negative impact on how an individual perceives a technology-induced stressful situation (Ragu-Nathan et al. 2008). In this way, we consider the three technostress inhibitors the organizational mechanisms that can directly impact one's perception of a technology-induced stressful situation.

We now present our research model (Figure 1), which is based on the concepts mentioned above. Due to the limit of the research-in-progress paper, we provide only a brief overview of the logic embedded in our hypotheses.

Conceptual Research Model: Constructs and Hypotheses

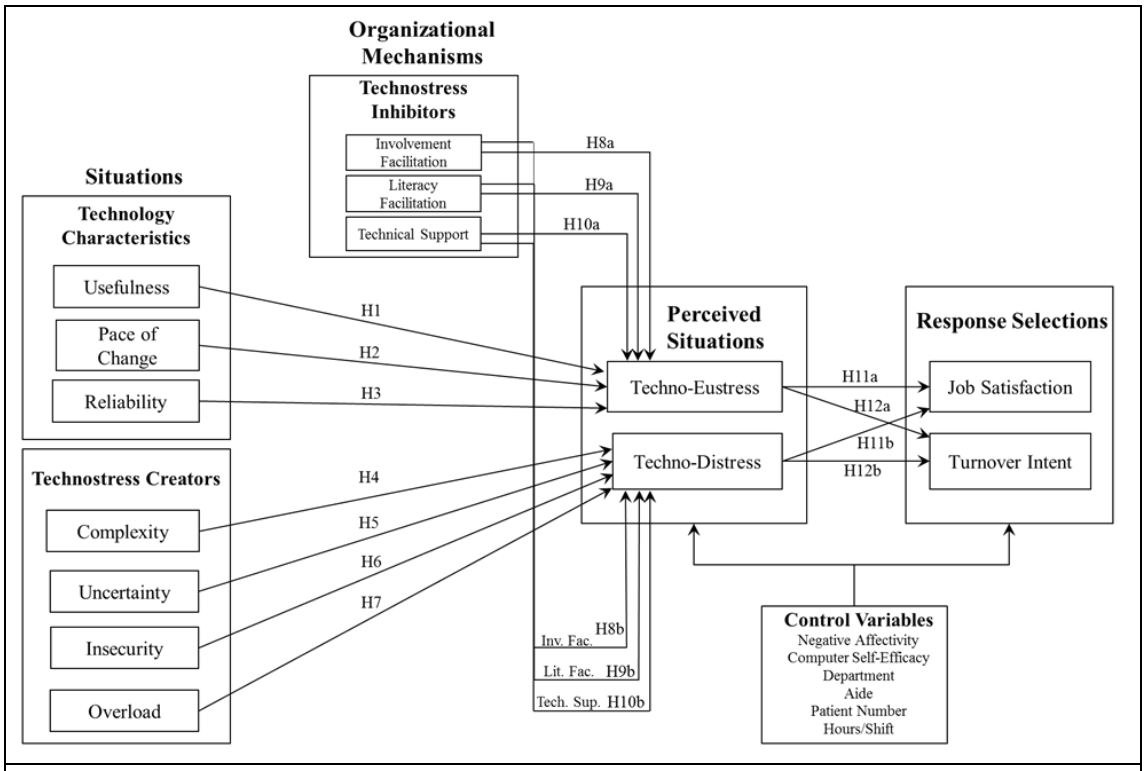

Figure 1: Research Model

H1-H3: Technology Characteristics ("Eustressors") and Perceived Situations

A recent literature review (Ayyagari et al. 2011) identifies and categorizes several technology characteristics salient to technostress into three types: (1) usability characteristics, (2) dynamic characteristics, and (3) intrusive characteristics. We sought to narrow down the characteristics to those more relevant to healthcare and associated with eustress, which we call "*eustress*ors" (since the *distress*ors, or the technostress creators associated with distress have been reinforced in the technostress literature championed by Tarafdar et al. 2007). We therefore investigate three technology characteristics of HIT and their relationship with perceived situations: (H1) usefulness, (H2) pace of change, and (H3) reliability. *H1*: When users of technology perceive it to be *useful*, they associate such feelings with positive emotions, and are therefore more likely to exhibit feelings associated with eustress, not with distress (Kulviwat et al. 2007; Tan et al. 2007). Care providers who consider HIT as useful have been reported to deliver a higher quality of patient care, and to perceive the HIT as offering them the opportunity to prescribe more evidence-based treatments (Ozok et al. 2014). *H2*: In traditional work contexts, a *high pace of technological change* has been argued to increase levels of negative stress (Arnetz and Wiholm 1997; Ayyagari et al. 2011). From the perspective of nurses, however, we argue that the high pace of change of HIT is associated with positive and eustressful feelings. This is because 94% of hospital nurses report that they are unhappy with the HIT software, and 98% of nurses say that they have never been included in their hospitals' IT decisions or in the design of the HIT (Miliard 2014). In this vein, changes in the software of HIT will be perceived positively, as nurses see this change as a step forward. *H3*: *Reliability* has been positioned as a way to maintain user engagement with technology and increase a user's confidence in technology, and thereby create a positive user experience (McGrath and Scanaill 2013). In a healthcare context, reliable technology has been argued to be inherently associated with safer and more effective patient care and thus positive feelings toward the system (Krueger 2010).

> ***H1, H2, and H3:*** *Usefulness, Pace of Change, and Reliability will be positively related to Techno-Eustress.*

H4-H7: Technostress Creators ("Distressors") and Perceived Situations

Technostress creators are the harmful technology-induced stressful situations associated with the use of technology (Tarafdar et al. 2011). In this study, we chose to examine how four of the five "*distress*ors" relate to techno-distress—(H4) techno-complexity, (H5) techno-uncertainty, (H6) techno-insecurity, and (H7) techno-overload (Ragu-Nathan et al. 2008). We did not choose to examine the impact of techno-invasion on hospital nurses because nurses work in shifts and do not tend to use HIT for personal use or in their homes, unlike traditional office workers (Trinkoff et al. 2011). *H4*: When users perceive technology as inherently *complex*, they often become upset with having to be well-versed with its high number of features (Ayyagari et al. 2011). Healthcare technology is often cited as being perceived by care providers as highly complex (WHO 2010). Such consequences of this complexity have included "impeding the development of mental models" in care providers (WHO 2010), and care providers not adopting HIT (Pearl 2014). *H5*: *Uncertainty* about technology materializes when changes in technology occur at many levels, such as constant changes in the software, hardware, and networks (Tarafdar et al. 2011). When this happens, individuals experience distress (Arnetz and Wiholm 1997). Since nurses are often unfamiliar with technology at multiple levels, especially at the hardware and network levels, they are more likely to experience negative feelings due to high levels of uncertainty (Bucknall and Thomas 1997). *H6*: Care providers who experience *insecurity* tend to have negative views toward HIT (Kuo et al. 2013). This is because they are insecure about how HIT will impact their current role (Wichowski 1994), and are insecure due to perceiving that the computer is a barrier between them and their patients (Sponselee et al. 2008). *H7*: Techno-overload occurs when ICTs force users to work faster and longer (Ragu-Nathan et al. 2008). Nursing is shift work. This means that when nurses feel overloaded by HIT, and have to work faster and longer, they are likely to view such insecurity as distressful given that they have to do more work in the same amount of time (Scott 2008).

> ***H4, H5, H6, and H7:*** *Techno-Complexity, Techno-Uncertainty, Techno-Insecurity, and Techno-Overload will be positively related to Techno-Distress.*

H8-H10: Organizational Mechanisms and Perceived Situations

The organizational mechanisms represent what organizations can do to inhibit the stress associated with technology-induced stressful situations (Ragu-Nathan et al. 2008; Tarafdar et al. 2011). We study three organizational mechanisms essential to technostress and their relationship with perceived situations: (H8) involvement facilitation, (H9) literacy facilitation, and (H10) technical support. *H8*: In healthcare, early involvement of nurses and other care providers in the design and implementation of HIT, such as barcode medication scanners, is considered a principal way to reduce distress, and to increase the positive feelings toward HIT (Hunt et al. 2004). *H9*: There is strong empirical evidence that encouraging end users to share technology knowledge with each other reduces negative feelings towards technology, distress, burnout, and computer anxiety, and increases an employee's computer self-efficacy (Eastin and LaRose 2000; Ragu-Nathan et al. 2008). Training healthcare workers about frequent technology changes can also decrease high levels of distress and anxiety, and can induce positive stress (Benson and Dundis 2003; Haughom et al. 2011). *H10*: An end user support help desk has been argued as a way to inhibit distressful feelings induced by technology (Ragu-Nathan et al. 2008). A recent study of nursing educators also found that access to technical support may help to reduce the impact of technological stress and increase positive ones (Burke 2009).

> ***H8a-b:*** *Involvement Facilitation will be (a) positively related to Techno-Eustress, and (b) negatively related to Techno-Distress.*
> ***H9a-b:*** *Literacy Facilitation will be (a) positively related to Techno-Eustress, and (b) negatively related to Techno-Distress.*
> ***H10a-b:*** *Technical Support will be (a) positively related to Techno-Eustress, and (b) negatively related to Techno-Distress.*

H11-H12: Perceived Situations and Response Selections

We examine the relationship between techno-eustress and techno-distress with two response selections: (H11) job satisfaction and (H12) turnover intention. In nursing, job satisfaction represents "the affective orientation that an employee has towards his or her work" (Chu et al. 2003). Turnover intention is

defined as "a conscious and deliberate willingness to leave the organization" (Egan et al. 2004). Both job satisfaction and turnover intention have been argued as outcome variables highly valuable to organizations due to their potential to increase or decrease "employee functioning" and their potential to be monetarily favorable or detrimental to an organization (Cooper et al. 2001; Ragu-Nathan et al. 2008). *H11*: Technology has been argued to have differential effects on stress levels and subsequently on job satisfaction (Korunka and Vitouch 1999). Research has uncovered positive relationships between eustress and job satisfaction (Le Fevre et al. 2006). Conversely, when employees experience feelings of distress, they tend to report that they are dissatisfied with their jobs (Amati et al. 2010; Boudreax et al. 1997). *H12*: A positive perception of HIT has been argued as a way to reduce turnover in hospital nurses (Furukawa et al. 2010). In organizations, eustress has been empirically shown to be positively related to life satisfaction, meaningfulness, and hope and active engagement in work, all of which have been argued to contribute to positive feelings of wellbeing (O'Sullivan 2011). Recently, however, distressful feelings from negative feelings towards HIT have been cited as a contributing factor in the high rate of nursing turnover (Beecroft et al. 2008).

> ***H11a-b:*** *(a) Techno-Eustress will be positively related to Job Satisfaction; (b) Techno-Distress will be negatively related to Job Satisfaction.*
> ***H12a-b:*** *(a) Techno-Eustress will be negatively related to Turnover Intention; (b) Techno-Distress will be positively related to Turnover Intention.*

Research Method

The present study employed an online survey using a questionnaire. The survey was distributed to registered nurses working in four hospitals in the western United States. Nurses were chosen because research suggests that nurses, not doctors, are the more prolific users of HIT at bedside (e.g., Venkatesh et al. 2011), and because nurses have recently been subject to high rates of turnover, which has been shown to lower the quality of patient care (Utriainen and Kyngäs 2009). The four hospitals were selected because nurses in each of the hospitals use HIT on a daily basis. The hospitals are all in the same care network. A link to the online survey was distributed to the nurses by email through a listserv. A total of 402 nurses were included in the analysis. Approximately 88% of the participants were female and 12% were male. Such gender percentages mirror those provided by the U.S. Department of Labor. The average age for participants was 35 to 44. Most respondents held a bachelor's degree or above and had more than 10 years of experience in nursing. Existing scales were adapted to suit the context of this study. Technology characteristics were derived from Ayyagari et al. (2011). They include usefulness (Moore and Benbasat 1991), reliability (Jiang et al. 2002), and pace of change (Heide and Weiss 1995). Technostress inhibitors and technostress creators were adopted from Ragu-Nathan et al. (2008). Techno-distress was adapted from the Kessler Psychological Distress Scale (Kessler et al. 2003). Techno-eustress was adapted from O'Sullivan (2011) scale on eustress. Turnover intention was adopted from Hom et al. (1984), and job satisfaction was adopted from Hackman and Oldham (1980). Two control variables were also adapted from previous scales. Computer self-efficacy was adapted from Compeau and Higgins (1995), and negative affectivity was adapted from the Positive and Negative Affect Scale (PANAS) (Watson et al. 1988). Hours per shift, number of patients, nurse's aide (a nursing assistant), and department were created by the authors. To test the hypotheses, covariance-based SEM in AMOS was used. Table 1 provides the fit statistics for the measurement and structural models, which have values above or matching the proposed cutoffs of less than 2 for the chi-square/df ratio, .92 for CFI, .08 or less for SRMR, and .10 for RMSEA (Hair et al. 2009; Markus 2012), indicating a good fit. Reliability and validity analyses were also conducted (available on request). The AVE for each construct is greater than 0.50 (Fornell and Larcker 1981), and the square root of AVE for each construct is greater than all interconstruct correlations (Chin 1998).

Table 1. Goodness-of-Fit Statistics

Model	Chi-Square	Chi-Square/df	CFI	RMSEA	SRMR
Measurement Model	3062.601	1.674	.932	.041	.0548
Structural Model	3599.028	1.663	.923	.041	.0766

Results

Table 2. Summary of Results and Hypotheses from the Structural Model			
Hypotheses		Beta and P-Values	Supported?
H1:	Usefulness will be positively related to eustress.	(β=.309; p<.001)	Yes
H2:	Pace of Change will be positively related to eustress.	(β=.130; p<.01)	Yes
H3:	Reliability will be positively related to eustress.	(β= -.036; p>.10)	No
H4:	Complexity will be positively related to distress.	(β= -.018; p>.10)	No
H5:	Uncertainty will be positively related to distress.	(β=.020; p>.10)	No
H6:	Insecurity will be positively related to distress.	(β=.330; p<.001)	Yes
H7:	Overload will be positively related to distress.	(β=.231; p<.001)	Yes
H8a: H8b:	Involvement facilitation will be positively related to eustress. Involvement facilitation will be negatively related to distress.	(β=.255; p<.01) (β=.158; p<.05)	Yes Inverse
H9a: H9b:	Literacy facilitation will be positively related to eustress. Literacy facilitation will be negatively related to distress.	(β= .002; p>.10) (β= -.304; p<.01)	No Yes
H10a: H10b:	Technical support will be positively related to eustress. Technical support will be negatively related to distress.	(β= -.176; p<.05) (β= .141; p<.10)	Inverse Inverse
H11a: H11b:	Techno-eustress will be positively related to job satisfaction. Techno-distress will be negatively related to job satisfaction.	(β=.149; p<.01) (β= -.236; p<.001)	Yes Yes
H12a: H12b:	Techno-eustress will be negatively related to turnover intention. Techno-distress will be positively related to turnover intention.	(β=.045; p>.10) (β= .216; p<.001)	No Yes

The aim of this study was to take a first step to recognize the role HIT plays in inducing techno-eustress and techno-distress in care providers, and specifically in nurses, and to understand how such techno-eustress and techno-distress influences how nurses psychologically respond to technostress creators and technology characteristics. Moreover, we sought to understand how hospitals can reduce techno-distress and increase techno-eustress by investigating the impact of three organizational mechanisms. Overall, our results (Table 2) reveal that technostress creators and technology characteristics can be perceived in terms of *eustress*ors (usefulness and pace of change) and *distress*ors (techno-insecurity and techno-overload). The results also unearth which technostress inhibitors may impact techno-eustress and techno-distress (H8, H9, and H10). Notably, our results also reveal that techno-eustress and techno-distress can significantly impact job satisfaction and turnover intention in different ways. Techno-eustress has a positive effect on job satisfaction only, and techno-distress has a negative effect on job satisfaction and turnover intention. We also found significant relationships that were the inverse of our original hypotheses. For instance, involvement facilitation was found to be positively and significantly related to techno-distress, and technical support was negatively related to techno-eustress and positively related to techno-distress. Five hypothesized paths were not significant. These were H3, H4, H5, H9a, and H11b.

Future Plans

Our plans call for extending this research program in the following ways. First, in this paper we have analyzed only the direct effects. It will be undoubtedly interesting to study the technological and situational factors as moderators in order to investigate under what circumstances technostress creators lead to eustress or distress. Second, we will use qualitative data collected from registered nurses to introduce an alternative conceptualization of technostress in IS research. We are in the process of doing so by reframing technostress as a transactional process using dialectic theory as its philosophical core (Carlo et al. 2012; Cooper et al. 2001). Third, we plan to incorporate the above quantitative results into a cross-cultural study that compares survey data from registered nurses employed in Germany, India, and the U.S.A. with the aim to identify how technostress is similar and different across the three countries.

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