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COPING WITH INTERRUPTIONS IN COMPUTER-MEDIATED ENVIRONMENTS: THE ROLE OF COMPUTER SELF-EFFICACY

RESEARCH-IN-PROGRESS

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ABSTRACT

Since technostress has been linked to tremendous productivity losses for U.S. organizations, this research-in-progress examines whether computer self-efficacy (CSE) can help individuals cope (i.e., deal) with such technological stressors as technology-mediated (T-M) interruptions (e.g., instant messages). Investigating the role of CSE in this context sheds light on the ways in which employees can maintain a positive well-being despite the presence of technological stressors. More specifically, we tried to understand the complex relationships between technology, stress, and information systems-related individual differences to provide businesses with an understanding of the conditions under which employees can work effectively. Drawing from the cognitive psychology and the technostress bodies of literature, we hypothesize that CSE moderates the link between the frequency with which such T-M interruptions as instant messages appear and stress. This paper proposes a laboratory experiment to test our model and concludes with an overview of its expected contributions.

Keywords

Coping, Computer Self-Efficacy, Interruptions, Instant Messages, Technostress.

INTRODUCTION

While Information and Communication Technologies (ICTs) have been suggested to positively impact organizational performance (Melville et al., 2004; Wade & Hulland, 2004), they have also been shown to result in stress for employees, leading to such negative organizational consequences as turnover and productivity losses (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). In particular, such interruptions mediated by ICTs as instant messages have been empirically linked to employee stress as well as to substantial productivity losses for U.S. organizations (Basoglu & Fuller, 2007; Galluch, 2009; Spira, 2007), raising the question of how people can effectively deal with such interruptions.

Stress research suggests that individual stress responses vary in accordance with peoples' ability to cope successfully with the stressor (Lazarus, 1966). Coping refers to individuals' efforts expended to deal with specific environmental demands that are perceived as taxing (Lazarus & Folkman, 1984). Beaudry and Pinsonneault (2005) suggested that coping with significant technology events is a major facet of user behavior, for example, to minimize the perceived threats imposed by a technology. Yet, little is known about coping with technological stressors such as technology-mediated (T-M) interruptions.

One important mechanism that may help people cope with T-M interruptions is Computer Self-Efficacy (CSE). CSE may affect the extent to which people think positively, thereby potentially allowing them to cognitively cope with such stressors as T-M interruptions (Bandura, 1997; Lazarus, 1999). Although general self-efficacy has been linked to coping behaviors (e.g., Bandura, 1982), research on the role of CSE as a coping mechanism in the technostress context is nascent. Thus, this work examines *whether the level of stress generated by T-M interruptions depends on CSE.*

The paper is structured as follows. The next section reviews the extant literature to frame a model of CSE as a coping mechanism in the technostress phenomenon. The third section develops a series of research hypotheses suggesting that the frequency with which T-M interruptions occur impacts individual stress responses to a lesser extent under the condition of increased CSE. The fourth section discusses the experimental procedure designed to test the model along with measurement development. It will also present the pre-test results. The paper concludes with an overview of its contributions.

BACKGROUND

The extant literature suggests that T-M interruptions lead to stress in individuals by breaking peoples' concentration on the current task, resulting in frustration (Basoglu & Fuller, 2007; Galluch, 2009; Ren et al., 2008). However, individual stress responses depend on coping effectiveness (Lazarus, 1966). As defined earlier, coping captures how well people deal with stressful events, such that individuals experience low levels of stress in the case of effective coping with a stressor, and high levels of stress in the case of ineffective coping (Lazarus, 1999). Thus, when people deal effectively with the threat arising from a stressor, the stressor is less likely to manifest itself in stress. Accordingly, coping can be integrated into research models of technostress as a moderator of the link between the technological stressor and the stress response.

Individuals' belief systems, such as self-efficacy beliefs, are major factors in coping (Bandura, 1982; Lazarus, 1999). Self-efficacy refers to the extent to which people believe in their ability to do what is required to meet task demands (Bandura, 1986). As such, it is a form of cognitive coping, generating positive thoughts that influence stress by positively coloring the interpretation of stressful events (Bandura, 1986; Lazarus, 1999). Hence, CSE as individuals' beliefs about their ability to use computers in service of accomplishing work tasks (Compeau & Higgins, 1995; Marakas et al., 1998) may weaken stressor-stress relationships, implying that CSE may interact with such stressors as T-M interruptions to impact individual stress. However, little research has examined CSE's relationship with technostress; a comprehensive literature search revealed only one paper. Ragu-Nathan et al. (2008) predicted and found that CSE has a direct negative relationship with such technostress creators as technological complexity. While this finding is encouraging and suggests that CSE may indeed play an important role in the technostress phenomenon, it does not recognize CSE as a coping mechanism. The role of CSE in technostress may be more complex than a simple direct effect of CSE on perceptions of technological complexity would suggest. Hence, more work is needed to deepen understanding of the construct's role in the technostress phenomenon.

As illustrated in Figure 1, prior literature has primarily focused on examining technostress, coping, and CSE in isolation. Some studies have looked at the intersection of two such areas. For example, Ragu-Nathan et al. (2008) investigated the connection between technostress and CSE, and Beaudry and Pinsonneault (2005) acknowledged the importance of studying the intersection between CSE and coping. However, no study to date has examined the point at which all three research areas intersect, although this point yields strong potential for explaining individual differences in technostress responses. Hence, this study theorizes about CSE to develop a model of coping with such technological stressors as T-M interruptions.

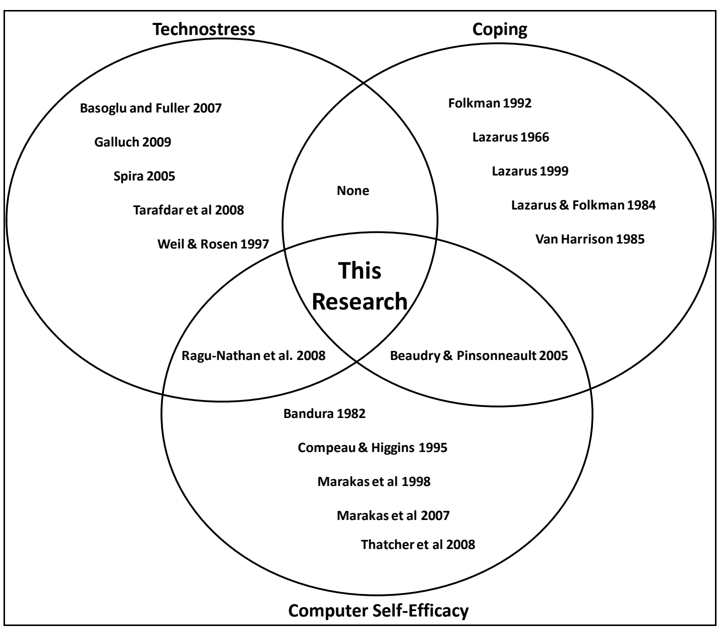

Figure 1. Illustrative Studies on Technostress, Coping, and CSE

HYPOTHESES DEVELOPMENT

Based on our prior conceptual framing for this study, the following paragraphs develop two hypotheses that probe our research topic. Consistent with prior research (e.g., Ragu-Nathan et al., 2008), we control for personality type (i.e., Type A or B personality), gender, age, and education. The research model is shown in Figure 2.

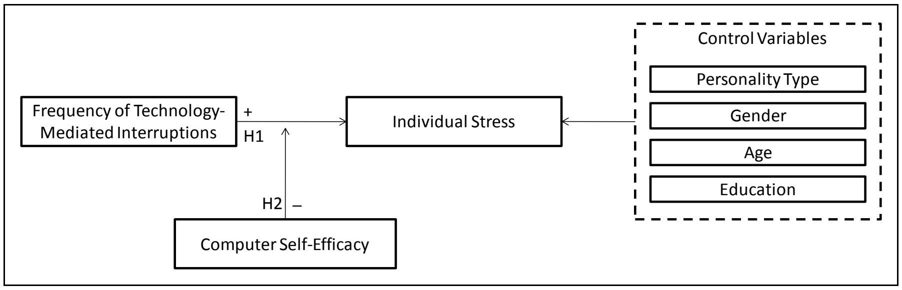

Figure 2. Research Model

The frequency of T-M interruptions refers to the number of technology-mediated (T-M) distractions, such as instant messages, that appear in a given time interval. Since peoples' capacity for doing mental work is strictly limited, sometimes to as little as one item (Wickens et al., 2004), any such distraction as a T-M interruption can quickly result in communication and information overload (Ragu-Nathan et al., 2008). As a result of receiving more information than they can efficiently process, people may not be able to concentrate on the task at hand and may, therefore, perceive their work demands as increasingly excessive. Since excessive work demands are closely associated with the threat of low performance (Endsley, 1995), they may give rise to technostress. Formally:

> *H1: The frequency of T-M interruptions is positively related to individuals' experiences of stress.*

Computer Self-efficacy refers to the extent to which an individual beliefs in her ability to successfully use a computer in support of work tasks (Compeau & Higgins, 1995). As such, CSE may help people maintain positive thoughts about their ability to successfully accomplish computer-based tasks despite the presence of excessive information processing and work demands. The anticipation of positive outcomes arising from CSE may serve to counter the anticipation of such negative outcomes as low performance. Accordingly, threats of low performance on the basis of T-M interruptions should be less likely to occur and should be weaker. In so doing, CSE beliefs assume the role of a coping mechanism. Formally:

> *H2: Computer self-efficacy moderates the effect of the frequency of T-M interruptions on individual stress so that the effect is weaker for higher levels of computer self-efficacy.*

PROPOSED METHODOLOGY

Consistent with prior research in the area of T-M interruptions (e.g., Basoglu & Fuller, 2007; Galluch, 2009), we will conduct a laboratory experiment with undergraduate students to test the model. Since the model should apply to any user of ICTs, no sample frame restrictions apply. In fact, since students constitute the organizational ICT users of the future, they are particularly suitable for this study. To account for the importance of cognitive concentration to our model, such that interruptions are theorized to break individuals' concentration on the task at hand, the online browser memory game Concentration was selected as the experimental task for this study. In this task subjects have to find matching pairs of symbols by flipping computer-generated cards. In the process, they have to memorize the symbols they have seen and where the symbols are hidden. An important question concerned the nature of the symbols. On the one hand, the commonly used pictures (e.g., assorted pictures of animals, people, or cars) may be more engaging, but formal symbols requiring abstract thinking may be more cognitively demanding.

We pre-tested the nature of the task with undergraduate students and found that the formal version is more adequate for this study. For example, students suggested that "The formal version is more demanding; you have to pay more attention," implying a greater importance of human cognition for the formal than for the pictures version. Furthermore, we pre-tested how many T-M interruptions, operationalized as instant messages, constitute a high as opposed to low frequency (i.e., the frequency will be manipulated through two factor levels). Statistical significance tests and verbal protocols showed that our manipulations are valid (see Figure 3).

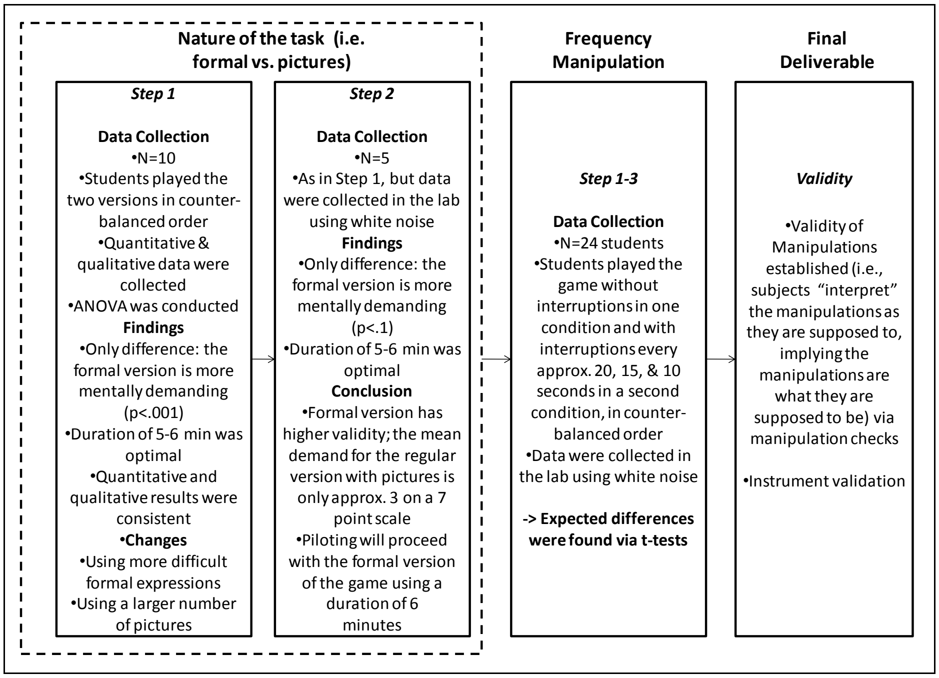

Figure 3. Overview of the Pre-Test Procedure and Findings

Along with the manipulation of the frequency of T-M interruptions, we also developed the survey instrument for this study. We plan to measure CSE using Compeau and Higgins' (1995) well-validated scale. Stress will be measured subjectively through an adaptation of Moore's (2000) work exhaustion scale, and objectively through the change in the stress hormones found in saliva, a state-of-the art physiological measure of stress. In addition, we will administer a manipulation check pertaining to the frequency of T-M interruptions along with measures for the control variables. Figure 4 describes the scale development process. At the moment, the scales are being purified on the basis of an extensive prior data collection process (n = 42) specifically for scale purification purposes. Undergraduate students played an active role in the scale development process through participation in question sorting tasks and the provision of extensive qualitative feedback.

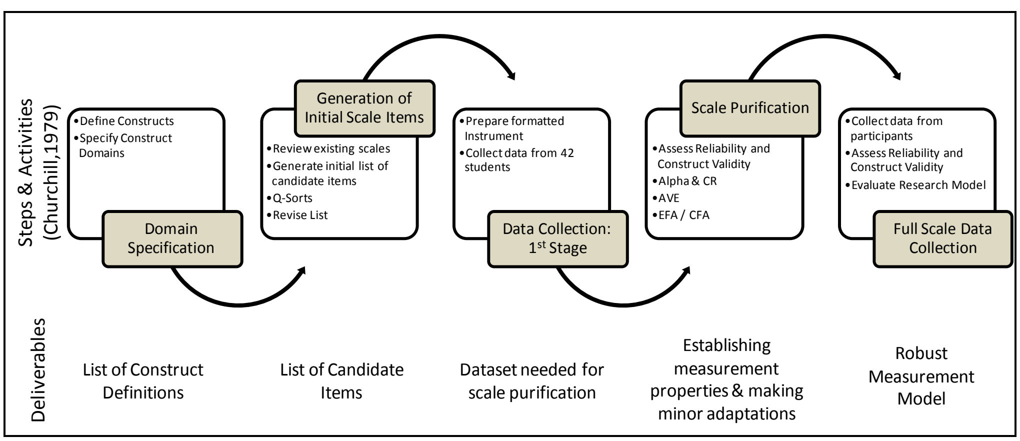

Figure 4. Overview of the Scale Development Process

Once the scales will have been finalized, we will pilot the experimental procedure using the process outlined in Figure 5. The volunteers recruited through course credit and monetary rewards will come to the lab, be briefed, relax to calm down from any potential prior stressful events, and take a practice trial of the Concentration task prior to taking the actual experimental task. Finally, the participants will fill out the manipulation checks as well as other measures and will be debriefed. Following the pilot with approximately 25 participants, we will conduct the full-scale experiment with about 90 students.

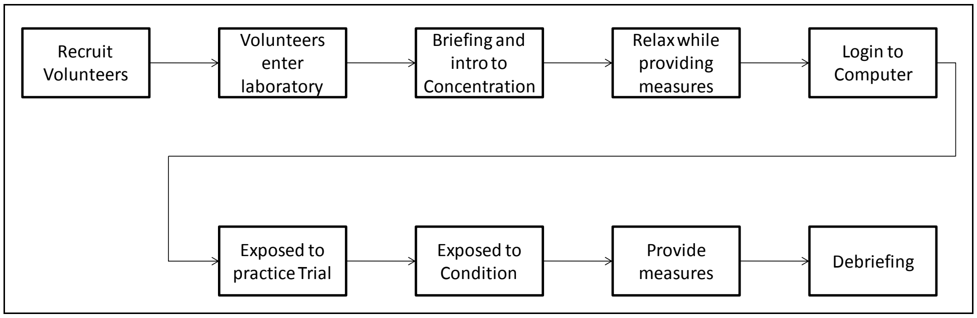

Figure 5. Flowchart of the Experimental Procedure

CONCLUSION

This research-in-progress was motivated by the question of whether the level of stress generated by T-M interruptions depends on CSE. The study suggests that CSE acts as a coping mechanism enabling people to think positively. As a result of positive thinking, individuals may incur less stress on the basis of such T-M interruptions as instant messages.

This research contributes to the literature on technostress primarily by explicitly incorporating the concept of coping, thereby acknowledging – consistent with Lazarus (1999) – that coping is an integral part of the technostress process that should complement any study of technostress. It further contributes to the technostress literature by clarifying the role of CSE in the technostress phenomenon and by suggesting that this role is more complex than a simple direct effect of CSE on technological stressors would suggest. Furthermore, this study ties an IS construct – CSE – to the concept of coping, thereby not only answering recent calls for examining the role of CSE in coping (Beaudry & Pinsonneault, 2005), but also enabling us to better understand the technostress process from an entirely IS-oriented perspective. This allows us to create more complete theories of technostress from an IS point of view, resulting in stronger theory with greater explanatory power than an isolated examination of these facets could provide (Kuhn, 1970).

This research yields important implications for practitioners as well. Specifically, managers may need to take a closer look at CSE as a means to help employees cope with technological stressors, such as instant messages, in their work environments. For example, computer training as a major antecedent to CSE (Yi & Davis, 2003) may not only aid worker productivity by allowing employees to better understand a software system, but by increasing their coping effectiveness as well.

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