Author(s): Pirkkalainen, Henri; Salo, Markus; Makkonen, Markus; Tarafdar, Monideepa

Title: Coping with Technostress : When Emotional Responses Fail

Year: 2017

Version:

Please cite the original version:

Pirkkalainen, H., Salo, M., Makkonen, M., & Tarafdar, M. (2017). Coping with Technostress : When Emotional Responses Fail. In ICIS 2017 : Proceedings the 38th International Conference on Information Systems (pp. 1-17). Association for Information Systems (AIS). http://aisel.aisnet.org/icis2017/IT-and-Social/Presentations/3/

Coping with Technostress: When Emotional Responses Fail

Completed Research Paper

Henri Pirkkalainen
Tampere University of Technology
PO Box 541, 33101 Tampere, Finland
henri.pirkkalainen@tut.fi

Markus Salo
University of Jyväskylä
PO Box 35 (Agora)
FI-40014 University of Jyväskylä, Finland
markus.t.salo@jyu.fi

Markus Makkonen
University of Jyväskylä
PO Box 35 (Agora)
FI-40014 University of Jyväskylä, Finland
markus.v.makkonen@jyu.fi

Monideepa Tarafdar
Lancaster University
Management School
Rm A42, Bailrigg, Lancaster, UK
m.tarafdar@lancaster.ac.uk

Abstract

In this study, we develop two new perspectives for technostress mitigation from the viewpoint of coping. First, we examine users' emotional coping responses to stressful IT, focusing specifically on distress venting and distancing from IT. As these mechanisms may not always be effective for individuals' well-being, we extend our approach to self-regulation in coping, which concerns general stress-resistance. Thus, we specifically study how IT control moderates the effect of emotional coping responses to stressful situations involving IT use. We test the proposed model in a cross-sectional study of IT users from multiple organizations (N=1,091). The study contributes to information systems literature by uncovering mechanisms individuals' can use to mitigate the negative effects of technostress and by delineating the less-understood perspective of interrelated coping mechanisms; how emotional coping responses are moderated by IT control towards more favorable outcomes. Implications of the research are discussed.

Keywords: Technostress, coping theory, dark side, IT use

Introduction

Active use of IT is imperative across industries. As organizations determine new ways to innovate and enhance performance using IT, managers and employees must be accustomed to the potential harm that IT use can cause. One such negative effect of IT use is technostress. This phenomenon has been defined as the inability of an individual to cope with the demands of IT use, which results in perceived stress (Brod 1982; Ayyagari et al. 2011). Multiple information systems (IS) studies have demonstrated the severity of the phenomenon in cross-sectional organizational settings, demonstrating increases in strain (Ayyagari et al. 2011; Galluch et al. 2015) and decreases in work performance (Tarafdar et al. 2015b; Ragu-Nathan et al. 2008). The mitigation of technostress has mostly been studied in the form of *organizational mechanisms* (Ragu-Nathan et al. 2008). However, the responsibility to fostering healthy IT use is not only for the organization as IT users themselves manage their IT and associated use patterns. Thus, IS scholars have called for more empirical research to uncover ways in which *IT users themselves* can combat technostress (Pirkkalainen and Salo 2016). We answer this call by investigating coping mechanisms that individuals themselves undertake to reduce technostress.

Since publication of Lazarus's highly-acclaimed book, *Psychological Stress and the Coping Process*, published over half a century ago in 1966, appraisal of stress and coping with stress have been discussed as two coexisting concepts. Coping essentially refers to the process of dealing with encounters that are appraised as stressful in order to diminish or overcome the situation (Lazarus 1966). Stress research has discussed a variety of coping mechanisms that individuals undertake to manage stress. For example, individuals may try to distance themselves from the stressful situation or vent their emotions (Carver et al. 1989). Many stress researchers have argued that coping mechanisms must be further investigated, as the mechanisms may be highly intertwined (Schwarzer and Knoll 2008; Folkman and Moskowitz 2004), the causes of stress differ across contextual settings (Folkman and Moskowitz 2004) and the mechanisms individuals use serve different purposes; e.g., directly addressing the stress-creating conditions or reducing the strength of the relationship between stress-creating conditions and their negative effects (Cooper et al. 2001).

Although coping has been acknowledged for many decades in psychology and in stress research in general, technostress is a relatively new phenomenon; thus, we know very little about the ways IT users cope with technostress in either professional or leisure settings. We are especially lacking Information Systems (IS) studies on coping that could inform organizations, individuals and societies regarding how to address the persistent problem of technostress, which reduces work performance (Tarafdar et al. 2015a) and individual well-being (Ayyagari et al. 2011). In particular, we found no studies that empirically investigate specific coping mechanisms for mitigating stress induced by IT use. We did find IS studies that utilize the concept of coping but examined the use of coping with phenomena other than technostress. Thus, there is a dearth of evidence-based solutions for mitigating technostress.

Stress research suggests that individuals can to some extent deal with stressful situations with their own emotional responses to the stressors (Lazarus and Folkman 1984). Emotional coping responses are likely to provide relief in a stressful situation because they are natural reactions to stressful events (Folkman and Moskowitz 2004). They may also lead to unfavorable outcomes as emotional responses may avert healthy reflection that could lead to the source of the stress (Scheier et al. 1994; Folkman and Moskowitz 2004; Bushman et al. 2001; Carver et al. 1989). The first objective of our study is to take the initial steps to validating such emotional coping responses as means to mitigate technostress. For this objective, we draw from the well-established coping theory (Lazarus and Folkman 1984; Lazarus 1966) because it focuses on the individuals' own mechanisms and responses to deal with stress. We include two previously unaddressed emotional coping responses to technostress: distress venting (i.e. letting feelings out when IT problems occur) and distancing from IT (i.e. separating oneself from the IT that created the problems).

The second objective of the study aims to shed light on the potentially mixed outcomes of emotional coping responses. Stress-researchers have suggested that individuals' control over stressful situations influences their coping behaviors (Schwarzer and Schwarzer 1996; Bandura 1991). We draw from the perspective of self-regulation, which suggests how certain resources (e.g., control) possessed by the individual provide general stress-resistance and alleviate the potentially non-beneficial impact of other coping behaviors (Schwarzer and Schwarzer 1996; Bandura 1991; Folkman and Moskowitz 2004). To this end, we apply the well-known concept of IT control (Fishbein and Ajzen 2011; Ajzen 1991) and examine its influence on the emotional coping responses.

We posit our research model using the transactional perspective of technostress, which has been widely applied by IS researchers (Tarafdar et al. 2007; Ragu-Nathan et al. 2008; Ayyagari et al. 2011). Our study investigates individuals' coping mechanisms in a cross-sectional study with 1,091 IT users from various organizations. Distress venting and distancing from IT are modelled as first-order moderators between technostress creating conditions and strain, as suggested by Cooper et al. (2001). The influence of IT control is modeled as a second-order moderator for the first-order moderations. We apply structural equation modelling (SEM) using Mplus software to examine our model.

This study makes four theoretical contributions. One, it provides theoretical and statistical support for individuals' own coping mechanisms in the form of distress venting and distancing as ways of dealing with technostress. Two, it advances the understanding of self-regulation as means to steer emotional coping responses. Three, it shows how distress venting is a nuanced coping response with mixed outcomes. Four, it evidences how IT control provides shelter from the potentially non-beneficial impacts of the emotional coping responses of distress venting and distancing from IT. These contributions help us better understand how individuals themselves can mitigate technostress. Further implications of these findings are discussed.

Theoretical Background and Research Model

Technostress mitigation and coping

Technostress research has been increasingly acknowledged in the IS community over the last few years. The importance of the phenomenon and its proven negative outcomes on performance and well-being (Tarafdar et al. 2015a; Ayyagari et al. 2011) have been discussed in major IS journals at an increasing rate (Pirkkalainen and Salo 2016). Researchers of IS are currently asking a major question and posing a challenge for researchers and practitioners: how can individuals themselves deal with technostress? (Tarafdar et al. 2015a; Pirkkalainen and Salo 2016). Early examples have arisen in terms of users' capability to use IT (Tarafdar et al. 2015b) and timing control over work IT interruptions (Galluch et al. 2015).

Coping is part of the stress process, in that it is a response to the stress-creating conditions that individuals experience (Lazarus 1966). Coping can be defined as individuals' psychological and behavioral efforts to deal with events that are appraised as demanding or exceeding the resources possessed by the individual (Lazarus and Folkman 1984).

There are some studies in IS that apply the concept of coping. Beaudry and Pinsonneault (2005) studied IT users' coping strategies for approaching new IT. Addas and Pinsonneault (2015) addressed coping in relation to user adaptation in the form of appropriation, avoidance and resistance. Stein et al. (2015) examined the emotional perspective of coping. Fadel and Brown (2010) applied the concept of coping to study the underutilization of IT. D'arcy et al. (2014b) studied moral disengagement as a coping response to IS security-related stress. Liang and Xue (2009) provided a theoretical perspective to the initial stage of threat assessment and provided conditions for which coping takes place. Despite the importance of these studies, none of them focus on coping mechanisms for mitigating technostress.

Coping literature outside the boundaries of IS has revealed multiple types of coping mechanisms that individuals use in demanding situations; these mechanisms could be applied to technostress mitigation. Many well-known mechanisms include emotional- and problem-focused coping as well as adaptive and maladaptive coping (Carver et al. 1989; Folkman and Moskowitz 2004; Lazarus and Folkman 1984). Stress researchers have argued that emotional responses to stressors might not always result in favorable outcomes (Scheier et al. 1994; Folkman and Moskowitz 2004). Such mechanisms activate rather effortlessly as they are natural responses to stressors (Carver et al. 1989). However, they might be ruminative in the long-run if the actual problems are not confronted (Folkman and Moskowitz 2004; Bushman et al. 2001; Carver et al. 1989). These concepts have been discussed in stress research (e.g., Carver et al. 1989; Folkman and Moskowitz 2004) but have never been addressed empirically in the context of technostress mitigation. We will base our study on two specific yet natural emotional coping responses, distress venting and distancing from IT. Distress venting refers to the tendency to focus on aspects that are perceived as upsetting and to express those feelings verbally (Scheff 1979; Carver et al. 1989) while distancing from IT is a coping mechanism where a person acknowledges the problem but tries to intentionally shut it out (Folkman and Moskowitz 2004). Research on these emotional responses in IT use and organizational contexts is especially interesting, as stressful IT use encounters in organizations are often involuntary and happen to both experienced and inexperienced IT users (Liang and Xue 2009).

Folkman and Moskowitz (2004) argued that there is no absolute or correct approach to measuring coping. Indeed, Cooper et al. (2001) explain how coping behaviors are highly contextual and vary in conceptualization and operationalization. Ayyagari et al. (2011) suggested that measurement of coping in the context of technostress mitigation could be integrated to the transactional perspective, which views stress as the overall transactional process that is captured by technostress creators, or stressors, and their effect on individuals' psychological and physical well-being (Lazarus 1966). Ayyagari et al. (2011) suggested that one way to examine coping was to investigate coping mechanisms as moderators of the relationship between stress-creating conditions and strain. This view has also been described by Cooper et al. (2001, p.142) as a stress-buffering perspective.

In addition, several coping studies and meta-reviews on the topic have argued for a better understanding of how coping responses differ between contexts and individuals (Schwarzer and Schwarzer 1996; Bandura 1991; Folkman and Moskowitz 2004). It is shown that individuals who possess certain resources (e.g., a high level of IT control) could utilize *other* coping mechanisms in a more effective way (Penley et al. 2002; Folkman and Lazarus 1984; Clarke 2006). This perspective draws from self-regulation in coping, which investigates mechanisms that can influence and steer the effects of other coping mechanisms (Aspinwall and Taylor 1991; Schwarzer and Schwarzer 1996; Bandura 1991). We focus specifically on IT control which has been described as individuals' perceptions of the degree they are capable of, or have control over, performing a given IT use behavior (Fishbein and Ajzen 2011). The interdependence of mechanisms, such as IT control steering emotional coping responses, is a generally less-understood perspective of coping in the stress literature. Even more interestingly, such examination has not been conducted in the context of technostress.

Research model for understanding coping

Our research model (Figure 1) builds on the transactional view on technostress (Lazarus 1966) and addresses technostress mitigation from the perspective of coping theory (Folkman and Lazarus 1984). The model is described in detail and several hypotheses are presented.

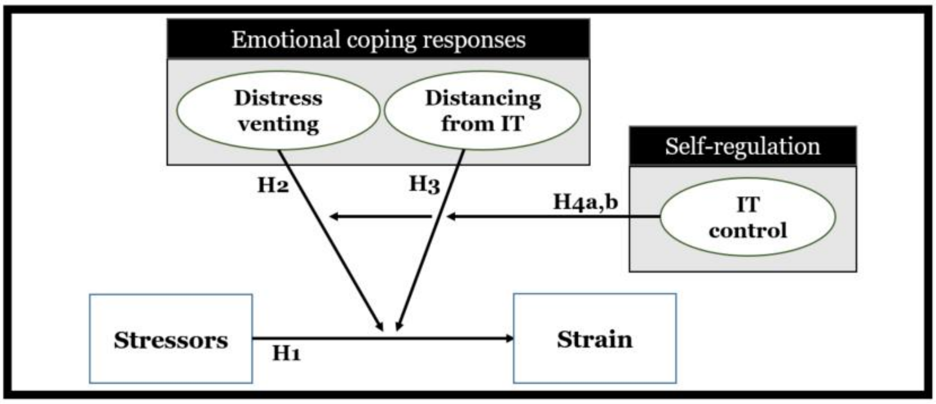

Figure 1. The proposed research model

Technostress researchers in IS have found strong support that stress-creating conditions in organizations lead to reduced well-being (or increased strain) (Ayyagari et al. 2011; Srivastava et al. 2015). Grounded on validated concepts of both stressors (Ragu-Nathan et al. 2008; Tarafdar et al. 2015b) and strain (Ayyagari et al. 2011; Srivastava et al. 2015), we posit that technostress creators, or stressors, increase strain perceived by IT users in organizations.

Hypothesis 1: Higher levels of stressors are associated with higher levels of strain.

From the coping perspective, we focus on distress venting and distancing from IT, which can be described as typical emotional responses to stressful situations (Bushman et al. 2001; Carver et al. 1989; Carver and Connor-Smith 2010). These mechanisms have not yet been validated in relation to technostress mitigation. It is noteworthy that the conceptualizations of these mechanisms vary in prior stress and coping literature. This makes definitive inference problematic and calls for empirical evaluation in the context of IT use.

Distress venting is often discussed in relation to negative emotions such as fear and anger (Folkman and Moskowitz 2004; Ward and Ostrom 2002). For example, Lazarus and Folkman (1984) discussed venting of anger, which reflects a more extreme form of emotional ventilation. Researchers have also applied other conceptualizations of emotional venting. Carver et al. (1989) addressed venting of distress, which refers to upsetting events that do not necessarily encompass anger. Carver et al. (1989) explained how emotional venting can also help a person to move forward, as the negative feelings are expressed and let out.

Generally, distancing has been discussed as a form of disengagement instead of dealing with the problem at hand (Carver et al. 1989; O'Brien and DeLongis 1996). Researchers have suggested that distancing might be applied when nothing can else be done (Folkman and Moskowitz 2004; Carver et al. 1989). Distancing can lead to detachment, which has been connected to poorer outcomes and decreased well-being (Carver and Connor-Smith 2010; Littleton et al. 2007; Moskowitz et al. 2009; Penley et al. 2002). Distancing is oftentimes connected to discussions about different forms of disengagement (e.g., behavioral, mental and substance-related, as discussed by Carver et al. 1989) and differing outcomes, which certainly leaves room for deeper exploration in the context of IT use and technostress mitigation.

Both venting and distancing are generally considered less useful and less adaptive coping approaches in the long-run, as denial and disengagement often characterize these strategies (Carver et al. 1989). However, during moments of distress, venting could bring momentary relief and decrease the impact of stress-creating conditions on strain (Lazarus and Folkman 1984; Carver et al. 1989). On the other hand, distancing from IT is a form of disengagement that likely leads to unfavorable outcomes, as the problem is not confronted (Penley et al. 2002; Carver and Connor-Smith 2010; Littleton et al. 2007; Moskowitz et al. 2009). Thus, we suggest the following hypotheses:

> H2: Distress venting negatively moderates the relationship between stressors and strain such that the higher the level of distress venting, the weaker the relationship between stressors and strain.
>
> H3: Distancing from IT positively moderates the relationship between stressors and strain such that the higher the level of distancing from IT, the stronger the relationship between stressors and strain.

Next, we posit that these emotional responses to stress-creating conditions are not always sufficient to deal with problematic IT use situations. Indeed, previous stress studies on distress venting and distancing suggest that the responses to stressors are subject to influence of certain coping resources possessed by individuals. Carver et al. (1989) argued that venting is associated with the absence of a locus of control regarding events. Those who had lower perception of control over the situation were more prone to distress venting (Carver et al. 1989). Self-control can also help keep distress at bay even though individuals often fail in such self-regulation (Baumeister et al. 1996). This type of influence does not only relate to venting. In fact, control over a situation could influence the effect of distancing although the results obtained so far are not conclusive (Carver and Connor-Smith 2010).

While distancing is usually linked to poor outcomes, a combination of distancing with more instrumental coping styles (e.g., self-control) could contribute to positive results (Penley et al. 2002; Klinger 1975). Folkman and Lazarus (1988) also elaborated on how the negative effects related to distancing might be subject to a lack of coping efficacy (e.g., lower self-control). While we did not come across any articles that address IT use, these initial findings of prior research provide an uncharted view on self-regulation in coping (Schwarzer and Schwarzer 1996; Bandura 1991; Folkman and Moskowitz 2004), which could inform us regarding how control over IT (rather than self or events) steers other coping resources. As these aforementioned studies regarding the influence of control on coping have been focusing on interpersonal relationships between family and friends or individual health, it is essential to extend on these concepts in relation to professional settings and IT use.

Summarizing the previous arguments, we argue that IT control influences the emotional coping responses to stressful encounters in IT use. Specifically, findings from stress research suggest that high IT control can even help in reducing the potential negative effects of the two emotional responses of venting and distancing. Indeed, the findings of Carver et al. (1989) suggest that IT control could compensate for the absence of a locus of control, which is associated with venting. Similarly, the findings of Folkman and Lazarus (1988) and Penley et al. (2002) imply that control could make the negative outcomes of distancing positive. In both cases, the potential negative effect or unwanted disengagement- behavior is reduced. Thus, we hypothesize the following:

> H4a: IT control helps in minimizing the effect of distress venting such that the higher the level of IT control, the weaker the moderating effect of distress venting on the relationship between stressors and strain.

H4b: IT control helps in minimizing the effect of distancing from IT such that the higher the level of IT control, the weaker the moderating effect of distancing from IT on the relationship between stressors and strain.

Method

Measures

We applied pre-existing and validated constructs in our study with appropriate modifications to contextualize the study items. Technostress creators, or stressors, have been observed to consist of several IT-related stress-creating conditions that are captured by constructs such as technology-overload (TO), technology-complexity (TC), technology-insecurity (TIS) and technology-invasion(TI) (Tarafdar et al. 2007; Ragu-Nathan et al. 2008). We applied the stressors (TS) second-order construct that was introduced by Tarafdar et al. (2007) and further used by multiple authors such as Tarafdar et al. (2015b) and Srivastava et al. (2015). Similarly to previous technostress studies, the stressors were operationalized as one reflective second-order construct measured by multiple first-order constructs. The strain (STR) scale was applied from Moore (2000) and Ayyagari et al. (2011). For distress venting (VEN), we applied the venting anger scale developed by Beaudry and Pinsonneault (2010), adding a fourth and closely-related element: “When IT problems occur I let my feelings out,” an item from the venting of emotions scale developed by Carver et al. (1989). Distancing from IT-scale (DIS) was adjusted from Leiter et al. (1991) and Carver et al. (1989) with minor modifications to focus the items on the adaptive (e.g., turning to other activities) rather than maladaptive escapism (e.g., drinking) perspective (Folkman and Moskowitz 2004). By following the suggestions by Fishbein and Ajzen (2011), IT control (CON) was operationalized as a reflective second-order construct measured by two first-order constructs: perceived autonomy (AUT) and perceived capability (CAP). Their measures were adapted from Fishbein and Ajzen (2011). The measurement items are provided in Annex 1. The measurement scale for all the items was the standard Likert scale ranging from 1 (strong disagreement) to 5 (strong agreement). The respondents also had the option to skip individual items, which resulted in a missing value. In addition, our study incorporated three control items related to gender, age, and IT experience.

Data collection

This research effort was conducted using an online panel for inviting IT users from varying industries to participate in our study. The large number of respondents from online panels makes it possible to (1) reach individuals from a wide variety of backgrounds and organizations; (2) reduce bias due to unique organization-specific factors; and (3) enable full anonymity, which can be compromised in traditional and personal data collection approaches (Bulgurcu et al. 2010). Several IS researchers have thus argued for the validity and relevance of online panels for research purposes (e.g., D’Arcy et al. 2014b; Lowry et al. 2016; Thau et al. 2009).

Several screening questions were implemented in the online survey, as we only wanted to include full-time workers who are dependent on IT to handle their daily work activities. Questions regarding the extent of IT use at work enabled us to discontinue responses to any of the three screening questions that were anything below “occasionally” (in a scale 1-5, 3). Similar to recent technostress articles (Ayygari et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2015b), we were interested in workplace IT use in general rather than focusing on a certain type of application/software. However, each respondent was asked to name the type of device they most frequently use at work (e.g., laptop, smartphone or tablet) and keep that device in mind when answering the questions. Altogether, 1,201 full responses were collected for the study. After careful data screening (e.g., removing non-conscientious responding with no variance between the answers, stdev<0.5), 1,091 valid responses were used for the study. Sample demographics are presented in Table 1.

	N	%
Gender		
Man	472	43.3
Woman	619	56.7
Age		
–29 years	231	21.2
30–39 years	460	42.2
40–49 years	220	20.2
50– years	170	16.5
IT experience		
Under ten years	356	32.6
10–19 years	428	39.2
20–29 years	238	21.8
30– years	69	6.3
Education		
Less than high school	1	0.1
Graduated high school	74	6.8
Trade / technical school	34	3.1
Some college, no degree	170	15.6
Associate degree	150	13.7
Bachelor's degree	430	39.4
Master's degree / Ph.D. or M.D.	232	21.3

Table 1: Sample statistics (N = 1,091)

Data analysis

The collected data was analyzed incrementally by starting with a simple model and then moving on to more complex ones. In the first model, only the control variables of gender, age, and IT experience were hypothesized to act as direct antecedents of strain. In the second model, stressors, distress venting, distancing from IT, and IT control were added as additional, direct antecedents of strain. In the third model, distress venting, distancing from IT, and IT control were additionally hypothesized to act as first-order moderators for the effect of stressors on strain (three two-way interactions). Finally, in Model 4, IT control was additionally hypothesized to act both as a second-order moderator for the aforementioned first-order moderations by distress venting and distancing from IT (two three-way interactions) and as a first-order moderator for the effects of distress venting and distancing from IT on strain (two two-way interactions) in order to include all the main effects and the first-order moderations underlying the second-order moderations as advised by Aiken et al. (1991).

For statistical analyses, we used the IBM SPSS Statistics 24 and the Mplus version 7.11 software. The SPSS software was used for data preparation and preliminary analysis, whereas the Mplus software was used for the structural equation modelling (SEM) analysis. Because of the potential deviations from normality in the indicator variables, we used as the model estimator the MLR option of Mplus, which stands for maximum likelihood estimator robust to non-normal data. The potential missing values were handled by using the FIML option of Mplus, which stands for full information maximum likelihood and uses all the available data in the model estimation. The interaction effects in Models 3 and 4 were estimated using the latent moderated structural equation (LMS) method developed by Klein and Moosbrugger (2000) and Monte Carlo integration with a total of 10,000 integration points. This enables the simultaneous estimation of all the model parameters in contrast to the traditional two-step methods, in which the parameters of the measurement and structural models are typically estimated separately.

Results

Indicator reliability and validity

Indicator reliability and validity was assessed using the standardized loadings and residuals of the model indicators. In a case where each indicator loads on only one construct, it is commonly expected that the standardized loading (λ) of each indicator should be statistically significant and greater than or equal to 0.707 (Fornell and Larcker 1981). This is equal to the standardized residual ($1 – \lambda^2$) of each indicator being less than or equal to 0.5, meaning that at least half of the variance of each indicator is explained by the construct on which it loads. However, in IS, also indicator loadings of as low as 0.5 or 0.4 have been commonly considered as acceptable (Gefen et al. 2000). The only indicator that did not meet neither of these criteria was DIS3 (“When IT problems occur at work, I do my best to get out of the situation”). Thus, after assessing that there would be no adverse effects on the content validity of the DIS construct, we decided to eliminate it and to re-estimate the model. The results of this re-estimation are reported in Annex 1. As can be seen, the latter, less stringent criterion was met by all the indicators. In addition, the former, more stringent criterion was met by all the indicators except for DIS4 and VEN4. Thus, overall, the indicator reliability and validity could be considered to be at an acceptable level.

Construct reliability and validity

Construct reliability was assessed by using the composite reliability (CR) suggested by Fornell and Larcker (1981), with which it is commonly expected that each construct should have a CR greater than or equal to 0.7 in order for it to exhibit satisfactory reliability (Nunnally and Bernstein 1994). The CR of each construct is reported in the first column of Table 2. As can be seen, all the constructs met this criterion.

	CR	AVE	STR	TO	TI	TC	TIS	VEN	DIS	CAP	AUT	TS	CON
STR	0.917	0.734	0.857										
TO	0.902	0.650	0.583***	0.806									
TI	0.874	0.698	0.642***	0.677***	0.835								
TC	0.901	0.647	0.665***	0.702***	0.773***	0.804							
TIS	0.903	0.651	0.705***	0.744***	0.819***	0.849***	0.807						
VEN	0.863	0.615	0.625***	0.586***	0.646***	0.669***	0.709***	0.784					
DIS	0.857	0.674	0.490***	0.448***	0.493***	0.511***	0.542***	0.638***	0.821				
CAP	0.854	0.661	0.037	0.126***	0.138***	0.143***	0.152***	0.149***	0.141***	0.813			
AUT	0.844	0.645	0.045	0.154***	0.170***	0.176***	0.186***	0.182***	0.172***	0.816***	0.803		
TS	0.929	0.766	0.743***	0.784***	0.864***	0.895***	0.949***	0.748***	0.571***	0.160***	0.196***	0.875	
CON	0.908	0.833	0.045	0.154***	0.170***	0.176***	0.186***	0.182***	0.172***	0.816***	1.000[a]	0.196***	0.913

Table 2: Assessment of construct reliability and validity

(Diagonal axis represents square roots of average variance extracted. CR=Composite reliability, AVE=Average variance extracted, STR=Strain, TO=Techno-overload, TI=Techno-invasion, TC=Techno-complexity, TIS=Techno-insecurity, VEN=Distress venting, DIS=Distancing from IT, CAP=Capability, AUT=Autonomy, TS=Stressors, CON=IT control, *** = p < 0.001, a = error variance fixed to 0 in order to avoid a negative error variance in model estimation)

Construct validity was assessed by examining the convergent and discriminant validity of the constructs, which were assessed using the two criteria suggested by Fornell and Larcker (1981). They are both based on the average variance extracted (AVE) of the constructs, which refers to the average proportion of variance that a construct explains in its indicators. In order to exhibit satisfactory convergent validity, the first criterion requires that each construct should have an AVE greater than or equal to 0.5, meaning that, on average, each construct should explain at least half of the variance of its indicators. The AVE of each construct is reported in the second column of Table 2. As can be seen, all the constructs met this criterion. In order to exhibit satisfactory discriminant validity, the second criterion requires that each construct should have a square root of AVE greater than or equal to its absolute correlation with the other constructs. This means that, on average, each construct should share at least an equal proportion of variance with its indicators than it shares with the other constructs. The square root of AVE of each construct (on-diagonal cells) as well as the correlations between the constructs and their statistical significance (off-diagonal cells) are reported in the remaining columns of Table 2. As can be seen, all the constructs met also this criterion, when excluding the expected high correlations of the second-order constructs TS and CON with the first-order constructs TO, TI, TC, and TIS as well as CAP and AUT acting as their reflective indicators.

Common method variance and bias

The potential common method variance (CMV) in the model indicators and common method bias (CMB) in the model estimates were examined by using two methods. First, we applied the Harman's single factor test (Podsakoff et al. 2003) by estimating a model in which all the model indicators loaded on a single factor. This test suggested the absence of serious CMV in the model indicators with a bad fit with the data ($\chi^2(560) = 9008.511$, $p < 0.001$, CFI = 0.612, TLI = 0.588, RMSEA = 0.118, SRMR = 0.112). Second, we applied the CFA marker technique by Williams et al. (2010). As a marker variable, we used a theoretically unrelated fashion consciousness construct, which has been previously used as a marker variable in the IS context by Malhotra et al. (2006). The results of the model comparisons associated with the CFA marker technique are reported in Table 3. As a criterion for model fit, we used the χ^2 difference test, in which the $\Delta\chi^2$ value was corrected with the Satorra-Bentler scaling correction factor (SCF) due to the usage of the MLR estimator in estimating the models (Satorra and Bentler 2010). First, we compared the baseline model with zero constrained loadings between the marker variable and the model indicators to the Method-C model with equally constrained loadings between the marker variable and model indicators. This comparison suggested that the Method-C fitted the data better than the baseline model, meaning that there was CMV in the model indicators. Second, we compared the constrained Method-C model with the unconstrained Method-U model that specified no constrains for the loadings between the marker variable and the model indicators. This comparison suggested that the Method-U model fitted the data better than the Method-C model, meaning that the CMV in the model indicators seemed to be congeneric rather than non-congeneric in nature (Richardson et al. 2009). Finally, we also examined whether the CMV in the model indicators resulted in CMB in the model estimates by testing the equality of the correlations between the model constructs obtained from the Method-U model with those obtained from the baseline model. This was done by using the Wald test, which suggested a statistically significant difference ($W(36) = 102.784$, $p < 0.001$). The results suggest that on average, CMV was found to account for only about 9.0 % of the total variance in the model indicators, which is relatively little when compared to the average figures of 15.8% in marketing, 23.8% in other business areas (mainly management), 28.9% in psychology and sociology, and 30.5% in education (Cote and Buckley 1987). In addition, when we re-estimated all the models reported in the next sub-section with the marker variable added to them, only marginal differences were observed with the effect of DIS on STR in models 2 and 4 as well as the effect of gender on STR and the three-way interaction TS x VEN x CON in model 4. Summarizing the results, we do not consider common method variance and bias as significant concerns in our data sample.

Model	χ^2	df	SCF	$\Delta\chi^2$	Δdf	p
Baseline	1,995.461	634	1.1994	–	–	–
Method-C	1,782.834	633	1.1981	127.252	1	< 0.001
Method-U	1,588.573	599	1.2040	204.150	34	< 0.001

Table 3: Results of CFA marker technique

Model estimation

The estimation results for the four models are reported in Table 4 in terms of the effect sizes of each variable on STR as well as their statistical significance (* = $p < 0.1$, ** = $p < 0.01$, and *** = $p < 0.001$), the proportion explained variance (R^2) in STR, and the potential change in the proportion of explained variance (ΔR^2) in STR when compared to the previous model. All the effect sizes are reported as unstandardized in order avoid the ambiguities in interpreting the interaction effects as mentioned by Aiken et al. (1991). The proportions of explained variance for Models 3 and 4 were not reported automatically by the Mplus software due to the usage of the LMS method in model estimation, so they were calculated manually from the model estimates by following the formulas by Maslowsky et al. (2014) as well as Muthén and Asparouhov (2015). The goodness-of-fit statistics for Models 1 and 2 as well as the results of the log-likelihood ratio tests that were used to examine the goodness-of-fit of Models 3 and 4 are reported in Annex 2.

Model 1, which contained only the direct effects of the three control variables on STR, performed very poorly in terms of the proportion of explained variance. In total, it was able to explain only about 4.8% of the variance in STR. Women (coded 1) were found to be slightly less strained in comparison to men (coded 0). In addition, strain seemed to decrease with IT experience. However, both of these effects were relatively weak, meaning that the three control variables by themselves are not particularly helpful in explaining the examined phenomena.

Model 2, which hypothesized also the effects of TS, VEN, DIS, and CON on STR, performed much better in comparison to Model 1 in terms of the proportion of explained variance. In total, it was able to explain about 58.2% (+53.4%) of the variance in STR. Stressors were found to have by far the strongest increasing effect on STR, followed by CON and VEN, of which the former was found to have a decreasing effect and the latter was found to have an increasing effect. The effect of DIS on STR was found to be statistically not significant. Thus, H1 was supported.

Model 3, which additionally hypothesized VEN, DIS, and CON as first-order moderators for the effect of TS on STR, performed somewhat better in comparison to Model 2 in terms of the proportion of explained variance. In total, it was able to explain about 62.2% (+4.0%) of the variance in STR. Of the added moderations, only the moderation by VEN was found to be statistically significant, so that the effect size of TS on STR decreased with higher scores of VEN and increased with lower scores of VEN. Thus, H2 was supported, whereas H3 was not.

Model 4, which additionally hypothesized CON both as a second-order moderator for the aforementioned first-order moderations by VEN and DIS and as a first-order moderator for the effects of VEN and DIS on STR, performed only slightly in comparison to Model 3 in terms of the proportion of explained variance. In total, it was able to explain about 64.4% (+2.2 %) of the variance in STR. Of the added moderations, only the second-order moderation of the first-order moderation by VEN was found to be statistically significant, so that the effect size of the moderation increased with lower scores of CON and decreased with higher scores of CON. The second-order moderation of the first-order moderation by DIS was not statistically significant. Thus, H4a was supported and H4b was not.

Item	Model 1	Model 2	Model 3	Model 4
Gender	-0.153*	0.091*	0.090*	0.092
Age	-0.006	-0.003	-0.003	-0.003
IT experience	-0.023***	0.000	-0.001	-0.001
TS	–	0.957***	0.979***	0.963***
VEN	–	0.145*	0.210**	0.215**
DIS	–	0.056	0.050	0.064*
CON	–	-0.163***	-0.155***	-0.184**
TS x VEN	–	–	-0.118*	-0.171**
TS x DIS	–	–	0.013	0.053
TS x CON	–	–	-0.027	0.077
VEN x CON	–	–	–	-0.057
DIS x CON	–	–	–	-0.091
TS x VEN x CON	–	–	–	0.188*
TS x DIS x CON	–	–	–	-0.139
R^2	0.048	0.582	0.622	0.644
ΔR^2	–	0.534	0.040	0.022

Table 4: Results of model estimation

In terms of the results reported in Table 4, it is important to note the change in the interpretation of the effect of TS on STR between Model 2 and Models 3 and 4. In Model 2, its size can be expressed with only one value, which is independent of the scores of VEN, DIS, and CON. In contrast, in Models 3 and 4, the effect becomes conditional and its size dependent on the scores of VEN, DIS and CON. If the score of all the three constructs is equal to the mean score of the construct (i.e., zero, because the constructs are mean-centered), the effect size is equal to the value listed on row four of Table 4 (which also lists the size of the unconditional effect in the case of Model 2). However, if the scores of the three constructs change, the effect size changes in proportion to the coefficients reported on rows eight and nine in the case of Model 3 and additionally rows 10, 13, and 14 in the case of Model 4. In other words, in Models 3 and 4, the effect size of TS on STR cannot be expressed with only one value as in Model 2.

In order to illustrate the effect of TS on STR as the scores of VEN and CON change, Table 5 reports its size and statistical significance with low, medium, and high scores of VEN and CON. In addition, Figure 2 plots the interactions graphically. Here, in line with Aiken et al. (1991), the low and high scores refer to the scores that are one standard deviation below or above the mean score of the construct, whereas the medium level refers to no deviation from the mean score of the construct (i.e., zero, because the constructs are mean-centered). As can be seen, the effect of TS on STR was found to be moderated by VEN especially with lower scores of CON.

	Low CON	Medium CON	High CON
Low VEN	1.199***	1.125***	1.050***
Medium VEN	0.906***	0.963***	1.020***
High VEN	0.613***	0.801***	0.990***

Table 5: Effect of stressors (TS) on strain (STR) with low, medium, and high scores of distress venting (VEN) and IT control (CON)

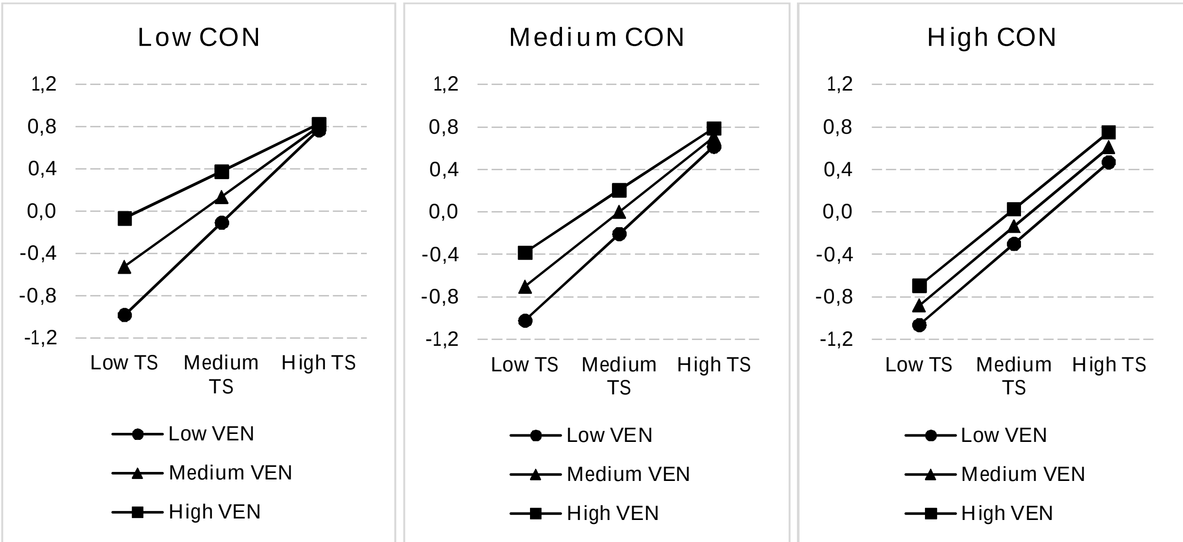

Figure 2. Plotted interactions with low, medium, and high scores of stressors (TS), distress venting (VEN), and IT control (CON)

Discussion of Results

Our study answers the call for research on ways IT users themselves can tackle technostress in organizations (D'Arcy et al. 2014a; Pirkkalainen and Salo 2016) through coping mechanisms. To the authors' best knowledge, this study is the first empirical investigation of emotional coping mechanisms in the technostress mitigation context. We examined emotional coping responses (distress venting and distancing from IT) in relation to stressor-strain relationship, and illustrated the interrelation of the coping responses and IT control. The findings suggest the following:

1) The emotional coping responses can to some extent serve as buffers between stressors and strain. The results show that IT users can deal with the demands of stressful usage situations in organizations with distress venting (H2). However, distancing from IT was shown to have no effect at all on stressor-strain relationship (H3). The lack of support for H3 is not fully surprising as the results on distancing have been inconsistent in stress research and the effectiveness of emotional coping responses is likely to differ based on the measured outcomes (Folkman and Moskowitz 2004).

2) Despite being able to ventilate feelings and alleviating strain as stressors emerge, the results showed that emotional coping responses are not always helpful. In fact, both distress venting and distancing from IT are associated with increased strain.

3) Finally, our results showed that IT control is not only strongly associated with reduced strain but can have a role in steering these potentially negative effects of the emotional coping behaviors towards more positive outcomes. The findings on this respect are interesting as distress venting can be an effective buffer between stressors and strain with low IT control while with high IT control it is ineffective (H4). Thus, the effect of the emotional response is partly diminished by IT control. These nuanced findings also illustrate that high distress venting might not be a favorable mechanism because although it may act as an effective stress-buffer in conjunction with low IT control, this positive effect is often overcome by the negative direct effects of these two conditions (stressors and distress venting) on strain (see Figure 2). Distancing from IT did not buffer stressor-strain relationship nor was it moderated by IT control.

Theoretical contributions

The first contribution derives from the entire research model. This article takes the first steps to empirically investigate individuals' own coping mechanisms to deal with technostress in the organizational context. This research stream has been missing in the IS domain despite the importance of the phenomenon, which is argued in other disciplines such as psychology. Our study uncovers emotional coping mechanisms that are responses to stressful IT use situations and examines individuals own ways of combatting technostress. We theoretically extend on the concepts of distress venting and distancing that were previously discussed in stress research as emotional coping responses to stressors (Carver and Connor-Smith 2010; Folkman and Moskowitz 2004) and uncover their purpose and role in technostress mitigation in the organizational context.

The second contribution is based on hypothesis 4 in particular. We advance the understanding in IS and technostress regarding the role of self-regulation as means to steer emotional responses. The self-regulation perspective, which aims to see how certain resources of an individual can steer the coping efforts towards more positive outcomes, has been under discussion in stress research for quite some time now while still remaining a less-understood coping phenomenon (Skinner et al. 2007; Schwarzer and Schwarzer 1996; Aspinwall and Taylor 1997; Folkman and Moskowitz 2004). We evidenced that such influence does exist between IT control and distress venting. This takes us directly to more specific, result-driven contributions.

The third contribution derives from hypotheses 2 and 4. The results show how the distress venting is associated with mixed outcomes. While distress venting can bring actual benefits as emotional coping response to stressors (H2), our findings show that distress venting itself is associated with increased strain. Further and most importantly, distress venting seems to be a favorable mechanism only with low IT control (H4). We complement and partly validate the findings of Carver et al. (1989) and Baumeister et al. (1996), who initially related the lack of control to ventilation of distress. By these results, we draw a clearer understanding of the maladaptive nature of emotional coping responses as discussed in stress research by Folkman and Moskowitz (2004) and Carver et al. (1989).

The fourth theoretical contribution derives from hypothesis 2 and 4. Our study shows how IT control provides shelter over stressful situations. IT control can mitigate stressful IT use encounters by directly reducing strain and also, influence the effect of the emotional coping responses to the extent that distress venting becomes irrelevant from the perspective of technostress mitigation. Our findings illustrate how distress venting, which can be a highly maladaptive mechanism in the long-run (Carver and Connor-Smith 2010), may not be essential coping mechanism when IT users perceive themselves as capable and in control of IT. The role of IT control in coping is of high importance because it shows how resource accumulation and mastery are critical assets for reaching desirable outcomes. These results provide strong contributions to IS research by shaping our understanding of coping mechanisms and their effectiveness in stressful IT use situations.

Practical contributions

Our study has several practical implications. First, IT users can, to some extent, mitigate the negative effects of stressors on strain by distress venting. While users can in some cases ease their frustration by airing out their emotions during the stressful situation, it appears that individuals cannot use distancing from IT (e.g. trying not to think about the problem) to alleviate strain. Therefore, it is safe to say based on these results that these two emotional coping responses differ from each other. We advise IT users to be cautious as both of the emotional responses are associated with increased strain. In sum, IT users could assess their responses to stressful situations and, when necessary, revisit them. This would prevent the two emotional coping responses from becoming repetitive rumination in the long-run.

Second, IT control does matter in terms of technostress mitigation. As shown in this study, users' personal perceptions of their control over work IT is associated with reduced strain and the two emotional coping responses do not seem to be relevant with high IT control. Even though organizations typically decide which IT products and services their employees use, the users themselves can often control how they use those IT products and services. A typical example of a stress-causing IT is email. The organization usually has a particular email provider and client, but there are numerous ways to use such an email system. If the job allows, it often remains up to the users' own choice whether they (A) keep their email open every single minute or dedicate certain email-free hours for other work tasks, (B) receive visual and sound notifications from incoming emails, (C) utilize browser-based system or a software client or (D) use a desktop or mobile device to read emails. Thus, the users could increase their perception of control by identifying various potential ways of using a particular IT. This naturally applies to organizations as well. As technostress-creating conditions cannot be fully prevented in workplaces, investing and allocating time for employees' personal development can pay off. The organizations could also educate and demonstrate their employees regarding the various ways of using IT and encourage the employees to choose the ways that have the best fit for them. This would assumedly increase the employees' perception of control over their work IT even though using certain IT would be mandatory per se. Finally, we encourage organizations to be conscious about the fact that distress venting might be a vital coping mechanism for individuals who do not see themselves as highly capable IT users. Emotional outbursts may well enable them to retain their well-being.

Limitations and future outlook

Despite its fruitful findings, this study had several limitations. First, we focused only on two emotional coping responses in our study. We do acknowledge that many other types of coping could be used to deal with stressful IT use encounters. We see this study especially as a discussion-opener for understanding individuals own ways to tackle technostress. We also believe the emotional coping perspectives uncovered in this study provide a good basis for upcoming research. Second, we conducted multiple tests for common method variance (CMV) and bias (CMB) of which the CFA marker technique indicated that CMV and CMB might affect the indicators and estimates of the study. However, further analysis showed that such potential influence would not jeopardize the validity of the model. The potential threat of CMV was first omitted as CMV accounted only for less than 9% of the model indicators' total variance. Based on the marker technique, CMB could still have remained a concern for our study. However, only marginal changes were observed in model estimates when controlling for CMB by using the CFA marker technique.

The role of self-regulation (i.e. certain skills and mindsets) of individuals is especially promising to study further. Several stress researchers have argued that the intertwined nature of coping mechanism is still a largely under-developed research area (Folkman and Moskowitz 2004; Schwarzer and Knoll 2008). We encourage other IS researchers to study not only differing coping mechanisms (e.g., problem-focused and emotion-focused coping) but also the interdependency of those mechanisms. We especially encourage to revisit distancing from IT which did not seem to play a role in stressor-strain buffering context. However, the effectiveness of emotional coping responses may well differ with other technostress outcomes (Folkman and Moskowitz 2004). We would suggest studying productivity and performance-related factors that could uncover the actual potential and nature of IT control and coping mechanisms in technostress mitigation.

In terms of the research methods applied, we argue that the incorporation of second-order moderations is highly helpful and can, as illustrated in this article, provide even more comprehensive understanding of IT users' behavior. Finally, this study addresses the self-regulation only from the perspective of IT control. Our intention is to extend our study with other types such as rationalization and efficacy-related actions, which can shed even more light on this under-explored field.

Conclusion

The phenomenon of technostress not only sets major demands for managing training and competence development of the workforce during dramatic organizational changes but also requires a good understanding of how employees can cope with varying demands set by IT. We believe that we can learn a great deal by looking deeper into the daily practices of IT users themselves. This research takes us one step further down that path and provides a good basis for upcoming studies in coping with technostress.

References

Addas, S., and Pinsonneault, A. 2015. "The many faces of information technology interruptions: a taxonomy and preliminary investigation of their performance effects," Information Systems Journal. 25(3), pp.231-273.

Aiken, L. S., West, S. G., and Reno, R. R. 1991. Multiple regression: Testing and interpreting interactions. Sage.

Aspinwall, L. G., and Taylor, S. E. 1997. "A stitch in time: self-regulation and proactive coping," Psychological bulletin, (121:3), pp. 417–436.

Ayyagari, R., Grover, V., and Purvis, R. 2011. "Technostress: Technological Antecedents and Implications," MIS quarterly, (35:4), pp. 831–858.

Ajzen, I. 1991. "The theory of planned behavior," Organizational Behavior and Human Decision Processes, (50), pp. 179–211.

Bandura, A. 1991. "Social cognitive Theory of Self-Regulation," Organizational Behavior and Human Decision Processes, (50), pp. 248–287.

Baumeister, R. F., Heatherton, T. F., Baumeister, R. F., and Heatherton, T. F. 1996. "Self-Regulation Failure: An Overview," Psychological Inquiry, (7:1), pp. 1–15.

Beaudry, A., and Pinsonneault, A., 2005. "Understanding user responses to information technology: a coping model of user adaptation.," MIS Quarterly, (29:3), pp. 493-524.

Beaudry, A., and Pinsonneault, A. 2010. "The Other Side of Acceptance: Studying the Direct and Indirect Effects of Emotions on Information Technology Use," MIS Quarterly, (34:4), pp. 689–710.

Bentler, P.M. and Bonett, D.G. 1980. "Significance tests and goodness of fit in the analysis of covariance structures," Psychological bulletin, (88:3), p.588.

Brod, C. 1982. "Managing technostress: Optimizing the use of computer technology," Personnel Journal, (61:10), pp. 1986–753.

Bulgurcu B.; Cavusoglu, H.; and Benbasat, I. 2010. "Information security policy compliance: An empirical study of rationality-based beliefs and information security awareness," MIS Quarterly, (34:3), pp. 523–548.

Bushman, B. J., Baumeister, R. F., and Phillips, C. M. 2001. "Do People Aggress to Improve Their Mood? Catharsis Beliefs, Affect Regulation Opportunity, and Aggressive Responding," Journal of Personality and Social Psychology (81:1), pp. 17-32.

Carver, C. S., and Connor-Smith, J. 2010. "Personality and coping," Annual review of psychology, (61), pp. 679–704.

Carver, C. S., Scheier, M. F., and Weintraub, J. K. 1989. "Assessing coping strategies: a theoretically based approach," Journal of personality and social psychology, (56:2), pp. 267–283.

Clarke, A. T. 2006. "Coping with Interpersonal Stress and Psychosocial Health Among Children and Adolescents: A Meta-Analysis," (35:1), pp. 11–24.

Cooper, G.L., Dewe, P.J.n and O'Driscoll, M.P. 2001. Organizational Stress: A Review and Critique of Theory, Research, and Applications. Thousand Oaks: Sage Publications Inc.

Cote, J. A., and Buckley, M. R. 1987. "Estimating Trait, Method, and Error Variance: Generalizing across 70 Construct Validation Studies," Journal of Marketing Research, JSTOR, pp. 315–318.

D'Arcy, J., Gupta, A., Tarafdar, M., and Turel, O. 2014a. "Reflecting on the dark side of information technology use," Communications of the Association for Information Systems, (35:5), pp. 109–118.

D'Arcy, J., Herath, T., and Shoss, M. 2014b. "Understanding Employee Responses to Stressful Information Security Requirements: A Coping Perspective," Journal of Management Information Systems, (31:2), pp. 285–318.

Fadel, K. J. and Brown, S. A. 2010. "Information systems appraisal and coping: The role of user perceptions," Communications of the Association for Information Systems, (26), pp. 107–126.

Fishbein, M. and Ajzen, I., 2011. Predicting and changing behavior: The reasoned action approach. Taylor & Francis.

Folkman, S., and Lazarus, R. S. 1988. "Coping as a mediator of emotion," Journal of Personality and Social

Psychology, (54), pp. 466–475.
Folkman, S., and Moskowitz, J. T. 2004. “Coping: pitfalls and promise.,” Annual review of psychology, (55), pp. 745–774.
Fornell, C. and Larcker, D.F. 1981. “Structural equation models with unobservable variables and measurement error: Algebra and statistics,” Journal of marketing research, pp.382-388.
Galluch, P., Grover, V., and Thatcher, J. 2015. “Interrupting the workplace: Examining stressors in an information technology context,” Journal of the Association for Information Systems, (16:1), pp. 1–47.
Gefen, D., Straub, D., & Boudreau, M. C. 2000. “Structural equation modeling and regression: Guidelines for research practice,” Communications of the association for information systems, (4:1), 7.
Gefen, D., Straub, D. W., and Rigdon, E. E. 2011. “An Update and Extension to SEM Guidelines for Admnistrative and Social Science Research,” Management Information Systems Quarterly (35:2), Iii--Xiv.
Hu, L.T. and Bentler, P.M. 1999. “Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives,” Structural equation modeling: a multidisciplinary journal, (6:1), pp.1-55.
Klein, A. and Moosbrugger, H. 2000. “Maximum likelihood estimation of latent interaction effects with the LMS method,” Psychometrika, (65:4), pp.457-474.
Klinger, E. 1975. “Consequences of commitment to and disengagement from incentives,” Psychological Review, (82), pp. 1-25.
Lazarus RS. 1966. Psychological Stress and the Coping Process. New York: McGraw-Hill.
Lazarus, R. S., and Folkman, S. 1984. Stress, appraisal and coping. New York: Springer.
Leiter, M.P. 1991. “Coping patterns as predictors of burnout: the function of control and escapist coping patterns,” Journal of Organizational Behavior, (12), pp. 123–144.
Liang, H., and Xue, Y. 2009. “Avoidance of Information Technology Threats: A Theoretical Perspective,” MIS Quarterly, (33:1), pp. 71–90.
Littleton H, Horsley S, John S, Nelson DV. 2007. “Trauma coping strategies and psychological distress: a meta-analysis,” Journal of Traumatic Stress, (20), pp. 977–88.
Lowry, B., Zhang, J., Wang, C., and Siponen, M. 2016. “Why do adults engage in cyberbullying on social media? An integration of online disinhibition and deindividuation effects with the social structure and social learning (SSSL) model,” Information System Research, (9), pp. 962–986.
Malhotra, N. K., Kim, S. S., and Patil, A. 2006. “Common Method Variance in IS Research: A Comparison of Alternative Approaches and a Reanalysis of Past Research,” Management Science (52:12), INFORMS, pp. 1865–1883.
Maslowsky, J., Jager, J. and Hemken, D. 2014. “Estimating and interpreting latent variable interactions: A tutorial for applying the latent moderated structural equations method,” International Journal of Behavioral Development (39:1), pp. 87–96.
Moore, J.E. 2000. “One Road to Turnover: An Examination of Work Exhaustion in Technology Professionals,” MIS Quarterly, (24:1), pp. 141–168.
Moskowitz JT, Hult JR, Bussolari C, Acree M. 2009. “What works in coping with HIV? A meta-analysis with implications for coping with serious illness,” Psychological Bullettin, (135), pp. 121–41.
Muthén, B. and Asparouhov T. 2015. Latent variable interactions. https://www.statmodel.com/download/LVinteractions.pdf
Nunnally, J.C. and Bernstein, I.H. 1994. “The assessment of reliability,” Psychometric theory, (3:1), pp.248-292.
O’Brien, T. B., and DeLongis, A. 1996. “The Interactional Context of Problem-, Emotion-, and Relationship-Focused Coping: The Role of the Big Five Personality Factors,” Journal of Personality, (64:4), pp. 775–813.
Penley, J. A., Tomaka, J., and Wiebe, J. S. 2002. “The Association of Coping to Physical and Psychological Health Outcomes: A Meta-Analytic Review,” (25:6).
Pirkkalainen, H., and Salo, M. 2016. “Two Decades of the Dark Side in the Information Systems Basket: Suggesting Five Areas for Future Research,” in Proceedings of the European Conference on Information Systems (ECIS), Istanbul: Turkey.
Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. 2003. “Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies.,” Journal of

Applied Psychology (88:5), American Psychological Association, p. 879.
Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., and Tu, Q. 2008. "The consequences of technostress for end users in organizations: Conceptual development and validation," Information Systems Research, (19:4), pp. 417–433.
Richardson, H. A., Simmering, M. J., and Sturman, M. C. 2009. "A Tale of Three Perspectives: Examining Post Hoc Statistical Techniques for Detection and Correction of Common Method Variance," Organizational Research Methods (12:4), Sage Publications Sage CA: Los Angeles, CA, pp. 762–800.
Satorra, A. and Bentler, P.M. 2010. "Ensuring positiveness of the scaled difference chi-square test statistic," Psychometrika, (75:2), pp.243–48.
Scheff, T. J. 1979. Catharsis in healing, ritual, and drama. Berkeley: University of California Press.
Scheier, M. F., Carver, C. S., and Bridges, M. W. 1994. "Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a reevaluation of the Life Orientation Test.," Journal of personality and social psychology, (67:6), pp. 1063–1078.
Schwarzer, R., and Knoll, N. 2008. "Positive Coping: Mastering Demands and Searching for Meaning," Handbook of Positive Psychological Assessment, pp. 1–27.
Schwarzer, R. & Schwarzer, C. (1996). A critical survey of coping instruments. In M. Zeidner & N. S. Endler (Eds.), Handbook of coping: Theory, research and applications (pp. 107- 132). New York: Wiley.
Skinner, E. A., and Zimmer-Gembeck, M. J. 2007. "The development of coping," Annual Review of Psychology, (58), pp. 119–144.
Srivastava, S. C., Chandra, S., and Shirish, A. 2015. "Technostress creators and job outcomes: theorising the moderating influence of personality traits," Information Systems Journal, (25:4), pp. 355–401.
Stein, M.-K., Newell, S., Wagner, E. L., and Galliers, R. D. 2015. "Coping with information technology: Mixed emotions, vacillation, and nonconforming use patterns," MIS Quarterly, (39:2), pp. 367–392.
Tarafdar, M., Gupta, A., and Turel, O. 2015a. "Special issue on 'dark side of information technology use': an introduction and a framework for research," Information Systems Journal, (25:3), pp. 161–170.
Tarafdar, M., Pullins, E. B., and Ragu-Nathan, T. S. 2015b. "Technostress: negative effect on performance and possible mitigations," Information Systems Journal, (25:2), pp. 103–132.
Tarafdar, M., Tu, Q., Ragu-Nathan, B., and Ragu-Nathan, T. 2007. "The Impact of Technostress on Role Stress and Productivity," Journal of Management Information Systems, (24:1), pp. 301–328.
Thau, S., Bennett, R. J., Mitchell, M. S., and Marrs, M. B. 2009. "How Management Style Moderates the Relationship between Abusive Supervision and Workplace Deviance: An Uncertainty Management Theory Perspective," Organizational Behavior and Human Decision Processes (108:1), pp. 79-92.
Ward, J., and Ostrom, A. 2002. "Motives for posting negative word of mouth communications on the Internet," Advances in Consumer Research, 29.
Williams, L. J., Hartman, N., and Cavazotte, F. 2010. "Method Variance and Marker Variables: A Review and Comprehensive CFA Marker Technique," Organizational Research Methods (13:3), SAGE Publications Sage CA: Los Angeles, CA, pp. 477–514.

Annex 1: Measurement items

Item	Loading	Mean	SD
STR1 I feel drained from activities that require me to use IT at work	0.826***	2.626	1.327
STR2 I feel tired from my IT activities at work	0.870***	2.592	1.318
STR3 Working all day with IT at work is a strain for me	0.849***	2.650	1.338
STR4 I feel burned out from my IT activities at work	0.882***	2.468	1.305
TO1 I am forced to work much faster because of work IT	0.751***	2.923	1.248
TO2 I am forced to do more work than I can handle because of work IT	0.864***	2.627	1.335
TO3 I am forced to work with very tight time schedules because of work IT	0.875***	2.761	1.335
TO4 I am forced to change my work habits to adapt to new IT	0.733***	2.986	1.333
TO5 I have a higher workload because of increased IT complexity	0.798***	2.868	1.367
TI1 I spend less time with my family due to work IT	0.840***	2.356	1.364
TI2 I have to be in touch with my work even during my vacation due to work IT	0.780***	2.628	1.456
TI3 I feel my personal life is being invaded by work IT	0.883***	2.416	1.423
TC1 I do not know enough about my work IT to handle my job satisfactorily	0.805***	2.082	1.317
TC2 I need a long time to understand and use new and use new IT	0.856***	2.194	1.287
TC3 I do not find enough time to study and upgrade my IT skills	0.767***	2.430	1.347
TC4 I find new recruits to this organization know more about IT than I do	0.726***	2.614	1.322
TC5 I often find it too complex for me to understand and use new IT	0.859***	2.208	1.275
TIS1 I feel a constant threat to my job security due to new IT	0.874***	2.077	1.323
TIS2 I have to constantly update my skills to avoid being replaced	0.713***	2.600	1.437
TIS3 I am threatened by coworkers with newer IT skills	0.859***	2.107	1.288
TIS4 I do not share my knowledge with my coworkers for the fear of being replaced	0.816***	2.050	1.308
TIS5 I feel there is less sharing of knowledge among coworkers for coworkers for the fear of being replaced	0.761***	2.258	1.345
CAP1 If I wanted to, I would be able to use IT at work the way I want	0.818***	3.738	1.111
CAP2 I believe I have the ability to use IT at work the way I want	0.854***	3.766	1.144
CAP3 I see myself as capable of using IT at work the way I want	0.765***	3.931	1.057
AUT1 I feel in complete control over how I use IT to support my work tasks	0.705***	3.845	1.123
AUT2 How I use IT at work is work is completely up to me	0.859***	3.461	1.246
AUT3 There is nothing that prevents me from using IT at work the way I want	0.837***	3.342	1.260
When IT problems occur at work...			
VEN1 ...I get mad and tell everyone about my IT problems	0.785***	2.228	1.208
VEN2 ...I lose my temper and curse for example	0.848***	1.980	1.234
VEN3 ...I take my IT problems out on my family, my friends, and other people	0.835***	1.786	1.272
VEN4 ...I let my feelings out	0.653***	2.577	1.175
DIS1 ...I try to keep away from the IT that created the problems	0.886***	2.577	1.292
DIS2 ...I separate myself as much as possible from the IT that created the problems	0.932***	2.510	1.296
DIS4 ...I turn to other activities to take my mind off the IT problems	0.607***	2.713	1.215

Table 6: Measurement items (*** = $p < 0.001$)

Annex 2: Goodness-of-fit statistics and log-likelihood ratio tests

In accordance with the guidelines by Gefen et al. (2011), the goodness of-fit of Models 1 and 2 was assessed by using the χ^2 test of model fit and four alternative fit indices that have been recommended in recent methodological literature (Hu and Bentler 1999; Hooper et al. 2008): the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Together, they assess the model fit comprehensively from both relative (CFI and TLI) and absolute (RMSEA and SRMR) perspectives (Hooper et al. 2008). These goodness-of-fit statistics are reported in Table 7. As it is typical for models estimated by using large sample sizes (Gefen et al. 2011), the χ^2 test of model fit of rejected the null hypothesis of the model fitting the data in the case of both the models. However, in the case of both models, acceptable fit was supported by the four fit indices, whose values met the respective cut-off criteria (CFI ≥ 0.90, TLI ≥ 0.90, RMSEA ≤ 0.06, and SRMR ≤ 0.08,) suggested by Hu and Bentler (1999) as well as Gefen et al. (2011).

	Model 1	Model 2	Model 3	Model 4
$\mathbf{X}^2$	62.290	2,117.799	–	–
df	11	647	–	–
p	< 0.001	< 0.001	–	–
CFI	0.977	0.936	–	–
TLI	0.963	0.930	–	–
RMSEA	0.065	0.046	–	–
SRMR	0.017	0.071	–	–

Table 7: Goodness-of-fit statistics

For Models 3 and 4, which were estimated by using the LMS method, the χ^2 test of model fit or the aforementioned four fit indices are not available (Maslowsky et al. 2014). Therefore, their goodness-of-fit was assessed by using the log-likelihood ratio test as suggested Maslowsky et al. (2014). The log-likelihood value, the number of free parameters, and the result of the log-likelihood ratio test for both the models are reported in Table 8. In addition, Table 8 reports the Satorra-Bentler scaling correction factor, which was used to correct the value of the test statistic (D) due to the usage of the MLR estimator in estimating the models (Satorra and Bentler 2010). In the case of both the models, the log-likelihood ratio test rejected the null hypothesis of there being no statistically significant loss in the fit of Model 2 in comparison to Model 3 and Model 4. Thus, inversely, we can infer that the goodness-of-fit of both Models 3 and 4 remains better than the goodness-of-fit of Model 2, which was assessed as acceptable above.

	Model 1	Model 2	Model 3	Model 4
Log-likelihood	-5,819.140	-50,145.632	-50,142.938	-50,138.511
Scaling correction factor	1.1973	1.2296	1.2202	1.2187
Free parameters	15	123	126	130
D	–	–	6.454	13.865
df	–	–	3	7
p	–	–	0.091	0.054

Table 8: Results of log-likelihood ratio tests