Distress, Eustress, or No Stress? Explaining Smartphone Users' Different Technostress Responses

Completed Research Paper

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Abstract

Technostress is common and has harmful consequences. Therefore, researchers have shown increasing interest in explaining technostress in the field of information systems (IS). While extant research merits in identifying the causes and consequences of technostress, it has not explained empirically why information technology (IT) users have different responses to similar potentially stressful IT events. Indeed, events such as smartphone failures can derive negative distress responses for some users and positive eustress responses for others. To address this gap in research, we conducted a qualitative study by interviewing users who had experienced smartphone failures. As a contribution, our findings uncover five distinct types of narratives for technostress responses and identify four perceptual dimensions that shape the corresponding responses. As such, we provide an initial answer to the call for understanding users' different interpretations of potentially stressful IT events. Such knowledge can help promoting the favorable outcomes of IT use and minimizing the negative side effects.

Keywords: Technostress, distress, eustress, stimulus-organism-response framework

Introduction

Technostress refers to a situation of stress that an individual experiences due to her/his use of information technology (IT) (Tarafdar et al. 2017). Negative technostress is particularly frequent and widespread with smartphone use: Nearly half consider smartphone use to include stressful situations (Tarafdar et al. 2013) and 27% have at least one smartphone problem every week (Dimensional Research 2015). The importance of technostress is highlighted by its severe outcomes, as it can decrease well-being, harm performance, and even contribute to burnout (Tarafdar et al. 2017).

Researchers have shown increasing interest in understanding technostress, especially in the field of information systems (IS). They have focused on identifying the causes of technostress (technostress creators) as well as its consequences (strains). However, prior studies have overlooked the role of users' interpretations: why users have different technostress responses to similar IT use events. For instance, smartphone failures can derive negative stress responses for some users (namely: distress) and positive stress responses for others (namely: eustress). Empirical explanations for these differences have remained absent in the technostress literature (Tarafdar et al. 2017).

To address this research gap, we asked the following research question: Why do users have different responses to similar potentially stressful IT events (i.e., smartphone failures)? While technostress can manifest in various forms and relate to many types of IT, we chose to focus on smartphone failures because smartphone use is one of the most popular forms of IT use, smartphone failures are a common source of technostress, and failures are usually distinguishable events (or series of events) that users are able to describe. Further, this study pertains to the voluntary use of smartphones for personal purposes. However, the pervasive and personalized nature of smartphones blurs the separations between different contexts (Derks et al. 2015; Lyytinen & Yoo 2002) and, thus, may open up possibilities for applying some of our findings also to other contexts, such as professional use purposes. By smartphone failures, we refer to both system failures (e.g., crashes, bugs, network issues, updates with lost features, unusually slow functioning) and user failures (e.g., mistakenly deleting content and inabilities to find features).

To answer the research question, we conducted a qualitative interview study with an interpretive approach because of its suitability for obtaining detailed accounts of users' real-life smartphone failure experiences and explaining the users' different interpretations of externally similar events (Klein & Myers 1999). In addition to utilizing literature on (techno)stress, we anchored our study on the stimulus-organism-response (S-O-R) framework, which is considered a contemporary foundation for understanding human experiences, including stress (Buxbaum 2016; Lazarus 1993).

As a theoretical contribution, we provide an initial answer to the call for understanding users' different interpretations of potentially stressful IT events (Tarafdar et al. 2015b; 2017). More specifically, we identify five distinct types of narratives for technostress responses. The findings indicate that responses are shaped by four dimensions. By understanding the different developmental paths from smartphone failures to distress, eustress, and no stress, researchers and practitioners can identify whether certain use situations are expected to lead to unfavorable, favorable, or neutral responses. Such identification can help users and IT providers reach more favorable outcomes.

Theoretical Background

Stress is defined as a *"relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being"* (Lazarus & Folkman 1984, p. 19). As such, the concept of stress captures not only the external, potentially stressful events within one's surroundings but also an individual's interpretations of them. While stress can refer to a psychological or physiological (short-term or long-term) situation, the definition—and this study in line with it—approaches stress from the psychological perspective (Lazarus 1993). Furthermore, this study focuses on single events that may trigger stress responses (e.g., referred to as daily stressors by Neupert et al. 2015). Technostress, in turn, is defined as a situation of stress experienced by an individual due to her/his use of IT (Tarafdar et al. 2017). Initially, researchers focused on technostress deriving from the adoption of new IT (e.g., Ragu-Nathan et al. 2008; Tarafdar et al. 2007; 2011), but recent research has studied various post-adoptive IT use events (e.g., Maier et al. 2015a; 2015b; Salo et al. 2017). For example, technostress can be caused by failures and malfunctions of smartphone applications in critical situations.

Previous Technostress Research

While most technostress research has focused on the organizational context (e.g., Ayyagari et al. 2011; Brod 1982; Ragu-Nathan et al. 2008; Tarafdar et al. 2007; 2011; 2015a), technostress has recently been found to present a serious issue in the use of IT for personal purposes (Lee et al. 2014; Luqman et al. 2017; Maier et al. 2015a; 2015b; Salo et al. 2017; 2018). Researchers have examined technostress related to various IT, such as smartphones (e.g., Lee et al. 2014; Hung et al. 2015), social networking services (e.g., Maier et al. 2015a; 2015b), and work devices and applications (e.g., Ayyagari et al. 2011).

Prior studies have focused on identifying the antecedents and consequences of technostress: IT-related stressors that can create technostress as well as strains and negative outcomes of the stressors. Researchers have identified several stressors, including IT-related complexity, overload, invasion, interruptions, privacy concerns, and dependence (Ayyagari et al. 2011; Galluch et al. 2015; Shu et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2007; 2011; 2015a). These stressors are triggered by potentially stressful IT use events such as smartphone failures (Tarafdar et al. 2015a). The strains and outcomes resulting from the stressors include negative emotional responses, decreased well-being, exhaustion, lack

of productivity and performance, decreased organizational commitment, and burnout (Maier et al. 2015a; Pawlowski et al. 2007; Ragu-Nathan et al. 2008; Srivastava et al. 2015; Tarafdar et al. 2007).

Researchers have noted that not all stress is negative. While most (techno)stress research has focused on the negative side of stress due to its harms and severe outcomes, (techno)stress can be also positive (Califf et al. 2015; Califf & Martin 2016; Srivastava et al. 2015; Tarafdar et al. 2017). Therefore, there is a distinction between distress and eustress (Le Fevre 2003; 2006; Selye 1976). In general, distress refers to *"bad"* stress, or negative emotions resulting from negative perceptions of an IT use situation, while eustress refers to *"good"* stress, or positive emotions resulting from positive perceptions of an IT use situation (Le Fevre 2003; 2006; Selye 1976; Tarafdar et al. 2017). Indeed, stress is subjective (Lazarus 1993; Lazarus & Folkman 1984): Two individuals can perceive an externally similar IT use event in a different manner, one responding with distress and another with eustress.

Prior empirical research has investigated some user-related aspects regarding technostress. Users' technological competence, computer confidence, and self-efficacy can help to decrease technostress (Shu et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2015a). In one study, technostress decreased as age and education increased (Ragu-Nathan et al. 2008). General personality traits have an influence: Openness to experience, neuroticism, agreeableness, and extraversion all impact the relationships between IT-related stressors and job outcomes (Srivastava et al. 2015). There is also initial evidence demonstrating that IT users may have different responses in similar IT use contexts (Califf & Martin 2016). A related research stream on coping with IT has valuably presented that users interpret an IT event as a threat or a challenge, estimate their ability to control a situation, and choose their adaptation efforts accordingly (e.g., Beaudry & Pinsonneault 2005; Fadel & Brown 2010; Salo et al. 2015; Stein et al. 2015).

Related research can also be found in the field of human-computer interaction. One broad research stream has focused on affect and emotion (Hibbeln et al. 2017; Jeon 2017; Thüring & Mahlke 2007). These studies have examined topics such as design in relation to emotional experience, affective computing, hedonic uses, and emotion recognition (Jeon 2017). For instance, personality and personal capacity have been pointed out as elements that influence stress in the context of human-computer interaction at work (Smith et al. 1999). Another parallel research stream has examined user experience and users' perceptions of it (e.g., positive vs. negative) (e.g., Law et al. 2014). In general, the literature on user interface design has emphasized the importance of understanding users' characteristics (e.g., skills and tasks) in order to reach design solutions that minimize failures and errors (Shneiderman et al. 2016).

Indeed, previous studies have provided valuable initial insights about technostress. While these studies help us pay attention to essential user-related aspects, they have not, to the authors' best knowledge, offered an answer as to why similar IT use events can result in different stress responses in different users (Tarafdar et al. 2015b; 2017). In addition to general demographics, IT use skills, and personality traits, emphasis should be placed on how individuals perceive the given situations (Lazarus 1993; Tarafdar et al. 2017). As demonstrated by Lazarus and Folkman (1984): *"The interpretation of stressful events is more important than the events themselves."*

Stimulus-Organism-Response Framework

To address the research gap, we employed the S-O-R framework as an overarching theoretical lens. The S-O-R framework is deemed suitable for this study for the following reasons: First, the S-O-R framework forms the foundation of contemporary psychological approaches to human experiences such as stress (Buxbaum 2016; Lazarus 1993). Second, it emphasizes the subjective nature of stress and acknowledges that users react differently to externally similar IT events (Lazarus 1993; Xiao & Benbasat 2011). Third, it posits that external IT events do not lead directly to stress reactions but are instead negotiated by the users' interpretations of them (Sherman et al. 1997).

Originating from a stream of psychology studies conducted in the 1950s (Lazarus 1993), the S-O-R approach has appeared in many similar forms, including the widely cited works of Mehrabian and Russell (1974) and Belk (1975). Researchers have employed the S-O-R approach to study stress as well as other topics related to human behavior (Lazarus 1993). The various approaches share several fundamental premises (Lazarus 1993; Sherman et al. 1997; Xiao & Benbasat 2011): (1) Individuals encounter events and cues within their environment, (2) they make (intuitive or analytical) interpretations about the events and cues, and (3) these interpretations influence their reactions to the events and cues.

The key concepts, their definitions, and technostress-related examples of the S-O-R framework are presented as follows. Stimulus is defined as external events and cues in one's surroundings that arouse an individual (Bagozzi 1986; Eroglu et al. 2001; Sherman et al. 1997). In the technostress context, stimulus refers to technological events (e.g., smartphone failures such as application crashes and malfunctions). Organism is defined as *"internal processes and structures intervening between stimuli external to the person and the final actions, reactions, or responses emitted,"* including an individual's perceptual and thinking activities (Bagozzi 1986, p. 46; Chang et al. 2011; Sherman et al. 1997). Through these processes and structures, an individual forms an appraisal of the situation (Lazarus 1993). The appraisal in a particular situation is influenced also by the individual's overall situation and historical background. With technostress, organism refers to the user's perceptual activities that are triggered by technological events (e.g., the user's interpretation of whether she/he is able to overcome the failure). Response is defined as the individual's psychological reaction as the outcome of interpreting the stimulus (Bagozzi 1986; Eroglu et al. 2001; Sherman et al. 1997). In the technostress context, responses refer to the distress (i.e., the experience of negative emotions) and eustress (i.e., the experience of positive emotions) responses.

When reflecting extant technostress research with the S-O-R framework, technostress studies have been dominated by the S-R approach. While technostress research has not entirely omitted the user, it has overlooked the role of the organism *"actively negotiating"* between stimulus and response (Lazarus 1993, p. 6). This overlook exists even though the role of the organism is highlighted in the two main reference theories applied by technostress researchers: the transactional view of stress (Lazarus 1966; Lazarus & Folkman 1984) and the person-environment model of stress (developed incrementally by several researchers). The transactional view of stress emphasizes how an individual's appraisal of external events *"lies at the heart of the stress process"* (Dewe et al. 2012, p. 26). Similarly, the person-environment fit model focuses on the individual's evaluation of fit between her/his abilities and environmental demands (Dewe et al. 2012; Edwards & Cooper 1990). As such, these reference theories are in line with the S-O-R framework. However, while the extant technostress research undoubtedly merits in identifying stressors and strains, most prior studies have left further examinations of the users' differing interpretations of IT events for future studies (Tarafdar et al. 2017). For instance, Ayyagari et al. (2011) utilized the person-environment fit model to identify IT characteristics related to technostress but acknowledged that they had focused less on how users actually evaluate the technological demands of IT use events.

A similar research gap existed in psychology before psychologists began *"to move away from stimulus-response (S-R) models to stimulus-organism-response (S-O-R) models,"* resulting in the organism becoming an established component in theories related to stress and human behavior (Lazarus 1993, p. 3). After this advancement, psychologists could *"ask what must be going on in the mind to influence people to act and react as they do"* (Lazarus 1993, p. 7) and called for more research to explore *"those cognitive processes that link the individual to the environment"* (Dewe et al. 2012, p. 25). Accordingly, we believe that technostress research should follow psychology's example and proceed towards the more comprehensive S-O-R approach. Without acknowledging the interpretive role of the organism, it may be impossible to explain why similar IT events induce different responses for different individuals. In sum, we employ the S-O-R framework as an overarching lens to uncover users' different interpretations of potentially stressful IT events (i.e., smartphone failures).

Method

Understanding users' different technostress responses to similar smartphone failures demanded rich data about the users' actual smartphone failure events, the users' interpretations of them, and the resulting technostress responses. Therefore, we chose to employ a qualitative study with an interpretive approach because of its fit with our research aim: An interpretive approach focuses on the meanings individuals assign to events and emphasizes how similar conditions (i.e., smartphone failures) can have different meanings for different individuals (i.e., users) (Klein & Myers 1999; Lee 1991). Thus, we collected data by interviewing users who had experienced smartphone failures. We analyzed the data by iterating between the data, the S-O-R framework, and prior theoretical knowledge on (techno)stress (Klein & Myers 1999).

Data Collection

We collected data by conducting interviews in a narrative fashion (Myers 1997; Smith 2015) for several reasons. Interviews helped us to (1) tap into users' real-life experiences with smartphone failures instead

of hypothetical situations (Smith 2015; Van der Heijden 2012), (2) gather a data set of users' narratives about how smartphone failures occurred, how users perceived the failures, and the types of stress responses the failures brought about, and (3) follow suggestions from stress and coping researchers for understanding the organism component. Much could be learned *"by asking people to provide narratives about stressful events, including what happened, the emotions they experienced, and what they thought and did as the situation unfolded"* (Folkman & Moskowitz 2004, p. 750). In sum, (some) reputed stress researchers emphasize that *"the gold is in people's stories"* of stressful events (Folkman 1999, p. xii).

Our data comprised interviews with 35 smartphone users. We applied the following criteria for this study: The interviewee had to have used a smartphone (more than just testing), experienced failures related to the use of smartphones and their applications, and be able to describe their failure experiences in detail. We recruited interviewees by harnessing our networks (e.g., sending interview invitations through social networking services) as well as by employing the snowballing technique of asking interviewees if they knew other potential interviewees (Patton 1990). We avoided situations in which the interviewee would be a well-known acquaintance of the interviewer. Of the 35 interviewees, 14 were women and 21 were men. Eleven of them were aged 24 years or under, ten between 25 and 34 years, nine between 35 and 44 years, three between 45 and 54 years, and two 55 years or over. Altogether, they varied in terms of background and expertise related to smartphone and IT use as well as occupational status. The reported failures reflected non-work-related uses of smartphones, although the separation of personal and professional contexts is blurred by the pervasive and personalized nature of smartphones (Derks et al. 2015; Lyytinen & Yoo 2002). Examples of the failures and the types of applications are presented in the Findings section.

We initiated the interviews by asking the interviewees to describe their use of smartphones and IT in general. We then proceeded by instructing them to think about specific events (e.g., failures and problems) with smartphones and their applications. Failures included both system failures (e.g., crashes, bugs, network issues, updates with lost features, unusually slow functioning) and user failures (e.g., mistakenly deleting content and inabilities to find features). With each failure (or a set of failures) an interviewee mentioned, we attempted to inquire for a narrative of what they were doing with the smartphone, what had happened, how they perceived the failure, and what kinds of responses and outcomes resulted. To learn details, we asked several questions about their real-life examples, perceptions, meanings, and practices. Anchoring the questions and answers to the course of actual events and requesting real-life examples helped us to reduce the risk for potential recall bias (Folkman & Moskowitz 2004). When possible, we utilized the mirroring technique to maintain a focus on the interviewees' language (Myers & Newman 2007). Altogether, we aimed to minimize social dissonance by using brief casual conversations in the beginning of the interviews, maintaining a diplomatic and empathetic role, and stating that there are no right or wrong answers (Myers & Newman 2007). We estimated that the interviewees reported their experiences rather openly (e.g., they voluntarily described many private affairs and did not shy away from spicing their failure descriptions with curse words). The interviews were conducted during 2013–2016 and lasted approximately 50 minutes, on average. They were recorded with the permission of the interviewees and transcribed for the relevant parts.

Data Analysis

We approached the analysis of the interviewees' descriptions with the aim of identifying distinct narrative types and the role of users' perceptions in them (Myers & Avison 2002; Smith 2015). Thus, the unit of analysis was the individual user's perception of smartphone failures and related responses. Within the analysis, we iterated between our data, the S-O-R framework, and the prior theoretical knowledge on (techno)stress (Klein & Myers 1999).

First, we generated an overview of the data through the S-O-R framework. Accordingly, smartphone failures were considered as stimulus, users' perceptions of the failures as organism, and their reactions after failures as responses. We extracted two previously known stress responses based on prior (techno)stress literature: distress as a negative response and eustress as a positive response (e.g., Le Fevre 2003; 2006; Selye 1976; Tarafdar et al. 2017). Based on our data, we complemented these responses by discovering a third response, *"no stress,"* because the interviewees' descriptions also included neutral reactions to smartphone failures. We then used these three responses to uncover different narratives on the grounds of the data. In total, we identified five fundamentally distinct narratives (see Figures 1–5). For distress, we found two different narratives: Users experienced distress because (A) they did not know

how to overcome the smartphone failures or (B) they knew how to overcome failures, but they perceived it as painful. We also found two narrative types for no stress: Users had neutral reactions because (A) smartphones and their failures were not that important for them or (B) they were important, but they handled them rather routinely. For eustress, we found one narrative. Importantly, narratives are considered as archetypes and organizing principles that distinguish fundamentally different stories from each other, but they may not capture every possible variation of situations (Sarbin 1986; Smith 2015). While we aimed to capture the prevailing narrative types, it was not our aim to rule out other possible narrative types. For instance, we focused deliberately on negatively toned IT events (i.e., smartphone failures). Therefore, while there may be other narrative types for eustress derived from positively toned IT events, they were out of the scope of this study.

Second, we sought specific insights about the organism component of the S-O-R framework within the narratives. Thus, we paid closer attention to the content of the narratives to identify their main ingredients, which we refer to as dimensions of appraisal (Lazarus 1993). As the first dimension, we noticed that the users' perceived *priority of the smartphone failure(s)* had a key role. This finding is in line with stress literature that states the priority or relevance of the event as primary appraisal (Folkman & Moskowitz 2004; Lazarus 1993). Stress studies further informed us about the idea of users' ability to deal with the situation as secondary appraisal (Folkman & Moskowitz 2004; Lazarus 1993). However, we found the need to refine this idea because our data reflected two distinct dimensions: Users could have confidence that they could, in principle, deal with the situation, but they did not necessarily have the situational resources to put that confidence in practice. Thus, we distinguished two additional dimensions, namely *confidence for overcoming the smartphone failure(s)* and *demand for situational resources*. As we identified these three dimensions, we noticed that they could not capture the essence of the eustress narrative. Hence, we added a fourth dimension to explain it: *excitement potential* related to the smartphone failures. After this, we examined the four dimensions to analyze their roles within each of the five types of narratives. We utilized the analytic techniques of cross-narrative analysis and asking the data questions (Berg 2004). We went through the narrative types separately and asked questions of each narrative regarding each dimension (e.g., What is the role of confidence for overcoming the smartphone failures within this narrative?). Through these procedures, we were able to note central dimensions, produce extensive handwritten and software-based memos, derive insights about the roles of the dimensions regarding each narrative type, explain the differences between the narrative types, and prepare the data to be reported (in the Findings section).

We aimed to ensure that our analysis was appropriate by following the suggested guidelines for interpretive studies (Bhattacherjee 2012; Klein & Myers 1999). In particular, we followed the suggestion to provide "*transparent approaches for data collection and analysis rather than statistical benchmarks for construct validity or significance testing*" (Bhattacherjee 2012, p. 105). In addition to describing our data collection procedures and criteria for the subjects regarding this study, we include a scheme for the main concepts used in our analysis and their descriptions (Table 1) and provide transparent data examples as chains of evidence to demonstrate that each type of narrative existed in our data (Figures 1–5). Overall, our analysis was iterative so that we could return and revise it as our understanding of the phenomenon improved (Klein & Myers 1999). We also employed co-author cross-checks to confirm that nothing essential from their perspective had been omitted regarding the dimensions and their roles within each narrative type. Furthermore, we established contextualization by asking the interviewees to describe their backgrounds and experiences of prior smartphone and IT use (Klein & Myers 1999). We utilized these background descriptions in setting up the context for the narratives.

Findings: Analysis of Five Types of Narratives

The interviewees' descriptions of smartphone failures included system crashes, freezes, network issues, updates with lost features, unusually slow functioning, and user failures such as use mistakes, the inability to find features, and using the device in an incorrect way. The descriptions reflected mainly non-work-related use purposes of smartphones. Based on our analysis, we discovered five distinct types of narratives for users' stress responses to smartphone failures. According to our analysis, six interviewees reflected narrative #1, three reflected narrative #2, ten reflected narrative #3, eight reflected narrative #4, four reflected narrative #5, and four reflected a mixture of several narratives. Since it is impossible to divide human behavior into perfectly exclusive types, this numerical division is tentative and attention should be

paid more to the content of the archetypal narratives than the numerical counts (Sarbin 1986; Smith 2015). The key concepts and descriptions underlying the narratives are presented in Table 1. An overview of the emphasis of each narrative, the role of each dimension regarding the narrative types, and related technostress responses are provided in Table 2. We present the narrative types in detail and provide an exemplar chain of evidence for each narrative type as follows.

Concept	Description
Priority of the smartphone and failure(s)	A user's perception of the importance of the smartphone and their failure(s) for them
Confidence for overcoming the failure(s)	A user's perception of her/his possibility of handling the type of smartphone failure(s) in question
Demand for situational resources	A user's perception of her/his specific abilities (e.g., time and effort) required for handling the smartphone failure(s) in the given situation
Excitement potential	A user's perception of the level of positive stimulation derived from handling the failure(s)
Distress response	A user's experience of negative emotions related to the smartphone failure(s)
Eustress response	A user's experience of positive emotions related to the smartphone failure(s)
No stress response	A user's experience of neutral emotions related to the smartphone failure(s)

Table 1. Key Concepts and Descriptions

	Narrative 1	Narrative 2	Narrative 3	Narrative 4	Narrative 5
Emphasis of the narrative	User's independence from a smartphone	User's involvement in an unfamiliar and unmanageable world of smartphones	User's constant struggle with manageable but straining incidents of smartphone use	Routinized, deep entanglement of smartphone use with user's everyday practices	User's fascination for the operational principles of smartphones, applications, and technology
User's engagement with the smartphone	Dismissive	Passive	Combative	Calm	Energetic
Priority of the smartphone and failure(s)	**Low***	High	High	High	High
Confidence for over-coming the failure(s)	n/a (*no necessary need to overcome the failure)*	**Insufficient***	Sufficient	Sufficient	Sufficient
Demand for situational resources	n/a *(no necessary need to overcome the failure)*	n/a *(user does not know what is demanded)*	**Excessive***	**Suitable***	Suitable
Excitement potential	Low	Low	Low	Low	**High***
Primary Response	*No stress*	*Distress*	*Distress*	*No stress*	*Eustress*

**Bolded dimensions are interpreted central for the narrative type in question.*

Table 2. An Overview of the Five Narratives

Narrative 1: It's Not So Important for Me

The first narrative reflected interviewees who did not perceive smartphones so important for them. They had been used to managing their daily activities without a smartphone, and they wished to continue doing

so. The interviews emphasized how the smartphones and their applications were something *"extra"* or *"bonus,"* reflecting an approach of perceiving smartphones as nice but not necessary. Therefore, failures did not matter too much, and they could simply go on without any notable stress reactions (i.e., no stress).

This type of narrative indicated low priority of the smartphone failures. The priority was estimated based on the consequences derived from the failures. As the failures did not have noteworthy impacts on these interviewees, the perceived importance was rather low. This was because the interviewees used the basic functionalities of their smartphones but did not entangle the smartphones or their applications into all daily activities. Importantly, they could proceed with their daily activities in a traditional way if failures occurred. They even avoided actions that would increase their dependence on smartphones and related failures (e.g., acquiring novel applications for many different purposes). While these users were not necessarily against technology, smartphones were not of special interest to them. In sum, they wanted to own their smartphones, not be owned by the smartphones.

One example of this narrative type was Jane (all names are pseudonyms), a 30-year-old woman working as a planner in the educational sector (Figure 1). She had a master's degree in speech communication. She had owned a smartphone for approximately a year. In addition to calling and texting, she used some basic smartphone applications such as calendar and weather applications. Jane implied several times how she preferred a traditional way of handling things and daily practices. Her dismissive approach underlined the smartphone's low priority: She thought that the primary purposes of a phone should be calling and texting and described how she preferred to maintain her independence from the phone. For example, she wanted to stick to a traditional pen-and-paper shopping list (although she acknowledged a potential smartphone-enabled way to do it) and was not interested in downloading fancy and new applications. These insights were in line with her description of failures related to a weather application. While she considered the application convenient, she did not mind its malfunctioning and unusually slow operation. She specifically stated how she did not rely (and did not desire to develop any reliance) on the application. Even in a situation of a completely non-functioning weather application, she thought she would check the traditional thermometer and look outside to see weather conditions. As the malfunctions did not affect her too much, it appeared that she had found a smartphone-life balance. Since none of her actions were particularly dependent on the application, she responded to the failures rather neutrally.

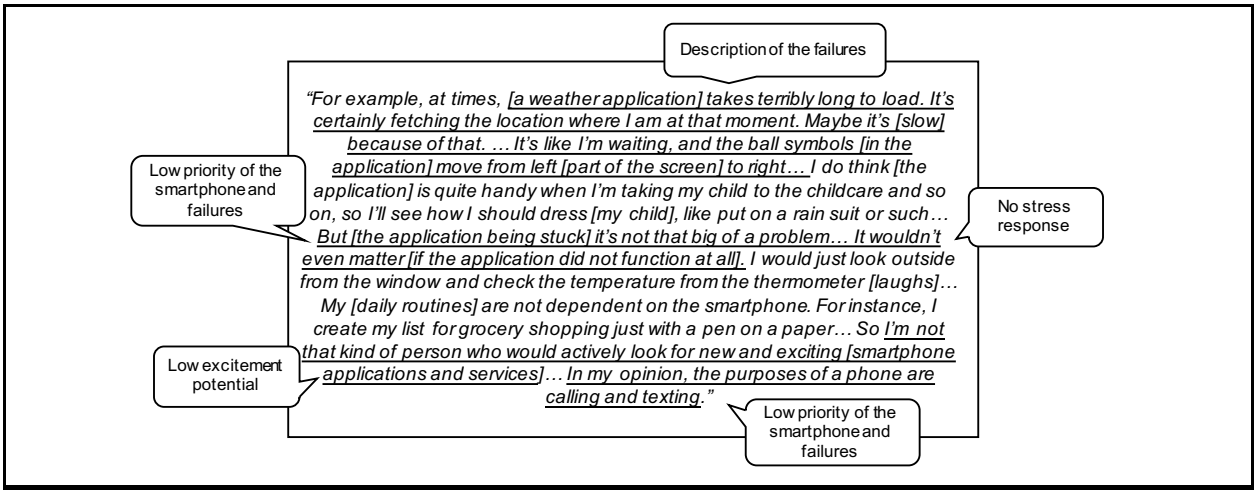

Figure 1. Chain of Evidence for Narrative 1 (Jane)

Narrative 2: I Don't Know How to Handle It (or IT)

The second narrative type was characterized by interviewees who were unfamiliar with the world of smartphones and their applications. The interviewees deliberately chose to use smartphones, as they considered them necessary to keep up with change, at least to some extent (e.g., due to social incentives; not to miss out on social relations and events). However, for them, smartphone use was a leap in the dark.

The underlying context that set up this type of narrative included low confidence for overcoming smartphone failures. By this concept, we refer to the user's lack of confidence for handling the types of

smartphone failures in question. As users were navigating what was, for them, unknown territory, they had only limited knowledge and skills about using smartphones and their applications, let alone the understanding of technical logic or operating principles behind them. They were left with little confidence that they could overcome the experienced smartphone failures. They knew they would likely remain stuck with the failures and thus experienced negative reactions (i.e., distress) when failures occurred.

The failures puzzled the users: They described how they could not understand what had just happened or how they should proceed. As such, there was a misfit between operation principles of a smartphone and a user's ways of thinking and acting. This misfit reflected a perception of a demand for turning one's *"brains to a different mode,"* as one elderly interviewee put it.

This was also the case with Helen, a woman in her mid-sixties who had recently retired from her job as an information officer (Figure 2). Despite having used computers and a limited set of computer applications during her work career, she reported her smartphone-related confidence and skills to be very modest. Indeed, she had relied heavily on organizational IT support whenever IT failures had occurred at work, a luxury to which she no longer had access. Now, as a pensioner, she was somewhat lost with the smartphone she used for personal purposes. One example she used to describe her lack of smartphone-related competence involved purchasing and setting up a new smartphone. She attempted to charge her new smartphone for the first time, but it did not appear to function. As she did not know what was wrong, she returned to the shop. The shop staff realized that she had not inserted the battery, which was still in the box behind a small piece of cardboard. A particularly negative set of experiences for Helen regarded sharing the smartphone's network connection for her laptop. She had experienced several occasions when the network connection did not work. In those situations, she felt helpless because she did not know how to handle it. For instance, Helen described how she did not know which buttons she should press or if there even were any buttons related to this issue. She considered this failure important because she wanted to get online and was paying a monthly fee for the network connection. Due to her lack of confidence for overcoming such failures, she felt distressed.

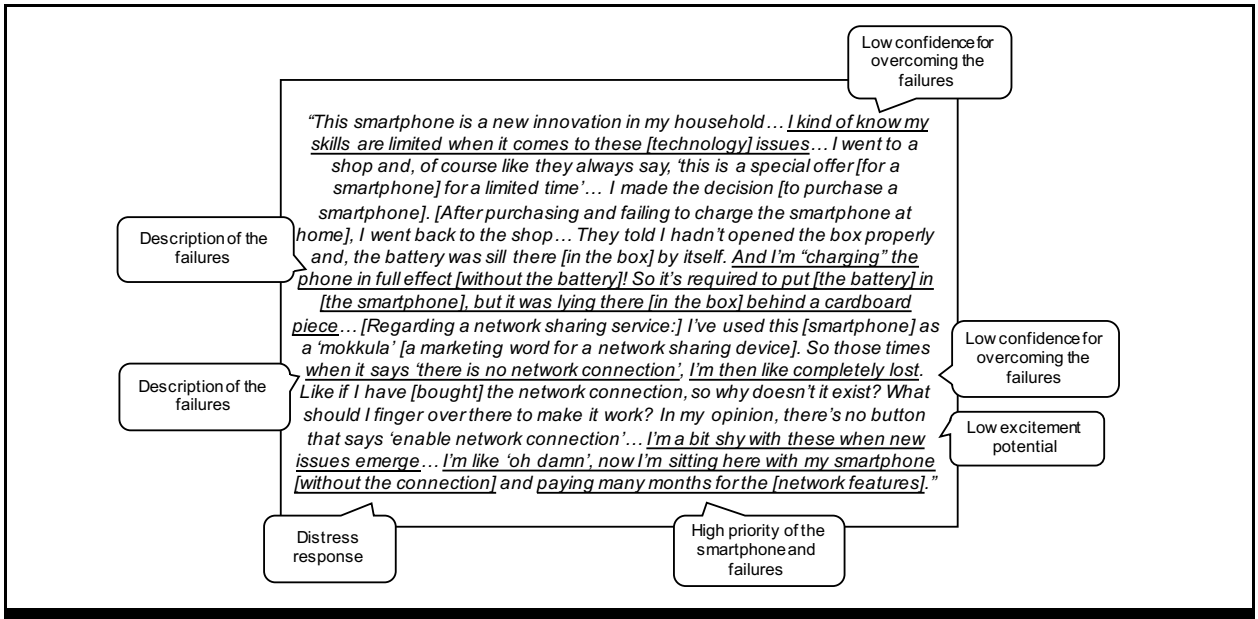

Figure 2. Chain of Evidence for Narrative 2 (Helen)

Narrative 3: I Can Handle It (or IT), but It's Going to Be Painful

This type of narrative reflects interviewees who could, in principle, handle the failures but perceived handling them as constant nuisance. They did consider the smartphone failures important because their smartphones were crucial for their daily activities. While they were confident that they could overcome the failures, they perceived the demand for situational resources (e.g., required time and energy for overcoming a failure in a given situation) to be excessive. This was because they had already allocated

their resources to other ongoing activities (e.g., focusing on completing a purchase with a smartphone application or being busy in general). The interviewees thought the failures always occurred at a wrong or the worst possible time. Therefore, the excessive demand resulted in negative emotional reactions (i.e., distress).

For instance, several interviewees described how they considered themselves knowledgeable and skilled users, thus reflecting high confidence for overcoming the types of failures in question. Such high confidence was derived from their previous successful experiences in dealing with similar tricky IT events or, when facing new problems, feeling assured about their abilities to learn how to handle the situation. However, there was a difference between the confidence of handling the failures and the transformation of that confidence into practice. Instead of using their time and energy to fight with malfunctioning smartphones and their applications, they wanted to proceed with what they had been doing before the failure. Accordingly, they did not derive any excitement from the failures.

An example of this narrative type is Earl, a 29-year-old truck driver (Figure 3). Earl used the smartphone frequently for various activities, such as social networking, watching videos, finding phone numbers, and brokering used cars from abroad. During the interview, he referred to several ways he could handle the failures, such as using workarounds, switching to a smartphone browser version from a malfunctioning application, and adjusting network settings. As such, he had confidence for overcoming many smartphone problems. However, he felt that the failures required frustrating amounts of effort, which got on his nerves. A specific example related to his use of a smartphone version of a marketplace for used cars. The marketplace had malfunctions such as losing previously saved settings for search queries. He even labeled the smartphone version as *"perhaps the worst ever,"* thus reflecting his negative emotions. It was evident that he would have liked to focus on the important issues related to buying cars instead of struggling with the failures. Nearly every time he used the smartphone version of the marketplace, he had to invest painful extra efforts and actions to correct the failures. Hence, the failures demanded excessive resources and resulted in distress.

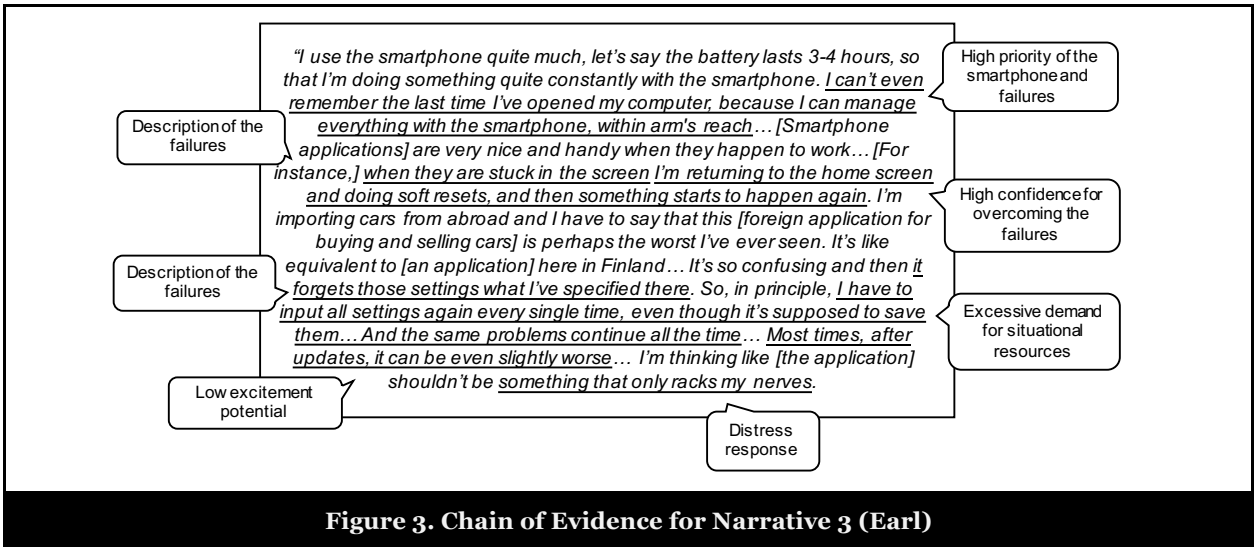

Figure 3. Chain of Evidence for Narrative 3 (Earl)

Narrative 4: It's Alright – It's Routine for Me

The fourth narrative type reflects users who had integrated their smartphones deeply into their daily practices. They used smartphones and their applications routinely for nearly all aspects of life: They tended to employ them frequently for activities such as managing a wide repertoire of social relations, commuting and traveling, paying and shopping, reading and following news, consuming entertainment, and gaming. Thus, smartphones and their failures were a priority for them. Through these many activities, they had gained extensive use experience and witnessed various situations with the smartphone. This had equipped them with confidence for handling failures, which occurred rather frequently. They were also used to applying their smartphones whenever and wherever and, hence, they

could harness their resources in almost any situation to put their confidence in practice when facing failures.

Although these users were confident, their technical knowledge and skills appeared to be limited on the use aspects (e.g., instead of extensive understanding of what happens in the background). As such, fluent smartphone use did not mean that they were excited about the technical principles or finding ways to overcome the failures. For example, managing detailed settings did not present a special, exciting challenge for them. Failures were so ordinary that they were effortlessly matched with a selected approach from a toolkit of solutions. As such, the emergence of a routine-like failure did not trigger special distress or eustress reactions. Instead, they were followed by rather neutral responses (no stress).

One of them was Tyler, an eighteen-year-old young man who was doing very well in high school (Figure 4). He was employed part time as a sales assistant. He knew his technological devices (smartphone and laptop) and their settings well and employed them for activities such as social networking, making video calls, following news feeds, consuming music and videos, and browsing the internet for schoolwork and his own interests. His smartphone use was characterized by numerous bit-by-bit use occurrences throughout the day, totaling his estimate of four hours of smartphone use per day. One of the failures Tyler experienced related to a public transit application he frequently used for checking routes and timetables for trams and buses. When the application was updated, it lost several key features that Tyler liked. The application was missing certain search functions and features that saved routes to favorites. He described how he received the update with rather mild reactions. When he perceived that the application failed in maintaining its previous features, he felt confident that he could overcome the situation and could easily change to an alternative. As such, he opted for using a competing public transit service within the smartphone's native browser application. He developed new practices for using it, such as keeping the competing service open in one of the browser's tabs. In sum, Tyler approached the application update with rather neutral reactions.

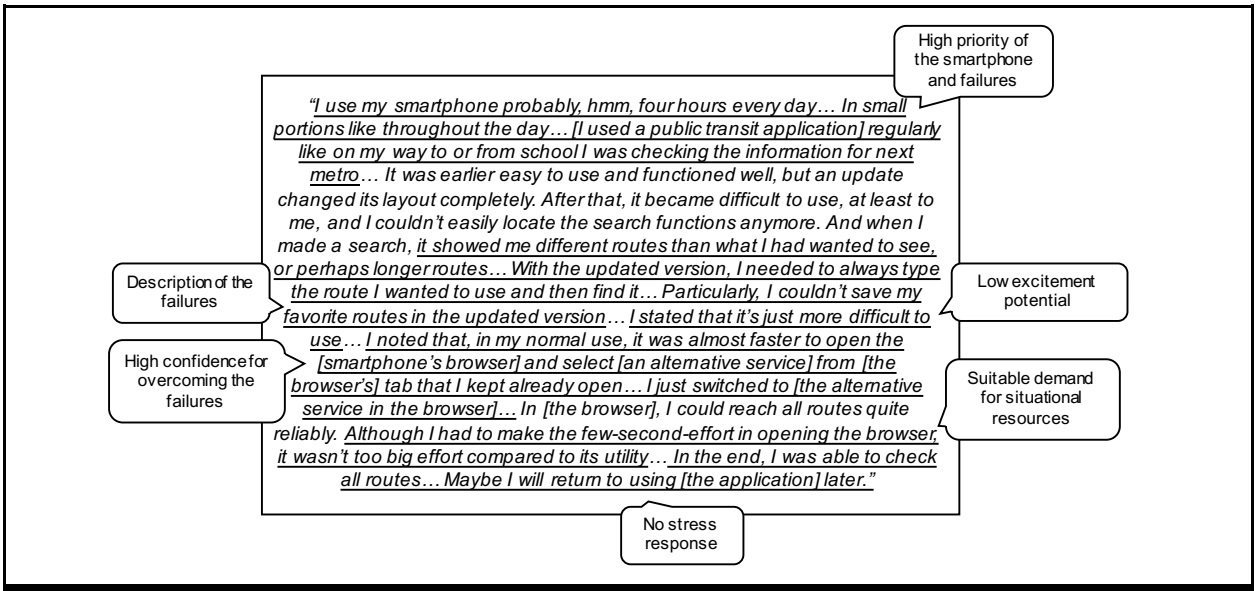

Figure 4. Chain of Evidence for Narrative 4 (Tyler)

Narrative 5: I'm Excited to Gain Something from It

The final type of narrative was about turning negative events into positive. The key driver for these narratives was the interviewees' fascination with smartphones, applications, and technology. These enthusiastic interviewees saw the high excitement potential deriving from the smartphone failures: the challenges and the stimulation generated by handling them.

While these interviewees tended to be technically savvy, they also had open minds and a thirst for more knowledge, skills, and self-development. Smartphones and related failures were important to them, they were confident about dealing with them, and they could allocate enough situational resources for them.

They described how they were stimulated by the problems, wanted to put themselves into exciting tests, and approached them as opportunities for learning. They assigned a positive tone to words such as *"nerd"* and *"technology freak"* that they used to describe themselves. At best, they depicted how they felt *"pride"* for overcoming the failures and a sense of achievement for *"triumphing"* over IT. As such, this type of narrative reflected positive responses to smartphone failures (i.e., eustress).

An example to illustrate this type of narrative is Jim, a 45-year-old man working full time in the mechanical engineering industry and simultaneously studying part time for a technical degree (Figure 5). Throughout the interview, there were references to Jim's enthusiasm toward technology and his hands-on efforts with it. For instance, he described the fun of experimenting with smartphone features during his free time, installing and trying out different mobile applications, and using the smartphone for several daily practices. He also elaborated on smartphone issues that could be considered sophisticated (e.g., failures related to fetching data correctly but displaying it incorrectly on a terminal device) and his views on the smartphone industry (e.g., how companies push beta versions out on the market to outsource software testing to the users). As though these clues would not already have convinced us about his character, he labeled himself a *"technology freak"* in a positive sense. He clearly considered the smartphone and its failures important. Like others, Jim experienced smartphone failures with several applications (e.g., applications for shopping, sports tracking, and car services). He was confident and tended to be equipped with vast situational resources when facing them: When failures occurred, he described how he was eager to track down the reasons for the failures and how those reasons could be managed. He used an array of detection techniques to analyze the failures. For instance, he could utilize the manuals, go systematically through the menus, seek information about the malfunction on the internet, and try out various possible fixes for the failures. These activities were driven by his curiosity and by viewing the failure as a challenge that could lead to a sense of achievement for managing to solve an issue. He was excited to approach smartphone failures as opportunities for gains, thus indicating eustress responses.

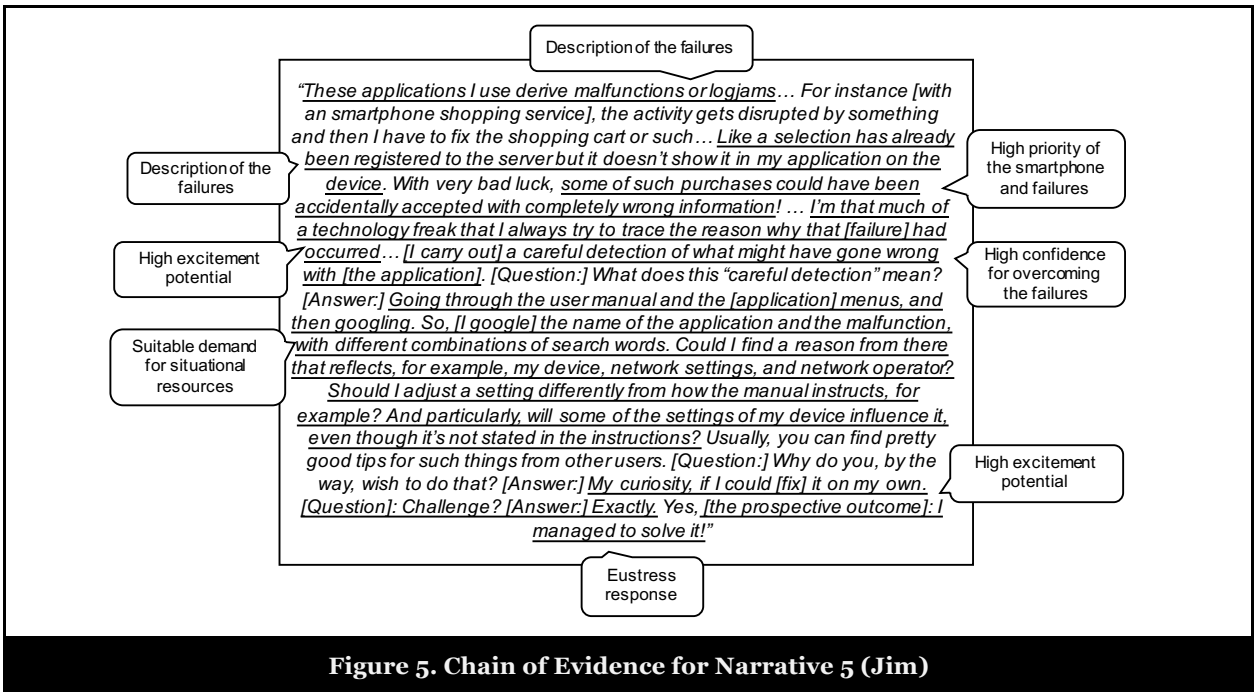

Figure 5. Chain of Evidence for Narrative 5 (Jim)

Discussion

This study identified five distinct narrative types that illustrate why individuals respond differently to smartphone failures. The five types of narratives reflect three technostress responses: Two types reflect negative distress responses, another two types reflect neutral no stress responses, and one type reflects positive eustress responses. As such, our findings extend prior understanding of technostress that has overlooked the role of users' different interpretations of potentially stressful IT events.

Contributions and Directions for Future Research

We elaborate on four contributions, as follows. First, we provide an initial empirical step for opening the black box of users' interpretations as an organism in relation to technostress. Our study suggests that it is time for technostress research to move towards the S-O-R view, in line with the ways researchers have made advancements in psychology (Buxbaum 2016; Lazarus 1993). While previous technostress studies have not entirely omitted the user from the picture, we could not locate any studies that distinguished the users' interpretations and explained the different paths for the three technostress responses (namely: distress, eustress, and no stress). Thus, our findings provide an initial answer to the calls for understanding users' interpretations of negative IT events as potential technostressors (Tarafdar et al. 2015b; 2017) as well as empirical explanations of how users exhibit different types of technostress responses to similar events (Califf & Martin 2016; Srivastava et al. 2015). More specifically, we found four dimensions that shape users' technostress responses (namely: priority of the smartphone and failures, confidence for overcoming the failures, demand for situational resources, and excitement potential). The identification and explanation of the five types of narratives and related dimensions contribute by providing in-depth insights into how users perceive IT failures in real-life situations. These kinds of insights are considered valuable and desired because they can produce accurate theoretical explanations and uncover how individuals take stances with IT-related phenomena (Rowe 2012; Te'eni et al. 2015).

Second, the detailed insights demonstrate the complexity of users' interpretations and technostress responses. For instance, our findings extend the previous studies' results regarding technological confidence and competency by specifying their complexity (Shu et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2015a). Contrary to what one might assume, high confidence does not necessarily reflect no stress or eustress responses. According to our findings, it does so only when paired with other perceptions: Confidence is not worth much if there are not sufficient situational resources available to put that confidence in practice. On top of that, the combination of high confidence and sufficient situational resources need to be complemented with high excitement potential to bring about a positive eustress response. While high excitement potential appears to reflect a personality trait of openness to experience (Srivastava et al. 2015), our study extends prior research by specifying that excitement potential may be useless without appropriate confidence and resources. As another example, our study highlights the need for the *"no stress"* response category that the prior studies have neglected. Without the presence of such response option, researchers may be missing important information. For instance, it is valuable to understand which circumstances steer users towards neutral no stress responses instead of distress or eustress responses. These exemplar findings reflect the complex nature of IT use, an area of research on which researchers are encouraged to focus (Burton-Jones et al. 2017). Within the technostress context, unpacking such complexity can help researchers to dig deeper into user perceptions of how negative IT events as potential technostressors are interpreted and responded to. By understanding the nuances of technostress, researchers can provide both users and IT providers with tools for more sophisticated use and design of IT that support rather than detract from users' positive engagement with IT.

Third, our findings provide initial directions for understanding technostress as a multifaceted phenomenon involving a user, an IT artifact (i.e., a smartphone) and its features, the user's interactions with the artifact, and the social context. By focusing on relatively similar IT events (i.e., smartphone failures), we discovered how the users had different appraisals due to their various kinds of historical backgrounds, expertise levels, and dispositions to such events. The users also reflected prevailing social norms and practices within their narratives. These personal and social characteristics shaped how the users interacted (or remained without interaction) with their smartphones in failure situations. These aspects could be further examined, for example, through activity theory (c.f., Engestrom 1987; Vygotsky 1978) that has proven to be a useful approach for explaining human practices within various fields, including IS and human-computer interaction (Dennehy & Conboy 2017; Kaptelinin 1996; Karanasios & Allen 2018). More specifically, researchers could use activity theory as a theoretical lens for considering the smartphone as an actor and zooming into the interplay between the user and the smartphone (including the surrounding technological and business ecosystem) in the contemporary social context. Such an approach suggests that use behavior is shaped not only by the user-smartphone interface but also by the smartphone-environment interface (Kaptelinin 1996). Related to these, we found potential insights that future research could examine more closely. For instance, it appeared that the first no stress narrative (narrative 1), which was based on the low priority of smartphone failures, required detachment from the

prevailing social norms and practices. Indeed, when a user perceived that using smartphones rather extensively was the contemporary social norm and wanted to align with it, the importance of smartphones and related failures tended to be high (narratives 2-5). Researchers could also look at tensions and contradictions, which are at the core of activity theory (Dennehy & Conboy 2017). An exemplar contradiction related to our findings is a user's reliance on smartphones in daily tasks coupled with her/his simultaneous desire to remain more independent from smartphones, especially in the face of failures. When technologies are *"the extensions of some precomputer human abilities"* (Kaptelinin 1996, p. 56) and increasingly inherent in managing daily tasks, the smartphone failures can represent more than merely minor setbacks in sporadic situations. Ultimately, researchers could utilize a recent remark according to which, in activity theory, an IT artifact (i.e., a smartphone) should be considered to be more than just a tool (Karanasios & Allen 2018). This could help researchers understand the users' symbiotic relationships with their smartphones and the consequences of failures in such relationships.

Fourth, the practical utility of extracting different types of narratives lays in (1) the designers' and providers' improved understanding of the user behavior as well as (2) the users' improved understanding of their own reactions. From the designers' perspective, developing archetypal narratives resonates with the idea of identifying personas as applied, for instance, in human-computer interaction (Cooper 1999; Miaskiewicz & Kozar 2011). Personas refer to typical groups of users that are distinguishable from others based on their behaviors, attitudes, and motivations (Cooper 1999; Pruitt & Grudin 2003). As such, the narrative types can form a basis for developing five personas for users who face smartphone failures. With personas, the designers can enhance their design decisions by engaging in user-centric and empathetic thinking (Miaskiewicz & Kozar 2011). Regarding our findings, the designers should aim primarily at converting distress responses to neutral ones and secondarily at providing facilitating conditions for eustress responses. In order to address the users with low confidence, the designers should reduce the complexity of smartphone and application use by providing these users simple beginner mode solutions, offering them dynamic instructions that match their on-going use activities, and showcasing illustrative help scenarios when failures persist. While ease of use is continuously highlighted with smartphones and their applications, not all designs fulfill this basic requirement. To avoid narrative type 3 responses, the designers could experiment approaches such as *"let us take care of this issue while you are busy"*. These could promote superior quality but, simultaneously, be resource-intensive for the designers and providers. In order to promote eustress responses, the designers could motivate the users to learn and engage with their smartphones and applications. This could be done by techniques such as gamification. From the users' perspective, the main benefit is the self-evaluation in terms of four key areas: the priority of smartphones and related failures for them, their confidence of overcoming the failures, the demand for situational resources in such cases, and the excitement potential related to the failures. For instance, the users who excessively prioritize their smartphones and related failures (i.e., the users who feel almost out of order with a failing smartphone) could rethink the importance of smartphones in their lives. As another example, the users who lack confidence could engage in technical training (e.g., through tutorials and handbooks specifically designed for beginners). Finally, the users who think the failures always arrive at a bad time could benefit from revising their time management and preparation practices (e.g., making sure that their smartphone has sufficient space for photos before an important day).

Limitations

There are certain limitations to this study. First, as narratives are archetypes that aim to portray distinct human experiences and behaviors, they are hardly perfect in explaining every possible variation of a situation (Sarbin 1986; Smith 2015). Although we were able to identify five prevailing narratives, there may be more. Second, there are many types of negative and positive emotions (Lazarus 1993). While this study did not specify the different negative and positive emotions, further studies could explore the different emotional reactions (e.g., with distress: anger vs. fear). Third, we utilized a retrospective approach to collecting data. This approach may reflect recall and reinterpretation issues (Folkman & Moskowitz 2004), which we aimed to minimize by anchoring the interviews in the course of actual events and requesting real-life examples. Fourth, we did not capture any physical manifestations of technostress (e.g., stress hormones or blood pressure). However, our aim was to focus on the subjective experience of technostress. Fifth, our interviewees were Finnish; hence, some of the findings may relate to nationality and culture. Finally, the findings of this study may not be fully generalizable. We estimate that the main principles of the five narratives and the four dimensions can be applied when examining users' responses

to failures in the context of voluntarily use of pervasive and personalized mobile technologies (e.g., tablets, smart watches, and activity trackers). Furthermore, the findings are focused on individual, non-work uses of smartphones. Thus, they may not fully transform to the organizational uses of IT, although mobile technologies blur the boundaries between private, public, and professional lives and uses (Derks et al. 2015; Lyytinen & Yoo 2002). Despite these limitations, we estimate that we were able to uncover new insights into users' interpretations of potentially stressful IT events.

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References

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

Bagozzi, R. P. 1986. *Principles of Marketing Management*, Chicago: Science Research Associates.

Beaudry, A., and Pinsonneault, A. 2005. "Understanding User Responses to Information Technology: A Coping Model of User Adaption," *MIS Quarterly* (29:3), pp. 493-524.

Belk, R. W. 1975. "Situational Variables and Consumer Behavior," *Journal of Consumer Research* (2:3), pp. 157-164.

Berg, B. L. 2004. Qualitative Research Methods for the Social Sciences, Boston: Pearson Education.

Bhattacherjee, A. 2012. Social Science Research: Principles, Methods, and Practices, Textbooks Collection.

Brod, C. 1982. "Managing Technostress: Optimizing the Use of Computer Technology," *Personnel Journal* (61), pp. 753-757.

Burton-Jones, A., Stein, M. K., and Mishra, A. 2017. MISQ Research Curation on IS Use, (https://www.misqresearchcurations.org/s/IS-Use-Curation-Final-Nov27.pdf, accessed April 4, 2018).

Buxbaum, O. 2016. Key Insights into Basic Mechanisms of Mental Activity, Switzerland: Springer.

Califf, C., and Martin, T. 2016. "Rethinking Technostress: A Transactional Approach Through Affordances," in *Proceedings of the Americas Conference on Information Systems (AMCIS)*, San Diego, CA.

Califf, C., Sarker, S., Sarker, S., and Fitzgerald, C. 2015. "The Bright and Dark Sides of Technostress: An Empirical Study of Healthcare Workers," in *Proceedings of the International Conference on Information Systems (ICIS)*, Fort Worth, TX.

Chang, H. J., Eckman, M., and Yan, R. N. 2011. "Application of the Stimulus-Organism-Response Model to the Retail Environment: The Role of Hedonic Motivation in Impulse Buying Behavior," *International Review of Retail, Distribution and Consumer Research* (21:3), pp. 233-249.

Cooper, A. 1999. *The Inmates are Running the Asylum*, Indianapolis: Sams.

Derks, D., van Duin, D., Tims, M., and Bakker, A. B. 2015. "Smartphone Use and Work–Home Interference: The Moderating Role of Social Norms and Employee Work Engagement," *Journal of Occupational and Organizational Psychology* (88:1), pp. 155-177.

Dewe, P. J., O'Driscoll, M. P., and Cooper, C. L. 2012. "Theories of Psychological Stress at Work," in *Handbook of Occupational Health and Wellness* (pp. 23-38). Boston: Springer.

Dimensional Research. 2015. Failing to Meet Mobile App User Expectations: A Mobile App User Survey, (https://techbeacon.com/sites/default/files/gated_asset/mobile-app-user-survey-failing-meet-user-expectations.pdf, accessed April 6, 2018).

Edwards, J. R., and Cooper, C. L. 1990. "The Person-Environment Fit Approach to Stress: Recurring Problems and Some Suggested Solutions," *Journal of Organizational Behavior* (11:4), pp. 293-307.

Eroglu, S. A., Machleit, K. A., and Davis, L. M. 2001. "Atmospheric Qualities of Online Retailing: A Conceptual Model and Implications," *Journal of Business Research* (54:2), pp. 177-184.

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.

Folkman, S. 1999. "Foreword," in *Stress and Emotion: A New Synthesis*, R. S. Lazarus (ed.), New York: Springer.

Folkman, S., and Moskowitz, J. T. 2004. "Coping: Pitfalls and Promise," *Annual Review of Psychology* (55), pp. 745-774.

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.

Hibbeln, M., Jenkins, J. L., Schneider, C., Valacich, J. S., and Weinmann, M. 2017. "How Is Your User Feeling? Inferring Emotion Through Human-Computer Interaction Devices," *MIS Quarterly* (41:1), pp. 1-21.

Hung, W. H., Chen, K., and Lin, C. P. 2015. "Does the Proactive Personality Mitigate the Adverse Effect of Technostress on Productivity in the Mobile Environment?" *Telematics and Informatics* (32:1), pp. 143-157.

Jeon, M. 2017. Emotions and Affect in Human Factors and Human-Computer Interaction, London: Academic Press.

Kaptelinin, V. 1996. "Activity Theory: Implications for Human-Computer Interaction," in *Context and Consciousness: Activity Theory and Human-Computer Interaction,* B. A. Nardi (ed.), Cambridge, MA: MIT Press, pp. 103-116.

Klein, H. K., and Myers, M. D. 1999. "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems," *MIS Quarterly* (23:1), pp. 67-93.

Law, E. L. C., van Schaik, P., and Roto, V. 2014. "Attitudes Towards User Experience (UX) Measurement," *International Journal of Human-Computer Studies* (72:6), pp. 526-541.

Lazarus, R. S. 1993. "From Psychological Stress to the Emotions: A History of Changing Outlooks," *Annual Review of Psychology* (44:1), pp. 1-22.

Lazarus, R. S. 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.

Lee, A. S. 1991. "Integrating Positivist and Interpretive Approaches to Organizational Research," *Organization Science* (2:4), pp. 342-365.

Lee, Y. K., Chang, C. T., Lin, Y., and Cheng, Z. H. 2014. "The Dark Side of Smartphone Usage: Psychological Traits, Compulsive Behavior and Technostress," *Computers in Human Behavior* (31), pp. 373-383.

Le Fevre, M., Kolt, G. S., and Matheny, J. 2006. "Eustress, Distress and Their Interpretation in Primary and Secondary Occupational Stress Management Interventions: Which Way First?" *Journal of Managerial Psychology* (21:6), pp. 547-565.

Le Fevre, M., Matheny, J., and Kolt, G. S. 2003. "Eustress, Distress, and Interpretation in Occupational Stress," *Journal of Managerial Psychology* (18:7), pp. 726-744.

Luqman, A., Cao, X., Ali, A., Masood, A., and Yu, L. 2017. "Empirical Investigation of Facebook Discontinues Usage Intentions Based on SOR Paradigm," *Computers in Human Behavior*, available online.

Lyytinen, K., and Yoo, Y. 2002. "Ubiquitous computing," *Communications of the ACM* (45:12), pp. 63-96.

Maier, C., Laumer, S., Weinert, C., and Weitzel, T. 2015a. "The Effects of Technostress and Switching Stress on Discontinued Use of Social Networking Services: A Study of Facebook Use," *Information Systems Journal* (25:3), pp. 275-308.

Maier, C., Laumer, S., Eckhardt, A. and Weitzel, T. 2015b. "Giving Too Much Social Support: Social Overload on Social Networking Sites," *European Journal of Information Systems* (24:5), pp. 447-464.

Mehrabian, A., and Russell, J. A. 1974. *An Approach to Environmental Psychology*, MIT Press.

Miaskiewicz, T., and Kozar, K. A. 2011. "Personas and User-Centered Design: How Can Personas Benefit Product Design Processes?" *Design Studies* (32:5), pp. 417-430.

Myers, M. D. 1997. "Qualitative Research in Information Systems," *MIS Quarterly* (21:2), pp. 241-242.

Myers, M. D., and Avison, D. 2002. Qualitative Research in Information Systems: A Reader, London: SAGE.

Myers, M. D., and Newman, M. 2007. "The Qualitative Interview in IS Research: Examining the Craft," *Information and Organization* (17:1), pp. 2-26.

Neupert, S.D., Ennis, G.E., Ramsey, J.L., and Gall, A.A. 2015. "Solving Tomorrow's Problems Today? Daily Anticipatory Coping and Reactivity to Daily Stressors," *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences.*

Patton, M. Q. 1990. Qualitative Evaluation and Research Methods. Beverly Hills: SAGE.

Pawlowski, S. D., Kaganer, E. A., and Cater, J. J. 2007. "Focusing the Research Agenda on Burnout in IT: Social Representations of Burnout in the Profession," *European Journal of Information Systems* (16:5), pp. 612-627.

Pruitt, J., and Grudin, J. 2003. "Personas: Practice and Theory," in *Proceedings of the Conference on Designing for User Experiences*, San Francisco, CA.

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.

Rowe, F. 2012. "Toward a Richer Diversity of Genres in Information Systems Research: New Categorization and Guidelines," *European Journal of Information Systems* (21:5), pp. 469-478.

Salo, M., Makkonen, M., and Hekkala, R. 2015. "'I Just Cursed and Opened a Beer': Explaining Mobile Users' Non-Complaining Behavior Through Coping," in *Proceedings of the International Conference on Information Systems (ICIS)*, Fort Worth, TX.

Salo, M., Pirkkalainen, H., Chua, C., and Koskelainen, T. 2017. "Explaining Information Technology Users' Ways of Mitigating Technostress," in *Proceedings of the European Conference on Information Systems (ECIS)*, Guimaraes: Portugal.

Salo, M., Pirkkalainen, H., and Koskelainen, T. 2018. "Technostress and Social Networking Services: Explaining Users' Concentration, Sleep, Identity, and Social Relation Problems," *Information Systems Journal* (available in early view).

Sarbin, T. R. 1986. "The Narrative as a Root Metaphor for Psychology," in *Narrative Psychology: The Storied Nature of Human Conduct*, T. R. Sarbin (ed.), Westport: Praeger/Greenwood, pp. 3-21.

Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., and Diakopoulos, N. 2016. *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, London: Pearson.

Selye, H. 1976. *Stress in Health and Disease,* USA: Butterworth's.

Sherman, E., Mathur, A., and Smith, R. B. 1997. "Store Environment and Consumer Purchase Behavior: Mediating Role of Consumer Emotions," *Psychology and Marketing* (14:4), pp. 361-378.

Shu, Q., Tu, Q., and Wang, K. 2011. "The Impact of Computer Self-efficacy and Technology Dependence on Computer-related Technostress: A Social Cognitive Theory Perspective," *International Journal of Human-Computer Interaction* (27:10), pp. 923-939.

Smith, J. A. 2015. Qualitative Psychology: A Practical Guide to Research Methods, SAGE.

Smith, M. J., Conway, F. T., and Karsh, B. T. 1999. "Occupational Stress in Human Computer Interaction," *Industrial Health* (37:2), pp. 157-173.

Stein, M., Newell, S. M., Wagner, E. L., and Galliers, R. D. 2015. "Coping with Information Technology: Mixed Emotions, Vacillation, & Nonconfirming Use Patterns," *MIS Quarterly* (39:2), pp. 367-392.

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.

Tarafdar, M., Bolman, E., Pullins, E. B., and Ragu-Nathan, T. S. 2015a. "Technostress: Negative Effect on Performance and Possible Mitigations," *Information Systems Journal* (25:2), pp. 103-132.

Tarafdar, M., Cooper, C. L., and Stich, J. F. 2017. "The Technostress Trifecta–Techno Eustress, Techno Distress and Design: Theoretical Directions and an Agenda for Research," *Information Systems Journal*, available online, pp. 1-37.

Tarafdar, M., Gupta, A., and Turel, O. 2013. "The Dark Side of Information Technology Use," *Information Systems Journal* (23:3), pp. 269-275.

Tarafdar, M., Gupta, A., and Turel, O. 2015b. "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., 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.

Tarafdar, M., Tu, Q., and Ragu-Nathan, T. S. 2011. "Impact of Technostress on End-User Satisfaction and Performance," *Journal of Management Information Systems* (27:3), pp. 303-334.

Te'eni, D., Rowe, F., Ågerfalk, P. J., and Lee, J. S. 2015. "Publishing and Getting Published in EJIS: Marshaling Contributions for a Diversity of Genres," *European Journal of Information Systems* (24:6), pp. 559–568.

Thüring, M., and Mahlke, S. 2007. "Usability, Aesthetics and Emotions in Human-Technology Interaction," *International Journal of Psychology* (42:4), pp. 253-264.

Van der Heijden, H. 2012. "User Acceptance of Electronic Commerce: Contributions from the Bled eConference," *BLED 2012*, Special Issue, Paper 11.

Vygotsky, L. S. 1978. *Mind and Society,* Cambridge, MA: Harvard University Press.

Xiao, B., and Benbasat, I. 2011. "Product-Related Deception in e-Commerce: A Theoretical Perspective," *MIS Quartely* (35:1), pp. 169-196.