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FORMATION AND MITIGATION OF TECHNOSTRESS IN THE PERSONAL USE OF IT[1]

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Understanding information technology (IT) use is vital for the information systems (IS) discipline due to its substantial positive and negative consequences. In recent years, IT use for personal purposes has grown rapidly. Although personal use is voluntary and can often reflect fun, technostress is a common negative consequence of such use. When left unaddressed, technostress can cause serious harm to IT users. However, prior research has not explained how technostress forms over time or how its mitigation takes place in a personal—rather than organizational—environment. To address these research gaps, we conducted a qualitative study with narrative interviews of IT users who had experienced technostress. This study contributes to (1) the technostress literature by unpacking states in which technostress forms and can be mitigated and (2) the IT affordance literature by explaining the role of affordances and their actualizations in technostress as well as introducing the new concept of actualization cost. In terms of practice, our findings help individuals and societies identify the development of technostress, understand the activities required for its mitigation, and recognize mitigation barriers.

Keywords: Technostress, formation, mitigation, barrier, IT affordances, self-regulation

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Introduction

Information technology (IT) use is one of the most influential constructs in the information systems (IS) discipline due to its wide range of good and bad consequences, making it important for research and practice (Burton-Jones et al. 2017; Straub and del Giudice 2012). As IT has been incorporated into nearly all life activities, its use for personal purposes has substantially increased (Carter and Grover 2015; Maier, Laumer, Weinert, and Weitzel 2015). Such personal uses of IT are exemplified by individuals' massive use of social networking services, news services, and digital content.

Researchers and practitioners have highlighted how personal uses of IT can have serious impacts on stress (Maier, Laumer, Weinert, and Weitzel 2015; Tarafdar et al. 2019). Thus, one major negative consequence of IT use is technostress (a term coined by Brod 1982), defined as a situation of stress that an individual experiences due to her/his use of IT (Tarafdar et al. 2019). While stress can also have a positive side (i.e., eustress via challenge or opportunity) (Benlian 2020; Califf et al. 2020), we focus here on negative stress (i.e., distress via hindrance or threat) due to its universal, harmful outcomes. Thus, the word *(techno)stress* from here on denotes negative (techno)stress. When left unaddressed, technostress can harm users in various ways, such as decreasing wellbeing and impairing cognitive abilities (Fischer and Riedl 2017; Tarafdar et al. 2019). For instance, exposing oneself to constant floods of invasive push notifications can cause a nervous breakdown, concentration problems, and disturb daily routines (Guardian 2017; Happiness Research Institute 2015). Thus, mitigating technostress clearly benefits both individuals and society, thereby contributing to the "grand vision of an [IT]-enabled bright society" (Lee 2015, p. iii; Lee 2016, p. 1). By technostress mitigation, we mean changing IT use practices to reduce stress (e.g., modifying one's stressful use of IT).

Technostress research has focused on identifying the antecedents of technostress (i.e., technostressors), their negative outcomes (i.e., strains), and organizational mitigation techniques (see an overview in Appendix A). Although a few studies discuss the emergence of technostress (e.g., Barley et al. 2011; Califf et al. 2020), it is unknown how technostress forms via individuals' use practices and how it can be mitigated over time. Furthermore, most technostress studies examine the organizational use of IT. Those examining personal use (e.g., Dhir et al. 2018; Lee et al. 2014; Luqman et al. 2017; Maier, Laumer, Eckhardt, and Weitzel 2015; Mauer, Laumer, Weinert, and Weitzel 2015; Tarafdar et al. 2020) are limited in that they do not unpack the temporal development of technostress and use practices. They also tend to bundle the IT and user components into single constructs (e.g., into technostressors) without investigating the underlying, specific interactions between the user and IT. We address these gaps by explaining technostress formation and mitigation over time in the personal use context.

Understanding technostress in the context of personal use is important for four reasons. First, personal use is a major form of contemporary IT use. Second, personal use is fundamentally voluntary, lacks organizational support structures, often reflects hedonic gratifications (e.g., fun), and highlights users' own responsibilities and biases (Kim et al. 2007; Li et al. 2015; Venkatesh et al. 2012; Wu and Lu 2013). These are elements not normally considered in organizational studies of technostress, thus examining these elements allows us to extend theory on technostress. Third, in the personal use context, users often have no mitigation options other than their own strategies, which ultimately determine users' exposure to technostress. Exploring how individuals engage in the healthy use of IT in their everyday lives provides implications not only for instrumental goals (e.g., productivity) but also for wellbeing goals in IS (Sarker et al. 2019). Also, it can indirectly help organizations improve performance because technostress from personal use can disturb one's work activities. Finally, technostress is unexpectedly common in personal use even though IT is used voluntarily and often for fun (Happiness Research Institute 2015). Technostress will likely be even more common in the future as IT becomes more pervasive (Fischer and Riedl 2017).

Given the importance of the topic and the research gaps, we ask two research questions:

(1) How does technostress form in the personal use of IT?

(2) How can users change their IT use practices to mitigate technostress?

To answer these questions, we conducted a qualitative study with narrative interviews because of the ability of a narrative to uncover how individuals change practices over time (Pentland 1999; Schwarz et al. 2014). Since stress emerges from the combination of the individual and her/his environment (Cooper et al. 2001; Lazarus 1993), we use the literature on IT affordances (i.e., action potentials of an IT) (Faraj and Azad 2012; Markus and Silver 2008) for analyzing how technostress develops and can be mitigated in the relationship between the IT and the user. Furthermore, changing practices that generate hedonic gratifications, are socially favored, and remain the responsibility of the user requires self-regulation (Baumeister et al. 1994; Wagner and Heatherton 2015). Therefore, we utilize the literature on self-regulation to understand the efforts required from users for mitigating technostress and the barriers obstructing them. This study contributes to (1) the technostress literature by unpacking

states in which technostress formation and mitigation occur and (2) the IT affordance literature by explaining the role of affordances in technostress and introducing a new concept: the actualization cost of an affordance (i.e., the effort, attention, or other resource consumed during the realization of an affordance).

The rest of the article is structured as follows. First, we present the theoretical background. Second, we describe and justify our methodological choices. Third, we report our findings. Finally, we discuss our contributions, future research directions, practical implications, and limitations.

Theoretical Background

The current literature on technostress provides a conceptual foundation for studying the phenomenon, but it does not explain how technostress forms or how users can mitigate technostress by changing their IT use practices. Therefore, we also draw from the relevant literature on IT affordances and self-regulation. The key concepts in this study are summarized in Table 1.

Technostress

Stress is 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 and Folkman 1984, p. 19). Researchers across disciplines (e.g., psychology, sociology, and medicine) have studied stress for decades. While earlier approaches defined stress as an objective environmental stimulus or an individual's response, there is now a consensus that stress should be viewed as a transaction between the individual and her/his environment (Cooper et al. 2001). The transaction view of stress (Lazarus 1966; Lazarus and Folkman 1984) emphasizes stress as a dynamic subjective experience that stems from one's ongoing relationship with her/his contextual surroundings (Cooper et al. 2001; Lazarus 1993). Two important concepts are *stressors*, which refer to sources of stress as conditions formed through the relationship between an individual and her/his environment, and *strains*, which refer to the individual's adverse responses related to the stressors (Cooper et al. 2001; Lazarus 1993). Stress emerges when an individual perceives that the demands of a situation tax or exceed her/his resources (Cooper et al. 2001; Lazarus and Folkman 1984).

Technostressors are the creators of technostress (Tarafdar et al. 2019). Although studies have examined varying technostressors with differing levels of granularity, an established set of technostressors exists for the organizational context. The most commonly named technostressors are invasion, complexity, overload, uncertainty, and insecurity (see Ragu-Nathan et al. 2008; Tarafdar et al. 2007; Tarafdar et al. 2011). While invasion, complexity, and overload are especially relevant in the personal use context, there are also others. For instance, studies have discussed an individual's dependency and overreliance on IT in daily routines (Lee et al. 2014; Maier, Laumer, Weinert, and Weitzel 2015; Shu et al. 2011) as well as privacy concerns and compromised private information (Ayyagari et al. 2011; Fox and Moreland 2015; Maier, Laumer, Weinert, and Weitzel 2015). Descriptions of exemplar technostressors relevant to the personal use context are presented in Table 1. Technostressors are inherently influenced by the design and features of a certain IT, such as message notifications (Ayyagari et al. 2011; Tarafdar et al. 2019). Thus, technostressors contribute to strains and negative outcomes, including poor wellbeing, exhaustion, lack of productivity, decreased organizational commitment, and burnout (Maier, Laumer, Weinert, and Weitzel 2015; Ragu-Nathan et al. 2008; Srivastava et al. 2015; Tarafdar et al. 2007).

A limited number of studies have addressed technostress mitigation. These studies focus on organizational use and professional users, such as knowledge workers. Work-related technostress can be mitigated by organizational programs, training, job control, and rewards (Arnetz 1996; Hung et al. 2011; Tams et al. 2020). Specific organizational support techniques include technical support, literacy facilitation, support with work–home boundaries, co-worker support, and user involvement (Benlian 2020; Fuglseth and Sørebø 2014; Maier et al. 2019; Ragu-Nathan et al. 2008; Tarafdar, Bolman et al. 2015; Tarafdar et al. 2011; Yan et al. 2013). Work IT users with higher IT self-efficacy, IT competence or experience, and inhibitory effectiveness may have lower technostress (Shu et al. 2011; Tams et al. 2018) and better performance (Tarafdar, Bolman et al. 2015). IT control, positive reinterpretation, venting, and distancing can also help and have combined effects with work-related technostress (Pirkkalainen et al. 2019). In some situations, options to escape from work IT for two minutes can decrease stress from work-related IT interruptions (Galluch et al. 2015). By implication, users' own actions, IT skills, and self-regulation abilities can influence technostress mitigation.

Despite these advancements, extant research does not explain how technostress forms via individuals' use practices over time and how mitigation takes place in a personal rather than organizational environment. As stress is not determined solely by the environment or the individual but by the relationship between the two (Cooper et al. 2001; Lazarus 1993), the interaction between the IT and the user is at the core of the formation and mitigation of technostress. Therefore, a theo-

Table 1. Key Concepts Used in Our Study

Concept	Description	Reference(s)
(Techno)stress Literature		
Technostressor	Technology-related conditions perceived by the individual as taxing (i.e., formed through the relationship between an individual and her/his technological environment)	Fischer and Riedl 2017 Tarafdar et al. 2019
Strain	The individual's adverse responses related to the (techno)stressors (i.e., outcomes)	Ayyagari et al. 2011 Ragu-Nathan et al. 2008
Examples of Recurrent Technostressors		Adapted to the context of personal use from:
Invasion	The situation of being reachable anytime and never free of intrusive IT	Fischer and Riedl 2017 Tarafdar et al. 2010
Privacy concerns	The situation of compromised private information	Ayyagari et al. 2011
Complexity	The situation of IT that is too difficult to use	Fischer and Riedl 2017 Tarafdar et al. 2007 Tarafdar et al. 2011
Dependency	The situation of overreliance on IT in daily practices and routines	Shu et al. 2011
IT Affordances and Use Literature		
IT affordances	Action possibilities allowed by users' potential interaction with the material properties of a particular IT	Faraj and Azad 2012 Markus and Silver 2008
Affordance actualization	The way in which a user interacts with an IT to activate an affordance in practice	Burton-Jones and Volkoff 2017
Material properties	Technical features and objects of an IT	Markus and Silver 2008; Seidel et al. 2013
Faithful use scheme	Use practices that are consistent with the IT designers'/providers' intents	DeSanctis and Poole 1994 Markus and Silver 2008
Hedonic gratification	Individuals' pleasurable reaction (e.g., enjoyment) resulting from the use of an IT	Li et al. 2015
Self-Regulation Literature		
Self-regulation	Individuals' ability to change their responses, practices, and behaviors	Baumeister and Vohs 2007
Standards	Ideals, norms, and views of favorable practices providing input for individuals' intentions and behavior	Baumeister and Heatherton 1996
Monitoring	Individuals' awareness of their own practices by keeping track of them	Baumeister and Heatherton 1996
Motivation to change	Individuals' drive to initiate a behavior change	Baumeister and Vohs 2007
Operational capacity to change	Individuals' ability to accomplish their desired behavior change in practice	Baumeister and Heatherton 1996

retical approach that views IT use as a symbiotic relationship of the two is needed.

IT Affordances

The IT affordance literature offers a lens for examining the IT–user relationship because the literature focuses on the dynamic interactions between the IT and its users, examines how the consequences of IT use emerge as a result of such interactions, and provides a much-desired focus on the IT artifact and its material properties (Majchrzak and Markus 2014; Markus and Silver 2008). IT affordances refer to the action possibilities allowed by users' potential interaction with the material properties of a particular technology (Faraj and Azad 2012; Markus and Silver 2008; Seidel et al. 2013). For example, affordances of social networking services include consuming constantly renewing information, receiving personalized notifications about new content, and sharing personal stories. Material properties, in turn, refer to technical features

and objects, such as push notifications and information feeds (Markus and Silver 2008; Seidel et al. 2013). Originating from ecological psychology (Gibson 1977), the idea of affordances highlights how the material properties of objects (i.e., technology) do not determine how individuals use the objects and what types of consequences such use may have (e.g., technostress). We treat affordances as a relational concept: affordances refer to the relationship between a user and the material properties of an IT (Faraj and Azad 2012; Markus and Silver 2008; Vaast et al. 2017). According to the relational view, an IT can have different meanings for different users or a certain user at different times (Vaast et al. 2017).

The affordances of an IT are not realized in practice until a user actualizes them (Seidel et al. 2013; Vaast et al. 2017). The term *affordance actualization* (Strong et al. 2014) refers to the way a user interacts with an IT to realize an affordance in practice (Burton-Jones and Volkoff 2017). The literature suggests that an IT reflects an affordance network (i.e., an interrelated set of action potentials that a user can actualize) (Burton-Jones and Volkoff 2017). Especially in the context of personal use, users can choose the affordances they actualize. For instance, a social networking service user can actualize the affordance of consuming constantly renewing information and, additionally, decide whether she/he wants to receive personalized notifications about new content.

Prior research concludes that users see only limited aspects of an IT (DeSanctis and Poole 1994; Markus and Silver 2008). For instance, users may perceive only a portion of the potential of a given IT before or when they use it (Majchrzak and Markus 2014). This is heavily influenced by the IT designers'/providers' intent behind the creation of an IT (Markus and Silver 2008; Strong et al. 2014). Designers often provide and promote a *faithful* use scheme for an IT, which refers to use practices that are consistent with the designers' intents (DeSanctis and Poole 1994; Markus and Silver 2008). For instance, the faithful use scheme for social networking services includes regularly checking new content on one's newsfeed and disclosing one's personal information to others.

Overall, the affordance literature helps us explore how users' affordance actualization, faithful use schemes, and interactions with the technological material properties can shape both formation and mitigation. More precisely, technostress does not "exist" in IT, but instead, it emerges over time through the user's choice of which affordances to actualize and the extent of such actualization. For example, knowledge workers may first perceive mobile email as a liberating tool but later, as use intensifies over time, find it restricting (Mazmanian et al. 2013). As such, users' interpretations of an IT and its use constantly evolve via their interactions with its material properties. Much of this is shaped by faithful use schemes, which influence use choices. Therefore, the literature helps us understand why using a certain IT may not initially stress an individual but how stress can later develop in relation to the use of the same IT. The literature also enables us to examine technostress-free ways of interacting with IT: to detail how the actualization of affordances and one's compliance to faithful use schemes might need to change to mitigate technostress. However, developing and changing affordance actualization practices may require different levels of internal efforts from users. Because the affordance literature does not detail such efforts, we need a theoretical approach that explicates the requirements for developing and changing one's practices.

Self-Regulation and its Barriers

Self-regulation is the key mechanism for changing one's practices (Bandura 1991; Baumeister et al. 1994), such as mitigating technostress. Self-regulation is especially critical for managing practices that generate hedonic gratifications, are socially favored, and remain the individual's responsibility (Bandura 1991; Baumeister et al. 1994; Hagger et al. 2009; Wagner and Heatherton 2015). These are all present in the context of IT use for personal purposes. First, personal use is characterized by hedonic gratifications, which here refer to users' pleasurable reactions resulting from IT use (Li et al. 2015; Wu and Lu 2013). For instance, designers often aim at providing hedonic gratifications when they design IT to be used for personal purposes (Eyal 2014). Second, personal use usually has a faithful use scheme associated with increased use: Many design choices aim at increasing users' time spent with their IT. Additionally, other users tend to expect frequent use from their peers (Eyal 2014). Third, personal use is fundamentally voluntary and comes with less external control and guidance (e.g., from an organization) (Kim et al. 2007; Venkatesh et al. 2012).

The concept of self-regulation (at times used interchangeably with the term self-control) refers to individuals' ability to change their responses, practices, and behaviors (Baumeister 2002; Baumeister and Vohs 2007). This can include modifying, quitting, or otherwise altering their current practices toward desired ones (Heatherton and Baumeister 1996). Self-regulation barriers refer to obstacles to achieving a change in one's practices (DiBonaventura and Chapman 2008). For example, a social networking service user could want to stop constantly checking new content but fail to do so because the service sends notifications that push the user to check new content. Self-regulation is also influenced by social aspects, and barriers can reflect obstacles external to the individual.

There are four main ingredients of self-regulation (Baumeister et al. 1994; Baumeister and Heatherton 1996; Baumeister and Vohs 2007), as follows.[2]

Standards. Standards describe how things should be. They are ideals, norms, and views of favorable practices that provide input for individuals' intentions and behavior (Baumeister and Heatherton 1996). Individuals can become aware of standards from societal influences (e.g., other people, designers, and media) and from their own experiences (Baumeister et al. 1994). Standards are perceived subjectively; they can be personal, and not all standards are suitable for everyone (Baumeister 2002). A standards barrier occurs when individuals do not have adequate standards of appropriate practices (for them), hampering change of one's practices (Baumeister and Heatherton 1996). This arises in two ways. An individual lacks standards about a behavior, or an individual applies an inappropriate standard. For example, a standard could indicate it is undesirable for a user to receive hundreds of notifications a day. However, the user might not be aware of this standard.

Monitoring. Monitoring refers to individuals' awareness of their own practices by keeping track of them, often resulting in a comparison of the monitored practices to a standard (Baumeister and Heatherton 1996). When an individual finds a mismatch between their monitoring and the ideal standard, she/he recognizes a problem to be addressed with a change of practices (Baumeister and Vohs 2007). A monitoring barrier occurs when one is not able to monitor her/his current practices realistically. For example, a user could fail to keep track of how many times they were distracted by notifications during a day. People often find it difficult to monitor their behavior, or they may have misconceptions about their own activities (Baumeister 2002). Inadequate monitoring can prevent individuals from identifying problematic practices and changing them (Baumeister and Vohs 2007).

Motivation to Change. Motivation to change refers to individuals' drive to initiate a change in their own practices. When addressing problematic practices, motivation reflects individuals' intention to align the mismatch between their own practices and standards. A motivation barrier occurs when individuals do not intend to change their practices (Baumeister and Vohs 2007). One reason for this is an (explicit or implicit) motivational conflict of benefits (Baumeister and Vohs 2007). For example, an IT user may lack the motivation to change if they consider the benefits of receiving hundreds notifications a day greater than the potential benefits of muting (some of) them.

Operational Capacity to Change. Operational capacity refers to individuals' ability to accomplish their desired behavior change in practice (Baumeister and Heatherton 1996). Operational capacity barriers arise when individuals do not have the executional capacity to change their behavior in practice. For example, an IT user may not have the willpower to resist constantly updating news feeds, and so cannot mute (some of) the notifications, despite wanting to do so. The existence of standards, monitoring, and motivation are useless if there is no operational capacity to change (Baumeister 2002). Individuals often remain with the status quo due to capacity barriers; it is easier to form intentions about a change than to do it in practice (De Ridder and De Wit 2006).

Altogether, we employ the literature on IT affordances and self-regulation to understand the black boxes (i.e., previously unknown areas) of technostress formation and mitigation (Figure 1). Based on the literature, we posit the following:

(1) Technostress is not solely determined by the IT or the user. Instead, technostress forms via the user's interactions with the IT's material properties, thereby reflecting affordances and their actualization. In the context of personal use, this is influenced by the faithful use scheme and hedonic gratifications.

(2) To mitigate the technostressors, users need self-regulation abilities to change their stressful ways of affordance actualization and are faced with self-regulation barriers that prevent them from doing so.

As such,[3] both the formation and mitigation of technostressors reflect a complex set of sociotechnical activities. We aim to explain these activities in detail with our empirical study.

Method

Answering our research questions required rich data about how technostress develops and how users mitigate it by changing their IT use practices over time. Hence, we chose to conduct a qualitative study with real-life narratives (Myers 1997). This approach was deemed appropriate due to its usefulness in explaining how things change and generating in-

[2]Baumeister et al. (1994) and Baumeister and Heatherton (1996) originally presented a three-ingredient view that was updated with a fourth (motivation) based on their later understanding of the subject (Baumeister and Vohs 2007).

[3]Central boundary conditions and assumptions: Our approach accounts for technostress stemming from the voluntary use of IT for personal purposes and assumes that users are not necessarily rational; the consequences of IT use are not determined solely by the IT or the user but, instead, the relation of the two; and users have the ability to change their own behaviors but are faced with barriers.

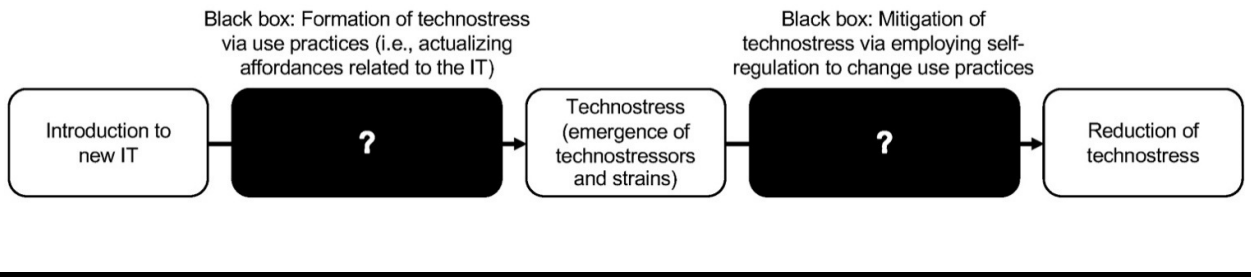

Figure 1. Illustration of the Black Boxes of the Formation and Mitigation of Technostress

depth insights into behavior in real-life contexts (Pentland 1999; Schwarz et al. 2014). We collected narratives by interviews and analyzed them by iterating between our data and the literature on (techno)stress, IT affordances, and self-regulation. This allowed us to discover explanations for the previously unmapped topic.

Data Collection

We chose to conduct narrative interviews to understand technostress formation and mitigation in terms of their temporal development (Myers 1997). Researchers in IS and other fields have found narratives suitable for explaining how things evolve over time and how individuals change their practices (Pentland 1999; Schwarz et al. 2014). Narratives are beneficial because they are anchored in the course of actual events instead of hypothetical situations (van der Heijden 2012), and individuals can describe their experiences in their own words without being restricted to the researchers' terminology (Gruen et al. 2002). Narratives are always about someone or something, are told by a person, and comprise ordered event sequences including a beginning, middle, and end (Pentland 1999). Narratives are best acquired from individuals who have directly experienced the studied phenomenon (Pentland 1999; Schwarz et al. 2014). Thus, we acquired narratives that describe technostress formation and mitigation, include the reporting of chronological events, and are told as well as experienced by the individuals themselves.

In total, we collected narratives by interviewing 32 users who had experienced technostress related to their personal use of IT and mitigated it. We utilized purposeful sampling (Patton 1990) by deliberately searching for information-rich users who could provide first-hand experiences of technostress. Thus, we applied prescreening to find potential subjects and gather brief spoken or written descriptions of their technostress experiences. We harnessed networks and connections to people who had referred to technostress, we used the snowballing technique, we made an enquiry to the participants of an IS course, and we conducted an email enquiry to the participant base of a municipal computer course for seniors. For the purpose of this study, we applied the following inclusion criteria: The interviewee had to (1) have experienced stress related to her/his personal use of IT, (2) have engaged in one or more ways to mitigate it, and (3) possess the ability to describe her/his experiences in detail. After identifying subjects satisfying these criteria, we made selections based on the *intensity* as the estimated severity of the described experiences (Patton 1990, p. 171) and the guideline of *representing a variety of voices* to reach triangulation of subjects (Myers and Newman 2007, p. 22). The age of interviewees ranged from 20 to 80 years. Half were women, and half were men. The interviewees were Finnish, varied in terms of IT use experience, and had varying occupational statuses, including employed, unemployed, student, and retired.

We started with interviews that focused on one popular social networking service. These narratives revealed that technostress could derive from a joint effect of several applications (e.g., a flood of notifications from many applications) and that the interviewees had also applied similar mitigations with applications other than social networking services. We accordingly broadened our focus to develop findings that would reflect multiple applications. Thus, we continued by interviewing users about various applications (e.g., social networking services, instant messengers, news services, and web browsers) used voluntarily on smartphones and computers.

We developed our open interview scheme incrementally as we let our previous interviews provide input for the following ones (final version available from the authors). Such refining of an interview scheme can be particularly advantageous when exploring new areas (Berg 2004; Myers and Newman 2007). We started by exploring changes in IT use behaviors. As technostress and its mitigation constituted a prominent theme, we revised our interview scheme to focus on technostress and its mitigation. We structured the interviews to uncover real-life stories of how the interviewees' technostress and mitiga-

tions had evolved. For this particular study, we asked the interviewees to thoroughly describe how their stressful situations with IT had originated, how they had changed or failed to change IT use practices to mitigate, what kind of barriers obstructed them from changing their IT use practices, and what kind of outcomes the mitigations resulted in. Within this general structure, we asked various detailed questions about examples, practices, and perceptions.

We followed the main guidelines set by Myers and Newman (2007) (see Table 2). We continued data collection until a sufficient level of saturation had been reached, that is, no significant new information emerged from the last interviews for the purpose of this study. The 32 interviews were conducted in 2015 and 2016, lasted 47 minutes on average, and contained altogether over 117,000 words. All interviews were recorded and transcribed for their relevant parts.

Data Analysis

Our unit of analysis was the individual user's experience of technostress formation and mitigation. We employed the guidelines by Berg (2004) because they provide a collection of established analytic procedures for moving between interview texts and theoretical concepts. We focused predominantly on inductive analysis but took advantage of the prior literature for making sense of our observations and integrating them with the prior literature. Our analysis was iterative so that we could revisit the data with a later understanding of the phenomenon (Berg 2004). The analysis is depicted in Figure 2, and adherence to methodological guidelines is summarized in Table 2.

The first phase of analysis focused on distinguishing relevant data (Berg 2004). Thus, we applied open coding (Berg 2004; Strauss and Corbin 1990) to label all interview text that reflected technostress and related mitigation. With the help of the qualitative coding software NVivo, the first author read and reread the data and attached labels to all relevant sets of words or sentences. By following the advice of Berg (2004), we used the interviewees' wordings in the labeling, we iteratively revised our previous codings by constant comparison, and another author went through the data and the codings to confirm that nothing essential from her/his perspective had been left out. We noted that the codes focused on the following general themes: technostress and its temporal development, mitigation practices and their temporal development, and barriers obstructing mitigation. Invasion, dependency, privacy concerns, and complexity were recurrent technostressors in our data (and in the prior literature, e.g., Ayyagari et al. 2011; Ragu-Nathan et al. 2008; Shu et al. 2011; Tarafdar et al. 2007; Tarafdar et al. 2011). IT-related overload (e.g., Tarafdar et al. 2011) was also common in our data, but it co-occurred and overlapped with other technostressors, such as invasion and dependency. Because of this, we focused on the four recurrent technostressors of invasion, dependency, privacy concerns, and complexity. Consistent with the prior literature, exhaustion, fatigue, time management problems, and distracted concentration were recurrent strains in the data (Maier, Laumer, Eckhardt and Weitzel 2015 Maier, Laumer, Weinert, and Weitzel 2015; Tams et al. 2014). As a result, we developed a general view of the data, which led us to the literature on IT affordances and self-regulation.

In the second phase, we employed the literature on IT affordances and self-regulation to make sense of the data. We first did this by focusing on the central concepts. We identified something as an IT affordance when the interviewees described things they could do with an IT, using phrasing such as "I could use the IT for" and "with the IT, I was able to." To label affordances, we used language similar to that of Majchrzak and Markus (2014). They present exemplar affordances such as *information sharing*, which is similar to what we call *sharing personal stories and information.* We noted that the affordances were related to material properties because the users named the features that allowed for these potential actions (e.g., describing how a status update feature enabled sharing stories with others). We identified something as an actualization of an affordance when users described how they employed the features to take action with the IT (e.g., phrases such as "I used it for…"). Faithful use schemes were evident because users referred to the designers'/providers' intents of using an IT in a certain way, such as "the service instructed me to" and "it was advertised for." In addition to faithful use schemes identified by the IT affordance literature, another type of use scheme emerged from our data: Peer-influenced use schemes were those in which other users encouraged certain kinds of behaviors and expectations of use. These schemes were identified with phrases such as "others encouraged me to" and "my friends were expecting me to." Furthermore, we identified self-regulation because the users explicitly stated how changing their use practices required effort. Specifically, we noted standards because users referred to favorable use practices, such as "using it less would be good" and "avoiding constant use is preferable." Monitoring was evident when users' statements included expressions such as "I tried to track how much I was using it." We identified motivation to change when users described their aims to alter their use, for example, "I really wanted to change my use." We noted the operational capacity to change because of phrases such as "I made an effort to change things" and "I wasn't able to change it." Finally, we noted hedonic gratifications because of words related to pleasure (e.g., "fun" and "enjoyment").

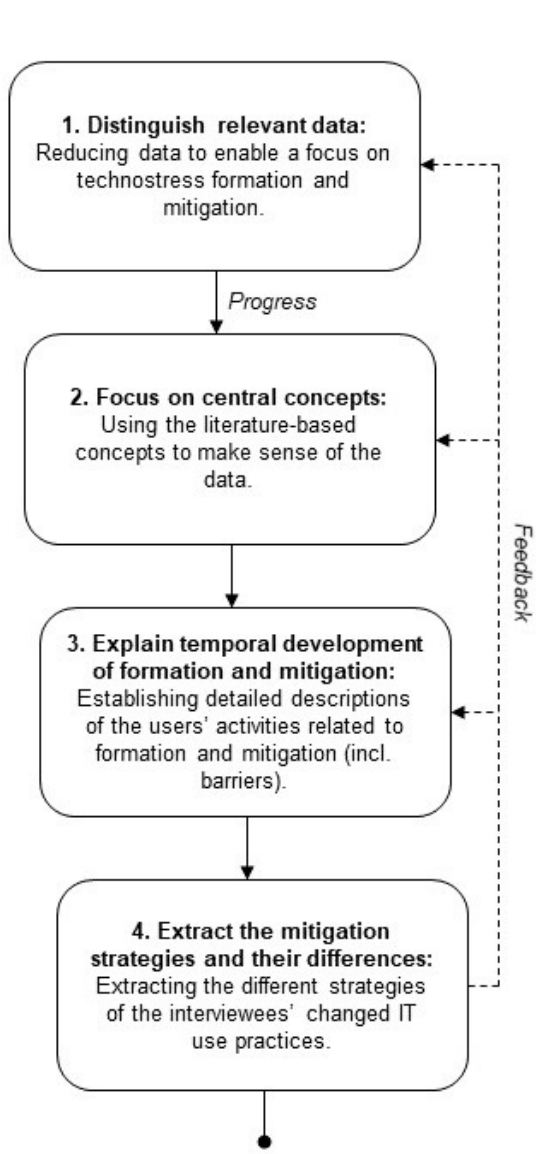

Figure 2. Summary of the Data Analysis Process

In the third phase, we focused on explaining the temporal development of technostress formation and mitigation. Based on the data, we constructed sequential timelines for the interviewees about their main activities related to technostress. These timelines were then segmented into two parts: one on the formation of technostress and one on its mitigation. We then compared within and across the timelines of the interviewees and noticed recurring patterns. These were the basis of the insights into formation, mitigation, and their differences, which we present in the "Findings" section. For example, with the formation timeline, we observed that the actualization of IT use in the initial part of the timeline was less intense and/or more limited than it was in the later part. This led us to the concept of intensified/expanded affordance actualization. As another example, with the mitigation timeline, we noted how users' changes to their stressful use practices required self-regulation efforts (e.g., "I just had to restrict my use") and were obstructed by self-regulation barriers (e.g., being unable to monitor their use).

Table 2. Adherence to Methodological Guidelines

Data Collection	
Interviewee selection	To interview information-rich users, we employed purposeful sampling (Patton 1990; i.e., prescreening to find suitable interviewees). We used inclusion criteria and selected interviewees based on the "intensity" (Patton 1990, p. 171) and the guideline of "representing a variety of voices" (Myers and Newman 2007, p. 22).
Interview structure	We anchored the questions and responses in events that had actually happened. We left room to be flexible and explore interesting themes that emerged during the interviews (Myers and Newman 2007). Accordingly, we developed the interview structure incrementally (Berg 2004; Myers and Newman 2007).
Interview procedures	To minimize social dissonance, we aimed to appear diplomatic but show empathy with careful reactions to the interviewees' answers and to demonstrate understanding of their negative IT experiences (Myers and Newman 2007). We often opened the interviews with a brief casual conversation and emphasized to the interviewees that there were no right or wrong answers and that we were interested in their genuine perceptions. We used the mirroring technique to formulate subsequent questions (Myers and Newman 2007). For instance, we used questions such as "What do you mean by [the interviewee's recently mentioned issue/concept]?" We aimed to minimize recall and reinterpretation biases (see Folkman and Moskowitz 2004) by instructing the interviewees to take their time and think carefully about their experiences as well as requesting real-life examples.
Researchers' own assumptions and experiences	We aimed to put our own assumptions and experiences in the background by repeatedly discussing the subjective nature of technostress and its mitigation (Berg 2004; Myers and Newman 2007). Although we did not structure the interview scheme according to a specific theory, our knowledge of behavioral research could have had an implicit effect on the interviews (which we, of course, attempted to minimize).
Data Analysis	
Nature of analysis	We focused on the data to reach a data-based picture of the phenomenon (i.e., what is essentially happening within the data). We then utilized the literature on (techno)stress, affordances, and self-regulation to make sense of our emerging findings and to integrate them in previous theoretical knowledge. The analysis was iterative so that we could move back and forth between the data and the previous theoretical knowledge (Berg 2004).
Constant comparison	We constantly compared whether the newly analyzed data supported, challenged, or created needs for modifying the previous analyses and findings (Berg 2004). We also revised the analysis by utilizing numerous handwritten memos and having thorough author discussions (Berg 2004).
Analytic techniques	We applied open coding to distinguish relevant data (Berg 2004). We then used the previous literature to focus on essential concepts and their relationships. We utilized analytic techniques, such as "stopping the clock" for the states of technostress formation and mitigation (Abbot and Alexander 2004; Rivard 2014), asking data questions (Berg 2004), and taking notes accordingly.
Triangulation	Regarding data triangulation, we ensured that the main findings were recurrent in the data and were mentioned by multiple users (Berg 2004). Rarely referenced insights that were considered noteworthy are explicitly reported as alternatives in the "Findings" section. We acquired a diverse set of interviewees to reach triangulation of the subjects (Myers and Newman 2007).
Confidentiality of disclosure	We did not use names or such identifiers when reporting the findings (Myers and Newman 2007). We also removed names from the interview transcripts. In the interview requests and at the beginning of the interviews, we stated the purpose of the research and that the research reports would not include names or such identifiers. All interviews were voluntary. We asked permission to record the interviews.

The concepts of the IT affordance and self-regulation literature helped us to construct a nuanced view of technostress formation and mitigation; we were able to map the states through which technostress formed and was mitigated. We followed Chakraborty et al. (2010) to construct state transition diagrams to elaborate on individuals' states of formation and mitigation activities, transitions between the states, and potential triggers for the transitions. We explain these insights in our "Findings" section with Figure 3, illustrative tables, an exemplar chain of evidence (Table 6), and data quotations (translated from Finnish to English).

In the fourth phase, we wanted to detail the different mitigations based on our data. Thus, we focused on the text portions describing mitigation practices, grouped similar text portions, and attached them with descriptive names. In this way, we uncovered mitigation strategies for changing use practices. For instance, there were text portions reflecting interviewees' explicit wordings about modifying IT use (e.g., phrases about how the interviewees had adjusted notifications and changed privacy settings). Therefore, two exemplar codes of *customizing notification settings* and *customizing privacy settings* were sorted as substrategies for *modifying IT use.* Furthermore, we examined the role of affordances and IT's material properties in relation to each mitigation strategy. Altogether, our analysis enabled us to write detailed descriptions for each state and uncover how formation and mitigation evolved over time. Next, we elaborate on our findings.

Findings: Formation and Mitigation of Technostress

Our data comprise narratives from 32 users who had suffered from technostress, mitigated it by changing their IT use practices (n.b. users also had examples of failed mitigation), and faced barriers that delayed or thwarted their mitigation (see Appendix B for an overview of the interviewed users). Technostress emerged from the personal use of popular applications such as social networking services, instant messengers, news and media services, and web browsers on smartphones and computers. Accordingly, our study focuses specifically on IT with material properties such as push notifications, connectivity features, dynamic information feeds, and self-disclosure features. Typical affordances that users actualized included receiving personalized notifications, being constantly connected, consuming continuously updating information, and sharing personal stories and information. The following technostressors were recurrent in our data: invasion, dependency, privacy concerns, and complexity. Exemplar recurrent strains and negative outcomes included exhaustion, fatigue, time management problems, and distracted concentration.

Formation of Technostress

Based on our data, we observed how technostress emerged over time. We found that users actively created their own technostress via interacting with the material properties of an IT. The technostress formed through an introduction to IT, affordance actualization via faithful/peer-influenced use schemes, the intensification/expansion of affordance actualization, the accumulation of actualization costs, and the emergence of strain and latent technostressor. The formation occurred rather naturally and did not require any specific self-regulation abilities. We elaborate on technostress formation below.

Introduction to the Uses of an IT. Users do not adopt IT in a vacuum. Instead, the designers include many material properties in the IT that encourage the faithful use scheme. For example, many social networking services have embedded instructions and beginners' tutorials that steer users toward using the services as a way of building and maintaining social relations and coordinating social activities. Certain material properties, when faithfully used, enable related affordances. For instance, social networking services provide material properties to disclose personal information to others, such as status updates and posts to followers. This, in turn, affords users the ability to share personal stories (e.g., "On [a specific service] you can say, like, what's up with you to all of your friends simultaneously"). Similarly, information feed features afford reading news, content, and stories by others; push notification features afford receiving real-time information and personalized updates; chat features afford synchronous messaging; event and calendar features afford organizing and attending events to be held in physical locations; and "people you may know," friend requests, and follow features afford (re)connecting with old and new acquaintances (e.g., "It was advertised like [reconnecting with old friends] is what [a specific service] is for"). The design of the IT further implies that all of this will be fun and convenient.

In addition to the faithful use scheme promoted by designers, use is influenced by users' peers. This peer-influenced use scheme emerges when friends, family, and acquaintances who are already users share their experiences of the IT before and during one's introduction to the uses of an IT. As a result, when users adopted an IT, the IT was often recommended as enjoyable and handy by friends, family, and acquaintances. This peer-influenced use scheme, demonstrated visibly through other users' practices, made the users curious about the potential of the IT, and they wanted to explore it. In many cases, the peer-influenced use scheme aligned with the faithful use scheme. As an example of a peer-influenced use scheme, Amanda (age 24) viewed a specific social networking service as the place to be in terms of managing modern-day social life:

> *It was like my friends were talking about [a new social networking service], and the media were speaking about it.…Like everyone was using [the service], so I wanted to know what people were talking about....My friends were already using it.... I also wanted to keep in touch with my acquaintances....I was thinking that perhaps [the service] is "the" communication channel….So [adopting the service] was an easy way to stay in touch.*

Affordance Actualization Via Faithful/Peer-Influenced Use Schemes. As users became familiar with the IT, they began to actualize the affordances in line with the faithful and peer-influenced use schemes. For instance, Amanda began to add some contacts on the social networking service, posted a few messages to her profile wall, and experimented with the service. Such actualization of the affordances brought about hedonic gratification. Users enjoyed it when, for instance, social networking services enabled them to use the service's information feeds to read the latest posts from their peers. This was often done via short interactions with the IT. At first, many users appeared delighted with push notification features, which enabled users to receive brief communications and activity updates in real time (e.g., "I was excited; it was a wonderful technology that enabled me to get real-time updates"). In this way, they could feel constantly connected. Continuing to employ the services according to the use schemes was natural since users simply liked many aspects of these new ways of communicating and consuming content. Due to the hedonic gratifications deriving from the short interactions, users began to engage with the IT intuitively. Such use started to build up effortlessly and did not require any specific self-regulation abilities. Users began to use the IT as part of their daily routines. As Elisabeth (21) put it,

> *[My updates] were about fun kinds of stuff....I found it cool that I was able to decorate my own profile... and stay in touch with people and browse friends' pictures....I was writing stuff on other people's [virtual] walls...and I added "likes" to other people's [updates and pictures]....I could easily find out about upcoming events and other things like that.*

Intensification/Expansion of Affordance Actualization. We found two ways users increased their actualization of affordances. One way was the intensification of affordance actualization, where users increased the actualization of a specific affordance by repeatedly using it. For example, social networking users increased the frequency with which they accessed the service to check their contacts' latest updates or started to follow more people, pages, and brands related to their interests. The other way was the expansion of affordance actualization, where users actualized more affordances than previously. In our data, most users actualized a large set of affordances rather than invoking only a specific affordance. For instance, some users expanded their use of a social networking site from keeping up-to-date with their close friends to utilizing the site's various features for managing events, engaging in hobby groups, and playing games. We also observed interplay between intensification and expansion: As users actualized more affordances in the affordance network, their use tended to intensify. Moreover, as use intensified, users were encouraged to actualize yet more affordances. For example, on social networking services, as one added more contacts and followed more people, one received more newsfeed information, push notifications, and event requests.

Intensification and expansion were influenced by the faithful and peer-influenced use schemes. For instance, the default settings of push notifications often meant users received automatic notifications for all messages (faithful use scheme), which caused users to check their accounts more often (intensification). As another example, service updates promoting new features, such as event management features (faithful use scheme), led users to actualize more affordances (expansion). Similarly, peer-influenced use schemes accelerated intensification when users felt obligated to respond to peers' messages in real time and expansion when users adopted features peers suggested (e.g., for coordinating events within a hobby group). In rare cases, peer-influenced use schemes differed from faithful use schemes by inhibiting intensification/expansion (e.g., via a common agreement to mute group notifications). Often, intensified and/or expanded use made the IT an integral part of users' everyday practices. Lynn (31) illustrated this when she said,

> *After [using a specific social networking service] for a while, it was nice that I started to find old schoolmates and all kinds of stuff on it....It was pretty fun for me....I use it for absolutely everything: to stay in touch with my friends and for my own company....I update what happened to me and post [news] articles...I've played games on it...I'm in parents' peer support and pen pal groups…and in flea market groups…cooking groups....Notifications and all arrive on a daily basis and quite a lot.… [The social networking service] is always on hand, it is always with me and online on the phone...[I use it] always, like when I wait for a bus...sit on a bus stop or in a bus....[Using it] is almost like an instinctive reaction that I don't think about too much.*

Accumulation of Actualization Costs. While each actualization tended to generate hedonic gratification and convenience, it also had a small actualization cost. We define actualization

cost as the effort, attention, or other resource consumed during the realization of an affordance. For instance, the affordance actualization of receiving a personalized push notification was done at the cost of shifting one's attention to the notification (i.e., away from other ongoing activities, such as discussions with other people or carrying out daily chores). Such single costs are often so small individually that users barely notice them in their daily use. While a single, small actualization cost was insignificant, accumulated actualization costs became onerous (e.g., constant attention-shifting to the incoming notifications). They piled up over time. This resulted in increasing demands from the user's relationship with the technological environment, which needed to be matched with the user's resources.

Although intensification and expansion could contribute to accumulated costs individually, combining the two resulted in the swiftest accumulation. In those cases, users' affordance actualization (and thus, related costs) tended to increase almost exponentially. For instance, Lynn had intensified her use of the social networking service by checking new content more regularly as well as expanded her use from using direct messages and status updates to engaging in several interest groups and playing games. This drove even greater use of the service. As a result, she was using it all the time: "*Eventually, I tended to use it whenever I had any spare time*." These continuous use occasions generated increasing demands for attention and effort, and thus, the costs accumulated. Table 3 presents further examples of the accumulation of actualization costs.

Emergence of Strain and Latent Technostressor. When the accumulated costs exceeded the user's ability to deal with them, strain and latent technostressor(s) emerged. This could occur in two ways: The accumulated costs exceeded a user's resources, or the user's resources depleted, and she/he could no longer keep up with the accumulated costs. We give examples on the emergence of the four recurrent technostressors in relation to accumulated costs in the following.

As an example of the invasion stressor, Connor (Table 3) followed his friends and acquaintances in adopting three popular social networking services, and hence, his communication practices had been incrementally built on those services. He felt that "*everyone*" was now basing their communication on them. Thus, a peer-influenced use scheme made him intensify his use. Only later did he realize that the demand to be constantly reachable anytime and anywhere had become too big and taxing, *"harming [him] the most*." The great number of incoming notifications caused him to constantly shift his attention away from other activities. As such, he felt it *"distressing"* because the use of the social networking services *"invaded [his] 'other' life"* and activities.

As an example of the dependency stressor, Dan (Table 3) acquired a new smartphone and liked to experiment with social networking services, follow news feeds, and browse interesting things from the web. He found these uses pleasant for communicating and finding extensive content on his favorite interests. His use intensified as he started to engage in these activities on a daily and nightly basis for various purposes. This made him fill his days with such use. He had the resources (e.g., attention and effort) to keep up with such use temporarily, but in the long run, he noticed he had become too dependent on his smartphone. His intensified use continued for a while before he realized it was a burden, draining his thinking capacity and disturbing his other activities and responsibilities. He explicitly stated: *"I felt that my smartphone and its various applications, especially related to social media, caused a great deal of this certain kind of stress in me."*

As an example of privacy concerns, Elisabeth (Table 3) initially found a social networking service fascinating; she liked to personalize her account frequently and generate content for the service. However, while actualizing the affordance of sharing stories about her life brought joy, it came with costs. Bit by bit, she revealed more personal information about her life by using various self-disclosure features (e.g., updates, profile information, and comments). Years later, she realized how sharing too many pieces of personal information for too long a time had accumulated to constitute a too-detailed picture of her life. This made her experience privacy concerns. Thus, she experienced anxiety: *"There was too much information about me out there… I became anxious."*

While with the other technostressors costs appeared to accumulate over time, with complexity, users tended to be so overwhelmed that significant costs emerged immediately (alternative route in Figure 3). As an example of complexity, Eugene, an older user, described his difficulties when trying to use two new social networking services and other IT. He was unfamiliar with these services and found them complicated; hence, he felt *"lost"* (i.e., clearly felt stressed). He was almost immediately annoyed when trying to learn how to operate in a new type of use environment. He stated that he just could not figure out how the services worked, what their multiple features were for, or how the services should be used. He felt that he did not have the resources to deal with such situations: "*My head has been like a cassette tape that's stuck and isn't working properly….It feels like I still just don't get how technology and systems operate.*"

As these examples demonstrate, technostress did not exist in the IT per se, but instead, users actively created it by actualizing the IT's affordances. Users' intensification and expan-

Table 3. Examples of Technostressors in Relation to Material Properties, Affordances, and Actualization Costs

Technostressor	Archetypal Material Properties	Exemplar Underlying Affordance(s)	Intensification of Affordance Actualization	Exemplar Actualization Cost	Accumulation of Actualization Costs
Invasion	Push notifications and connectivity features	Receiving personalized notifications and being constantly connected	Creating numerous sources for the notifications and receiving them constantly	Attention shifting to the notification, IT, and its content	Constant flow of personalized notifications results in the inability to focus and feel free of IT
Data example of invasion: "*Since everyone was using [social networking services]… and the people close to me were using them....I started using them as well....I enrolled in different messaging groups… but there was a demand to be reachable anytime. Nowadays, if a person contacts another person and does not get a reply in 15 minutes, people start to wonder if she/he is dead....It's kind of distressing when you are obliged to reply to email and social networking messages in real time....Eventually, the notification sounds disrupted me even if I was not looking at the screen....This harmed me most, and I found it annoying when I needed to stop what I was doing and turn my attention elsewhere [to the IT]....It invaded my 'other' life.*" (Connor, 34)					
Dependency	Dynamic feeds and multipurpose functionalities (e.g., a bundle of communication, content, event, and calendar features)	Consuming constantly renewing information and handling daily routines (e.g., maintaining relationships, consuming content, and managing events)	Filling substantial portions of one's life with IT use and relying on the IT for several daily routines	Added reliance on and attachment to the IT	Increased reliance and attachment results in reduced thinking capacity and the inability to handle certain daily routines without IT
Data example of dependency: "*I liked [my new smartphone and]…using social networking services....I was reading news with it [and]…Googling a lot of interesting things… I could access it anytime; it was always in my pocket....For instance, with [a specific social networking service], I realized that whether it was day or night, I spent an awful lot of time with it… and [looking at] the news[feeds] and that kind of stuff....And I was, for instance, checking so many things from Google [while doing something else], like details about small things....I felt that the smartphone and its various applications, especially related to social media, caused a great deal of this certain kind of stress in me....I started to feel like I was becoming a zombie…I was too attached to the smartphone [and its services]…I realized how much time and the certain type of thinking capacity, or whatever it is, it took from me.*" (Dan, 22)					
Privacy concerns	Self-disclosure features	Sharing personal stories and information	Disclosing an ongoing stream of information over time regarding various aspects of personal life	Other people's access to shared personal information	Other people's repeated access to too much and/or too sensitive information leads to worries of compromised privacy
Data example of privacy concerns: *"I [joined a social networking service], probably because it was kind of novel and interesting....I could edit my profile [page] so that I had pictures on my [virtual] wall....I did a lot of that. Because I found it cool that I was able to decorate my own profile…I disclosed [my personal information for other users] over such a long period of time....[But then] I started to feel that there was too much information about me out there [on the social networking service, and]…I became anxious about the thought of [sharing a lot of personal information for other users of the social networking service].*" (Elisabeth, 21)					

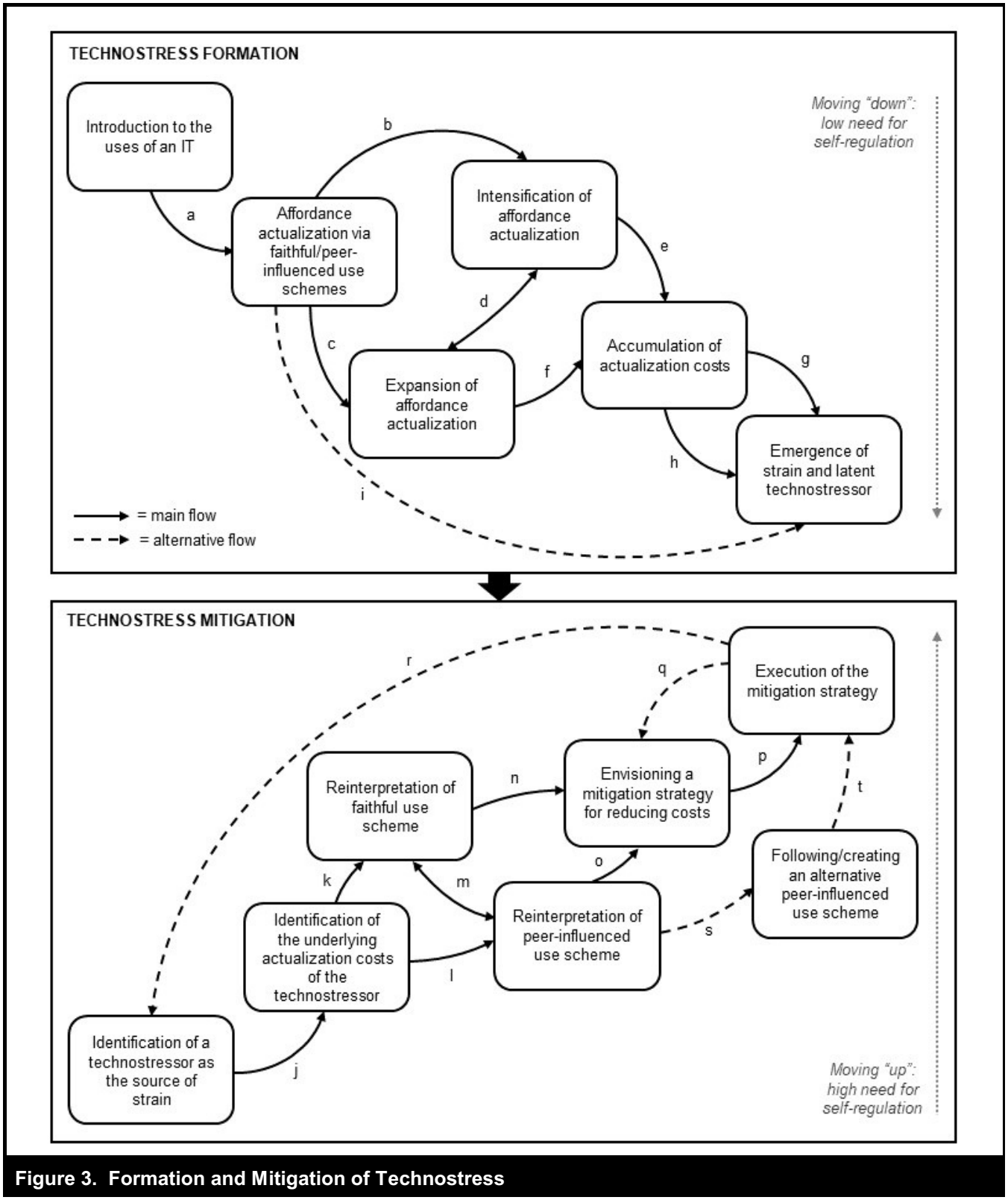

Figure 3. Formation and Mitigation of Technostress

Table 4. Transitions and Potential Triggers for the Formation of Technostress

Transition	Description	Exemplar Triggers
a	From introduction to affordance actualization in practice	Recommendations and stories from other users; advertisements from designers and providers
b	Intensification: repeated actualization of a specific affordance	Hedonic gratifications; designers' push to increase notifications; peers' expectations to communicate in real time
c	Expansion: actualization of more affordances than previously	Designers' release of new features; peers' collective enactment of (previously unactualized) affordances; user's curiosity about uses of an IT
d	Combination of intensification and expansion of affordance actualization	Increased time spent with an IT can lead to discovery of more action potential; versatile use can add to the intensity of use
e	Accumulation of costs by intensification	Contributing to and/or following constantly updating digital content (e.g., discussions, people, and pages)
f	Accumulation of costs by expansion	Use of various features of a particular IT for multiple purposes (e.g., social features, news, gaming, events, and group coordination activities)
g	Emergence of strain and latent technostressor when actualization costs exceed one's resources	A period of receiving excessive push notifications (e.g., in event/group coordination); too much digital content to keep up with (e.g., sensational news/social situation)
h	Emergence of strain and latent technostressor when resources deplete to match the actualization costs	A new need to allocate personal resources for activities other than the use of a particular IT (e.g., family time and urgent work projects)
i	Instant accumulation costs that exceed one's resources	Complexity: interface too complicated when trying to actualize an affordance

sion of their affordance actualization especially increased the associated costs. When users did not have enough resources to deal with the costs, strains and latent technostressors emerged. At this point, users could notice general strains, but the technostressors—as the sources of the strains—did not tend to be evident. Figure 3 and Tables 4 and 5 summarize the formation and mitigation of technostress.

Mitigation of Technostress

Based on our data, mitigating technostress requires identifying a technostressor as the source of strain, identifying the underlying actualization costs of the technostressor, reinterpreting use schemes as stressful, envisioning a mitigation strategy for reducing costs, and executing the mitigation strategy. While the formation of technostress was effortless and occurred almost independently due to the hedonic gratifications and faithful/peer-influenced use schemes, mitigation tended to be effortful and require much self-regulation. Users also faced self-regulation barriers that delayed or thwarted mitigation. We elaborate on these below.

Identification of a Technostressor as the Source of Strain. Because users initially saw the affordances as action potentials for mainly positive outcomes, the users needed to identify the downsides of the affordances to initiate mitigation. Thus, the users needed to specify their strain and link it to a technostressor: They identified a specific strain or a negative outcome (e.g., exhaustion or distracted concentration) and implicitly or explicitly searched for the source of their strain experience. This search was done based on general monitoring of the user's feelings, experiences, and IT use. In practice, users noted their strain experiences and negative outcomes were due to technostressors. For instance, Dan noted how his exhaustion and fatigue (e.g., feeling like a *"zombie"* and experiencing reduced *"thinking capacity"*), which are signs of stress, were due to being *"too attached to the smartphone [and its services]."* While in this state, the detailed IT use routines contributing to the technostressors tended to remain unspecified.

Identification of the Underlying Actualization Costs of the Technostressor. Then, users needed to link the technostressor to their specific ways of using an IT: They identified the actualization costs that caused the technostressor to emerge. Thus, it often took time for users to unpack exactly which routines and what parts of their IT use contributed to the technostressor in question. This was done by identifying a favorable way of using a particular IT for them—a standard—

Table 5. Transitions and Potential Triggers for the Mitigation of Technostress

Transition	Description	Exemplar Triggers
j	From identifying a technostressor to identifying the costs behind it	Accurate information about one's IT usage (e.g., application use infographics or data of a monitoring software); assessment of one's specific IT use routines; detailed knowledge or feedback from a credible source (e.g., spouse, expert, or media)
k	Reconsidering use by reinterpreting the faithful use scheme	Realization that one's IT use routines are anchored to designers' and providers' intents
l	Reconsidering use by reinterpreting the peer-influenced use scheme	Realization that one's IT use routines are anchored to other users' behaviors and expectations
m	Combining reinterpreting the faithful and peer-influenced use schemes	Collective reconsideration of the faithful use scheme; questioning the design choices that empower the peer-influenced use scheme
n	Envisioning a strategy for deviating from the faithful use scheme	Conclusion of risks/benefits evaluation (e.g., the time lost on social networking use is not worth neglecting other important activities)
o	Envisioning a strategy for deviating from the peer-influenced use scheme	Encounter of a warning example portraying a prospective future (e.g., a friend being constantly distracted by notifications)
p	Implementing the envisioned strategy in practice	IT change events (e.g., software updates, purchases, and renewed privacy policies); changes in other life practices (e.g., moving can trigger a cessation of smartphone use in bed)
q	Shifting to another strategy	Assessment of the attempted mitigation strategy's effectiveness and concluding that it did not eliminate technostress
r	Relapsing	Need to check specific information and stay up-to-date; need to engage in a conversation with specific people; lack of self-regulation abilities to maintain mitigation
s	Replacing the extant peer-influenced use scheme (collectively) with a new one	Discussions with other users; shared (informal) agreement of new practices and standards
t	Complying with the new peer-influenced use scheme in practice	Following examples or encouragement of others (e.g., friends who are taking a break from a popular social networking service); showing an example to others

and monitoring their specific IT use according to it. While in this state, users were more careful in their monitoring of IT use. When users found a mismatch between their standard and their IT use routines, they tended to realize some of their specific IT use routines generated substantial actualization costs. As such, the costs of the faithful or peer-influenced way of using IT became salient. For example, Mike (Table 6) did not initially realize the actualization costs. He felt general strain, started to pay attention to his use of the social networking service, and began to monitor its details with independent monitoring software. This detailed monitoring helped him develop an accurate picture of his actual use and realize that his stress was due to certain use practices that underlay his dependency on the service (n.b. he also faced invasion from constantly invading messages). He got statistics about his usage and noticed how he relied on the service at nearly every turn, almost compulsively browsed every update on the service's newsfeed, and shared a huge number of posts and links. He noted that his use had escalated without him realizing it. Triggers for transitioning to this state included witnessing objective infographics presenting details of one's IT use (e.g., Mike) and obtaining new standards from friends or news (e.g., users had heard/read about detailed privacy issues and settings from media/news).

Both identification states (identification of technostressor as the source of strain and identification of the underlying actualization costs of the technostressor) were complicated by two barriers: standards bias and monitoring bias. By standards bias, we mean a person's unquestioned, constricted view of

how a particular IT should be used. Several users had initially been unable to identify the actualization costs because they had an over-positive perception of IT use. Users described that they had initially been so enthusiastic about IT use and took it so for granted that they were blind to the potential negative consequences. As a result, users initially neglected or did not register the actualization costs. This bias was influenced by a societal tilt toward viewing IT use as positive via faithful and peer-influenced use schemes. According to all users, the mainstream thinking was that IT has considerable benefits and is integrated into numerous activities of human life. One example user was Eric (35), who felt society and other users viewed the abundant use of social networking services as desirable. Thus, he actively used such services to communicate his image to others. Only afterward did he start to recognize that this particular use caused him stress. As such, his bias delayed him from identifying the costs and associated use routines:

> *At some point, years ago, [society's view] may have influenced me. It made me try to be active with social networking services....Other people's active use [of social networking services] and their image created pressure about my self-image....[Self-image], at that time, was an issue to which I paid quite a bit of attention....But if I take a look at how I've changed [since then]…the biggest thing is that I've questioned the information and concepts created by society about how we should live our lives...and now I don't pay too much attention to, or don't care about, what others think of me. In that sense, it's quite a relief.*

By monitoring bias, we mean a user's inability to keep realistic track of their IT use (e.g., the frequency, extent, and nature of their use). This arose for two reasons: It was hard to monitor use when the occasions were frequent, enjoyable, and of short duration and users were highly absorbed in their IT use. Nearly all users found it difficult to estimate how many times they accessed their social networking services, how many hours they used a particular IT in a week, and how many times they were interrupted by notifications. Approximately half the users referred to being so engrossed in their IT use that they were unable to keep track of it. One such user was Natalie (37), who had developed a dependency on social network surfing but did not initially realize it. She described that she only afterward noticed numerous occasions when she had been sitting in front of her computer for hours at a time without being fully aware of it. This was because she was *"wandering through the random paths"* of the Internet, such as browsing the endless structure of hyperlinks from one interesting content item to another. As she put it,

> *[Later] I became aware [that my use] disturbs and annoys me….[Previously] I could sit several hours in front of the computer…so that I used to end up… like if I noticed that someone posted an interesting update [on a social networking service] with a link to a story article, I started to read it. Then I followed that trail onward and could post a comment on it. And then I ended up somewhere completely different....So, there certainly has been a long development over which I have become aware that this disturbs me. At first, I just went along with [such surfing]…and only later did I realize that I was getting nothing done [because of it].*

Reinterpretation of Faithful/Peer-influenced Use Scheme. There were two paths users could take to reinterpret existing use. One path was questioning the faithful use scheme, through which users reconsidered designers' view of how IT should be used as something that promoted stress and negative outcomes (in addition to positive outcomes). The other path was questioning the peer-influenced use scheme, through which users challenged other users' expectations of IT use and aimed to opt out from them. Often, faithful use and peer-influenced use schemes resembled each other, and thus, the actions with which users questioned the schemes were similar.

While in this state, users attached negative meanings to the specific IT use based on their previous comparison of the monitored use practices and standards. Users began to see IT use more holistically by considering not only the hedonic gratifications and convenience but also their costs. For instance, many users initially perceived the material properties of push notifications in social networking services positively because they afforded them real-time updates when new information was created. However, when they had noticed that continuous notifications distracted them from other ongoing activities (i.e., contributing to the emergence of the invasion technostressor), and the actualization costs became apparent, they viewed notifications more negatively. For example, Mike (Table 6) first thought browsing the social networking service's newsfeed was *"fun."* Later, he stated, *"[It] was more stressful; it was no longer enjoyable."* He noted that his use was preventing him from focusing and getting things done. In his reinterpretation, he concluded the faithful and peer-influenced use scheme was not good for him. Some reinterpretations were dramatic. Samuel initially perceived receiving constant notifications from an instant messenger as a joyful experience. At first, it was also acceptable that his friends expected prompt replies to messages.

Table 6. Exemplar Chain of Evidence

Mike: 29, social networking service
Technostressors: dependency; invasion
Mitigation strategy: Modifying IT use

"My friend praised [a social networking service] and said it's good for keeping in touch....The friend had already convinced a few other friends to join [the service]. And I'm somewhat the type that I easily tend to experiment with everything when my friends and acquaintances are involved....[My friend's] slogan was even, 'It's better than [a previously popular service]' [laughs]....I remember it was advertised like [reconnecting with old friends] was what the [service] was for."	Introduction to the uses of an IT
"At first, I guess I was just experimenting with how [the social networking service] works and just goofing around....In the beginning, I posted [status updates] to give it a go."	Affordance actualization based on faithful/peer-influenced use schemes
"I started using it roughly on a daily basis....Back then, I went to [the social networking service] when I was bored or I wanted to do something fun…at home…on the bus…when working…during discussions outside of my interest....I browsed the newsfeed when eating breakfast and such… [and] during spare moments, when nothing was happening or I was waiting for something."	Intensification of affordance actualization
"For each hobby of mine, I was in a group… like related to skateboarding and floorball… photography… and I followed many interesting people and their articles and blogs."	Expansion of affordance actualization
"So, when I started to do something reasonable [on my computer], I easily ended up reading the newsfeed, and then it took half an hour of my time. I started to receive tremendous numbers of chat messages [as notifications] from my groups. It was making noise all the time."	Accumulation of actualization costs
"It was that kind of stressful....And I was losing time....That's what I didn't like."	Emergence of strain and latent technostressor
"[Browsing the newsfeed] was such a terrible waste of time....And those [notifications] were so distracting."	Identification of a technostressor as the source of strain
"I've actually monitored my smartphone and computer usage for a while [with a monitoring application]…especially [to figure out] which distracting applications I use....I've monitored over half a year how much I use, for example, [the social networking service] each day."	Identification of the underlying actualization costs of the technostressor
"I noticed that browsing [the service and its newsfeed]....was more stressful; it was no longer enjoyable…when I had to constantly browse all the new content in my newsfeed."	Reinterpretation of faithful/peer-influenced use scheme
"I couldn't [leave the social networking service completely], so I intended to resolve [the problem] by trying to reduce my use of it....So then, at one point, I took the attitude that I didn't have to browse [the whole newsfeed]."	Envisioning a mitigation strategy for reducing costs
"Sometimes, earlier, I kept [the social networking service] open [in a browser tab] pretty often, or all the time. But now, I haven't done it for six months to a year. I always close it [the tab]....And I disabled those notification sounds from messages and such."	Execution of the mitigation strategy
"I have reduced [my usage of the social networking service] quite a bit....I've been fairly successful with it....In the beginning, [my daily use] was one to two hours all the time....Now it's less than 30 minutes [a day]."	(Success in mitigation)

However, as he built his social network and started to receive an extreme number of message notifications from his contacts, the opposite view emerged. After he came to find the constant notifications disrupted his concentration and activities, he determined that receiving these notifications was like being in *"hell."* He questioned others' expectations of immediate responses to messages and a constant connection. As these examples portray, the meaning of interacting with the material properties of a specific IT changed, and simultaneously, users began to question the prevailing use schemes.

Envisioning a Mitigation Strategy for Reducing Costs. After the users reinterpreted their use routines, they intended to do something about them. They began to envision an alternative, less stressful way of using the IT that disrupted the faithful use and/or peer-influenced use scheme. What users needed was motivation to reduce the actualization costs by projecting a change in their IT use. For instance, Elisabeth identified her privacy concerns regarding the social networking service but, initially, did not plan to do anything about it. Only when she realized that her new boyfriend was about to gain access to her detailed data was she motivated to plan a temporary suspension of her account. As such, transition to this state was triggered by critical or escalating consequences of the actualization costs. Other examples of how motivation to change was sparked included minor nervous breakdowns (e.g., Samuel experienced the *"final straw"* after being constantly disrupted by notifications) and new estimations of the drawbacks of the IT (e.g., estimating that the drawbacks of receiving hundreds of notifications a day outweighed the benefits).

We found four types of mitigation strategies for changing use practices: modifying IT use, switching to an alternative IT, taking a temporary break from IT, and quitting use permanently. Modifying IT use refers to a mitigation where a user continues to use the stress-causing IT but alters her/his specific ways of using it to decrease stress (e.g., by customizing notification settings and reducing occasions of use). Switching to an alternative IT refers to a mitigation where a user replaces the use of the current stress-causing IT with an alternative IT to reduce stress (e.g., switching to a new alternative application and switching from a dedicated application to the browser version). Taking a temporary break refers to a mitigation where a user suspends the use of a stress-causing IT for a period of time (e.g., two months) to reduce stress but returns to it afterward. Finally, quitting use permanently refers to a mitigation where a user stops using a stress-causing IT and does not return to it afterward. Table 7 presents the substrategies of mitigation strategies.

While developing a mitigation strategy seemed an obvious way of managing technostress, users often lacked the motivation to do so. We identified a motivation barrier related to a conflict of benefits: The benefits of the current IT use (e.g., hedonic gratifications and convenience) were often immediate and tangible, while individually, the costs seemed small. Often, users preferred the short-term benefits, and thus, the long-term benefits of disrupting the faithful and/or peer-influenced use schemes were not fully considered. One example was Susan (20), who was stressed because of privacy concerns when web surfing. This stress arose because she knew about the risks related to the disclosure of personal information, which accumulated and painted a detailed picture of her online behavior for the IT provider (and other third parties). However, she still valued the utility and convenience afforded by a web browser over the risk of compromised security and privacy:

> *I found that there is so much fraud taking place on the Internet. I suspect that they try to deceive you all over the Internet....I previously used [Web Browser 1], but it didn't work properly, so I used [Web Browser 2] and tested that and [Web Browser 3]. I found that [Web Browser 3] is the simplest. I currently use [Web Browser 3, but]....I don't trust [it]....However, I consider myself only a small pawn in their databases. Yes, it is annoying that [especially Web Browser 3] surveils us [users]....Yeah, [giving away my private information by surfing] is annoying, but I don't feel like I should quit using the Internet [and Web Browser 3] because of it.*

Execution of the Mitigation Strategy. Once the users identified a mitigation strategy, they needed to execute it. The previous states could bring users this far, but they needed to harness their operational capacity to convert their intentions into actions. The execution occurred via reconfiguring the IT's material properties and/or changing the users' interactions with them. Exemplar detailed strategies focusing on the IT's material properties included customizing settings or features and switching to an alternative application with different types of features. Exemplar detailed strategies focusing on the users' interactions included decreasing use occasions and terminating the use of an application temporarily. However, a reconfiguration of the IT's material properties often affected users' interactions and vice versa. For instance, muting notifications and reducing the pages or people followed contributed to less incoming notifications and content to check, which resulted in fewer interactions with the IT. In this way, reconfigurations of the material properties tended to condition the users to reshape their interactions with them as well.

There were two main reasons why complying with a mitigation strategy was problematic in practice. First, what made mitigation difficult was that the changes were inconsistent

Table 7. Mitigation Strategies and Substrategies for Changing Use Practices

Strategy	Substrategies for Changing Use Practices
Modifying IT use	Customizing notification settings; customizing privacy settings; customizing features (e.g., removing people and pages to follow); decreasing use occasions; developing workarounds
Switching to an alternative IT	Switching to a new alternative application/device; switching back to an old application/device; switching to a different version of the same service (e.g., from a dedicated application to the browser version)
Taking a temporary break	Deleting an application temporarily; abandoning a device temporarily; removing an account for a service temporarily; terminating use of an application/device temporarily (application/device still installed/owned)
Quitting use permanently	Deleting an application; deleting an account for a service; getting rid of a device; quitting use of an application/device (application/device still installed/owned)

with the prevailing faithful and/or peer-influenced use schemes. For instance, social networking services enable, but importantly, discourage different types of unfaithful use (i.e., implementing a mitigation strategy) at the same time. Examples of such unfaithful use are as follows: reducing use or taking breaks, many providers send reminders to log in and check new activity; switching, such services tend to be designed for lock-in as, in many cases, transferring contacts and content to an alternative is not supported; and quitting, the providers try to prevent deleting accounts by actions such as asking impassioned questions (e.g., "Are you sure? These friends will miss you if you quit.").

Second, to reduce the actualization costs, users needed to (partially or wholly) abandon their actualization of certain affordances. It was difficult to forego the hedonic gratifications and action potential that they had previously increased. This was where the four mitigation strategies for changing use practices were distinct. Modifying IT use was characterized as opting out of actualizing some affordances of the affordance network but continuing to actualize others. A temporary break from IT meant leaving any actualization of the affordances related to a particular IT for a while but returning to actualize them later. Switching to an alternative IT meant replacing concurrent use with the actualization of affordances related to an alternative IT. Quitting use permanently referred to stopping actualizing the affordances permanently and, thus, eliminating all the actualization costs. These different strategies had distinct levels of operational difficulty. The greater the change in the affordance actualization, the harder the operationalization of the mitigation tended to become. Generally, modifying IT use was perceived as easy, taking a temporary break and switching were moderate, and quitting use permanently was difficult.

Specifically, we found three types of operational capacity barriers that obstructed the execution of a mitigation strategy: the need for hedonic gratifications, a lack of IT skills, and peer pressure to continue the current IT use. The need for hedonic gratifications made users continuously crave use occasions. Several users revealed they had difficulty resisting the constantly incoming notifications and updating information feeds. One of them was Paul (36), who experienced dependency and invasion from constant checking of certain social networking services. He recognized that his use drained him: *"The temptation to check the [feeds and notifications] is so great that it consumes quite a lot of energy."* While he intended to reduce his use, he could not do it. This was because the feeds and notifications were too persuasive since they *"were calling [him] out all the time, like, 'here you can find new things, things happen here, the world turns here.'"*

Another common operational capacity barrier was the lack of IT skills, since a shortage of technological know-how obstructed mitigation. For example, users frustrated with too many notifications on their smartphones could not turn off these notifications unless they knew how. Margaret (65), a frustrated elderly user, is one example of this. She had used a web browser with an unstable Internet connection, and she wanted this fixed but did not know how. Her inability to correct her problem by reconfiguring the material properties of the IT made her even more exhausted than just knowing the problem existed:

> *I kind of know my skills are limited when it comes to these [IT] issues....Those times when [my browser] says 'there is no network connection.' I'm then like completely lost....What should I finger over there to make it work? In my opinion, there's no button that says 'enable network connection.' A couple of times, I've thought that [I had] an easy solution for the Internet connection problem, but no, [expressions of frustration], it was no good....To this day, I haven't solved it.*

A third operational capacity barrier was peer pressure to continue the current IT use. Many users were motivated to change their use but did not have the capacity to oppose pressure from peers to do so. Such pressure to follow the peer-influenced use scheme coerced users to remain with the status quo rather than changing how they interacted with IT. One such user was Connor (34), who experienced exhaustion from invasion for a long time because of the continuous demand to be available online. He identified an instant messenger application as a specific source of his stress and had the motivation to stay away from it. However, he could not significantly reduce his use because his peers pressured him to keep actualizing its affordances. They even let him know they were worried about him when he made attempts to reduce his instant message use:

> *I felt the demand to be reachable anytime....I considered it such an unpleasant situation that I didn't want it....But if I didn't log into [a messenger] and check what was going on there, my peers started to wonder [about me]....For me, this meant that my mom started to worry about me if I didn't reply in a certain timeframe....I know this influenced my behavior and created the necessity to check [the instant messenger] again and again. The damn [instant messenger] even showed other people the date and time when I last logged in....So, I just kept on logging in so that my peers would see recent login information.*

Following/Creating an Alternative Peer-influenced Use Scheme. As an alternative route in Figure 3, users could deviate from an existing use scheme by also following an alternative peer-influenced scheme or developing a new use scheme together with their peers. In this approach, users (collectively) viewed the current use scheme as stressful and moved toward a less stressful use scheme that would be mutually accepted. For instance, one user described how he had regularly discussed with his peers about alternative use practices for managing IT-related stress. He further stated he had heard from his peers about various techniques to modify one's use (e.g., by assigning smartphone-free zones to tackle dependency). In addition, the techniques that he discovered were discussed and shaped in collaboration with others (*"If I've come up with a new way…to ease my strain [from IT use] ...I want to share it and hear others' opinions about the technique."*)

Shift to Another Strategy and Relapse. Based on our data, users could first attempt to reduce their technostress by one strategy, and if this was not as helpful as desired, envision another strategy. For instance, a few social networking service users who took a break first attempted to modify their use. They muted certain types of notifications and adjusted the connectivity settings to reduce the constant flow of notifications. Despite these changes, they still did not feel free of the services' invasion. Therefore, they thought they should take a break. Similarly, some users modified their use after taking a break. An example was Elisabeth, who returned to the social networking service after a period away. She deliberately wanted to re-enter the service with more caution and, accordingly, disclosed less personal information and customized her privacy settings. Finally, maintaining an already-implemented mitigation strategy was not always successful. Some users relapsed to their previous stressful ways of using the IT because they could not abandon actualizing the affordances. Such use then generated actualization costs again and, consequently, technostress.

Discussion and Contributions

As a novel contribution, we developed detailed explanations for the sociotechnical activities of technostress formation and mitigation. The findings (summarized in Figure 3 and Tables 4 and 5) lead researchers to open the black boxes left unaddressed by previous research (illustrated in Figure 1). Although researchers have highlighted the widespread nature of technostress and its harmful effects, no previous study has explained how technostress forms over time or how users can change their IT use practices to mitigate it in the context of personal use. We addressed these research gaps by leveraging our data and the literature on (techno)stress, IT affordances, and self-regulation. In this way, we provide the first understanding of how technostress develops over time and offer an answer to the call for research regarding individuals' mitigation strategies (Pirkkalainen and Salo 2016; Tarafdar, Gupta, and Turel 2015). Our findings go beyond the organizational support techniques that prior technostress mitigation studies have focused on (see Appendix A). Table 8 compiles the novel and most central findings of our study, which have not been covered in extant research. We elaborate on our theoretical contributions and directions for future research below.

Contributions to the Technostress Literature

Our detailed insights enabled us to unpack (1) how hedonic gratifications and faithful and/or peer-influenced use schemes drive users to intensify and/or expand their interactions with the IT that can simultaneously build up technostress and (2) the mitigation activities that pave the way for abandoning hedonic gratifications and deviating from the use schemes.

Table 8. Summary of the New Findings	
Finding 1: Use schemes as the foundation of technostress	When users are first introduced to an IT, they are not only offered a set of material properties but also use schemes for how those material properties could (or should) be used. These faithful and peer-influenced use schemes set the stage for the potential emergence of technostress.
Finding 2: Actualization cost	Each actualization of an affordance comes with an actualization cost, which is fundamental for the formation of technostress.
Finding 3: Drivers of affordance actualization in personal IT use	The hedonic gratifications, faithful use schemes, and peer-influenced use schemes drive users' affordance actualization. The context of personal IT use is characterized by hedonic gratifications and users' susceptibility to the prevailing use schemes (e.g., in contrast to organizational control and guidance).
Finding 4: Intensification, expansion, and instant accumulation of actualization costs	The accumulation of actualization costs can occur via intensification (i.e., actualization of a specific affordance more frequently), expansion (i.e., actualization of more affordances), or instant accumulation (i.e., immediate costs when trying to actualize an affordance). If not matched with sufficient resources, the accumulation of actualization costs generates technostress.
Finding 5: Standards and monitoring biases inhibit technostress mitigation	Initially, users tend to see only limited aspects of the IT: They see the affordances but not their potential costs. Users' biases relating to standards and monitoring inhibit the identification of actualization costs and the use routines causing them and, thus, transitions to the initial states of technostress mitigation.
Finding 6: Reinterpretation of use and related use schemes	Technostress mitigation requires a reinterpretation of one's IT use and the related use schemes. This can be dramatic at times, such as labeling a specific way of actualizing the affordances of an IT as initially "exciting" but later comparable to "hell." Reinterpretation can also result in the (collective) development of a new peer-influenced use scheme.
Finding 7: Reconfiguration of material properties and/or interactions	The execution of technostress mitigation strategies for changing use practices requires a reconfiguration of an IT's material properties and/or users' interactions with them. A reconfiguration of the material properties tends to reflect a reconfiguration of the interactions with them and vice versa. However, this is obstructed by operational capacity barriers.
Finding 8: Four technostress mitigation strategies	There are (at least) four technostress mitigation strategies that users can employ to change their use practices. They differ in their operational difficulty and how they address the affordances and material properties related to an IT.

In terms of formation, our study demonstrates how technostress develops in a dynamic relationship between the user and IT. The beginning of this relationship is heavily influenced by faithful and peer-influenced use schemes, which steer users toward certain types of use practices before they even push any buttons on an IT (Finding 1). Indeed, our findings indicate that users actively create their technostress by continuously interacting with the IT's material properties and intensifying and/or expanding their use. We extend the work of Mazmanian et al. (2013), who demonstrate that intensifying use can create unexpected consequences, by specifying how technostress emerges in the context of the personal use of IT. Although IT use provides benefits (e.g., connecting one socially), we discovered it comes with costs associated with actualizing affordances (Finding 2). Single actualization costs are often so small they are ignored by users, but increasing actualizations result in the accumulation of actualization costs. We detail that this can occur via the three following ways: intensification of concurrent use practices, expansion by using the IT in more ways than previously, or, alternatively, instant emergence (Finding 4). Technostressors such as invasion and dependency are unlikely to appear immediately when an IT is being used, but instead, they are based on the gradual accumulation of actualization costs. In contrast, the complexity technostressor tends to emerge in a punctuated manner, similar to changes that occur radically after a stable period of time. Hedonic gratifications and use schemes drive intensification/expansion (Finding 3) and cause intensification/expansion to occur unnoticed and rather naturally, without the need for any specific self-regulation abilities. Overall, this explanation of technostress formation in the relationship between the user and IT extends prior technostress studies that have mainly bundled the user and IT components into rather static constructs without investigating their complex entanglement over time (see Califf and Martin 2016; Tarafdar et al. 2019). Our insights can offer a fresh view to the predominant literature and reframe the thinking of how technostress develops.

In terms of mitigation, our findings demonstrate how difficult mitigating technostress is. While simply turning off a device to make technostress disappear may seem easy to do, many things make turning that device off difficult. Technostress mitigation requires several sociotechnical activities and, often, a considerable amount of time and effort from individual users. Our data indicate that users were able to mitigate technostress by (1) identifying a technostressor as the source of strain, (2) identifying the underlying actualization costs of the technostressor, (3) reinterpreting use schemes as stressful, (4) envisioning a mitigation strategy for reducing costs, and (5) executing the mitigation strategy in practice. These activities require self-regulation. Executing a mitigation strategy is especially difficult because it requires the operational capacity to (partially or fully) abandon actualizing affordances related to the IT (Finding 7). For instance, modifying one's IT use not only can eliminate the future actualization costs but also the actualizations of an affordance that a user enjoys. As such, users need to sacrifice something for less stressful IT use. This can be done by using one or more types of strategies for changing use practices, each differing in terms of operational difficulty and how it addresses the affordances of an IT (Finding 8).

Furthermore, mitigation is obstructed by self-regulation barriers. The barriers we identified can be considered novel when compared to prior technostress studies. We found an overlap only in technical/literacy support, IT control, and IT competence (e.g., Pirkkalainen et al. 2019; Ragu-Nathan et al. 2008; Tarafdar, Bolman, et al. 2015; Tarafdar et al. 2011), and our finding related to a lack of IT skills (i.e., technical support and competence can help users combat their lack of IT skills). By anchoring the barriers to the main concepts in the self-regulation literature, we were able to understand their different underlying mechanisms. As such, our study not only generates knowledge about potential mitigation strategies for technostress but identifies impediments to mitigation. For instance, our finding related to standards bias (Finding 5) is echoed in others' criticism of certain assumptions in the IS profession: "the entire IS profession perpetuates the myth that better technology, and more of it, are the remedies for practical problems" (Lyytinen and Robey 1999, p. 95). Accordingly, heavily intensified/expanded use is encouraged by much IT design, is generally socially favored, and is even often considered necessary (Carter and Grover 2015; Eyal 2014). We suggest this view should be challenged and revisited in research. Also, rather paradoxically, while IT is often used to monitor behavior (Vieira da Cunha et al. 2015), IT use in the personal use context is exceptionally difficult to monitor as it often flies below the radar. This raises essential questions to be addressed: How can IT use be realistically monitored? How can the actualization costs be made visible to users? Our findings also extend the self-regulation literature by uncovering how individuals can easily be carried away with integrating personalizable objects (i.e., IT) into their lives.

We also find that while (users' perceptions of) some material properties of IT can contribute to stressors (as theorized by Ayyagari et al. 2011), others can simultaneously create barriers to technostress mitigation. For instance, the use of complex features only seems to act as a potential technostress creator. However, while the use of notifications and information feeds can create the stressors of invasion and dependency, such notifications and feeds also persuade users to fulfill their need for hedonic gratifications, thereby inhibiting mitigation. These insights into the singular role of some material properties and the dual role of others present an area for future research.

Finally, our data highlight the role of psychological dependency on IT in personal use settings. Researchers have identified employees' high dependency or reliance on IT for work tasks as a stressor (Pawlowski et al. 2007; Shu et al. 2011), but dependency can be particularly problematic with personal use. This is because users can become easily dependent on (or even addicted to) IT that provides streams of hedonic gratifications and short-term stimulation (Eyal 2014). We note the relationship between technostress and addiction: addiction or compulsive use can be an antecedent of technostress (Lee et al. 2014) and vice versa (Brooks et al. 2017). Here, the concepts of dependency and addiction are not equivalent; dependency emphasizes users' reliance on IT in daily routines but does not necessarily indicate obsessive behavior or typical addiction symptoms (e.g., withdrawal emotions, thrill-seeking use, or mood changes) (see Turel et al. 2011).

Contributions to the IT Affordance Literature

We extend a recent discussion on IT affordances and technostress (Califf and Martin 2016; Fox and Moreland 2015). Our findings can provide a basis for utilizing the literature on IT affordances (e.g., Faraj and Azad 2012; Leonardi 2011; Majchrzak and Markus 2014; Orlikowski and Scott 2008; Vaast et al. 2017) to study technostress formation and mitigation. Although the affordances identified in our study are in line with prior work on social media affordances (e.g., receiving personalized notifications resembles *triggered attending* and sharing personal stories/information resembles *metavoicing;* Majchrzak et al. 2013), we detail how the actualization of those affordances generates technostress over time. Moreover, our study contributes by introducing a new concept (actualization cost) and uncovering the role of faithful/peer-influenced use schemes in technostress.

First, we extend the nascent literature on affordance actualization (Burton-Jones and Volkoff 2017; Strong et al. 2014) by introducing the concept of actualization cost (Finding 2), which plays a key role in determining the negative consequences of one's IT use practices (e.g., emergence of technostress). We defined actualization cost as the effort, attention, or other resource consumed during the realization of an affordance. As an example, realizing the affordance of receiving personalized notifications comes with the cost of shifting attention to the notification, IT, and its content. One of our central findings (Finding 4) is the cumulative nature of actualization costs, which is what makes the costs so insidious. Single costs seem harmless to users (e.g., attention shifting to a single notification), but their accumulation can cause serious harm (e.g., inability to focus and feel free of IT). This mechanism explains why the wider potential outcomes of using a certain IT can take time to emerge (see Burton-Jones et al. 2017).

Second, our findings highlight the socially constructed nature of use schemes. Although the prior literature has focused on faithful use schemes (i.e., using IT in line with designers' intents) (DeSanctis and Poole 1994; Markus and Silver 2008), our data also emphasize the importance of peer-influenced use schemes in relation to affordance actualization (Finding 1). Distinguishing the two use schemes in relation to affordance actualization is important because they can represent two different phenomena. For instance, a faithful use scheme related to a particular IT (e.g., using face recognition features for tagging people in pictures on a social networking service) may contradict a peer-influenced use scheme related to the same IT (e.g., a shared agreement to stop tagging each other in pictures). Thus, our study provides insights into how collective engagement (Vaast et al. 2017) and social scripts (Polites and Karahanna 2013) shape the negative consequences of IT use. Furthermore, our findings indicate that social conformance to use schemes exposes users to the risk of facing technostress. This is also demonstrated in the dramatic reinterpretations of one's use practices (Finding 6): Faithful and/or peer-influenced use schemes encourage users to view many personal IT use practices as fun and exciting (which they often are initially) even if the users can later consider similar practices as a burden or even like hell. As such, our findings further the discussion on the role of IT design and designers' interests in technostress (Tarafdar et al. 2019). While technostress is created by individuals' activities and choices they make when engaging with IT, these activities and choices are often steered by IT designers. Simultaneously, this means that to mitigate technostress, one often needs to deviate from the faithful (or peer-influenced) use schemes. We consider this an issue to be resolved to prevent technostress from becoming increasingly widespread in the context of personal use. Resolving the issue will require both designers' more careful consideration about the faithful use schemes they promote by their design choices and users' increased critical thinking about how they react to these faithful use schemes and whether they should follow them. Both these aspects open opportunities for future research.

Implications for Practice

Our findings offer implications for mitigating technostress. Mitigation reflects a complex change of IT use practices that can demand substantial effort from technostressed users. Since delivering communication of the potentially harmful consequences of IT use can at times be counter to IT designers' and providers' interests, the onus is on users. Stakeholders that can help users include educators, the public sector, and health organizations. As users tend to have difficulties with technostress mitigation, our findings can assist users and their stakeholders in focusing on the relevant barriers to minimizing the delays and setbacks those barriers cause.

Researchers can focus on people's biases to provide prescriptive implications (Bazerman 2005). In the context of personal IT use, monitoring biases exist because users tend to underestimate their amount of IT use. Similarly, standards biases exist because many users have implicit pro-IT attitudes: They take socially promoted views of personal use for granted and focus on the positive sides of using their favorite IT. As Bazerman (2005, p. 27) argues, if we know that people "are biased in predictable directions, affirmative action is needed to debias these judgments." Thus, a prescriptive implication would be to start considering technostress mitigation from the assumption that users engage in irrational practices, inadequate monitoring, and incomplete standards rather than the assumption that people's IT use practices are rational, their monitoring is realistic, and their standards are up-to-date. Regarding standards, overly enthusiastic users and communities could be identified online, and their awareness could be raised with educational messages (see Noar et al. 2007) about the adverse side effects of IT use. Since many current IT products or services do not allow monitoring by default (with some emerging exceptions), users could be provided guidance about monitoring activities (e.g., separate monitoring applications). As our data highlighted, applications that tracked IT use and compiled statistics about it helped users identify the actualization costs and the specific use routines that create the costs.

Another prescriptive implication relates to people's "psychological tendency to overly discount the future" (Bazerman

2005, p. 29). Contextualized to technostress mitigation, users appreciated the benefits of increasingly actualizing IT affordances today in favor of the potentially greater benefits of mitigation tomorrow. This resonates with the motivation and operational capacity barriers: Knowing that something is bad in the long run does not automatically mean that users want to waive their momentary hedonic gratifications. Indeed, some users did not change their practices even though they knew that they would likely have been better off. Thus, the users must be convinced that the changed practices will create significant improvements in their situation. To demonstrate such improvements, users could be provided with extensive lists of the potential benefits technostress mitigation could bring. One way of combatting the hedonic gratifications of IT use is offering alternative rewards for mitigation. To promote such an approach, technostressed users and their families could be instructed to develop personal- or group-level reward systems for their changes in IT use practices. Thus, users could be involved in group challenges that aim at committing people to changing their IT use practices for the better.

Limitations

This study has certain limitations. First, we collected self-reported, retrospective data, which may be subject to recall bias (see Folkman and Moskowitz 2004). However, self-reported data have been considered reliable for studying technostress (e.g., Ayyagari et al. 2011; Ragu-Nathan et al. 2008) and IT use changes (e.g., Schwarz et al. 2014). We deliberately chose to conduct narrative interviews in a retrospective form because it was an efficient way of identifying users who had suffered from technostress and mitigated it in their natural environment. Second, we chose to employ the literature on IT affordances and self-regulation in place of other potentially relevant literature. For example, we acknowledge that the literature on coping with IT (e.g., Beaudry and Pinsonneault 2005; Salo et al. 2020; Tarafdar et al. 2019) could offer insights into technostress mitigation, especially on emotions. However, we estimated the IT affordance literature would be more precise in focusing on the IT and user components simultaneously and the self-regulation literature would better extract the main components needed for changing one's use practices. Third, while stress can also be perceived positively (Califf et al. 2020; Srivastava et al. 2015) and examined from a physiological perspective (Riedl 2012; Riedl et al. 2012), this study focused on the negative side of technostress from a psychological perspective. Fourth, while our study acknowledges how personal use can reflect various social circles and settings, we did not focus on the collapse of personal and work-related contexts (e.g., Hogan 2010). Fifth, we acknowledge that some mitigations (e.g., quitting IT use permanently) can introduce additional problems. Finally, there are some general guidelines for favorable ways of using IT (e.g., avoiding excessive IT use), but in the end, what is favorable for a specific user can be a personal matter. Thus, this study does not specify one right way of using IT.

Conclusions

IT use has become an integral part of almost all life activities, and accordingly, IT use for personal purposes has grown rapidly. Although much personal use is characterized by fun and voluntariness, technostress is a common and serious negative consequence of such use. Previous research has paid attention to technostress, but it has not yet explained how technostress develops over time and how users can mitigate it in a personal, rather than organizational, environment. Our study illuminated these two previously unexplored areas by utilizing a qualitative approach with narratives and literature on (techno)stress, IT affordances, and self-regulation. Our findings suggest that users actively create their technostress by intensifying and/or expanding affordance actualization and, simultaneously, actualization costs. This is driven by hedonic gratifications and faithful/peer-influenced use schemes. While formation may occur without any specific self-regulation efforts, mitigation requires much self-regulation and involves significant barriers. Our findings contribute both to the technostress and IT affordance literature streams by providing new insights into technostress as something that forms and is mitigated in the relationship between an IT and its user. In this way, our findings can provide a reframed view on technostress.

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Appendix A

Summary of Reviewed Technostress Studies

Article	Context	Stressors and Antecedents	Strains and Negative Outcomes	Mitigation
Agogo and Hess 2018	Org.	IT stressors[a]		
Ahmad et al. 2012	Org.	IT stressors[a]	Reduced org. commitment	
Arnetz 1996	Org.		Strain	Org. support[c]
Ayyagari et al. 2011	Org.	Work stressors[b]	Strain	
Barley et al. 2011	Org.	Overload, time spent with email		
Benlian 2020	Org./ Mixed	Hindrance and challenge stressors	Partnership (dis)satisfaction	Org. support,[c] work–home role
Benlian et al. 2019	Personal/ smart assistants	Privacy invasion	Strain, interpersonal conflict	Anthropomorphic design features
Brooks et al. 2017	Mixed/ SNS	IT stressors[a]	Internet addiction	
Califf et al. 2020	Org.	Hindrance and challenge stressors	Job (dis)satisfaction, attrition, turnover	Org. support[c]
Chen and Karahanna 2018	Org./ Mixed	Interruptions,[d] work stressors[b]	Work and nonwork exhaustion, work and nonwork performance	
Chen and Wei 2019	Org./SNS	Information and social overload	Strain	
D'Arcy et al. 2014	Org.	IT stressors[a]	Moral disengagement, ISP-violating behavior	
Dhir et al. 2018	Personal/ SNS	Compulsive use, fear of missing out	Fatigue due to SNS use, depression, anxiety	
Fox and Moreland 2015	Personal/ SNS	Content, being tethered, lack of privacy, social comparison, relationship tension	Negative emotions	
Fuglseth and Sørebø 2014	Org.	IT stressors[a]	(Dis)satisfaction with work IT use	Org. support[c]
Galluch et al. 2015	Org./study	Interruptions[d]	Strain	Work IT control, option for break
George 1996	Org.	Monitoring via IT	Work-related illness	
Hudiburg 1989	Education	IT "hassles"		
Hung et al. 2011	Org./ mobile	Accessibility, IT stressors[a]	Reduced work productivity	Org. support[c]
Hung et al. 2015	Org./ mobile	Accessibility, IT/communication overload	Reduced work productivity	
Hwang et al. 2018	Org.	IT stressors,[a] work stressors[b]	Reduced org. commitment and security compliance	
Koch et al. 2012	Org.	IT use		
Lee et al. 2014	Personal/ mobile	Compulsive use		

Article	Context	Stressors and Antecedents	Strains and Negative Outcomes	Mitigation
Leung and Zhang 2017	Org. (telework)	IT stressors,[a] permeability at home, work-to-family conflict		
Luqman et al. 2017	Personal/ SNS	Excessive use	Use discontinuance	
Maier, Laumer, and Eckhardt 2015	Org.	IT stressors,[a] work stressors[b]	Exhaustion, job (dis)satisfaction, reduced org. commitment, turnover	
Maier, Laumer, Eckhardt, and Weitzel 2015	Personal/ SNS	Social overload	SNS exhaustion, (dis)satisfaction with SNS, use discontinuance	
Maier, Laumer, Weinert, and Weitzel 2015	Personal/ SNS	IT stressors,[a] disclosure, pattern, social overload	SNS exhaustion, use discontinuance	
Maier et al. 2019	Org.	IT stressors[a]	Job burnout, user performance	User involvement
Marchiori et al. 2018	Org.	IT stressors[a]		
Moody and Galletta 2015	Search tasks	(Lack of) information scent	Reduced information search performance	
Pawlowski et al. 2007	Org.	Various including IT dependency and work–life balance	Various including strain and reduced work performance	
Pirkkalainen et al. 2019	Org.	IT stressors[a]	Reduced productivity	IT control, positive reinterpretation, distress venting, distancing from IT
Ragu-Nathan et al. 2008	Org.	IT stressors[a]	Job (dis)satisfaction, reduced org. commitment and continuance	Org. support[c]
Riedl et al. 2012	Org.	IT breakdown		
Salanova et al. 2013	Org.	Job demands	Strain and addiction	
Salo et al. 2019	Personal/ SNS	Various including over-dependence, life comparison, online conflict	Concentration, sleep, identity and social relation problems	
Shu et al. 2011	Org.	IT dependency, IT stressors[a]		Work IT self-efficacy
Srivastava et al. 2015	Org.	IT stressors[a]	Job burnout	
Stich et al. 2019	Org.	Email misfit, work stressors[b]		
Tams et al. 2020	Org.	Interruptions[d]	Work-life conflict, reduced work-related IT use	Job control
Tams et al. 2014	Memory tasks	Interruptions[d]	Reduced performance	
Tams et al. 2018	Org.	Interruptions,[d] workload	Task performance	Work IT self-efficacy, inhibitory effectiveness, IT experience
Tarafdar, Bolman et al. 2015	Org.	IT stressors[a]	Reduced sales performance, IT-enabled performance, and innovation	Org. support,[c] work IT competence and self-efficacy

Article	Context	Stressors and Antecedents	Strains and Negative Outcomes	Mitigation
Tarafdar et al. 2020	Personal/ SNS	IT stressors,[a] disclosure, pattern, social overload	SNS addiction	Distraction (within SNS or outside SNS)
Tarafdar et al. 2007	Org.	IT stressors[a]	Reduced work productivity	
Tarafdar et al. 2011	Org.	IT stressors[a]	Job (dis)satisfaction, (dis)satisfaction with work IT, reduced org. commitment and productivity	Org. support[c]
Tu et al. 2005	Org.	IT stressors[a]	Reduced work productivity	
Wang et al. 2008	Org.	IT stressors,[a] org. environment		
Yan et al. 2013	Org.	Work stressors[b]	Strain	Org. support[c]

Notes: org. = organizational; SNS = social networking service. None of the reviewed studies address the process of technostress mitigation, and only two studies partially reflect technostress formation in organizational contexts: Barley et al. (2011) explain how the increase of workload via constant email use can create stress, and Califf et al. (2020) refer to environmental conditions, stressors, responses, and outcomes as a process. To find technostress studies for our review, we followed the general suggestions for literature searches by Webster and Watson (2002). We went through each issue of the eight journals in the AIS Basket published between January 1995 and October 2020 (AIS 2011). We included empirical articles that referred to technostress or IT-related stress in their titles or abstracts. As technostress is an interdisciplinary topic, we additionally aimed to cover various journals by running keyword searches and searching backward and forward from the citations of the identified articles. While every review may "miss some articles" (Webster and Watson 2002, xvi), we aimed to ensure our review included relevant articles that examined technostress mitigation.

[a]IT stressors refer here to invasion (e.g., never free of IT), overload (e.g., too much IT/information), complexity (e.g., IT is too difficult to use), uncertainty (e.g., IT changes are too quick or constant), insecurity (e.g., others know more about IT), or a set of these (applied by many; introduced by Tarafdar et al. in 2007 in a journal article and earlier in their working paper).

[b]Work stressors/antecedents refer here to work–home conflict, invasion of privacy, work overload, role ambiguity, job insecurity, or a set of these (applied by many; first used by Ayyagari et al. 2011) as well as task closure, interruption overload, psychological transition (Chen and Karahanna 2018), work relationships, job control, and job conditions (Stich et al. 2019).

[c]Organizational support mechanisms include technical support, literacy facilitation, involvement facilitation (applied by many; introduced by Ragu-Nathan et al. 2008), innovation support (Tarafdar et al. 2011), job control, rewards (Hung et al. 2011), support for work–home boundary management (Benlian 2020), relaxation and tai chi programs (Arnetz 1996), and co-worker support (Yan et al. 2013)

[d]The concept of interruptions partially overlaps with the concept of invasion.

Appendix B

Examples of the Interviewees' Technostress Experiences[4]

Interviewee and Age	Technostressor	Type of IT Related to the Experience	Mitigation Strategy for Changing Use Practices
Amanda, 24	Invasion	A social networking service	Modifying IT use: decreasing use occurrences by disabling notifications (success)
Ann, 20	Invasion	A news application	Switching to alternative IT: changing from a smartphone application to its website version (success)
Bill, 37	Invasion	Smartphone applications (e.g., social networking service and instant messengers)	Modifying IT use: using "do not disturb" mode frequently in the evening (success)
Brenda, 20	Invasion	Social networking services	Modifying IT use: assigning notifications with specific sounds (success)
Carol, 49	Dependency, Invasion	Smartphone applications (e.g., social networking service and browser)	Modifying IT use: restricting smartphone before going to sleep (success)
Catherine, 26	Dependency, Invasion	A social networking service	Taking a temporary break from IT: restricting application use for some time (failed after three days)
Connor, 34	Invasion	Social networking services	Modifying IT use: increasing offline time from social networking services (failed)
Cory, 21	Dependency, Invasion	A social networking service	Modifying IT use: adjusting notification settings and deleting private content (success)
Dan, 22	Dependency, Invasion	Smartphone applications (e.g., news and social network services)	Switching to alternative IT: change from a smartphone to an old mobile phone (success)
Elisabeth, 21	Privacy concerns	A social networking service	Taking a temporary break from IT: deleting account of a social networking service for 2 months (success)
Eric, 35	Invasion	Social networking services	Modifying IT use: reducing personal activity and updates on social networking services (success)
Eugene, 80	Complexity	Social networking services and other IT	Quitting use permanently: removing the social networking service (success)
Jack, 29	Dependency, Invasion	Smartphone applications (e.g., social networking and news services)	Modifying IT use: decreasing use by keeping smartphone away from bed (success)
Janice, 32	Invasion	A social networking service	Taking a temporary break from IT: informing group members about approximately week-long breaks (success)
Keith, 39	Complexity	Instant messenger application	Switching to alternative IT: migrating to an alternative instant messenger (failed)
Laura, 28	Privacy concerns	A social networking service	Modifying IT use: adjusting privacy settings and deleting private content (success)

[4]Most interviewees described more than one type of technostress experience. For presentation clarity, we present here one example per interviewee.

Interviewee and Age	Technostressor	Type of IT Related to the Experience	Mitigation Strategy for Changing Use Practices
Lucy, 23	Privacy concerns, Complexity	A social networking service	Quitting use permanently: quitting the social networking service (failed)
Lynn, 31	Invasion, Dependency	A social networking service	Switching to alternative IT: changing from a smartphone application to its browser version (failed)
Margaret, 65	Complexity	Web browser (network connection)	Modifying IT use: fixing network issues by workarounds and trial and error (failed)
Mike, 29	Dependency, Invasion	A social networking service	Modifying IT use: decreasing use of the service (success)
Natalie, 37	Invasion	Social networking services and their links to other websites	Taking a temporary break from IT: deleting account of a social networking service for 6 months (success)
Nina, 21	Privacy concerns	A social networking service	Quitting use permanently: quitting the social networking service (failed)
Olivia, 32	Privacy concerns	A social networking service	Quitting use permanently: quitting the social networking service (failed)
Paul, 36	Dependency, Invasion	Smartphone applications (e.g., social networking services)	Modifying IT use: decreasing use occurrences of the applications (failed)
Ralph, 27	Privacy concerns	A social networking service	Modifying IT use: adjusting privacy settings and minimizing private content (success)
Robert, 21	Dependency	A social networking service	Taking a temporary break from IT: deactivating the account for an exam preparation period (success)
Samuel, 30	Invasion	Instant messenger application	Quitting use permanently: quitting the instant messenger application (success)
Sophia, 28	Complexity	Web browser	Switching to alternative IT: change from an unreliable laptop to another (success)
Susan, 20	Privacy concerns	Web browser and its tracking features	Switching to alternative IT: change to a more secure and trustworthy browser (failed)
Tim, 41	Privacy concerns	Website accounts containing critical information (e.g., credit card number)	Modifying IT use: using privacy and security protection software and adjusting settings (success)

Notes: Success was evident when the interviewees used phrases such as “successful” and “improvement” to describe their mitigation or referred to achieving the desired changes in use (e.g., decreased use). Failure was evident when the interviewees used phrases such as “I failed” and “I couldn’t do it” or referred to not achieving the desired changes in use (e.g., being stuck in stressful use routines).