ICT-Based Communication Events as Triggers of Stress: A Mixed Methods Study

Research-in-Progress

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Abstract

ICT-based communication brings more flexibility to our lives but likewise can be a source of stress. In this paper, we argue that stress due to ICT-based communication is triggered not only by stable material properties of ICTs but also by characteristics of the usage situation itself. To explore the stress-inducing characteristics of ICT-based communication events, we opt for a developmental mixed methods approach. A qualitative study with 59 participants is used to identify ICT-based communication event stressors. Based on the transactional theory of stress and coping and the qualitative data, we develop hypotheses on how these stressors affect momentary stress levels and cumulate over the course of a day to affect end-of-day stress levels. An ongoing quantitative experience sampling study will be used to test the proposed hypotheses. By adopting an event-based perspective, this paper could help to understand variations of stress due to ICT-based communication across different events.

Keywords: ICT-based communication events, technostress, episodic strain, spillover strain, mixed methods approach

Introduction

Communication is "a conditio sine qua non of human life" (Watzlawick et al. 2011, p. xiii). With the increasing dissemination of information and communication technologies (ICTs), the share of human interactions that is carried out via ICT is constantly growing (Butts et al. 2015). ICTs allow users to communicate for work purposes anytime and anywhere (Ayyagari et al. 2011; Ragu-Nathan et al. 2008), while at the same time being able to stay connected to personal contacts (Sayah 2013). As a result, ICT-based communication brings more flexibility and autonomy to our lives which foster effectiveness and feelings of satisfaction and accomplishment (Diaz et al. 2012; Fonner and Stache 2012; Middleton and Cukier 2006). Yet, ICT-based communication can also be a source of stress (Barley et al. 2011). For example, preceding research shows that the amount of ICT-based communication is related to feelings of overload (Barley et al. 2011), impaired recovery (Lanaj et al. 2014), and work-life conflict (Boswell and Olson-Buchanan 2007; Diaz et al. 2012). However, the focus on *volume* of ICT-based communication as a trigger of stress bears the risk of overlooking that each communication – and thus, individuals' reaction to it – may vary "on an event-by-event basis" (Butts et al. 2015, p. 764). Accordingly, to fully understand when and why ICT-based communication is perceived as stressful, an event-based approach is needed that incorporates variation on the level of discrete ICT-based communication events and individuals' reaction to them.

Building on the notion that distinct communication events may elicit distinct effects, the present study proposes that each ICT-based communication event features specific characteristics which might (or might not) induce stress. In doing so, we aim to answer two research questions: (1) Which characteristics of ICT-based communication events do individuals perceive as sources of stress (i.e., stressors) and why?, and (2) To what extent do these ICT-based communication event stressors trigger momentary feelings of stress (i.e., episodic strain) as well as increased stress levels at the end of day (i.e., spillover strain)?

With its focus on stress caused by ICT-based communication, this study is located at the interface of two research fields: organizational behavior (OB) research on individual-level outcomes of ICT usage and information systems (IS) research on technostress, that is, stress that results from individuals' interactions with ICTs (Ayyagari et al. 2011; Tams et al. 2014; Tarafdar et al. 2015). The present study aims to contribute to preceding research in two respects. First, most studies on consequences of ICT usage in both IS and OB do not account for different usage contexts (for example, specific types of ICT or tasks) that might differ in their implications for technostress (Tarafdar et al. 2015). Thus, the present study focuses on ICT usage for communication purposes as a particularly prevalent usage context, and contributes to a better understanding of this context's specific impact on stress by identifying stressors that are distinctive for ICT-based communication events. Second, most studies on technostress conceptualize technostress as chronic, overall stress resulting from material properties of ICTs such as their complexity or constant connectivity (e.g., Ayyagari et al. 2011; Barley et al. 2011; Ragu-Nathan et al. 2008). In doing so, these studies do not capture variations of technostress within individuals across different usage events. In the same way, OB research on individual-level outcomes of ICT usage is limited in that it relies heavily on investigating volume of use as an independent variable and thus does not account for the possibly divergent effects of discrete ICT usage events (Butts et al. 2015). The present study goes beyond preceding research by applying an event-based approach as suggested by Ayyagari and colleagues (2011) and Galluch and colleagues (2015) that allows us to identify stressors that are unique to ICT-based communication events and to examine their impact on individual stress reactions. Examining these immediate reactions is highly relevant since they involve increased perceived momentary stress as well as increased blood pressure and stress hormones (e.g., Bono et al. 2013; Galluch et al. 2015). Moreover, by investigating both episodic and spillover strain, this study captures not only short-term effects of ICT-based communication events but also how a series of ICT-based communication events occurring in the course of a day cumulates to affect end-of-day strain which contributes to gain a deeper understanding of ICT-based communication events' prolonged spillover effects.

To make these contributions, we draw on the transactional model of stress and coping (Lazarus 1966; Lazarus and Folkman 1984) as a theoretical framework to explain why perceived stress should vary across ICT-based communication events due to specific stressors that individuals encounter in the course of such events. To our knowledge, this is the first study to explore sources of stress specific to ICT-based communication events and investigate their relation to episodic and spillover strain. Accordingly, we opt for a developmental mixed methods approach (Venkatesh et al. 2013) consisting of two sequential studies.

Study 1, a qualitative interview study with 59 participants, serves to identify stressors specific to ICT-based communication events and to develop hypotheses on how these stressors affect episodic and spillover strain. Design, procedures, and results of Study 1 are presented in this paper. The goal of Study 2 is to test our research hypotheses. Therefore, we are currently collecting quantitative data using the experience sampling methodology that requires participants to provide repeated reports on events and experiences as they occur in their daily lives (e.g., Bolger et al. 2003; Fisher and To 2012). Specifically, we collect data on participants' perceptions of a recent ICT-based communication event three times a day as well as participants' current state at the end of day, on 12 days in total. To date, the sample consists of data on more than 2,000 ICT-based communication events. We outline the design and procedures of this quantitative study in this paper. Finally, we discuss potential contributions of our study to IS and OB research on ICT-based communication.

Theoretical Background: The Transactional Theory of Stress and Coping

The transactional theory of stress and coping (Lazarus 1966; Lazarus and Folkman 1984) describes stress as a transactional relationship between environmental stimuli (stressors) and the individuals' response to them (strain). Stressors are properties of events an individual faces that harm, threaten, or challenge an individual (Lazarus and Folkman 1984). Strain refers to the individual's negative psychological, physiological, or behavioral response to the stimuli (Cooper et al. 2001; Thomas and Ganster 1995). According to the transactional theory of stress and coping (Lazarus 1966), the emergence of stress depends on the interplay of two appraisal processes (Lazarus and Folkman 1984). During the primary appraisal process, individuals assess the "relevance of what is happening" (Lazarus and Folkman 1987, p. 145), that is, they evaluate if an event is significant for their well-being and hence represents a potential stressor. During the secondary appraisal process, individuals assess if they are able to take the actions needed to successfully cope with the stressor. When an event is judged as being relevant for an individual's well-being and its demands are perceived to exceed the individual's capabilities, strain arises (Lazarus and Folkman 1984, 1987).

The majority of research on technostress draws on the transactional theory of stress and coping to explain the emergence of chronic levels of technostress as a result of chronic, consistent stressors (Galluch et al. 2015) such as technologies' material properties (e.g., Barley et al. 2011; Ragu-Nathan et al. 2008; Tarafdar et al. 2007, 2015). However, Lazarus and Folkman (1987, p. 143) state that the transactional process between stressor and strain "involves change over time or across situations". By emphasizing the temporary, situation-dependent nature of the stressor-strain relationship, they suggest that levels of strain vary not only inter-individually but also across different events. Therefore, the theory also provides the basis for an event-based approach explaining the emergence of episodic strain, that is, momentary levels of strain experienced in a specific situation, as a result of episodic, temporary stressors specific to that situation (Galluch et al. 2015).

Drawing on the transactional theory of stress and coping, we adopt an event-based perspective to examine the stressor-strain relationship in the context of ICT-based communication. In line with basic assumptions of the theory, ICT-based communication events should induce strain if the events' demands exceed individuals' resources to deal with them. We argue that the extent to which ICT-based communication events' demands exceed individuals' resources is determined by specific properties of ICT-based communication events that we refer to as ICT-based communication event stressors. If these stressors are present during an ICT-based communication event, this event should trigger episodic strain. In addition to these episodic effects, episodic stressors might also elicit prolonged effects as indicated, for example, by increased stress levels at a later juncture. These are referred to as 'spillover effects'. Preceding research that examines these effects in the context of mood and affect suggests that mood linked to a negative event at one time may persist and affect mood in the subsequent time period (e.g., Marco and Suls 1993; Williams and Alliger 1994). Spillover effects hence reflect processes that involve affective states building over the course of a day (Bono et al. 2013), which, in line with the transactional theory of stress and coping, may result from the individual being unable to cope with stressors it confronts (Marco and Suls 1993). Transferring these findings to the context of stress, recent empirical studies show that work and communication events do not only trigger immediate reactions such as increased perceived momentary stress and stress hormones but also spill over into the evening by affecting individuals' end-

of-day well-being (e.g., Bono et al. 2013; Butts et al. 2015; Galluch et al. 2015). Applying these results to the context of our study, ICT-based communication events might both elicit short-term effects resulting in episodic strain and build over time to affect individuals' state in the evening. Accordingly, the extent to which individuals are involved in ICT-based communication events characterized by a certain stressor over the course of a day should be linked to individuals' strain at the end of day, referred to as spillover strain.

By differentiating between episodic and spillover strain, we aim for a deeper understanding of ICT-based communication events' short-term, episodic effects and their cumulated spillover effects. To our knowledge, this is the first study to examine ICT-based communication event stressors and their differential effects on episodic and spillover strain. Accordingly, we opt for a developmental mixed methods approach (Venkatesh et al. 2013) with two sequential studies: an exploratory, qualitative study to identify ICT-based communication event stressors and develop hypotheses on their impact on strain, and a confirmatory, quantitative study to test these hypotheses.

Study 1: Identification of ICT-Based Communication Event Stressors and Development of Research Model

The purpose of Study 1 is to explore which properties of ICT-based communication events users perceive as sources of stress and to develop hypotheses on the relationship between these stressors and users' strain. We chose an explorative, qualitative approach as we aim to examine phenomena that "have attracted little research or formal theorizing to date" (Edmondson and McManus 2007, p. 1161).

Participants and Procedures

To collect qualitative data, we conducted interviews with knowledge workers, that is, employees who are primarily involved with "the creation, distribution, or application of knowledge" (Davenport 2005, p. 11). We sampled knowledge workers because ICT-based communication is an essential part of their job (Wajcman and Rose 2011). To identify participants, the authors' personal and professional networks were contacted. Overall, 105 individuals were invited to participate in the interview study. Our final sample consists of 59 participants, all of them living and working in Germany. The final sample includes 18 top executives (4 female), 20 middle managers (9 female), and 21 employees without managerial responsibilities (10 female) who work in a diverse range of industries including IT, banking and finance, and consulting. Average job tenure is 4.8 years and average age is 41.9 years.

To guarantee comparability, we used a partial standardized interview guide that allowed for idiosyncratic questions for clarification if needed. Participants were informed about the general topic and structure of the interview, however, research questions or propositions were not discussed due to the study's explorative approach. In the course of the interviews, participants were asked which ICTs they use for work-related or private communication purposes and to describe their usual user behavior. Finally, we asked them to delineate ICT-based communication events they had experienced as significantly positive or negative. In total, the participants described 103 ICT-based communication events (51 with work-related and 52 with private contacts). During the interviews, which lasted 60 minutes on average, participants could continue at length and without interruption. After transcription, three coders coded the interview sections in which participants described the properties of significant ICT-based communication events and their reaction to them following the principles of grounded theory (Charmaz 2014).

Results

After several iterations of coding and regular discussions among the coders, the properties of ICT-based communication events that the participants described as inducing strain (or as not causing strain if absent) were categorized into three aggregated codes representing ICT-based communication event stressors: valence, lack of autonomy, and interruptiveness. Codes that applied to less than 20% of the described ICT-based communication event properties were excluded from further analyses to ensure generalizability. With regard to individuals' reactions, the coding procedures resulted in two overarching categories: negative reactions indicating strain and positive reactions indicating the absence of strain. In support of the stressor-strain relationship described by the transactional theory of stress and coping, the

qualitative data suggest that the three ICT-based communication event stressors determine the emergence and level of strain triggered by an ICT-based communication event. In the following, we elaborate each stressor in detail and draw on the qualitative data as well as the theory to derive hypotheses regarding the stressors' impact on strain experienced in ICT-based communication events (episodic effects). In addition, our hypotheses on the stressors' cumulated impact on spillover strain are supported by recent empirical findings. The resulting research model is presented in Figure 1.

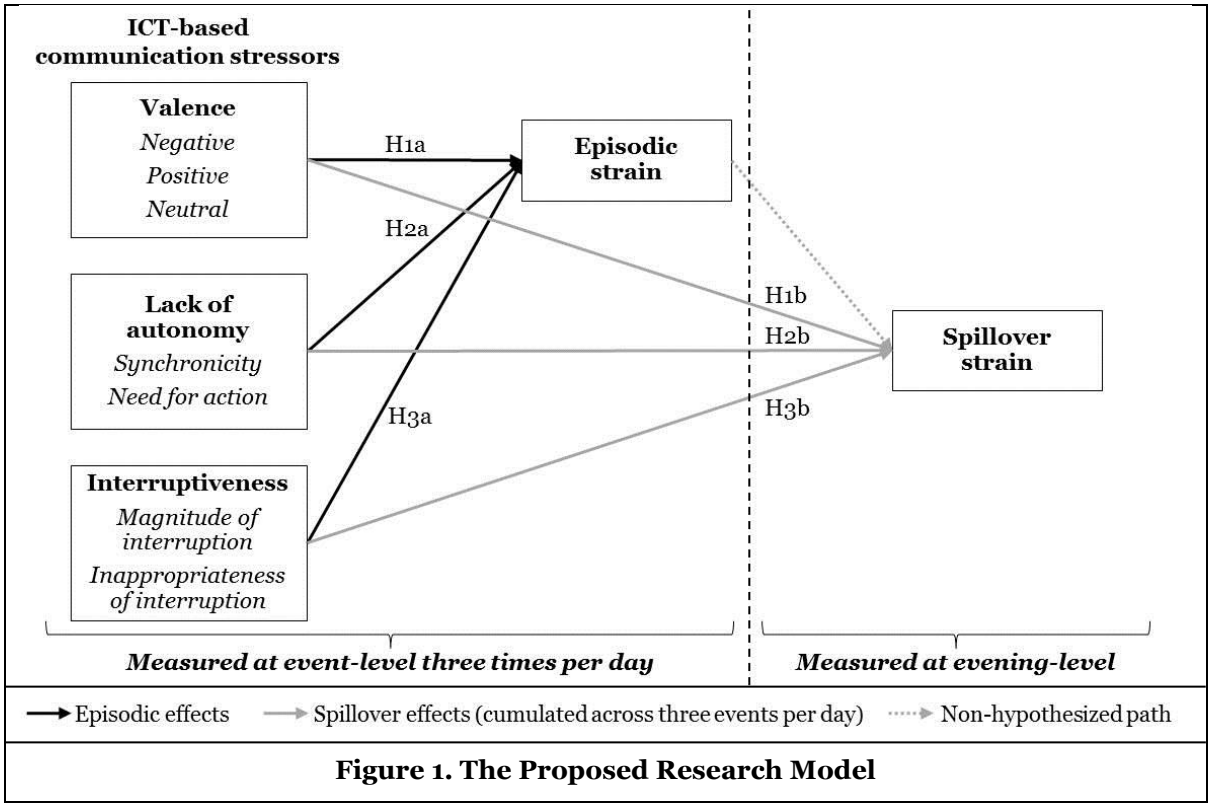

Figure 1. The Proposed Research Model

In the context of the present study, the stressor *valence* refers to individuals' evaluation of the content of ICT-based communication events. Participants distinguished between three forms of valence: (1) negative, (2) positive, and (3) neutral. As described by the interviewees, situations in which ICTs are used to convey negative content seem to cause episodic strain by inducing negative emotions: *"A sick family member called and the doctor's results were negative. My private life suddenly was present at work. I sat in front of my laptop when that person called and my heart was beating and I was scared"* (Middle manager). In contrast, several quotes indicate that situations in which ICTs are used to transfer positive content trigger positive emotions which in turn enhance individuals' well-being. Hence, the qualitative data suggest that ICT-based communication events with positive content do not induce strain but are perceived as beneficial by users. This notion is in line with research on the relationship between events and mood. Recent studies suggest that positive work events foster positive mood states, whereas negative work events have a dampened impact on mood and increase stress levels (e.g., Bono et al. 2013; Miner et al. 2005). Finally, interviewees described ICT-based communication events with neutral content as neither inducing stress nor being beneficial. Taken together, in line with the transactional theory of stress and coping, interviewees experienced events with negative valence as threats to their well-being and, thus, as sources of stress (Lazarus and Folkman 1984), whereas positive and neutral events are perceived as reducing or not affecting momentary strain respectively.

Hypothesis 1a: Valence of ICT-based communication events is related to episodic strain such that negative valence increases, positive valence reduces, and neutral valence is unrelated to episodic strain.

In addition to these findings of our qualitative study, a recent study found that negative work events are associated with increased stress levels and negative mood states in the evening, while positive work events are related to lower blood pressure and increased work detachment in the evening (Bono et al. 2013). In line with these findings, we argue that the extent to which individuals are involved in ICT-based communication events with negative, positive, or neutral valence over the course of a day might affect individuals' spillover strain.

Hypothesis 1b: Cumulated valence of ICT-based communication events an individual experiences over the course of a day is related to spillover strain such that cumulated negative valence increases, cumulated positive valence reduces, and cumulated neutral valence is unrelated to spillover strain.

The stressor *lack of autonomy* refers to increased feelings of acting as a result of pressure and control by others (Gagné and Deci 2005; Ryan and Deci 2000) in the course and aftermath of an ICT-based communication event. The qualitative data indicate that lack of autonomy comprises two aspects, synchronicity and need for action. With regard to the former, media synchronicity theory (Dennis and Valacich 1999; Dennis et al. 2008) describes synchronous media as being characterized by high transmission velocity which allows messages to be reached in the moment they are sent and fosters fast responses. In situations in which communication channels with capability for high transmission velocity are used, interviewees experience pressure of responding immediately. This pressure is perceived as constraining autonomy of when to respond and, in turn, as a source of stress: *"It was mainly because of the communication channel: Any other channel except calling would have been fine, because then I could have responded when I wanted and when I had the time to deal with it"* (Top executive). Analogously, with regard to the second aspect of lack of autonomy, the qualitative data indicate that ICT-based communication events tend to increase strain if they are perceived as bringing along some need for action, in particular if the individual's resources for acting are limited. The perceived pressure to act limits individuals' autonomy over what to do next and thus induces strain. In contrast, if ICT-based communication events do not require instant action, stress levels are not affected: *„When my boss texts me to remind me of something [...] and there is no urgency behind it, that's rather neutral to me. But when he sends a request to hand in a presentation on Monday morning and I know for sure it's not done yet, that's rather negative"* (Top executive).

Taken together, the interviewees describe ICT-based communication events characterized by synchronicity and need for action as reducing their autonomy, either during the event (synchronicity) or after the event (need for action). In line with the transactional theory of stress and coping, experiencing lack of autonomy should result in feelings of having limited resources to successfully cope with the situation, which in turn increases episodic strain (Lazarus and Folkman 1984, 87). This notion is supported by previous studies suggesting that feeling limited in one's autonomy results in deteriorated well-being (Gagné et al. 2003; Reis et al. 2000).

Hypothesis 2a: Lack of autonomy of ICT-based communication events is positively related to episodic strain.

Beyond our qualitative findings, preceding studies found that acting autonomously during the day fosters individuals' well-being in the evening (Reis et al. 2000; Sheldon et al. 1996). Therefore, we suggest that the extent to which the ICT-based communication events an individual is involved in throughout a day are characterized by a lack of autonomy affects the individual's spillover strain.

Hypothesis 2b: Cumulated lack of autonomy of ICT-based communication events an individual experiences over the course of a day is positively related to spillover strain.

Finally, the interview data suggest that the level of strain induced by using ICT for communication purposes is influenced by the *interruptiveness* of an ICT-based communication event. In the context of the present study, we define interruptiveness as the extent to which an individual feels unreasonably interrupted by an ICT-based communication event. Interruptiveness involves the magnitude and the appropriateness of an interruption by ICT-based communication. Magnitude of interruption that is, the extent to which an individual perceives an ICT-based communication event as disruptive, depends on the event's timing: *"My colleagues got my private phone number [...]. But they know that I have small children and that I am unavailable in the evening. It sucks if I get calls in the evening nevertheless."* (Top executive). When an ICT-based communication event's timing is inconvenient that is, takes place while an individual is involved in something else (e.g., another task or role), the individual's resources to cope with

the communication are constrained. In line with Lazarus and Folkman (1984), limited coping resources should increase stress. In contrast, when the timing of an ICT-based communication event is convenient, such that individuals have sufficient resources to handle it, stress levels should not be affected.

Moreover, the interview data suggest that the appropriateness of an interruption associated with an ICT-based communication event influences individuals' stress reaction. In line with the interruption evaluation paradigm (Grandhi and Jones 2010, 2015), the interviewees stated that they evaluate the utility and value of an ICT-based communication event to assess whether they justify an interruption. If this evaluation process comes to the conclusion that the interruption is unworthy, negative emotions such as anger or irritation are elicited which lead to increased strain. For example, a top executive stated: *"We are currently having a house built and my wife called me with a petty question about that. At that moment, that wasn't important for me at all but she wanted to force a decision. […] Of course, I felt extremely disrupted, I didn't understand why she acted like that, and I was angry, too".* In contrast, when the interviewees perceive an ICT-based communication event as a reasonable, worthwhile interruption, they report to not experience increased strain. Together, we suggest that individuals' episodic strain should increase when the interruptiveness of an ICT-based communication event is high that is, when it is perceived as disruptive and having low utility or value.

Hypothesis 3a: Interruptiveness of ICT-based communication events is positively related to episodic strain.

Adding to the result of our qualitative analysis, preceding research indicates that the amount of disruptive events an individual experiences during a day is related to well-being in the evening (Zohar et al. 2003). In line with this, we propose that the extent to which individuals are involved in ICT-based communication events that are characterized by perceived interruptiveness over the course of a day influences their spillover strain.

Hypothesis 3b: Cumulated interruptiveness of ICT-based communication events an individual experiences over the course of a day is positively related to spillover strain.

In addition to the hypothesized links, our research model includes a path from episodic to spillover strain. As previous research has shown that indicators of episodic strain are related to indicators of end-of-day strain (Butts et al. 2015), we control for the cumulated impact of episodic strain on spillover strain to uncover the true direct effect of ICT-based communication event stressors on spillover strain.

Study 2: Validation of Research Model

Data Collection

The goal of Study 2 is to validate the proposed research model developed in the course of our qualitative study (cf. Figure 1) with quantitative data. Accordingly, we are currently collecting quantitative data among participants employed at three companies from the industries consulting, automotive supplier, and IT. Data are collected using the experience sampling methodology (ESM) which "features repeated measurements of the same participants as they go about their daily lives" (Fisher and To 2012, p. 865). ESM is the method of choice for capturing participants' experiences in fluctuating events as it uncovers variation over the course of time (Bolger et al. 2003; Fisher and To 2012). Following the principles of ESM, we collect data from the same participants four times a day over two weeks (Monday – Saturday; 12 days total). In particular, participants are asked to answer short online surveys about a recent communication event and their reaction to it (event survey) three times a day and their strain at the end of day (evening survey). The sample currently consists of more than 2,000 completed event surveys referring to ICT-based communication events. In addition, before the two-week survey period, participants completed an online survey including questions about demographics, their job, ICT usage, personality, and general well-being.

Measures

We decided to mainly use single items measures for the event and evening survey for two reasons. First, individuals' recent experiences and states are rather unidimensional and concrete, so single items have proven to be reliable and valid measures when used in ESM studies (e.g., Bono et al. 2013; Fisher and To

2012). Second, in order to maintain the participants' motivation to respond regularly, short questionnaires and hence, short measures should be used for conducting ESM (Fisher and To 2012).

ICT-based communication event stressors. The three stressors and their facets are measured by single items with either a dichotomous scale (e.g., "This communication event led to an acute need for action for me", answering "yes" or "no") or a five-point Likert scale (e.g., "How much have you felt disturbed by the initiation of this communication event?", ranging from "not at all" to "very much").

Strain. In this study, we focus on individuals' psychological strain as one of three forms of individual responses to a stressor (Cooper et al. 2001; Thomas and Ganster 1995). *Episodic strain* is assessed with the self-assessment manikin (SAM), a well-established and validated non-verbal scale which measures the three affective dimensions pleasure, arousal, and dominance associated with a person's emotional reaction to an event (Bradley and Lang 1994). Hereby, unpleasant feelings accompanied with high arousal indicate momentary psychological strain (Russell and Pratt 1980; Warr 1990). S*pillover strain* is reversely reflected by individuals' well-being in the evening. We cover well-being in the evening by measuring psychological distress and satisfaction which both are considered indicators of well-being (e.g., Diener et al. 1999; Jackson et al. 1983). Psychological distress refers to a mental state characterized by negative emotions and thoughts (Selye 1974; Warr 1990) and is measured with three items (adapted from Cohen et al. 1983; Watson et al. 1988). A sample item is "Today I feel distressed". Satisfaction in the evening, defined as the individual's overall evaluation of one's quality of life that day (Pavot and Diener 1993) is measured by a single item adapted from Ryff and Keyes (1995): "When I think about today, I am satisfied". All items assessing spillover strain are measured on a seven-point Likert scale.

Data Analysis

A key characteristic of ESM data is its multilevel structure. In our case, communication events are nested within days, and days are nested within persons. To account for the hierarchical data structure, we will use hierarchical linear modeling (HLM) for data analysis (Bolger et al. 2003; Fisher and To 2012). HLM allows to differentiate within-person from between-person variance, thereby accounting for dependencies caused by the nested data structure and error components on each level of the data (Beal and Weiss 2003). To model the episodic effects of ICT-based communication event stressors, their relationship with episodic strain will be examined. To model the spillover effects of ICT-based communication events, the association between ICT-based communication event stressors, cumulated over the course of a day, and spillover strain will be assessed.

In order to take into account that accumulated strain on one day might affect strain levels on the following day, we will control for previous day's spillover strain in our analyses (Miner et al. 2005). Moreover, participants have the opportunity to report if they had any significantly stressful events over the course of the day in an open answer format in the evening survey. This information will be used to control for the impact of events other than the ICT-based communication events on strain levels. Finally, we will include several control variables as indicators of general strain levels such as negative affectivity (Watson et al. 1988), job demands (Karasek 1979), and work-life conflict (Netemeyer et al. 1996) to ensure that biases in the measurement and analyses of strain are avoided.

Potential Contributions

The present study contributes to preceding IS research on technostress as well as OB research on individual-level outcomes of ICT-based communication in several ways. First, our research responds to calls for studying technostress in more specific usage contexts (Ayyagari et al. 2011; Tarafdar et al. 2015) by investigating stress caused by ICT-based communication, a particularly prevalent usage context in our every-day lives (Butts et al. 2015). Second, by applying an event-based perspective to study sources of stress associated with ICT-based communication, we account for the possibility that the extent to which ICT-based communication triggers stress might vary from event to event (Butts et al. 2015; Galluch et al. 2015). Drawing on qualitative data from 59 participants, we identify three stressors specific to ICT-based communication events suggested to affect individuals' stress levels in the course and aftermath of these events. Our study may also contribute to a more differentiated perspective on the consequences of ICT-based communication. Drawing on quantitative data collected in a 12-day experience sampling study, we will examine both short-term effects of ICT-based communication event stressors on episodic strain and

their cumulated spillover effects on end-of-day strain. By differentiating between these two forms of strain which were both found to be highly relevant for individuals' well-being (e.g., Bono et al. 2013; Galluch et al. 2015), we aim for a deeper understanding of how ICT-based communication events' trigger immediate stress reactions and how they build over time.

Future studies could integrate our event-based approach with preceding research by simultaneously investigating three forms of stress induced by ICT-based communication and their specific antecedents: (1) chronic strain triggered by chronic stressors related to ICTs' material properties identified in previous studies (e.g., Ayyagari et al. 2011; Ragu-Nathan et al. 2008), (2) episodic strain triggered by stressors associated with distinct ICT-based communication events, and (3) daily strain triggered by exposure to ICT-related stressors over the course of a day. In doing so, interdependencies between these three types of strain and their antecedents could be examined.

The event-based perspective on ICT-based communication applied in the present study yields important implications for both employers and providers of ICT. The notion that levels of stress induced by ICT might vary not only across individuals and technologies but also across usage situations challenges organizational initiatives aimed at general ICT bans such as turning off email servers after hours (Volkswagen, BBC News 2012). Instead, situation-specific, individual solutions are needed. In the same line, providers of ICT could contribute to reduce stress caused by ICT-based communication by supporting users in managing their reachability according to their needs in a specific situation and in giving them more control over their exposure to ICT-based communication event stressors. For example, interruptiveness could be decreased by implementing settings that allow users to be unavailable for anybody but the contacts relevant for a task they are currently involved in.

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