Always Online: Boundary Management and Well-being of Knowledge Workers in the Age of Information and Communication Technology Use

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Summary

Information and communication technologies (ICTs) transform individuals' ways of working and living fundamentally. This dissertation addresses two pivotal developments coming along with the increasing prevalence of ICTs that significantly influence individuals' well-being: First, ICTs change human communication – at work and in their personal life as well as across the boundaries of these life domains. Second, in the age of cross-border availability ICTs have the power to alter how individuals manage the boundaries of their work and personal life. Preceding research on these topics suggests that ICTs are a double-edged sword: They bring benefits as well as harm for individuals' well-being. As well-being is an important precursor of performance-related outcomes, organizations face new challenges in the light of these developments to maintain and foster their employees' well-being.

Hence, this thesis is concerned with the overarching question how potentially positive consequences coming along with the ubiquity of ICTs can be fostered and negative consequences can be avoided to maintain and increase individual well-being in the long run. To provide new insights on this question, two comprehensive empirical studies are conducted. Specifically, study 1 examines under which circumstances ICT-mediated communication has beneficial or detrimental effects on well-being from an event-based perspective, applying a mixed-methods research design. Based on an exploratory qualitative study with 50 knowledge workers, four features of ICT-mediated communication events are identified that determine users' momentary affective states: valence, disturbance, need for action, and synchronicity. Then, in a quantitative experience sampling method study with data on 2,537 events and 1,355 daily measures, these features' episodic effects on momentary affective states and their spillover effects on end-of-day well-being are tested. Hierarchical linear modeling results show that the four features exert episodic effects on momentary affective states. Analyses of spillover effects further suggest that the effects of valence, disturbance, and need for action on momentary affective states cumulate over the course of a day to affect individuals' end-of-day well-being.

Study 2 focuses on antecedents and effects of individuals' boundary management of both their work and personal life in the age of cross-border availability. Results of structural equation modeling with data from 401 knowledge workers collected in two waves show that coworker availability expectations diminish work-life segmentation, while personal contact

availability expectations reduce life-work segmentation. The study also shows that boundary management behavior has asymmetrical effects, depending on directionality: Work-life segmentation is associated with increased well-being, while life-work segmentation is associated with reduced well-being. Further, the relationship between work-life segmentation and well-being is moderated by individuals' work-life segmentation preferences, underlining the relevance of boundary management preferences to our understanding of the conditions under which given boundary management behaviors are beneficial or detrimental to well-being.

In sum, these comprehensive studies provide a more nuanced picture of the determinants that may influence when the consequences coming along with the ubiquity of ICTs are positive or negative for individuals' well-being, thereby yielding several important contributions for research: Study 1 contributes to our understanding of the drivers of ICT-mediated communication's double-edged nature as well as their dynamic relationship with well-being from an event-based perspective by identifying four affectively significant features of ICT-mediated communication events and unveiling both their episodic and spillover effects on individual well-being. Study 2 contributes to a comprehensive framework for investigating and understanding bidirectional boundary management in the age of cross-border availability by detecting distinct antecedents of work-life and life-work segmentation and their opposing effects on well-being. Together, their findings suggest three major factors which may determine when the consequences of the ubiquity of ICTs are beneficial or detrimental for individuals' well-being – event-specific features, personal preferences, and life domain concerned.

With these new insights based on theoretical underpinning, this dissertation contributes to a more differentiated empirical and theoretical understanding of individuals' boundary management and well-being in the age of ICT use. Thereby, the thesis suggests valuable implications for future research and further provides employees as well as organizations with differentiated leverages to establish an environment in which ICTs are used in both healthy and productive ways.

Zusammenfassung

Informations- und Kommunikationstechnologien (IKT) verändern die Arbeits- und Lebensweise der Menschen maßgeblich. Die vorliegende Dissertation beschäftigt sich mit zwei zentralen Entwicklungen, die mit der steigenden Verbreitung von IKT einhergehen und das Wohlbefinden von Individuen signifikant beeinflussen: Zum einen verändern IKT die Kommunikation zwischen Menschen – sowohl innerhalb des Arbeits- und Privatlebens als auch über die Grenzen dieser Lebensbereiche hinweg. Zum anderen verändern IKT im Zeitalter der ständigen Erreichbarkeit, wie Individuen die Grenzen ihres Arbeits- und Privatlebens gestalten. Bisherige Forschungsarbeiten zu diesen Themen deuten darauf hin, dass IKT ein zweischneidiges Schwert sind: Sie bringen sowohl Vorteile als auch Nachteile für das Wohlbefinden von Individuen mit sich. Da das Wohlbefinden einen bedeutenden Einflussfaktor für relevante Leistungsgrößen darstellt, stehen Unternehmen vor dem Hintergrund dieser Entwicklungen vor neuen Herausforderungen, um das Wohlbefinden ihrer Mitarbeiter[1] zu erhalten und zu fördern.

Die vorliegende Arbeit befasst sich daher mit der übergeordneten Frage, wie potenziell positive Auswirkungen, die mit der Verbreitung von IKT einhergehen, gefördert und negative Auswirkungen vermieden werden können, um das Wohlbefinden langfristig zu erhalten und zu steigern. Im Speziellen untersucht Studie 1 anhand eines Mixed-Methods-Forschungsdesigns, in welchen Situationen sich IKT-basierte Kommunikation positiv oder negativ auf das Wohlbefinden von Individuen auswirkt. Basierend auf einer explorativen Interviewstudie mit 50 Wissensarbeitern werden vier Merkmale identifiziert, die maßgeblich für die affektive Reaktion auf eine IKT-basierte Kommunikationssituation sind: Valenz, wahrgenommene Störung, akuter Handlungsbedarf und Synchronität. Anschließend wird in einer Experience Sampling-Studie mit Angaben zu 2.537 Situationen und 1.355 Tagesmessungen der Einfluss dieser identifizierten Merkmale sowohl auf die unmittelbare affektive Reaktion als auch auf das Wohlbefinden am Ende des Tages untersucht. Die Ergebnisse der hierarchischen linearen Modellierung zeigen, dass die vier Merkmale die unmittelbare affektive Reaktion signifikant beeinflussen. Darüber hinaus zeigt die Analyse, dass sich die Effekte von Valenz, wahrgenommener Störung und akutem Handlungsbedarf

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[1] Aus Gründen der besseren Lesbarkeit wird auf die gleichzeitige Verwendung männlicher und weiblicher Bezeichnungen verzichtet. Personenbezeichnungen gelten stets für die weibliche und männliche Form.

auf die unmittelbare affektive Reaktion über den Tag hinweg kumulieren und so das Wohlbefinden am Ende des Tages beeinflussen.

Im Fokus der Studie 2 stehen die Einflussfaktoren und Auswirkungen der Grenzgestaltung des Arbeits- und Privatlebens im Zeitalter der ständigen Erreichbarkeit. Die Ergebnisse der Strukturgleichungsanalyse, die auf einer Datengrundlage von 401 Teilnehmern und zwei Messzeitpunkten beruhen, zeigen, dass wahrgenommene Erreichbarkeitserwartungen von Kollegen die Segmentierung des Arbeitslebens von dem Privatleben (Work-Life Segmentierung) verringern, während wahrgenommene Erreichbarkeitserwartungen von privaten Kontakten die Segmentierung des Privatlebens von der Arbeit (Life-Work Segmentierung) reduzieren. Darüber hinaus zeigt die Studie, dass sich die Auswirkungen der Grenzgestaltung je nach Richtung unterschiedlich auf das Wohlbefinden auswirken: Während sich Work-Life Segmentierung positiv auswirkt, ist eine Life-Work Segmentierung mit negativen Effekten verbunden. Darüber hinaus wird die Beziehung zwischen Work-Life Segmentierung und Wohlbefinden von den persönlichen Work-Life Segmentierungs-präferenzen moderiert. Dieses Ergebnis unterstreicht die Relevanz der Rolle von persönlichen Präferenzen, um die Bedingungen zu verstehen, unter denen sich eine bestimmte Art der Grenzgestaltung positiv oder negativ auf das Wohlbefinden auswirkt.

Zusammen tragen die beiden Studien zu einem differenzierteren Verständnis bei, wie potenziell positive Auswirkungen auf das Wohlbefinden, die mit der Verbreitung von IKT einhergehen, gefördert und negative Auswirkungen vermieden werden können und liefern damit wichtige Beiträge für die Forschung: Studie 1 trägt anhand eines situativen Ansatzes zu unserem Verständnis der Treiber bei, welche die Zweischneidigkeit von IKT-basierter Kommunikation bedingen, indem vier relevante Merkmale von IKT-basierten Kommunikationssituationen identifiziert werden und deren sowohl unmittelbare als auch anhaltende Effekte auf das Wohlbefinden aufgedeckt werden. Studie 2 entwickelt einen umfassenden Forschungsrahmen, um die bidirektionale Grenzgestaltung im Zeitalter der ständigen Erreichbarkeit ganzheitlich zu untersuchen und zu verstehen und deckt verschiedene Einflussgrößen von Work-Life und Life-Work Segmentierung und deren gegensätzliche Effekte auf das Wohlbefinden auf. Integriert betrachtet identifizieren die beiden Studie drei wichtige Determinanten, welche maßgeblich beeinflussen können, wann die mit der steigenden Verbreitung von IKT einhergehenden Auswirkungen förderlich oder hinderlich für das Wohlbefinden von Individuen sind: situationsspezifische Merkmale, persönliche Präferenzen sowie der betroffene Lebensbereich.

Die vorliegende Dissertation trägt durch diese neuen Erkenntnisse, basierend auf fundierten theoretisch-konzeptionellen Überlegungen, zu einem differenzierteren empirischen und theoretischen Verständnis der Grenzgestaltung und des Wohlbefindens im Zeitalter der IKT-Nutzung bei. Sie liefert damit wertvolle Implikationen für die zukünftige Forschung und zeigt

darüber hinaus profunde Ansatzpunkte für Mitarbeiter wie auch Unternehmen auf, um ein Umfeld zu schaffen, in dem IKT auf eine gleichermaßen gesunde und produktive Weise genutzt werden können.

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Frankfurt am Main, in April 2018   Kathrin Reinke

Content Overview

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List of Abbreviations

AIS	American Institute of Stress
BAuA	Bundesanstalt für Arbeitsschutz und Arbeitsmedizin
BMAS	Bundesministerium für Arbeit und Soziales
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
DAK	Deutsche-Angestellten-Krankenkasse
df	Degrees of Freedom
ESM	Experience Sampling Methodology
EU-OSHA	European Agency for Safety and Health at Work
HLM	Hierarchical Linear Modeling
ICTs	Information and Communication Technologies
IT	Information Technology
M	Mean
n.s.	Non-significant
p	Significance Level
PANAS	Positive and Negative Affect Schedule
RMSEA	Root Means Square Error of Approximation
SAM	Self-assessment Manikin
SD	Standard Deviation

SE	Standard Error
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual
Trait NA	Trait Negative Affect

1 Introduction

"Information and communication technologies (ICTs) pervade work as well as personal lives in the 21st century" (Ayyagari/Grover/Purvis 2011, p. 831).

The increasing pervasion of information and communication technologies (ICTs) throughout the last decades has entailed major transformations of individuals' ways of working and living (Bliese/Edwards/Sonnentag 2017). ICTs change existing structures, processes, and systems in individuals' work lives, thereby creating new ways of working and collaboration (Davis 2002; Tarafdar et al. 2007). They enable employees to have access to work-related documents and information and to easily communicate with supervisors, coworkers and clients during as well as outside their working hours (Matusik/Mickel 2011). At the same time, ICTs can also be used for personal purposes and provide individuals with new opportunities to stay connected to their personal life independent of time and location (Chesley 2014; Sayah 2013).

This thesis focuses on two pivotal changes coming along with today's ubiquity of ICTs in individuals' work and personal lives, which have increasingly gained attention in both research and practice. First, the increasing prevalence of ICTs fundamentally changes human communication – that is, how individuals communicate at work, in their personal life, and also across the boundaries of their work and personal life domains. The use of modern ICTs enables a faster flow of communication with shortened response times, and largely removes former temporal and spatial constraints of communication (Davis 2002). As a result, information can be shared easily also with individuals in other time zones or locations, enabling to communicate globally (Burke/Ng 2006; Davis 2002). Thereby, the share of human interaction that is carried out via ICTs – i.e., ICT-mediated communication – continuously grows (Barley/Meyerson/Grodal 2011; Butts/Becker/Boswell 2015).

Second, with ICTs enabling individuals to communicate largely without temporal and spatial constraints, they bring along new opportunities as well as challenges for how individuals manage the boundaries around their work and personal life: ICTs specifically facilitate to be available for others *across* the boundaries of the work and personal life domain, i.e., cross-border availability. In particular, ICTs enable individuals to be available for their work contacts in their personal life and likewise, individuals can stay connected to their personal

contacts in their work life via ICTs (Olson-Buchanan/Boswell 2006; Sayah 2013). Hence, this cross-border availability has become a significant aspect of individuals' boundary management, that is, to which extent they segment or integrate their work and personal life (Olson-Buchanan/Boswell 2006; Sayah 2013). While this cross-border availability is *facilitated* by ICTs, it is more and more discussed that cross-border availability is also *expected* – a new demand that individuals face in the working world, which may have the power to further alter individuals' boundary management (e.g., Dettmers/Bamberg/Seffzek 2016; Mazmanian/Orlikowski/Yates 2013).

In light of these developments, research has begun to investigate the consequences coming along with the ubiquity of ICTs for individuals' well-being, both in regard of ICT-mediated communication as well as in regard of their boundary management in the age of cross-border availability. The present dissertation aims to provide a more nuanced picture of the conditions under which the consequences coming along with the prevalence of ICTs are beneficial or detrimental to individuals' well-being. Thereby, the thesis may point out effective ways that enable to foster positive effects and to avoid negative effects in order to maintain or even increase individual well-being. In particular, the thesis sets two major research goals. First, the present dissertation aims to shed light on why, how, and under what circumstances ICT-mediated communication is positively or negatively related to individual well-being, applying a mixed-methods study (study 1). Second, this dissertation aims at illuminating how new demands resulting from the ubiquity of ICTs affect individuals' boundary management and how this relates to individual well-being, using a two-wave study (study 2).

To reach these research goals, this thesis proceeds as follows. First, the practical and empirical relevance is explained in more detail, and central concepts and constructs that are examined in the empirical studies are defined. Then, two fundamental theories, affective events theory (Weiss/Cropanzano 1996) and boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) are outlined and critically evaluated, and their relevance as a theoretical framework for study 1 and study 2, respectively, is explained. Next, the thesis provides a comprehensive literature review on the current state of research on both ICT-mediated communication and boundary management. In the following, overarching key limitations of the literature are presented. On this basis, key research questions addressed in the studies are derived, which are then elucidated in more detail and empirically examined in study 1 (Chapter 2) and study 2 (Chapter 3), respectively. Finally, the dissertation discusses its overall contributions to the literature on boundary management and well-being in the age of ICT use, outlines overarching implications for organizations and employees, and suggests directions for future research (Chapter 4).

1.1 Practical and Empirical Relevance

During the past century, several major developments in society have radically transformed individuals' lives (Bliese/Edwards/Sonnentag 2017). Aside from an increasing global competition, an aging workforce, and an increase in jobs in the tertiary sector, the prevalence of ICTs has been identified as a major trend with fundamental consequences for how individuals work and live (Bliese/Edwards/Sonnentag 2017; Burke/Ng 2006). As illustrated by Figure 1-1, the prevalence of ICTs applies to a wide variety of different industries and work areas. The change in the ways of working and living due to the increasing prevalence of ICTs, in turn, is suggested to have significant implications for individuals' well-being (Bliese/Edwards/Sonnentag 2017; Morschhäuser/Lohmann-Haislah 2016).

Figure 1-1: ICT Use across Occupational Groups in Germany (BMAS 2016)
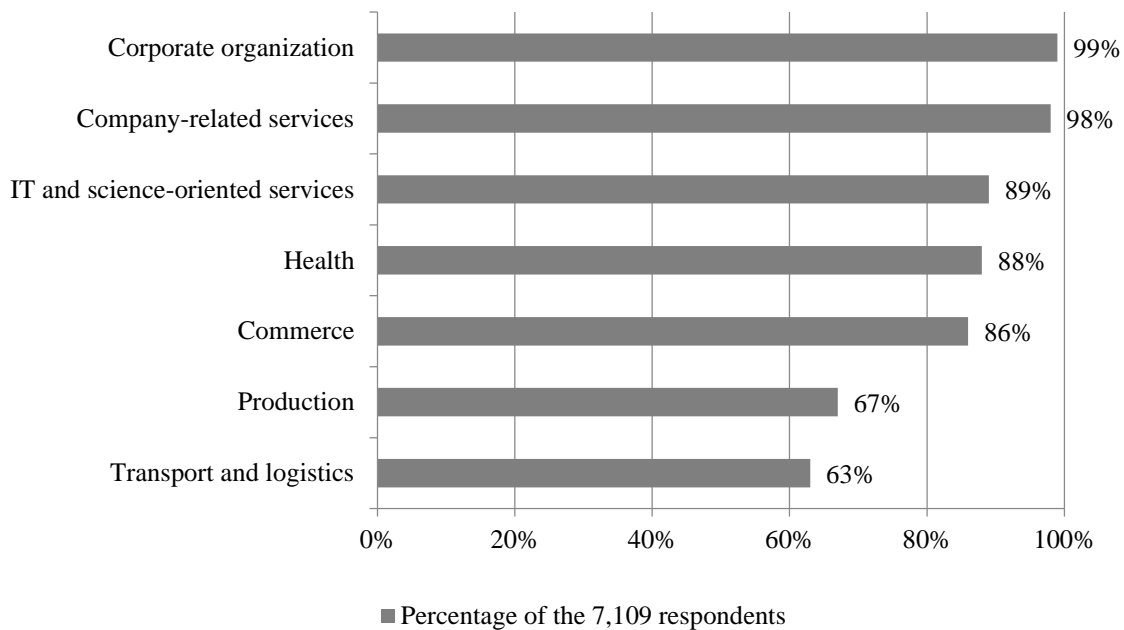
In particular, the increasing dissemination of ICTs has fundamentally changed how, when and where individuals work, transforming prevalent communication and information processes and behaviors in the working world (Davis 2002). Since modern ICTs such as laptops, smartphones and tablets overcome preceding temporal and spatial restrictions of communication and information exchange to a great extent, they facilitate faster, transnational, and more flexible ways of working (Burke/Ng 2006; Davis 2002). As a consequence, many jobs are not bound to a specific location, specific hours, or a specific device anymore, but they can be conducted anytime and anywhere. Seizing on these opportunities provided by ICTs, more and more organizations have implemented

arrangements of flexible working hours such as telework (Bliese/Edwards/Sonnentag 2017; Burke/Ng 2006). Such flexible arrangements are associated with many benefits for both employees and organizations, as they are suggested to increase employees' perceived autonomy, facilitate their coordination of the interface between work and personal life, reduce turnover intentions, and increase their job satisfaction (Gajendran/Harrison 2007).

Yet, media and society have increasingly discussed potentially negative consequences associated with the prevalence of ICTs for individuals' well-being (e.g., Limberg 2008; BBC News 2014). For example, the increase in opportunities to communicate enabled by ICTs and the concomitant increase in the amount of information to process is regarded as a source of stress, leading to rising psychological demands in the working world (Barley/Meyerson/Grodal 2011; BAuA 2016). Further, it is argued that having the opportunity to be connected to work anywhere and anytime carries the risk for employees to "become more and more tethered to their workplace" (Boswell et al. 2016, p. 291): Employees may increasingly attend to work-related matters via ICTs also outside their work domain such as after hours, on weekends or during vacations. These changes in work patterns are suggested to lead to an increasing dissolution of boundaries between employees' work and personal life, impede sufficient recovery phases and result in increased conflicts between individuals' work and personal lives (e.g., Olson-Buchanan/Boswell 2006; Park/Fritz/Jex 2011). According to Morschhäuser/Lohmann-Haislah (2016), the dissolution of boundaries due to ICT use is deemed to be a fundamental psychological stressor of the modern working world.

Monitoring the development and presence of psychological stressors and, accordingly, counteract their consequences is of great significance not only for individuals, but also for organizations and society at large. To constantly face psychological stressors at work may have profound effects on employees' well-being and performance, which also impacts organizations' productivity and increases their costs, for example due to increased absenteeism and sick days (e.g., DAK-Gesundheit 2015; Richardson/Rothstein 2008; Tenney/Poole/Diener 2016).

In line with this, work stress has been reported as a major cause of absenteeism and turnover intentions among knowledge workers in the United States as well as in several European countries (AIS 2014; EU-OSHA 2014). Underlining this notion, absenteeism due to psychological illness has dramatically increased over the last two decades in Germany, with the number of sick days tripling since 1997 as shown in Figure 1-2 (Marschall et al. 2017). This development represents a significant concern for organizations from an economic perspective, particularly since psychological illness results in the longest absenteeism rate with 38.1 days on average compared to other frequent diseases such as musculoskeletal

disorders with 19.5 days and diseases of the respiratory system with 6.5 days on average (Marschall et al. 2017). Consequently, in order to prevent this high loss in productivity and the resulting increase in costs, organizations should be highly interested in developing organizational measures that promote a healthy working environment in which detrimental effects of psychological stressors on employees' well-being are avoided.

Figure 1-2: Sick Days per 100 Assured due to Psychological Illness (Marschall et al. 2017)

Year	Value
1997	76.7
1998	88.6
1999	96.3
2000	110
2001	115.9
2002	123.8
2003	124.6
2004	125.6
2005	125.4
2006	121.7
2007	130.2
2008	140.2
2009	149.5
2010	169.6
2011	195.6
2012	203.5
2013	212.8
2014	237.3
2015	243.7
2016	246.2
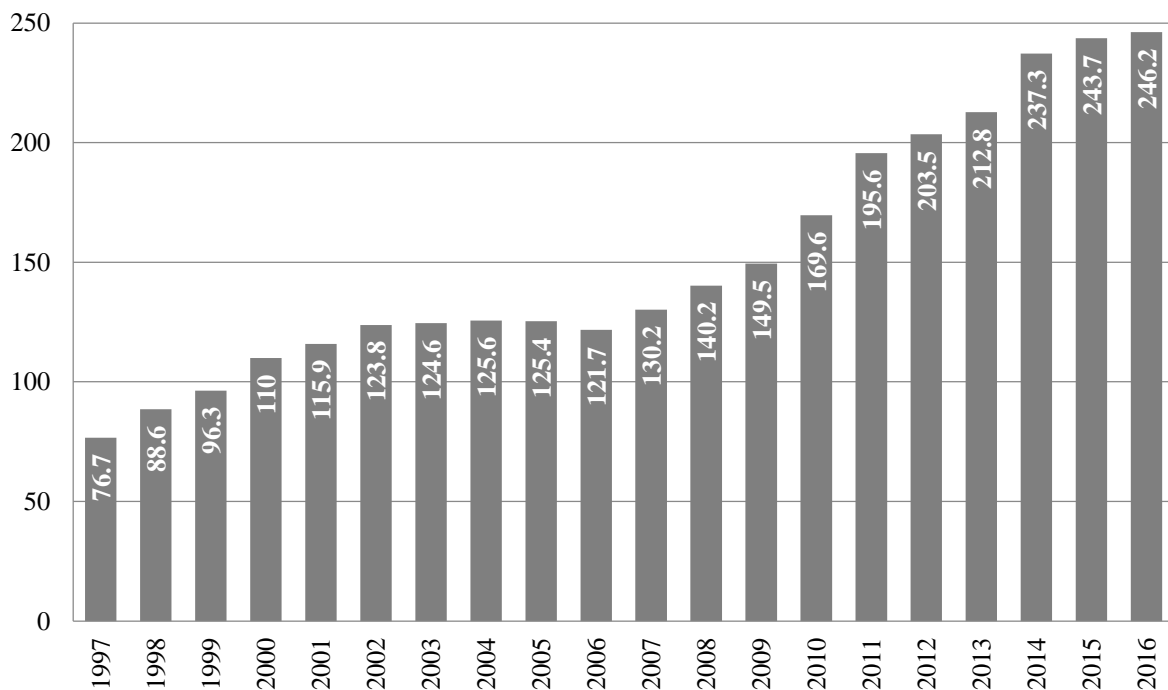
Some organizations responded to the potential threat associated with ICT use as discussed in media and society with measures that represent rather inflexible regulations, such as turning off Blackberry servers after working hours (Volkswagen AG, BBC News 2012) or automatically deleting email communication while on vacation (Daimler AG, BBC News 2014). These measures are based on the underlying assumption that every work-related contact during personal life is detrimental for every employee, and hence, should be prohibited. However, such inflexible regulations do not only prohibit potential drawbacks but also potential benefits for employees that may be associated with ICT use (Towers et al. 2006). Instead of implementing such rather undifferentiated, drastic measures, organizations should aim at understanding the conditions under which their employees may benefit or suffer from the consequences associated with ICT use – both at work and after hours – and implement organizational measures that foster beneficial effects while reducing detrimental consequences for their employees' well-being.

To contribute to a profound understanding of the consequences associated with the increasing prevalence of ICTs for individuals' well-being, numerous studies across several disciplines have investigated this topic in the past two decades, resulting in a growing amount of informative yet highly heterogeneous research (e.g., Bliese/Edwards/Sonnentag 2017; Schlachter et al. 2017). Thereby, preceding research has both investigated the relationship between ICT-mediated communication and well-being as well as antecedents and effects of individuals' boundary management in the age of cross-border availability. Overall, research widely concludes that ICT-mediated communication represents a double-edged sword, exhibiting both beneficial and detrimental effects on individual well-being (e.g., Allen/Shoard 2005; Boswell/Olson-Buchanan 2007; Cavazotte/Lemos/Villadsen 2014). Further, studies indicate that the ubiquity of ICTs comes along with new opportunities for individuals' boundary management but likewise with new demands in the form of rising cross-border availability expectations. Thereby, boundary blurring – facilitated by cross-border availability – is widely regarded as detrimental for individuals' well-being (Derks et al. 2014; Park/Fritz/Jex 2011).

Although prior studies provide valuable insights in general consequences associated with the ubiquity of ICTs, these findings are likewise very heterogeneous and partially even contradictory. As a result, implications derived from previous findings are rather inconclusive, and several important considerations remain unclear. First, with regard to ICT-mediated communication, preceding research has predominantly examined its overall effects on well-being, with the majority of research focusing on the extent of ICT use (e.g., Derks/van Mierlo/Schmitz 2014; Lanaj/Johnson/Barnes 2014) or material properties of ICTs (e.g., Ayyagari/Grover/Purvis 2011; Day et al. 2012). Yet, what remains unclear is why, how, and under what circumstances the beneficial or detrimental effects of ICT-mediated communication are prevalent. Further, as a result of the rapid development in research on ICT-mediated communication, preceding studies are based on heterogeneous theoretical approaches, with a lack of a clear theoretical underpinning.

Second, with regard to individuals' boundary management in the age of cross-border availability, preceding studies have largely focused on how individuals are available for work contacts in their personal life, and hence, how they manage the boundary of their personal life (e.g., Boswell/Olson-Buchanan 2007; Park/Fritz/Jex 2011). Thereby, the antecedents and consequences of availability for personal contacts at work, and thus, individuals' management of their work boundary, are largely disregarded. Moreover, the conditions under which specific boundary management behaviors exhibit beneficial or detrimental effects are widely unknown. Yet, enhancing our understanding of these conditions represents a critical leverage to foster positive effects and prevent negative effects on individuals' well-being.

While addressing these important limitations of prior research, the present dissertation aims to develop more differentiated and comprehensive insights into our theoretical and empirical understanding of the consequences of the ubiquity of ICTs on well-being. Thereby, this thesis provides organizations as well as employees with leverages based on empirical investigations to create an environment that avoids detrimental effects but likewise fosters beneficial effects of ICT use, thus demonstrating valid alternatives to current rather undifferentiated, inflexible organizational measures.

1.2 Core Concepts

In this section, central concepts that are examined in the empirical studies in Chapter 2 and 3 are defined to create a common understanding of their underlying assumptions and meanings. Core concepts involve (1) ICT-related concepts, which are relevant for both empirical studies, (2) concepts concerning the work-life interface, which are mainly examined in study 2, and (3) concepts related to individual well-being, which is relevant as the ultimate outcome for both study 1 (indicators of momentary and end-of-day well-being) and study 2 (indicators of long-term well-being).

1.2.1 Definitions of ICT-related Concepts

1.2.1.1 ICT Use

Although research on antecedents and consequences of ICT use is increasingly growing within several fields of research, there is a lack of joint conceptual understanding and usage of the term "ICT use". Instead, there exists a variety of conceptual terms, such as ICT use, smartphone use, electronic communication, or extended work availability (Butts/Becker/Boswell 2015; Derks/Bakker 2014; Dettmers/Bamberg/Seffzek 2016; Diaz et al. 2012). It is important to note that these different conceptual terms may reflect distinct types of ICT use, differing for example with regard to their function, the contextual content, or the device used. However, these terms are often not defined at all or they are used interchangeably, although they might be concerned with different types of ICT use and thus should be treated as distinct types (see Table 1-1). For example, whereas some studies explicitly focus on specific types of ICT use (Butts/Becker/Boswell 2015; Lanaj/Johnson/Barnes 2014), other studies use the term ICT use without specifying the contextual content and time frame but measure only a specific type, such as work-related ICT use in personal life. As indicated by Table 1-1, this heterogeneous and often undifferentiated use of different terms likewise creates challenges for researchers to compare and condense empirical findings.

Table 1-1: Exemplary Selection of Constructs Studied in Research on ICT Use

Author(s)	Construct of Interest	Definition	Construct Measured
Ayyagari/Grover/ Purvis 2011, pp. 833, 837	ICT use, characteristics of ICTs	Technology characteristics refer to the assessment of "attributes or features of a particular ICT"	Characteristics of various ICTs used
Barley/Meyerson/ Grodal 2011, pp. 888, 891-892	Use of email and other communication technologies	–	Work-related communication on and off the job
Butts/Becker/Boswell 2015, pp. 764, 773	Electronic communication during nonwork time	"Electronic communication by definition entails exchanges with other people"	Received work-related electronic communication during nonwork time
Derks/van Mierlo/ Schmitz 2014, pp. 74, 77	Work-related smartphone use after hours	–	General smartphone use in the evening
Diaz et al. 2012, pp. 501, 504	Communication technology use	–	Communication technology use to perform one's job during non-work hours
Lanaj/Johnson/Barnes 2014, pp. 12, 14	Late-night smartphone use for work	–	Late-night smartphone use for work

To overcome the heterogeneous use of different concepts in the present dissertation, the term "ICT use" is applied as an overarching umbrella term in this thesis including the empirical studies. Particularly, ICT use refers to the phenomenon of using ICTs – including any device, be it smartphone, laptop, tablet etc. – for information as well as for communication purposes (Ayyagari/Grover/Purvis 2011; Derks/Bakker 2014). Thereby, ICT use may include both using ICTs for work-related purposes such as preparing slides for a work presentation or taking a work-related phone call, as well as using ICTs in the personal context, such as sending personal text messages or reading a personal email within as well as across the boundaries of the life domain concerned.

1.2.1.2   ICT-mediated Communication

With ICTs particularly transforming human communication (Barley/Meyerson/Grodal 2011; Butts/Becker/Boswell 2015), many preceding studies – explicitly or implicitly – focus on

investigating ICT use for communication purposes only (e.g., Butts/Becker/Boswell 2015; Dettmers et al. 2016; Mazmanian 2013). In the present dissertation, this subtype of ICT use, that is using ICTs to conduct interpersonal interactions, is referred to as ICT-mediated communication. ICT-mediated communication may include communication for work as well as for personal purposes, both within and across the boundaries of the work and personal life domain, and both as a recipient or as a sender. The effects of ICT-mediated communication on individual well-being have increasingly been studied in the past decades, with heterogeneous results. In Chapter 2, ICT-mediated communication is further illuminated as the focal construct in study 1 in order to shed light on its beneficial and detrimental effects on well-being. Figure 1-3 shows the conceptual classification of ICT-mediated communication as a subtype of ICT use as it is examined in this thesis.

Figure 1-3: Conceptual Classification of ICT-mediated Communication
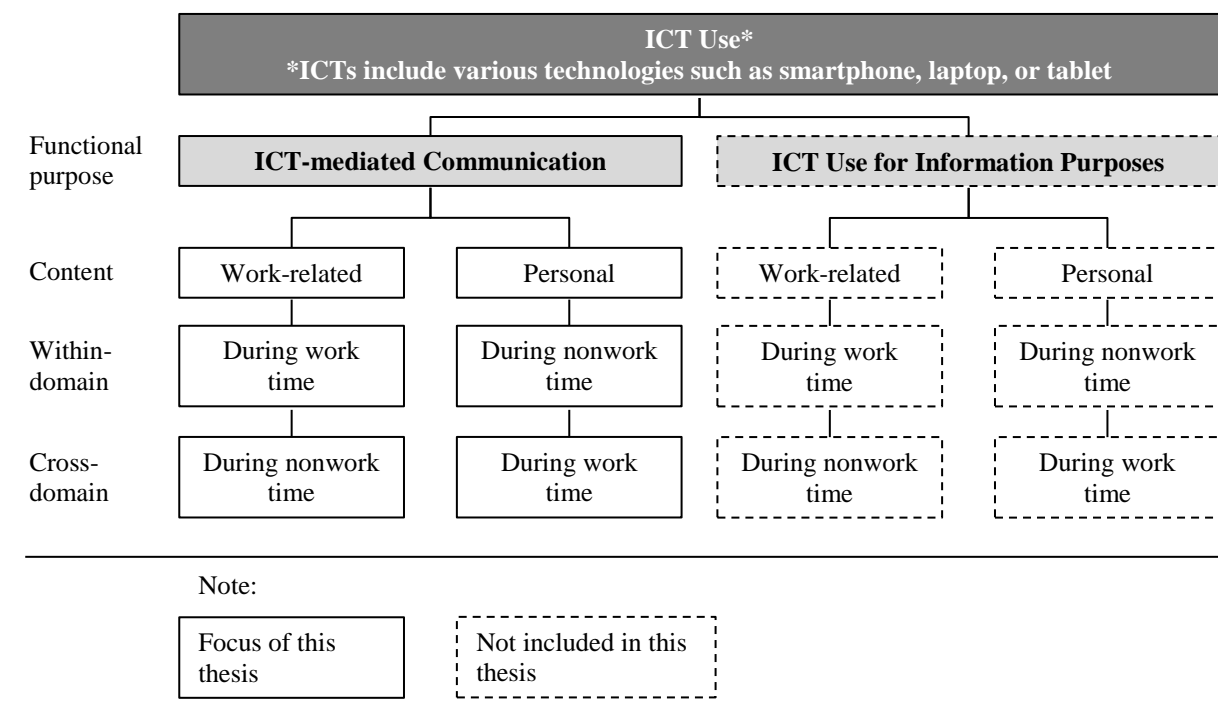
1.2.1.3 Cross-border Availability and Cross-border Availability Expectations

The ubiquity of ICTs in individuals' lives has not only altered individuals' communication in general, but has also changed how individuals stay connected with their work and personal contacts *across* the boundaries of their work and personal life domain. In particular, ICTs enable individuals to be available for members of one domain while they are currently involved with the *other* domain (e.g., Boswell/Olson-Buchanan 2007; Sayah 2013). In the present dissertation, this availability across the boundaries of individuals' work and personal

life domains is defined as cross-border availability, and thus focuses on ICT-mediated communication across boundaries, which represents the research context of study 2.

Taking into account that ICTs allow individuals to stay connected not only to their work contacts but likewise to their personal contacts anytime and anywhere (Sayah 2013), this concept can be further differentiated by specifying the directionality of cross-border availability: On the one hand, ICTs allow individuals to stay connected with their work contacts beyond the boundaries of the work domain in their personal life domain, which is referred to as *work-life availability* in the present dissertation. For example, individuals may engage in work-related email communication after hours or take work-related phone calls at the weekend (e.g., Butts/Becker/Boswell 2015; Olson-Buchanan/Boswell 2006). On the other hand, ICTs also enable *life-work availability*, that is, they allow individuals to be available for their personal contacts in their work life, for instance by writing text messages to personal contacts while they are at work (Sayah 2013).

Research indicates that this opportunity to engage in cross-border availability facilitated by ICTs comes along with new demands individuals face, that are in particular, rising expectations from work and personal contacts to be available across the boundaries of work and personal life (Matusik/Mickel 2011; Mazmanian/Orlikowski/Yates 2013). In Chapter 3, study 2 investigates the effects of these cross-border availability expectations on individuals' boundary management and well-being. Thereby, the focus lies on cross-border availability expectations as perceived by individuals, defined as the degree to which an individual perceives that members of one life domain demand the individual to be available while he or she is engaged in another life domain. Specifically, the thesis differentiates in study 2 between cross-border availability expectations as perceived by three groups of persons: (1) supervisor availability expectations, defined as the degree to which individuals perceive their supervisors to demand them to be available via ICTs in personal life, (2) coworker availability expectations, defined as the extent to which individuals perceive their coworkers demand for availability via ICTs in personal life, and (3) personal contact availability expectations, defined as the degree to which individuals perceive that their personal contacts demand them to be available via ICTs in the work domain.

1.2.2   Definitions of Concepts Related to the Work-Life Interface

1.2.2.1   Boundary Management

The concept of boundary management is rooted in research on classificatory schema and cultural categories that individuals create in order to guide and structure their lives (e.g., Zerubavel 1993; Zerubavel 1996). More than two decades ago, research began to examine

individuals' boundary management around the categories of "personal life" and "work life" (Nippert-Eng 1996) and provided a theoretical framework to discuss this phenomenon with the introduction of boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996), which is outlined in Chapter 1.3.2. In the context of this dissertation, boundary management hence is concerned with the ways individuals create, modify and maintain some sort of boundaries of their work and personal life domains, reflecting how individuals conceive of and relate their personal life and work (Nippert-Eng 1996). In Chapter 3, the phenomenon of boundary management in the age of cross-border availability is investigated by means of study 2.

Key to boundary management is the notion that the ways how individuals prefer to and actively manage the boundaries around their life domains can be arrayed on a continuum, ranging from segmentation to integration (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996). Segmentation on the one hand involves engaging in practices to keep life domains separated, for example by keeping separate smartphones or calendars or by trying to keep thoughts and issues of one domain separate from the other. Integration on the other hand implies to integrate life domains, for example by bringing colleagues home for dinner or by taking personal calls while at work (Nippert-Eng 1996).

Apart from investigating individuals' boundary management on a continuum, the present dissertation takes into account that individuals may manage their work and personal life domains asymmetrically (Clark 2000; Kossek/Lautsch 2012), that is, they might integrate their work into their personal life but separate their personal life from work, and vice versa. For example, individuals may take work-related calls in their personal life but may not take care of personal matters while at work. This renders it particularly important to acknowledge the *bidirectional* nature of boundary management. Building on this notion, the thesis differentiates in study 2 between work-life segmentation – conceptualized as the opposite of work-life integration – and life-work segmentation – conceptualized as the opposite of life-work integration. Accordingly, work-life segmentation refers to the degree to which individuals segment their work from their personal life (i.e., low work-life integration), whereas life-work segmentation refers to the degree to which individuals segment their personal life from their work life (i.e., low life-work integration). In addition to describing individuals' boundary management behavior with these terms, study 2 differs between work-life segmentation preferences (i.e., low work-life integration preferences) and life-work segmentation preferences (i.e., low life-work integration preferences) to describe how individuals prefer to manage the boundaries of their work and personal life.

1.2.2.2 Life Balance

Recent research examining the consequences of individuals' boundary management for individual-level outcomes largely investigates effects on constructs related to work-life balance, such as work-life conflict or work-life interferences (e.g., Derks et al. 2015; Kubicek/Tement 2016). Building on recent developments in the work-life balance literature as discussed in the following, this dissertation investigates life balance as the focal outcome of individuals' boundary management in study 2.

Reviews of preceding work-life balance research reveal that multiple definitions of work-life balance exist in the literature. These conceptualizations of work-life balance applied in preceding research can be grouped into four perspectives: work-life balance (1) as the absence of conflict between work and personal life roles, (2) as the degree to which work and personal life enrich one another (often in addition to the absence of conflicts), (3) as high effectiveness in meeting expectations in work and personal life roles, and (4) as high satisfaction with one's involvement in work and personal life roles (Greenhaus/Allen 2011; Wayne et al. 2017). Describing these four perspectives in more detail, the conflict perspective focuses on the concept of interrole conflict, that is, the degree to which individuals perceive that pressures associated with one role, such as the role of a manager, are incompatible with pressures arising from another role, such as a parent (Greenhaus/Beutell 1985; Kahn et al. 1964). In addition to regarding work-life balance as the absence of interrole conflict, research has added the enrichment perspective, which refers to the extent to which attending to a role of one domain is improved and facilitated by experiences and competencies gained by attending to a role of the other domain (Frone 2003; Greenhaus/Powell 2006). The effectiveness perspective suggests that work-life balance should be perceived as high when individuals perceive their overall participation in both work and personal life domains as effective, well-functioning, and productive, as they are able to meet demands associated with their work and personal life roles (Greenhaus/Allen 2011; Voydanoff 2005). Finally, the satisfaction perspective focuses on individuals' contentment resulting from their overall assessment of how successfully they meet the demands of their work and personal life roles, thereby, adding an affective component (Valcour 2007; Wayne et al. 2017).

Accordingly, the conflict/enrichment perspectives focus on (negative and positive) interferences between work and personal life domains, examining how experiences in one domain affect experiences in the other domain. In contrast, the effectiveness/satisfaction perspectives focus on global, overall perceptions of balance across different life domains (Wayne et al. 2017). Integrating these different approaches, recent research regards conflict and enrichment rather as predictors of global perceptions of work-life balance, which, in turn,

should influence other important individual-level outcomes (Maertz/Boyar 2011; Wayne et al. 2017).

Lately, recent research has underlined the subjectivity of global perceptions of work-life balance, emphasizing the need to acknowledge that individuals may vary in their perceptions of work-life balance, contingent on their personal priorities or values (Greenhaus/Allen 2011; Maertz/Boyar 2011). This approach further implies that individuals do not necessarily need equal involvement in their work and personal life domains to achieve balance – as encouraged by viewing work-life balance as a scale. Rather, work-life balance should be perceived as high, if an individual's involvement in different life domains is in accordance with his or her personal preferences and values (Greenhaus/Allen 2011). Greenhaus/Allen (2011) apply this fit perspective on the concept of work-life balance, highlighting the congruence between individuals' work-life balance experiences and their aspirations. Following this perspective, this dissertation uses the term life balance in study 2, postulating that individuals should perceive their lives as balanced when their involvement in all relevant life domains is in accordance with their personal preferences and aspirations.

1.2.3 Definition of Individual Well-being

Broadly speaking, research on well-being is concerned with studying individuals' quality of life, which includes a broad variety of different concepts (Diener et al. 1999). In general, studies examining antecedents and consequences of well-being can be differentiated between investigating objective well-being and subjective well-being. Objective well-being often is examined as the focal outcome in economic and societal contexts and reflects individuals' economic prosperity and wealth by investigating social and economic indicators of well-being such as income, societal status, per capita purchasing power, and longevity (Diener/Suh 1997; Paim 1995).

Subjective well-being on the other hand is primarily studied in the context of organizational behavior and psychology, and is concerned with individuals' subjective evaluations of their lives, which transcends economic prosperity (Diener/Sapyta/Suh 1998). Investigating subjective well-being instead of objective well-being is based on the notion that individuals evaluate and react to similar circumstances and conditions differently based on their diverse internal values, goals, and experiences (Diener/Sapyta/Suh 1998; Diener et al. 1999). Taking into account inter-individual variations in well-being due to evaluations based on one's own, individual values and standards, subjective well-being is regarded as the essential element of individual well-being (Diener et al. 1999). As such, research on subjective well-being has increasingly grown in the last decades in organizational science (Diener et al. 2017), and is found to be related to important job-related outcomes such as creativity, absenteeism,

turnover, and performance (Tenney/Poole/Diener 2016; Wright/Huang 2012). Building on these insights, this dissertation focuses on subjective well-being as a significant individual-level outcome in both empirical studies.

As subjective well-being is concerned with an individual's both affective and cognitive evaluation of the quality of his or her life, it refers to a broad category of phenomena that includes multiple components such as a variety of affects, satisfaction with different domains, health, as well as global evaluations of life satisfaction (Diener et al. 2017; Diener et al. 1999). Thereby, subjective well-being can be conceptualized as an individual's global and relatively stable evaluation of his or her life but may likewise be conceptualized as a momentary state (Diener 1984; Eid/Diener 2004). Accordingly, subjective well-being does not represent a unidimensional construct but should rather be regarded as an umbrella term with multiple dimensions. Therefore, researchers are recommended to capture various facets assessed individually when studying causes and consequences of subjective well-being (Diener et al. 2017).

Based on these notions, this dissertation aims to shed light on causes of both short-term as well as long-term fluctuations in subjective well-being in the context of ICT use. Accordingly, study 1 focuses on momentary affective states and end-of-day well-being on the one hand, while study 2 examines exhaustion and life satisfaction as indicators of rather long-term well-being on the other hand, which are described in more detail below. As in both empirical studies, the dissertation focuses only on indicators of individuals' subjective well-being as opposed to objective well-being, it should be noted that the term "well-being" will be used as follows to refer to subjective well-being.

1.2.3.1 Momentary Affective States

As described previously, individuals' affect is regarded as an important component of their well-being (Diener et al. 2017; Diener et al. 1999). Accordingly, research on individuals' affect – which includes affective traits and states – has intensified since the mid-1980s, yielding a growing literature with multiple conceptualizations of affect (Brief/Weiss 2002; Moors 2009).

In contrast to individuals' affective traits, which are regarded as stable individual differences in affectivity, affective states reflect how individuals feel at a certain moment. Thereby, affective states include both individuals' emotions and moods (Frijda 1993; Weiss/Cropanzano 1996). Researchers suggest that emotions and mood can be differentiated by the three features diffuseness, intensity, and duration, whereby diffuseness is argued to be the most important feature distinguishing between emotions and moods (Frijda 1993; Morris

1989). In particular, emotions are regarded as responses to events relevant for the individual (Frijda 1986, 1988), such as happiness or anger. Hence, emotions are characterized by event or object specificity, as they are affective states directed at specific objects (Frijda 1993; Weiss/Cropanzano 1996). In comparison to emotions, moods are thought to be unfocused, more diffuse affective states, lacking object specificity as they are not directed at a specific cause. Further, moods are suggested to be typically less intense and more enduring than emotions, although intensity and duration of both emotions and moods may vary considerably (Morris 1989; Weiss/Cropanzano 1996).

A great amount of research on individuals' affective state is concerned with the structure and classification of affect. Hereby, two fundamental perspectives can be distinguished suggesting different dimensions along which affective states can be organized: the positive affect-negative affect model (Watson/Clark 1984; Watson/Tellegen 1985) and the arousal-pleasure model (referred to as the circumplex model of affect, Russell 1979, 1980). As regards the positive affect-negative affect model, researchers suggest that affective states can be presented along the two distinct dimensions positive affect and negative affect, which was supported in various empirical studies (e.g., Watson/Clark/Tellegen 1988; Watson/Tellegen 1985). Thereby, positive affect reflects the degree to which an individual "is feeling a zest for life" (Watson/Clark 1984, p. 472), with high positive affect involving affective states such as feeling energetic and enthusiastic, and low positive affect being characterized by fatigue and sadness. Negative affect refers to the degree to which an individual is feeling unpleasantly aroused or upset. High negative affect includes affective states such as feeling angry and nervous, whereas low negative affect is marked by affective states such as calmness and serenity (Watson/Clark 1984; Watson/Tellegen 1985).

Other researchers argue that affective states can be described along the two bipolar dimensions arousal and pleasure, which likewise found empirical support (e.g., Reisenzein 1994; Russell 1979; Russell/Lewicka/Niit 1989). Arousal refers to the degree of activation or intensity of an affective reaction, ranging from low arousal to high arousal. Pleasure reflects the valence of an affective state and distinguishes positive from negative emotions, ranging from pleasure to displeasure (Moors 2009; Russell 1980). Combinations of these two dimensions of arousal and pleasure, as presented in the circumplex model of affect, can be used to describe various affective states. For example, feeling sad is characterized by low arousal and displeasure, while excitement is marked by high arousal and high pleasure (Feldman Barrett/Russell 1999; Russell 1980).

Although the labeling of the two models indicate that they reflect different phenomena, researchers nowadays suggest that the two models describe the same structure of affect

presented in different ways, that is, rotated around the axis (Watson/Tellegen 1985; Weiss/Cropanzano 1996; Yik/Russell/Feldman Barrett 1999) as shown in Figure 1-4.

Figure 1-4: Similarities among Different Models of the Structure of Affect (slightly modified presentation adapted from Yik/Russell/Feldman Barrett 1999, p. 601)

Circumplex Model of Affect
(Russell 1979, 1980)

Positive Affect-Negative Affect Model
(Watson & Tellegen, 1985)
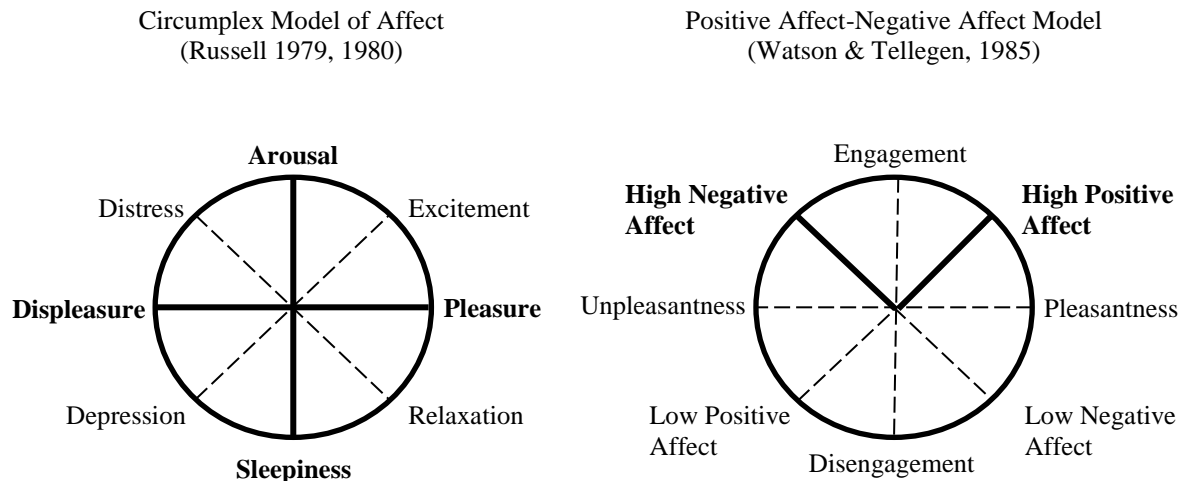
In regard of their applicability, Weiss/Cropanzano (1996) suggest that the positive affect-negative affect model is more difficult to interpret, as studies indicate that low positive affect and low negative affect are dependent constructs, which are not clearly definite. In contrast, the structure of the arousal-pleasure model is principally orthogonal and more straightforward to comprehend, with pleasure and arousal representing distinct constructs at their high and low ends (Weiss/Cropanzano 1996). Following this notion, the present dissertation draws on the circumplex model of affect as suggested by Russell (1980) and conceptualizes momentary affective states in terms of their degree of arousal and pleasure-displeasure as indicators of momentary well-being in study 1.

1.2.3.2 End-of-day Well-being: Psychological Distress and Satisfaction

To investigate how individuals' experiences and activities in a given time frame explain fluctuations in their well-being, Sonnentag (2001) argues that researchers need to examine individuals' well-being at "specific moments and in specific situations" (Sonnentag 2001, p. 198), as opposed to only assessing evaluations of their global well-being. Seizing on this approach, preceding studies have increasingly focused on investigating fluctuations in *end-of-day well-being* – i.e., an individual's evaluation of his or her state on a given day – to

investigate the effects of an individual's experiences and activities over the course of a day (e.g., Kuba/Scheibe 2017; Sanz-Vergel et al. 2010; Sonnentag/Zijlstra 2006).

Building on this notion, this thesis examines fluctuations in end-of-day well-being due to ICT-mediated communication that an individual experiences over the course of a day in study 1. Further following the recommendation by Diener et al. (2017) to holistically assess the broad concept of well-being by using distinct indicators, this dissertation uses two indicators that capture different facets of well-being in study 1: psychological distress as a negative indicator, which covers the aspect of emotional states, and satisfaction as a positive indicator, which captures cognitive evaluations of satisfaction with one's life as a facet of well-being (e.g., Diener et al. 1999; Pavot/Diener 2008). In particular, psychological distress refers to a mental state characterized by experiencing negative emotions and thoughts (Selye 1974; Watson/Clark/Tellegen 1988). Adapted to the day level in study 1, psychological distress hence assesses the extent to which an individual experiences negative emotions and thoughts on a specific day. Satisfaction refers to individuals' cognitive judgement of their quality of life (Pavot/Diener 1993), herein as experienced on a specific day.

1.2.3.3 Long-term Well-being: Exhaustion and Life Satisfaction

In addition to conceptualizing well-being as a momentary, short-term state, well-being can further be conceptualized as rather global and relatively stable evaluations of one's life (Diener 1984; Eid/Diener 2004). This conceptualization of well-being is investigated as the ultimate outcome in study 2. Again, following recommendations by Diener et al. (2017) to use multiple, distinct indicators, this thesis includes two indicators of this rather long-term component of well-being in study 2: exhaustion as an important negative indicator and life satisfaction as a core positive indicator of well-being (e.g., Maslach/Schaufeli/Leiter 2001; Pavot/Diener 1993; Sonnentag/Binnewies/Mojza 2010). Exhaustion represents one dimension of burnout, which refers to a psychological syndrome resulting from experiencing chronic interpersonal stressors in the work environment. Thereby, exhaustion is defined as "feelings of being overextended and depleted of one's emotional and physical resources" (Maslach/Schaufeli/Leiter 2001, p. 399). Life satisfaction refers to an individual's cognitive evaluation of the quality of his or her life as a whole, based on the individual's personal criteria and standards. Hence, evaluating one's life satisfaction involves a judgmental process, in which individuals compare their life circumstances to specific, individual standards that they set for themselves (Diener et al. 1985; Pavot/Diener 1993).

1.3 Theoretical Background

Two theories that provide central conceptualizations about relationships examined in this dissertation are outlined in the following: affective events theory and boundary theory. While affective events theory (Weiss/Cropanzano 1996) offers an organizing framework for investigating events as proximal causes of affective reactions and as distal causes of more prolonged individual-level outcomes in study 1, boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) provides a valuable framework to examine the antecedents and consequences of individuals' boundary management in study 2. In the following, core considerations of the two theories, their limitations as well as their specific contributions to the empirical studies are outlined.

1.3.1 Affective Events Theory

Affective events theory (Weiss/Cropanzano 1996) provides theoretical considerations on the structure, causes, and effects of individuals' affective experiences. Particularly, the theory offers a conceptual framework that examines events – that is, changes in a person's current experience – as predictors of affective reactions, which in turn, influence individuals' attitudes and behaviors (Weiss/Cropanzano 1996). The conceptual framework of the theory is presented in Figure 1-5. A few key conceptual considerations form the core of affective events theory, outlined as follows.

First, Weiss/Cropanzano (1996) emphasize that affective states fluctuate over time within individuals as a consequence of *what happens to them*, taking into account time as an important parameter to examine affective experiences. To that point, most research has focused on environmental features such as job characteristics or individuals' dispositions – thus, causal variables that are rather stable – to explain individuals' affective experiences. Highlighting that affective states vary over time within individuals, the theory argues that explaining these changes in affective states requires to examine causes that are likewise changing, that is, events (Weiss/Beal 2005; Weiss/Cropanzano 1996). Accordingly, at the core of affective events theory lays the assumption that events are proximal causes of individuals' affective reactions. Thereby, environmental features may influence the frequency of certain events, and dispositions are suggested to impact how events elicit affective reactions (Weiss/Cropanzano 1996).

Second, the theory contends that events that are of *affective significance* for an individual prompt him or her to react emotionally in some way (Cropanzano/Dasborough/Weiss 2017; Weiss/Cropanzano 1996). Hereby, it is important to note that "some, but by no means all, events have affective significance in that they generate an emotional reaction or mood change

in people" (Weiss/Cropanzano 1996, p. 31). Rather, events are suggested to be affectively significant if individuals evaluate them as relevant for their personal desires, goals, and values. Hence, whether an event is perceived as affectively significant is contingent on an individual's subjective evaluation process. What kind of affective reactions are then elicited by an affectively significant event varies across events depending on their characteristics, with specific event features being "conducive to specific emotional reactions" (Weiss/Cropanzano 1996, p. 23).

Third, a key idea of affective events theory is that these affective reactions elicited by certain events in turn *influence prolonged individual-level outcomes*, that is, individuals' overall attitudes and behaviors. More specifically, the theory suggests that affective reactions to an event influence affect-driven behaviors and attitudes, with the latter reflecting in changes in individuals' judgement-driven behaviors. Thus, one core premise of affective events theory is that individuals' affective reactions mediate the link between discrete events and changes in attitudes and behaviors (Weiss/Beal 2005; Weiss/Cropanzano 1996).

Figure 1-5: The Conceptual Framework of Affective Events Theory (Weiss/Cropanzano 1996, p. 12)[2]
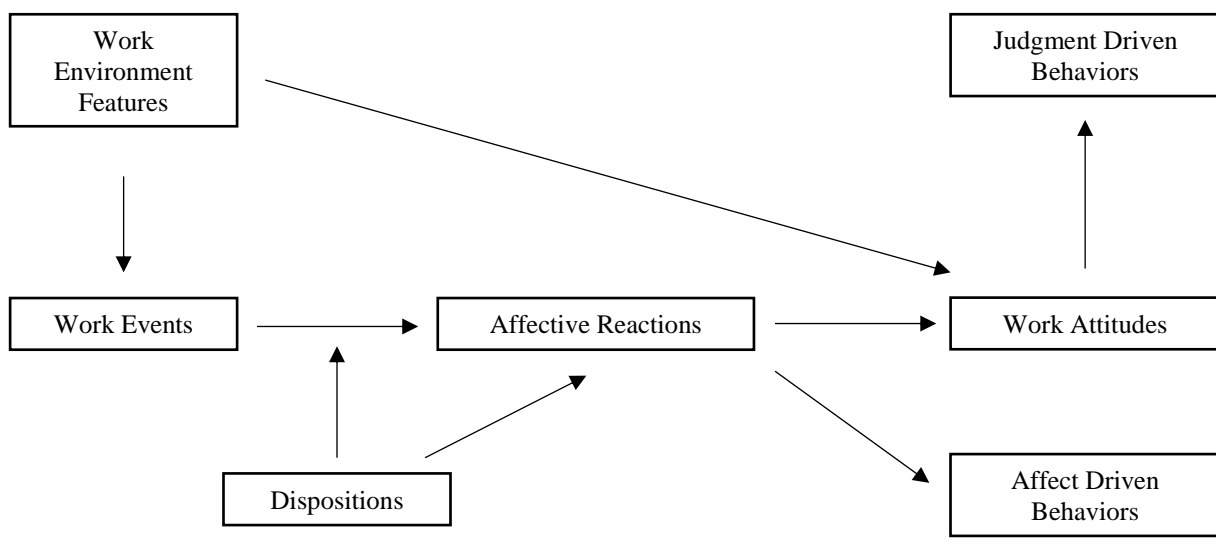
Originally, affective events theory was developed to explain the role of affective experiences at work for individuals' job satisfaction. With their theory, Weiss/Cropanzano (1996) highlighted the critical role of examining discrete work events to predict within-person variance of affective states, attitudes, and behaviors related to job satisfaction, besides

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[2] This figure was published in Research in Organizational Behavior, 18, Weiss, H. M./Cropanzano, R., Affective Events Theory: A Theoretical Discussion of the Structure, Causes and Consequences of Affective Experiences at Work, 1-74, Copyright Elsevier (JAI Press Inc.) (1996).

investigating stable environmental features or individuals' dispositions. Seizing on the idea that job satisfaction is only one consequence of individuals' affective experiences (Weiss/Cropanzano 1996), empirical research has transferred affective events theory to other contexts. These studies have confirmed the relevance of the theory's central assumptions by examining the link between certain events, affective states, and other organizational and individual-level outcomes such as organizational justice and well-being in addition to job satisfaction (Weiss/Beal 2005). In particular, certain events have been found to elicit immediate affective reactions which in turn influence outcomes such as strain and job satisfaction (Fuller et al. 2003), work-life conflict (Butts/Becker/Boswell 2015), fatigue (Zohar/Tzischinski/Epstein 2003), or turnover intentions (Grandey/Tam/Brauburger 2002), providing support for the role of affective reactions as mediators of the relationship between events and relevant outcomes (Weiss/Beal 2005).

Critically appraising these key considerations of affective events theory indicates both its valuable insights and limitations: By highlighting that affective states fluctuate over time within individuals, the theory elucidates the necessity to examine discrete events in order to explain these within-person fluctuations in affective states – as opposed to focusing only on stable characteristics as antecedents. Further, the theory emphasizes that different events may cause different affective reactions, which in turn, have distinct prolonged consequences. Thereby, affective events theory provides a valuable organizing framework to examine the relationship between affectively significant events, affective reactions, and prolonged individual-level outcomes (Weiss/Beal 2005). However, the theory likewise involves several points of criticism. It should be noted that affective events theory does not provide theoretical explanations on what specific kinds of events elicit specific affective reactions. Similarly, the theory does not address the processes underlying the causal relationship between momentary affective states and prolonged outcomes; such as how affective experiences aggregate over time to influence prolonged individual-level outcomes (Weiss/Beal 2005). In line with these notions, Weiss/Beal (2005) emphasize that affective events theory can rather be considered as a macrostructure which helps to guide research on the causes and consequences of affective experiences at work. Yet, affective events theory does not provide a testable model that explains *how* events influence affective states and consequently shape individuals' attitudes and behaviors. Accordingly, the broad macrostructure provided by affective events theory requires to be refined by corresponding microstructures in order to add explanatory value with regard to underlying mechanisms and processes to the theory. Hence, research is needed to "fill in the blanks" of the theory's macrostructure (Weiss/Beal 2005).

In the light of these considerations, the present dissertation draws on affective events theory as an important organizing framework to examine the link between events, affective reactions,

and individual-level outcomes in the context of ICT use. To overcome the theory's limitations as manifested in its conceptualization as a broad macrostructure, the thesis further aims to refine this macrostructure in the context of ICT use by specifying underlying processes and mechanisms. Specifically, affective events theory provides a valuable theoretical lens for investigating the double-edged effects of ICT-mediated communication on well-being in study 1 by involving three important implications. First, with its focus on events as the proximal causes of individuals' fluctuating affective states, the theory points to the potential relevance of turning to ICT-mediated communication *events* to explain fluctuations in individual-level outcomes. Second, by highlighting that an event's affective significance is contingent on an individual's subjective evaluation process, affective events theory indicates the need to identify affectively significant ICT-mediated communication events from the ICT user's subjective perceptions. Third, by suggesting that affective states mediate the relationship between events and prolonged individual-level outcomes, the theory provides a theoretical lens to investigate the underlying mechanisms of the relationship between ICT-mediated communication events, individual's affective states, and their prolonged well-being. Altogether, these implications derived from affective events theory provide a valuable theoretical framework for study 1, indicating that ICT-mediated communication events – contingent upon their specific features –may be evaluated as affectively significant and hence, should elicit specific affective reactions. These affective reactions, in turn, should influence more prolonged evaluations of individuals' well-being. This theoretical framework is empirically examined in study 1.

1.3.2   Boundary Theory

Boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) has originally evolved from research on heuristic classification systems, which argues that individuals create mental clusters to guide and organize their world in their minds (Zerubavel 1993, 1996). In particular, Zerubavel (1996) argues that individuals form mental categories by grouping similar constructs together into one mental category and splitting different constructs into separate mental categories. The creation of these categories is argued to help strengthening the mental separation of constructs that imply different meanings, such as dividing the newspaper into sections of "politics" and "culture" (Zerubavel 1996). The process of forming mental categories is suggested to be strongly influenced by the culture and society individuals live in, which results in the development of similar classification schemas in one community or culture. For example, the mental clusters of "childhood" and "adulthood" should differ across countries with varying levels of majority and different responsibilities that are associated with attaining one's majority (Zerubavel 1993, 1996).

Nippert-Eng (1996) applied this approach of mental categorization to the work-life balance literature by discussing the creation of boundaries around the categories of work and personal life. Particularly, she introduced the idea that individuals manage the boundaries around their work and personal life on a continuum ranging from segmentation to integration (see Chapter 1.2.2.1), with individuals thus differing in the degree to which their mental categories of work and personal life overlap or are separate (Nippert-Eng 1996). Building on this notion, Ashforth/Kreiner/Fugate (2000) further developed a theoretical framework that they called "boundary theory" (Ashforth/Kreiner/Fugate 2000, p. 472) by illuminating characteristics of boundaries as well as the process individuals engage in to manage and transit the boundaries around their work and personal life.

Overall, boundary theory describes how individuals create, manage and cross the boundaries around their work and personal life roles (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996). Boundaries can be described in terms of two key characteristics, which are suggested to influence the way individuals manage and transit them: flexibility and permeability (Ashforth/Kreiner/Fugate 2000). Flexibility refers to the degree to which boundaries are elastic and can be temporally or spatially changed. For example, when an individual may perform work tasks in various locations and at various hours, the physical and temporal boundary is flexible. Permeability refers to the extent to which elements of one role domain may enter the other domain. For instance, individuals who attend to their work role by receiving work-related visits while they are physically located in their personal life domain have a permeable personal life boundary (Ashforth/Kreiner/Fugate 2000; Clark 2000).

Key to boundary theory is that individuals vary in the degree to which they prefer to segment or integrate their work and personal life on a continuum (Ashforth/Kreiner/Fugate 2000). Segmenters prefer to have clear and thick boundaries around their work and personal life, thus, they prefer low flexibility and permeability. Accordingly, they are suggested to engage in behaviors that help them to maintain their work and personal life domain as distinct mental categories, e.g. by keeping separate smartphones or calendars for each domain or by trying to keep thoughts and issues of one domain separate from the other. Individuals segmenting their work and personal life are suggested to perceive greater contrasts between their role identities, that is, their definition of who they are in a given domain. Hence, transitions between their work and personal life occur rather infrequently (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996). Conversely, integrators prefer flexible and permeable boundaries around their work and personal life, for example by taking work-related calls while at work or bringing colleagues home for dinner. Accordingly, individuals who integrate their work and personal life are suggested to only make almost unnoticeable distinctions between who they are at work and who they are in their personal life domain, perceiving low contrast between their

role identities. Thereby, flexible and permeable boundaries facilitate frequent transitions between domains (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996).

A critical evaluation of boundary theory reveals several meaningful insights as well as points of criticism. First and foremost, the theory provides a valuable framework for examining boundary management on a continuum from segmentation to integration. As boundary theory emphasizes that individuals vary in the degree of how they prefer to and actually manage the boundaries of their work and personal life on this segmentation-integration continuum, the theory specifically acknowledges inter-individual differences in boundary management preferences and behaviors. However, although boundary theory contends that transitions between work and personal life occur in both directions, a central point of criticism of the theory is that it does not further address intra-individual variation in boundary management, depending on the *directionality* of boundary management. In line with this notion, Clark (2000) and Kossek/Lautsch (2012) take a differentiated view on boundary management and highlight that the work boundary and the personal life boundary may be permeable and flexible to a different degree, that is, individuals may prefer to manage and actually engage in managing these boundaries asymmetrically. As an example, individuals may prefer to integrate their work into their personal life; hence, they may keep a flexible and permeable boundary around their personal life and allow for transitions when in their personal life domain. At the same time, they may segment their personal life from their work, thus, preferring a clear and thick boundary around their work with very little boundary crossing (Clark 2000; Kossek/Lautsch 2012). Consistent with these considerations, Hecht/Allen (2009) find in a recent study that a boundary's degree of permeability may differ contingent on directionality, that is, the boundary around an individual's personal life may be more permeable than the boundary around the work life. Accordingly, it should be noted that the segmentation-integration continuum may be more complex than introduced by boundary theory. In particular, it might rather be comprised of two distinct dimensions depending on directionality (Hecht/Allen 2009).

Integrating these critical considerations with core assumptions of boundary theory, the present dissertation applies boundary theory as a valuable theoretical framework in study 2 to examine antecedents and effects of individuals' boundary management. Specifically, the core assumptions of boundary theory and its critical appraisal provide two meaningful implications for study 2. First, by highlighting that individuals differ in the ways they prefer to and actually manage the boundaries around their work and personal life, boundary theory provides the theoretical lens to describe how individuals manage their boundaries on the segmentation-integration continuum. Second, building on recent considerations that emphasize the relevance of the directionality of boundary management, the present dissertation differentiates

between individuals' management of their work boundary (i.e., involving life-work segmentation vs. life-work integration) and their personal life domain boundary (i.e., including work-life segmentation vs. work-life integration). Accordingly, work-life and life-work segmentation are treated as distinct constructs with potentially differential antecedents and effects in study 2.

1.4 Overview of the Literature

In the following, a comprehensive review on previous research that focuses on (1) investigating the relationship between ICT-mediated communication and individual well-being and (2) examining antecedents of individuals' boundary management and its effects on individual well-being in the age of cross-border availability is provided. Over the last two decades, research in both fields has rapidly grown, providing findings dispersed across disciplines, including psychology, business and management, sociology, and information systems (Boswell/Olson-Buchanan 2007; Park/Fritz/Jex 2011; Rose 2015; Tarafdar/Pullins/ Ragu-Nathan 2015). As a result, preceding studies have applied a variety of different conceptual and theoretical perspectives, resulting in informative yet heterogeneous insights.

The aim of this literature review is to give a structured, comprehensive overview of the present state of research in both fields and to identify the key limitation of each research field. To give a structured overview of the diverse literature, the thesis first introduces several organizing themes that describe main conceptual commonalities and differences of prior studies in both research fields. Second, key findings of preceding studies are reviewed and summarized for each research field. Based on this comprehensive review, the key limitation of each research field is identified in order to establish the overarching motivation for study 1 and study 2, respectively, and derive their research goals and approaches. Other underlying aspects coming along with the key limitation that confine the present state of research are elucidated in the specific chapter of the empirical studies.

1.4.1 Positive and Negative Effects of ICT-mediated Communication

While still in its early stages, research on the consequences of ICT use for individual well-being has been constantly growing over the last decade, with two streams of research providing particularly valuable insights: organizational behavior research, investigating the impact of ICT use on various aspects of individual well-being (e.g., Barley/Meyerson/Grodal 2011; Lanaj/Johnson/Barnes 2014); and information systems research into the phenomenon of technostress, that is, stress resulting from individuals' interactions with ICT (Ragu-Nathan et al. 2008; Tarafdar et al. 2007). The following literature review includes both streams of research. Key findings derived from this comprehensive review are revisited in study 1.

1.4.1.1 Categorization of Previous Research

To structure the heterogeneous literature on ICT use and well-being, four organizing themes – each with several sub-categories – are introduced that describe the main conceptual commonalities and differences of prior research. The four themes are: (1) type of ICT use investigated, (2) conceptualization of independent variable(s), (3) underlying theoretical perspective on ICT use, and (4) study design. Table 1-2 lists the four organizing themes, their underlying categories, and exemplary studies for each subcategory of both streams of research organizational behavior and information systems.

Table 1-2: Organizing Framework for Research on ICT Use and Well-being

Organizing Theme	Category		Exemplary Studies
Type of ICT use investigated	Function	General ICT use	Boswell/Olson-Buchanan 2007; Derks/Bakker 2014; Maier/Laumer/Eckhardt 2015*; Ragu-Nathan et al. 2008*
		ICT-mediated communication	Barber/Santuzzi 2015; Butts/Becker/Boswell 2015; Dettmers et al. 2016; Mazmanian 2013
	Content	Work-related purpose	Chen/Muthitacharoen 2016*; Derks et al. 2016; Ferguson et al. 2016; Tarafdar/Pullins/Ragu-Nathan 2015*
		Work-related and personal purpose	Chesley 2014; Park/Jex 2011
Conceptualization of independent variable(s)	Extent of ICT use		Barley/Meyerson/Grodal 2011; Derks et al. 2015; Diaz et al. 2012; Lanaj/Johnson/Barnes 2014
	ICTs' material properties		Ayyagari/Grover/Purvis 2011*; Day et al. 2012; Ragu-Nathan et al. 2008*; Tarafdar et al. 2007*, Tu/Wang/Shu 2005*
	Demands resulting from ICT use		Day et al. 2012; Dettmers/Bamberg/Seffzek 2016; Maier/Laumer/Eckhardt 2015*; Ragu-Nathan et al. 2008*,
	Features of ICT use events		Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015*

Organizing Theme	Category	Exemplary Studies
Underlying theoretical perspective on ICT use	ICT use as a demand or stressor	Ayyagari/Grover/Purvis 2011*; Barley/Meyerson/Grodal 2011; Derks/van Mierlo/Schmitz 2014; Park/Fritz/Jex 2011
	ICT use as a demand and asset	Butts/Becker/Boswell 2015; Diaz et al. 2012; Middleton/Cukier 2006*; Sayah 2013
Study design	Between-person studies	Fenner/Renn 2010; Srivastava/Chandra/Shirish 2015*, Tarafdar/Pullins/Ragu-Nathan 2014*; Tu/Wang/Shu 2005*
	Within-person studies	Butts/Becker/Boswell 2015; Derks/Bakker 2014; Dettmers et al. 2016; Lanaj/Johnson/Barnes 2014
Note: * denotes studies of the information systems research stream into technostress.		

The first organizing theme refers to the type of ICT use investigated. To describe these types, the present dissertation differentiates between ICT use's function and content. With regard to its function, some studies examine general use of ICTs, including both information and communication purposes (e.g., Ayyagari/Grover/Purvis 2011; Derks/Bakker 2014). The majority of prior studies investigate use of ICTs for communication purposes (e.g., Dettmers et al. 2016; Mazmanian 2013). In most of the latter studies, the respondents are in the role of the recipients of ICT-mediated communication (e.g., Butts/Becker/Boswell 2015; Dettmers et al. 2016). As regards ICT use's content, previous research has largely focused on work-related ICT use. These studies, in turn, differ in whether they examine work-related ICT use during working hours (e.g., Day et al. 2012; Ragu-Nathan et al. 2008; Tarafdar et al. 2007) or after hours (e.g., Boswell/Olson-Buchanan 2007; Butts/Becker/Boswell 2015; Ferguson et al. 2016; Lanaj/Johnson/Barnes 2014). In contrast, only a few studies examine individuals' ICT use for personal purposes, either in their personal life (Chesley 2014) or work life (Chesley 2014; Ladkin et al. 2016; Park/Jex 2011).

As indicated in Chapter 1.2.1.1 (see Table 1-1), however, it should be noted that some empirical studies do not explicitly state which type of ICT use is being studied, for example whether general ICT use or ICT-mediated communication is the construct of interest. As a result, there is a mismatch in some cases between the type of ICT use purportedly studied and its measurement: for example, when work-related ICT-mediated communication after hours is the focal construct of interest but the measurement includes any ICT use, regardless of its function and content. Therefore, this review includes studies on both functional types of ICT

use, general and specifically for communication purposes, as well as on both work-related and personal content, and subsumes these different types under the term "ICT use" (see Chapter 1.2.1.1) to facilitate an overview of the studies and their findings.

The second theme concerns how the independent variable is conceptualized in investigations of the impact of ICT use on individual well-being. Hereby, four research approaches can be distinguished, focusing either on the extent of ICT use, properties of ICTs, demands resulting from ICT use, and features of ICT use events. The most commonly studied antecedent of individual well-being is extent of ICT use, measured as frequency or duration of use (e.g., Derks et al. 2015; Derks/van Mierlo/Schmitz 2014; Diaz et al. 2012). Second, prior research – particularly research on technostress – investigates the impact of ICTs' material properties, such as complexity, uncertainty, or malfunctioning, on individual well-being (e.g., Day et al. 2012; Tarafdar et al. 2007; Tu/Wang/Shu 2005). In more detail, complexity refers to the extent to which individuals perceive the use of ICTs as effortless and simple, as opposed to finding it difficult and challenging (Ayyagari/Grover/Purvis 2011; Ragu-Nathan et al. 2008), and uncertainty refers to the degree to which individuals perceive the need to constantly adapt to continuing changes of ICTs (Ragu-Nathan et al. 2008). Malfunctioning of ICTs for example includes freezes, crashes, or breakdowns of the technologies used (Day et al. 2012). Hence, these properties are considered as inherent in the technology itself and, thus, as rather stable (Ragu-Nathan et al. 2008). Moreover, several studies examine demands resulting from ICT use, such as increased workload as a result of a faster, intensified flow of information and communication due to ICTs, or increased expectations to respond fast and be constantly connected, as drivers of ICT users' well-being (e.g., Day et al. 2012; Dettmers/Bamberg/Seffzek 2016; Tu/Wang/Shu 2005). Finally, two recently published studies have investigated specific features of ICT use events as antecedents such as affective tone of the communication and message profile, referring to the extent to which the ICT-mediated message is instrumental or non-instrumental for a given task (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015).

The third organizing theme refers to research's underlying theoretical perspective on ICT use. The majority of existing literature regards ICT use as a stressor or a demand. This research stream relies heavily on theories on stress and depletion (e.g., Hobfoll 1989; Lazarus/Folkman 1984); some authors also draw on boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) to explain how ICT use causes stress by inducing conflicts between different life domains. Consequently, this research stream primarily considers ICT use as a cause of impaired well-being, and particularly investigates its relationship with negative indicators of well-being such as work-life conflict, strain, and depletion (e.g., Boswell/Olson-Buchanan 2007; Derks/van Mierlo/Schmitz 2014; Ferguson et al. 2016; Srivastava/Chandra/Shirish

2015). Conversely, several studies specifically acknowledge the potential of ICT use to be both a stressor/demand and an asset (Dettmers/Bamberg/Seffzek 2016; Diaz et al. 2012). These studies aim to capture the double-edged nature of ICT use, for example by including also resources associated with ICT use such as flexibility and control of ICT use as well as beneficial outcomes, such as work satisfaction and successful management of work-life boundaries (e.g., Dettmers/Bamberg/Seffzek 2016; Diaz et al. 2012; Middleton/Cukier 2006). However, these studies often lack an overarching theoretical framework explaining the double-edged effects of ICT use on individual-level outcomes. One recent exception is the study by Butts/Becker/Boswell (2015), who refer to affective events theory to theoretically underpin differential effects of ICT use on well-being.

The fourth theme concerns the study design, which reflects the proposed temporality of the relationship between ICT use and well-being. Most studies examine the link between ICT use and well-being at the between-person level, using cross-sectional designs (e.g., Boswell/Olson-Buchanan 2007; Diaz et al. 2012). Recently, an increasing number of studies have adopted a within-person approach, examining how changes in daily ICT use elicit fluctuations in individual well-being for several consecutive days. The majority of these studies measure independent and dependent variables – i.e., ICT use and indicators of individual well-being – at the same time once a day (e.g., Butts/Becker/Boswell 2015; Derks et al. 2016; Derks et al. 2015). Yet, two recent studies have investigated whether the extent of daily ICT use affects participants' well-being the following day, analyzing data from two daily surveys (morning and evening) completed on several consecutive days (Dettmers et al. 2016; Lanaj/Johnson/Barnes 2014).

Taken as a whole, the thematic review suggests that previous studies largely investigate between-person relationships of work-related ICT use and individual well-being, mostly focusing on the extent of ICT use or properties of ICTs as antecedents.

1.4.1.2 Findings of Previous Research

Together, the studies presented in the above thematic review identify both potential harm and benefits of ICT use for individuals' well-being. With regard to detrimental effects, studies show that the extent of work-related ICT use after hours is related to increased work-life conflict, psychological distress, and depletion (Boswell/Olson-Buchanan 2007; Fenner/Renn 2010; Ferguson et al. 2016; Lanaj/Johnson/Barnes 2014; Schieman/Young 2013), as well as to impaired psychological detachment, recovery experiences, and health (Arlinghaus/Nachreiner 2013; Derks/van Mierlo/Schmitz 2014; Dettmers et al. 2016; Mellner 2016; Park/Fritz/Jex 2011). Moreover, prior studies examining ICTs' material properties such as complexity and malfunctioning or demands accompanying ICT use such as increased

workload and response expectations find positive associations with work-life conflict, psychological detachment, strain, and burnout (Day et al. 2012; Dettmers 2017; Maier/Laumer/Eckhardt 2015; Srivastava/Chandra/Shirish 2015; Tarafdar et al. 2007), as well as negative effects on job satisfaction and performance (Ragu-Nathan et al. 2008; Tarafdar/Pullins/Ragu-Nathan 2015; Tu/Wang/Shu 2005). Besides, studies on the effects of ICT use events' features find significant effects on momentary perceptions of well-being. In particular, Butts/Becker/Boswell (2015) show that negative affective tone and time required to attend to work-related ICT-mediated communication after hours increase momentary anger, which, in turn, increases momentary work-life conflict (Butts/Becker/Boswell 2015). Further, in an experimental setting, Galluch/Grover/Thatcher (2015) find that ICT-mediated messages that are not instrumental for handling a given task increase episodic stress and, in turn, strain.

On the other hand, some studies also provide support for beneficial effects of ICT use. Findings of these studies, which are often based on qualitative data, indicate that ICT use is associated with feelings of increased flexibility and autonomy (Allen/Shoard 2005; Cavazotte/Lemos/Villadsen 2014; Towers et al. 2006). These feelings of increased flexibility and autonomy are suggested to stem particularly from ICTs enabling users to stay connected to work without any temporal and spatial times, which allows them to use formerly idle time slots such as commuting time or waiting periods more effectively (Allen/Shoard 2005; Golden/Geisler 2007). In support of this, ICT-enabled flexibility and autonomy have been shown to enhance individuals' ability to meet work-life demands and to manage the boundaries between work and life domains according to their individual needs (Golden/Geisler 2007; Sayah 2013; Towers et al. 2006). Moreover, further resources associated with ICT use such as perceived control and predictability of ICT use have positive effects on individual well-being, as they increase psychological detachment and reduce emotional exhaustion (Dettmers/Bamberg/Seffzek 2016). Finally, research suggests that ICT use fosters work-related outcomes such as effectiveness, feelings of accomplishment and productivity, and work satisfaction (Allen/Shoard 2005; Diaz et al. 2012; Middleton/Cukier 2006; Towers et al. 2006).

To further investigate the double-edged effects of ICT use on individual well-being, a few studies have examined several individual characteristics and strategies that may moderate the relationship between ICT use and well-being, with mixed results. In particular, Fenner/Renn (2010) suggest that certain time management strategies such as setting goals and priorities may reduce the positive relationship between ICT use and work-life conflict, while Derks et al. (2016) find that for individuals preferring to integrate work and personal life, extent of ICT use has a negative relationship with work-life conflict. Studies examining other individual-level factors, that is, perceived control and predictability of ICT use as potential buffers of the

negative relationship between ICT use and well-being did not found any significant moderating effects (Dettmers/Bamberg/Seffzek 2016). Moreover, a recent study has investigated the role of motivation for ICT use, suggesting that autonomous motivation may increase whereas controlled motivation may decrease individuals' well-being (Ohly/Latour 2014).

Figure 1-6 summarizes the results of the literature review on ICT use and well-being by selected constructs. Overall, the literature review underlines the heterogeneity of research approaches and findings in the two research streams organizational behavior and information systems research. Together, the thematic review indicates that prior studies largely focus on between-person effects of the extent of work-related ICT use or properties of ICTs on individual well-being. Thereby, previous studies find ample support for detrimental effects but likewise point to beneficial consequences. These results underline ICTs' double-edged nature. Yet, findings on the effects of ICT-mediated communication on well-being remain inconclusive to a large extent: It still remains unclear why, how, and under what circumstances ICT-mediated communication is beneficial or detrimental to individual well-being. In Chapter 1.4.3, implications coming along with this key limitation of the research field on ICT-mediated communication and individual well-being are further elaborated in order to establish the overarching motivation for study 1.

Figure 1-6: Condensed Overview of the Literature on ICT use and Well-being

Moderators

Individual-level Moderators
- Time management strategies
- Segmentation preference

ICT-related Moderators
- Control of ICT use
- Predictability of ICT use

Antecedents concerning ICT Use

Extent of ICT Use
- Minutes
- Frequency

Material Properties of ICTs
- Complexity
- Uncertainty
- Malfunctioning

Resulting Demands from ICTs
- Availability expectations
- Workload

Features of ICT Use Events
- Affective tone
- Time required
- Message profile

Contextual Focus: Work-related ICT Use (at Work and after Hours)

Individual-level Outcomes

Well-being & Health
- Psychological detachment
- Exhaustion
- Health
- Strain
- Anger

Work-life Interface
- Work-life conflict
- Flexibility
- Ability to meet work-life demands

Job-related Outcomes
- Work satisfaction
- Performance
- Effectiveness
- Productivity

Findings: Double-edged Effects

1.4.2 Antecedents and Consequences of Boundary Management

As can be seen from the previous chapter, one focus of preceding research is to examine work-related ICT-mediated communication particularly after hours, thus, concentrating on ICT-enabled availability *across* the boundaries of work and personal life. In particular, research suggests that this cross-border availability comes along with new demands, in particular with rising availability expectations (see Chapter 1.4.1.1). Following up on this context, the following literature review focuses on how these new demands – aside from other influences – impact individuals' boundary management, and how this, in turn, affects individual-level outcomes. Accordingly, although this research field reflects a different

perspective by specifically focusing on boundary management in the age of cross-border availability, some studies from the previous chapter may be mentioned here too, in order to give a complete overview of the present state of research. Main study findings outlined in this review are revisited in study 2.

1.4.2.1 Categorization of Previous Research

Studying antecedents and consequences of individuals' boundary management has gained more and more attention over the last two decades in organizational behavior research. Particularly, the ubiquity of ICTs influencing how individuals manage the boundaries around their personal and work life has given new directions for research on boundary management (Olson-Buchanan/Boswell 2006). Three organizing themes, again each with subcategories, reflect the differential conceptual emphases of preceding studies: (1) level of specification, (2) directionality, and (3) conceptualization of boundary management. Table 1-3 presents the three organizing themes and lists the underlying categories, as well as exemplary studies for each subcategory.

Table 1-3: Organizing Framework for Research on Boundary Management

Organizing Theme	Category	Exemplary Studies
Level of specification of boundary management	General boundary management	Hecht/Allen 2009; Kreiner 2006; Kubicek/Tement 2016; Matthews/Barnes-Farell/Bulger 2010
	Boundary management through boundary creation around cross-border ICT use	Barber/Jenkins 2014; Olson-Buchanan/Boswell 2006; Park/Jex 2011; Sayah 2013
Directionality of boundary management investigated	Work-life boundary management	Barber/Jenkins 2014; Carlson et al. 2015; Kreiner 2006; McNall/Scott/Nicklin 2015; Powell/Greenhaus 2010
	Work-life and life-work boundary management	Hecht/Allen 2009; Matthews/Barnes-Farell/Bulger 2010; Park/Jex 2011

Organizing Theme	Subcategory		Exemplary Studies
Conceptualization of boundary management	Boundary management preferences	Effects of boundary management preferences	McNall/Scott/Nicklin 2015; Park/Fritz/Jex 2011; Park/Jex 2011; Paustian-Underdahl et al. 2016
		Fit between boundary management preferences and organizational supplies	Chen/Powell/Greenhaus 2009; Kreiner 2006; Rothbard/Phillips/Dumas 2005
	Boundary management behavior	Overall boundary management behavior on a regular basis	Barber/Jenkins 2014; Carlson et al. 2015; Park/Jex 2011; Powell/Greenhaus 2010
		Actual past boundary management behavior	Matthews/Barnes-Farell/Bulger 2010

The first organizing theme concerns the level of specification of individuals' boundary management that is examined. Hereby, two subcategories can be differentiated: general boundary management and boundary management through cross-border ICT use. With regard to the former, preceding studies examine influences and consequences of how individuals generally manage their boundaries, which may include but is not limited to cross-border ICT use. Rather, these studies examine various boundary management practices such as a person's management of physical artefacts (e.g., using separated key chains and calendars for work and personal life), discussion of topics across the domains' boundaries (e.g., talking about one's personal life at work), mental connectivity (e.g., actively trying to forget about work issues while one is engaged in the personal life domain), and cross-border ICT use (e.g., taking only selected work-related calls at the weekend) as means to implement the desired degree of segmentation or integration (e.g., Kreiner 2006; Kreiner/Hollensbe/Sheep 2009; Nippert-Eng 1996).

Further, as a result of ICTs becoming a significant part of individuals' boundary management (Sayah 2013; Wajcman et al. 2010), an increasing number of studies examine antecedents and effects of boundary management through cross-border ICT use. These studies exclusively focus on how individuals create boundaries for cross-border ICT use as a specific form of boundary management, such as using separate ICTs for their work and personal life, switching off their work-related ICTs while in the personal life domain, and limiting cross-border availability to certain time frames (e.g., Olson-Buchanan/Boswell 2006; Park/Jex 2011; Sayah 2013) in order to reach their preferred degree of segmentation or integration.

The second theme refers to the directionality of boundary management that is investigated in preceding studies, differentiating between the degree of individuals' work-life segmentation, hence, their management of the personal life boundary, and the degree of their life-work segmentation, thus, their management of the work boundary. The majority of prior research examines antecedents and consequences of work-life segmentation, thereby focusing on how individuals manage their personal life boundary (e.g., Carlson et al. 2015; Kubicek/Tement 2016; Powell/Greenhaus 2010). So far, only few studies take into account the bidirectional nature of a person's boundary management and investigate how individuals manage both their personal life boundary and their work boundary (Hecht/Allen 2009; Matthews/Barnes-Farell/Bulger 2010; Park/Jex 2011).

The third organizing theme involves how the construct of boundary management is conceptualized in preceding studies. Hereby, two superior approaches can be distinguished – studies focusing on boundary management preferences and studies examining boundary management behavior – with two subcategories each. The majority of research focuses on boundary management preferences. Thereby, several studies examine the impact of specific boundary management preferences (i.e., work-life segmentation preferences) on various individual-level outcomes, such as work-to-family enrichment and recovery (e.g., McNall/Scott/Nicklin 2015; Park/Fritz/Jex 2011). Other studies investigate the role of a fit between individuals' boundary management preferences and organizational supplies of these preferences (e.g., Chen/Powell/Greenhaus 2009; Kreiner 2006; Rothbard/Phillips/Dumas 2005).

Moreover, research has recently begun to examine individuals' boundary management behavior beyond their preferences. Most studies hereby investigate general boundary management behavior, asking individuals to assess how they manage the boundaries around their work and personal life on a regular basis (e.g., Carlson et al. 2015; Park/Jex 2011; Powell/Greenhaus 2010). One study further examines individuals' actual boundary management behavior during a given past time frame (Matthews/Barnes-Farell/Bulger 2010).

Overall, the organizing review indicates that preceding research on boundary management largely investigates individuals' work-life boundary management, including both general boundary management and boundary management through cross-border ICT use, with a focus on examining the effects of individuals' boundary management preferences and organizational supplies.

1.4.2.2 Findings of Previous Research

Together, preceding studies as introduced in the organizing review provide valuable insights into important antecedents and consequences of individuals' boundary management. As regards key influences of how individuals manage the boundaries around their work and personal life, preceding studies identify various individual-level factors as antecedents of individuals' boundary management. Results indicate that personal characteristics such as ambition, job involvement, and work role identification reduce work-life segmentation (Boswell/Olson-Buchanan 2007; Hecht/Allen 2009; Olson-Buchanan/Boswell 2006; Park/Jex 2011). These findings support the notion of boundary theory that individuals who strongly identify with one role domain are more likely to integrate that role into the other domain, as it presents an important aspect of the self-concept (Ashforth/Kreiner/Fugate 2000). Further, likewise in line with boundary theory, individual work-life segmentation preferences increase work-life segmentation (Park/Jex 2011; Powell/Greenhaus 2010). Similarly, personal life role identification is suggested to reduce life-work segmentation, whereas personal life-work segmentation preferences are positively related to life-work segmentation (Olson-Buchanan/Boswell 2006; Park/Jex 2011).

Apart from personal characteristics and individual boundary management preferences, prior research further identifies environmental factors, that is, social-normative pressures perceived in the work environment as significant antecedents of individuals' boundary management. In particular, it is argued that individuals perceive new demands in the form of rising expectations in their organizations to increase their level of work-life integration, especially by embracing work-life availability (e.g., Kossek/Lautsch 2012; Sayah 2013). These perceived expectations and norms may stem from noticing the boundary management behavior of important work contacts (Mazmanian 2013; Mazmanian/Orlikowski/Yates 2013), from contextual signals such as organizational distribution of ICTs to employees (Mazmanian 2013; Richardson/Benbunan-Fich 2011), as well as from formal organizational policies fostering work-life integration, such as availability requirements and telecommuting (Adkins/Premeaux 2014; Kossek/Lautsch 2012). Findings of preceding studies suggest that these perceived organizational expectations and norms are negatively related to individuals' work-life segmentation, prompting individuals to increasingly integrate their work into their personal life by staying connected to work in their personal life (Park/Fritz/Jex 2011; Piszczek 2017; Sayah 2013).

In regard of how boundary management affects individual-level outcomes, research gives two important suggestions. First, with respect to preceding studies examining general boundary management preferences and organizational supplies, findings emphasize the importance of a fit between them: Congruence between preferences and supplies is found to be related to

enhanced well-being, such as reduced work-life conflict and reduced levels of stress, as well as increased job satisfaction and organizational commitment (e.g., Chen/Powell/Greenhaus 2009; Kreiner 2006; Rothbard/Phillips/Dumas 2005). Further, one recent study has shown that boundary management preferences may affect how work-life integration via ICTs relates to individual-level outcomes, as boundary management preferences moderated the relationship between work-life integration via ICTs and boundary control, i.e., the extent to which individuals feel in control of their boundary management (Piszczek 2017).

Second, research on the consequences of individuals' boundary management behavior largely hints at beneficial effects of segmentation behavior. Several studies find work-life segmentation to be associated with reduced work-life conflict (Carlson et al. 2015; Hecht/Allen 2009; Kubicek/Tement 2016; Matthews/Barnes-Farell/Bulger 2010; Powell/Greenhaus 2010) and similarly, two recent studies suggest that life-work segmentation is related to reduced life-work conflict (Hecht/Allen 2009; Matthews/Barnes-Farell/Bulger 2010). Underlining these findings, setting fewer boundaries for work-related ICT use during personal life is found to be associated with increased work-life conflict and work-life interferences (Olson-Buchanan/Boswell 2006; Park/Jex 2011) and impaired psychological detachment (Barber/Jenkins 2014; Park/Fritz/Jex 2011). In contrast, only few studies suggest that work-life segmentation may likewise come with costs such as decreased positive work-life spillover (Carlson et al. 2015; Powell/Greenhaus 2010). Together, studies on the consequences of boundary management behavior strongly point to harmful effects of boundary blurring, indicating that work-life segmentation should be more beneficial for individuals' life balance and well-being (Derks et al. 2014).

Figure 1-7 provides a summary of the literature review on antecedents and effects of boundary management in the age of cross-border availability on the basis of selected constructs. Taken together, the organizing review shows that the majority of prior research on boundary management largely focuses on individuals' management of their personal life boundary, that is, individuals' work-life segmentation. Thereby, preceding studies find that in addition to personal characteristics and preferences, rising work-life availability expectations in organizations may reduce individuals' work-life segmentation, which, in turn, may have detrimental effects on their well-being. However, this focus of preceding research largely disregards that individuals' boundary management is bidirectional, requiring a differentiation between work-life and life-work segmentation and their distinct antecedents and effects in order to gain a comprehensive understanding of the consequences of boundary management. In the next chapter, implications involved with this key limitation of the research field on boundary management in the age of cross-border availability are further explained to derive the overarching motivation for study 2.

Figure 1-7: Condensed Overview of the Literature on Boundary Management in the Age of Cross-border Availability

Antecedents

Individual-level Factors
- Ambition
- Domain involvement
- Domain role identification
- Boundary management preferences

Environmental Factors
- Expectations of cross-border availability and boundary management

Boundary Management

Regular Boundary Management
- Regular general boundary management
- Regular boundary management through boundary creation around ICT use

Actual Boundary Management Behavior

Fit Perspective
- Congruence between individual boundary management preferences and organizational supplies

Focus Directionality:
Work-life Boundary
Management

Individual-level Outcomes

Work-life Interface
- Work-life conflict
- Life-work conflict
- Positive work-life spillover
- Boundary control

Well-being & Health
- Psychological detachment
- Stress

Job-related Outcomes
- Job satisfaction
- Organizational commitment

1.4.3 Synthesis: What We Know and What We Need to Know

Overall, the present literature review indicates that research on individuals' ICT-mediated communication and boundary management in the age of cross-border availability has constantly grown, providing valuable findings on antecedents and consequences for individual well-being. Yet, the review likewise demonstrates that various research streams have emerged in different disciplines, resulting into a highly heterogeneous literature with a broad variety of different emphases, definitions, conceptualizations, and theoretical perspectives. In the following, central findings of both research fields, ICT-mediated communication and boundary management, are condensed shortly. For each research field,

the overall, pivotal limitation of prior research is outlined to derive the motivation for the two studies' and their research goals and approaches. Related underlying aspects of these overall limitations that confine current research are explained in more detail in Chapter 2 and 3, respectively.

First, as regards research on ICT-mediated communication, preceding studies provide ample support for detrimental effects of ICT-mediated communication on well-being, such as increased stress, work-life conflict, and impaired recovery (e.g., Barley/Meyerson/Grodal 2011; Derks et al. 2015; Lanaj/Johnson/Barnes 2014). On the other hand, findings from – mostly qualitative – studies suggest that ICT-mediated communication also involves beneficial effects such as increased flexibility, work satisfaction, and productivity, and may help to achieve a better work-life balance (e.g., Diaz et al. 2012; Golden/Geisler 2007). Integrating the results of the heterogeneous literature demonstrates that preceding findings are inconclusive to a large extent, and point to the double-edged nature of ICT-mediated communication, as it implies both benefits as well as harm for individual well-being.

As a result, it still remains unknown why, how, and under what circumstances ICT-mediated communication has beneficial or detrimental effects on individual well-being, based on an overarching theoretical underpinning. Hence, research still lacks a theoretically grounded and empirical understanding of the drivers of these double-edged effects of ICT-mediated communication. This pivotal limitation of prior research might stem from predominantly focusing on studying the overall effects of ICT use on individual well-being by focusing on the extent of ICT use or ICT properties (e.g., Ayyagari/Grover/Purvis 2011; Lanaj/Johnson/Barnes 2014). Thereby, the majority of research disregards that ICT-mediated communication is an episodic activity consisting of single, distinct events that each are characterized by specific features. Accordingly, individuals' perception of and reaction to ICT-mediated communication might vary from event to event, depending on the specific features of the respective event (Butts/Becker/Boswell 2015). Hence, by neglecting that ICT-mediated communication consists of single events, prior research overlooks that features of discrete ICT-mediated communication events might determine whether ICT-mediated communication creates beneficial or detrimental effects on individuals' well-being.

Thus, in order to gain a differentiated, theoretically grounded understanding of the drivers of the double-edged nature of ICT-mediated communication, study 1 adopts an event-based perspective. In particular, the thesis argues that research needs to examine the effects of specific features of ICT-mediated communication *events* to shed light on how, when, and under which circumstances ICT-mediated communication has beneficial or detrimental effects on individuals' both momentary and prolonged well-being. This presents the scope of study 1.

Second, with regard to research focusing on boundary management in the age of cross-border availability, preceding studies suggest that the growing ubiquity of ICTs does not only come with new opportunities but likewise with challenges for a person's boundary management: Individuals confront new demands in the form of rising expectations in their work environment to reduce their personal life boundaries' strength by embracing work-life availability. Accordingly, perceiving these rising expectations may prompt employees to increasingly integrate work into their personal life (e.g., Park/Fritz/Jex 2011; Sayah 2013). At the same time, research indicates that work-life integration predominantly exerts detrimental effects for individuals, as it increases work-life conflict and decreases psychological detachment (e.g., Barber/Jenkins 2014; Olson-Buchanan/Boswell 2006; Powell/Greenhaus 2010). Yet, recent findings on moderating effects (Piszczek 2017) indicate that this conclusion might not be definite, suggesting that specific individual characteristics might determine when given boundary management behaviors have a beneficial or detrimental effect on individual well-being.

Despite these valuable insights, preceding research lacks a comprehensive framework that integrates and extends preceding findings by taking a holistic yet differentiated approach on studying antecedents and effects of boundary management: With the present focus on studying how individuals manage their personal life boundary, the majority of research disregards that boundary management is bidirectional (Kossek/Lautsch 2012). However, acknowledging the bidirectional nature of boundary management is particularly important in the age of cross-border availability, with ICTs enabling not only work-life availability but likewise to be available for personal contacts in work life (Sayah 2013). Further, individuals may manage their work and personal life boundaries asymmetrically, for instance by integrating personal life into work but segmenting work from personal life (Clark 2000; Kossek/Lautsch 2012). This notion underlines the necessity to differentiate between work-life and life-work boundary management in order to gain a comprehensive understanding of their differential antecedents and consequences for individuals' well-being.

Accordingly, to thoroughly understand the influences of individuals' bidirectional boundary management, researchers need to examine how the demands coming along with both work-life and life-work availability shape individuals' boundary management. Likewise, research should examine the discrete effects of both work-life and life-work boundary management on well-being simultaneously. Furthermore, more research is needed to shed light on the conditions under which these effects may vary in order to illuminate when and how specific bidirectional boundary management behaviors are beneficial or detrimental for individuals' well-being. These considerations form the scope of study 2.

1.5 Central Research Questions and Overview of the Studies

On a superordinate level, this thesis aims to provide a more nuanced picture of the determinants that influence when the consequences coming along with the prevalence of ICTs are beneficial or detrimental to individuals' well-being. To reach this overarching goal, this dissertation sets two main research goals. These goals are (1) to shed light on why, how, and under which circumstances ICT-mediated communication affects well-being positively or negatively by taking an event-based perspective and (2) to contribute to a comprehensive, thorough understanding of how differential cross-border availability expectations affect individuals' bidirectional boundary management behavior and how this, in turn, relates to individual well-being. Accordingly, the thesis comprises two empirical studies with different research designs: one mixed-methods study including a qualitative interview study and an experience sampling study, which focuses on ICT-mediated communication, and one study with data collected in two waves, which focuses on boundary management in the age of cross-border availability. Figure 1-8 provides an overview of the overarching conceptual framework of the thesis.

Figure 1-8: Overarching Conceptual Framework of the Thesis
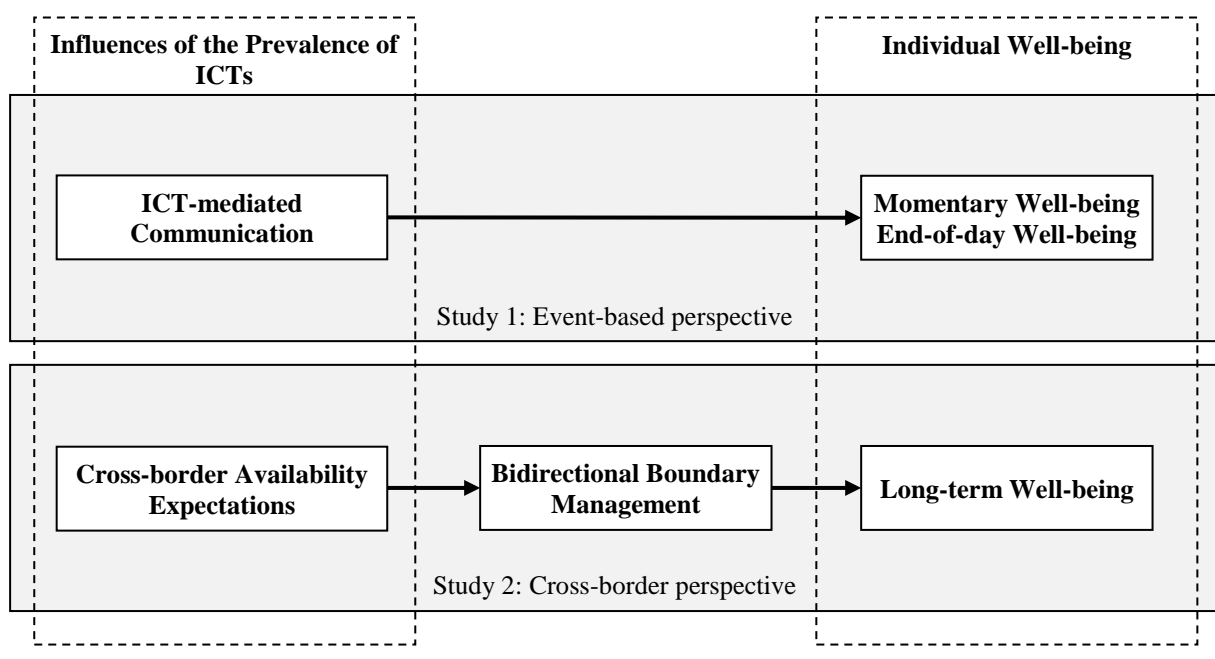
In particular, study 1 (Chapter 2) takes an event-based perspective and focuses on illuminating the drivers of the double-edged effects of ICT-mediated communication and unveiling its dynamic relationship with individuals' both momentary and prolonged well-being. To this end, the study uses a mixed-methods approach (Wright/Sweeney 2016) and sheds light on two research questions:

(1) Which features of ICT-mediated communication events trigger individuals' momentary affective reactions?

(2) How do affectively significant ICT-mediated communication events influence individuals' momentary and prolonged well-being?

To answer the first research question, an interview study with 50 knowledge workers is conducted, and features of ICT-mediated communication events that are affectively significant from the ICT users' point of view are derived from the participants' descriptions. Integrating these findings and central assumptions of affective events theory, a theory-driven research model is developed. Hypotheses are then tested with an experience sampling study with more than 300 participants providing data on 2,537 ICT-mediated communication events and 1,355 end-of-day well-being measures in order to answer the second research question. Based on the findings, this mixed-methods study aims at gaining a more differentiated theoretical understanding of the drivers of ICT-mediated communication's double-edged nature and to provide valuable implications for practitioners in order to prevent negative and enhance positive effects of ICT-mediated communication on individual well-being.

Study 2 (Chapter 3) takes a cross-border perspective and investigates the differential demands that come along with ICT-enabled cross-border availability, that is, rising cross-border availability expectations, and how these affect individuals' bidirectional boundary management behavior. Further, the effects of both work-life and life-work segmentation on individuals' well-being are examined. Thereby, the study is guided by three research questions:

(1) How is individuals' bidirectional boundary management behavior shaped by others' cross-border availability expectations?

(2) What are the discrete effects of individuals' actual work-life and life-work segmentation on their well-being?

(3) Is a certain boundary management behavior most beneficial for individuals' well-being or do the effects of individuals' bidirectional boundary management behavior on well-being vary depending on individual characteristics?

To shed light on these research questions, study 2 integrates theoretical considerations based on boundary theory with empirical findings, and develops a nuanced research model. To examine how availability expectations influence individuals' actual boundary management behavior, which in turn, should affect individual-level outcomes, the study draws on data from 401 knowledge workers collected in two waves six weeks apart. To test the direct and moderating effects, structural equation modeling is used. Based on the results, this study

intends to provide a holistic framework for understanding bidirectional boundary management in the age of cross-border availability, and to derive valuable practical implications for managing the boundaries of work and personal life in a way that fosters individuals' well-being.

In sum, the empirical studies presented in this thesis provide comprehensive yet differentiated insights on our understanding of individuals' boundary management and well-being in the age of ICT use. With the different conceptual emphases and levels of analysis of the two studies, the dissertation contributes to the present theoretical and empirical understanding of the consequences associated with the increasing prevalence of ICTs in several ways: Study 1 acknowledges the relevance of events to explain the double-edged effects of ICT-mediated communication on well-being. By identifying four features of ICT-mediated communication events that are affectively significant and detecting both episodic and spillover effects of these features on individual well-being, study 1 contributes to the understanding of the drivers of the double-edged nature of ICT-mediated communication and provides new insights on its dynamic relationship with individual well-being. Further, by unveiling distinct antecedents of both work-life and life-work segmentation and their opposing effects on well-being as well as the relevance of individual characteristics as potential moderators, study 2 contributes to a comprehensive and more nuanced framework for understanding bidirectional boundary management in the age of cross-border availability. Together, the two studies provide new insights on the conditions under which positive consequences coming along with the ubiquity of ICTs can be fostered and negative consequences for individuals' well-being can be avoided, as integrating the studies' findings points to three major determinants: event-specific features, personal preferences, and life domain concerned. In the following, the two studies' motivation, their research goals and contributions, as well as the empirical results and implications are elucidated in more detail (Chapter 2 and 3), followed by an overall discussion from an integrative perspective (Chapter 4).

2 Double-edged Effects of ICT-mediated Communication on Well-being: A Mixed Methods Study[3]

2.1 Motivation for the Mixed-Methods Study

"I was sitting in the church at a wedding celebration, forgot to put my cell phone on silent mode. Embarrassingly, I got a call – actually good news – but it totally annoyed me. If I had gotten that message in a different situation, it would have made me happy." (E-f-39)[4]

Ever since ICTs have become ubiquitous in every sphere of our lives (Ayyagari/Grover/Purvis 2011), they have transformed human communication, with the share of interpersonal interactions carried out via ICT continually growing (Barley/Meyerson/Grodal 2011; Butts/Becker/Boswell 2015). The increasing volume of ICT-mediated communication is widely regarded as detrimental to individuals' well-being. For example, ICT-mediated communication has been shown to affect well-being adversely by increasing stress, work-life conflict, and impairing recovery (Barley/Meyerson/Grodal 2011; Boswell/Olson-Buchanan 2007; Derks/van Mierlo/Schmitz 2014; Dettmers et al. 2016). Yet research also suggests that ICT-mediated communication enhances individuals' flexibility and autonomy, thereby facilitating fulfillment of work and family demands and contributing to individuals' work satisfaction (Diaz et al. 2012; Middleton/Cukier 2006; Towers et al. 2006). Thus, ICT-mediated communication can be considered a double-edged sword, involving potential benefits as well as harm for individuals' well-being. However, what still remains unknown is why, when, and under what circumstances ICT-mediated communication has beneficial or detrimental effects on individuals' well-being. This mixed-methods study aims to contribute to our understanding of the drivers of these double-edged effects of ICT-mediated communication.

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[3] This chapter is based on a joint working paper (Reinke et al. 2017).

[4] Each interviewee's position is denoted by "T" for "top manager," "M" for "middle manager," "E" for "executive," or "N" for "no managerial responsibilities." Gender is denoted by "m" for "male" or "f" for "female." Each interviewee is also given an identifying number (from 1-50).

ICT-mediated communication is an episodic activity that unfolds in single, demarcable events, such that each call, each email, each text message constitutes an episode that entails changes in a person's current experience. As each ICT-mediated communication event is characterized by specific features, not all ICT-mediated communication events are the same but differ from one other with respect to such features as who is interacting, when the interaction occurs, or which medium is used. Accordingly, individuals' perception of and reaction to ICT-mediated communication might vary within-person on an event-by-event basis, depending on event-specific features (Butts/Becker/Boswell 2015). In line with this notion, the introductory quote from one of our interviewees indicates that variations in features of ICT-mediated communication events can trigger distinct affective reactions and, thus, might determine whether beneficial or detrimental effects are elicited.

The impact of an ICT-mediated communication event might not be confined to the period in which the event occurs, affecting only momentary affective states. Instead, ICT-mediated communication events possibly have prolonged impact on individuals' well-being. As one of our interviewees describes: "Friday night at around 11 pm, I got the message that a candidate signed the contract. It had been a very difficult project. I was really glad about that, and the weekend was great then" (N-m-34). As this quote illustrates, the momentary affective states triggered by an ICT-mediated communication event might also spill over to individuals' prolonged well-being, persisting over longer periods, such as, in this case, a whole weekend. This notion is in line with affective events theory (Weiss/Cropanzano 1996), which emphasizes the role of events in predicting individual-level outcomes, arguing that an event's specific features can trigger immediate affective reactions that subsequently influence prolonged outcomes. Drawing from this line of argument, ICT-mediated communication events might affect individuals' prolonged well-being through their impact on momentary affective states.

Despite the potential relevance of ICT-mediated communication events for both individuals' momentary affective states and prolonged well-being, the vast majority of preceding research focuses on chronic, overall outcomes of ICT-mediated communication or ICT use in general. These studies have provided valuable insights into the overall relationship between ICT use (in general or specifically for communication purposes) and well-being by examining either extent of ICT use (e.g., Chesley 2014; Lanaj/Johnson/Barnes 2014) or ICT properties, such as connectivity or complexity (e.g., Ayyagari/Grover/Purvis 2011; Ragu-Nathan et al. 2008), as drivers of ICT users' well-being.

With most preceding research focusing primarily on the overall effects of ICT-mediated communication, a pivotal limitation is overlooking that features of discrete ICT-mediated communication events might determine whether ICT-mediated communication has beneficial

or detrimental effects. This shortfall potentially obscures the differential effects of distinct ICT-mediated communication events on individuals' well-being. Failing to consider that these effects might vary on an event-by-event basis, some studies conclude that work-related ICT-mediated communication during non-work time is mainly detrimental to individuals' well-being. This assumption also underlies corporate initiatives geared to prevent work-related ICT-mediated communication after hours (Volkwagen AG, BBC News 2012) or during holidays (Daimler AG, BBC News 2014).

Moreover, previous research does not integrate the short-term and prolonged effects of ICT-mediated communication, thus limiting our understanding of the mechanisms underlying its relationship with individuals' prolonged well-being. Taken together, while prior research has identified both the benefits and harm of ICT-mediated communication, we do not know why, how, and under what circumstances ICT-mediated communication positively or negatively affects individuals' momentary and prolonged well-being.

We argue that accounting for the event-level effects of ICT-mediated communication would enable more complete and differentiated understanding of its relationship with well-being, and allow for unveiling the mechanisms explaining its double-edged nature. Hence, the present research employs an event-based approach to investigate why, how, and under what circumstances ICT-mediated communication events positively or negatively affect individuals' momentary affective states and prolonged well-being.

Using a mixed-methods approach (Wright/Sweeney 2016) incorporating both a qualitative and a quantitative study, we aim to answer two research questions. Our first research question asks: Which features of ICT-mediated communication events trigger individuals' momentary affective reactions? To inductively understand which features of ICT-mediated communication events elicit changes in momentary affective states – that is, to characterize affectively significant events from individuals' perspective – we conducted an interview study with 50 participants. From participants' descriptions of critical incidents of ICT-mediated communication, we derived four features of ICT-mediated communication events that are decisive for individuals' affective reaction: valence, disturbance, need for action, and synchronicity.

Building on these findings, our second research question asks: How do affectively significant ICT-mediated communication events influence individuals' well-being? Integrating insights from our qualitative study with affective events theory, we develop a research model including both immediate and prolonged consequences of ICT-mediated communication events for individuals' well-being. Specifically, we develop a set of testable hypotheses regarding: (1) *episodic effects,* that is, effects of the previously identified features of

affectively significant ICT-mediated communication events on individuals' momentary affective states; and (2) *spillover effects,* that is, effects of these features on individuals' end-of-day well-being, mediated by momentary affective states. To test our hypotheses, we conducted an experience sampling study with more than 300 participants, who provided data on 2,537 ICT-mediated communication events and 1,355 end-of-day well-being surveys.

Our mixed-methods research contributes to our understanding of the relationship between ICT-mediated communication and individual well-being in several ways. First, we add to a more differentiated perspective on ICT-mediated communication, acknowledging that its consequences might depend on the characteristics of each specific episode. By inductively identifying the features of ICT-mediated communication events that influence individuals' affective states, we establish what constitutes affective events in the context of ICT-mediated communication from the users' point of view.

Second, our findings allow us to detect drivers of the double-edged nature of ICT-mediated communication and, in turn, to discern between such communication events that are beneficial and detrimental to individual well-being. Given that well-being is a precursor of personal outcomes such as health and longevity, as well as job-related outcomes such as performance and turnover (Tenney/Poole/Diener 2016; Wright/Huang 2012), understanding the effects of ICT-mediated communication on well-being is of significant importance, for not only ICT users but also employers and society at large. By illuminating what kinds of events elicit positive or negative effects, our results provide users and practitioners with leverage to both mitigate the unintended consequences of ICT-mediated communication and increase its beneficial impact on well-being, using measures at the level of single ICT-mediated communication events.

Third, by integrating both episodic and spillover effects of ICT-mediated communication events, this research identifies the mechanisms intervening between single ICT-mediated communication events and individuals' prolonged well-being. In contrast to the focus on between-person effects of most preceding studies on ICT use and well-being (Boswell/Olson-Buchanan 2007; Day et al. 2012; Diaz et al. 2012; Ragu-Nathan et al. 2008), our mixed-methods study builds and tests theory of within-person dynamics, modeling the interplay between ICT-mediated communication events, momentary affective states, and end-of-day well-being.

Together, these insights allow us to refine the macrostructure of affective events theory in the context of ICT-mediated communication by specifying: (1) the nature of affectively relevant ICT-mediated communication events; and (2) the process of how these events relate to momentary and prolonged well-being. Thereby, we contribute to the theoretical understanding

of the dynamic within-person relationship between ICT-mediated communication and well-being.

Finally, with the ubiquity of ICTs in all spheres of our lives, the permeability of work and personal life boundaries increases, such that work-related communication is no longer confined to the workplace, working hours, or work devices (Boswell/Olson-Buchanan 2007). Likewise, personal communication can take place anytime, anywhere, and through any device (Wajcman/Bittman/Brown 2008), increasing the odds of individuals being affected by personal communication while working (Chesley 2014). Despite the potential relevance of personal ICT-mediated communication, most preceding studies on the effects of ICT use on well-being examine only work-related ICT use (e.g., Ayyagari/Grover/Purvis 2011; Day et al. 2012), in particular during non-work-time (e.g., Boswell/Olson-Buchanan 2007; Butts/Becker/Boswell 2015; Derks/van Mierlo/Schmitz 2014). To gain more complete understanding of how ICT-mediated communication relates to well-being, we extend existing research by: (1) simultaneously including work-related and personal ICT-mediated communication, during both personal time and working hours; and (2) investigating their differential effects on individuals' well-being.

This chapter is organized as follows. First, we shortly review empirical research on the impact of general ICT use and ICT-mediated communication on individual well-being, discuss the literature's key limitations, and outline our research objectives. Next, we draw on affective events theory to establish the relevance of ICT-mediated communication events and individuals' subjective perception thereof, and to discuss the mechanisms that might link those events to individual well-being. To illuminate which features characterize affectively significant ICT-mediated communication events, we employ an exploratory, qualitative study. Integrating this study's findings with affective events theory, we then present our research model linking ICT-mediated communication events to momentary and prolonged changes in individuals' well-being. We next investigate our hypotheses through a quantitative study. Finally, we discuss how our mixed-methods research contributes to literature on the consequences of ICT-mediated communication, suggest areas for future research, and offer practical implications.

2.2 Conceptual and Theoretical Background

As shown with the literature review in Chapter 1.4.1, research on the relationship between ICT use and individual well-being has been growing over the last decade, with two research streams – organizational behavior research and information systems research on technostress – providing particularly valuable insights on the consequences of ICT use. In the following,

we draw on the four organizing themes reflecting the different conceptual emphases of prior research that were introduced in Chapter 1.4.1.1, and summarize key findings across all four themes. In conclusion, we outline the limitations of previous studies, delineate the objectives of the present research building upon these, and describe the theoretical framework we draw on to pursue our research objectives.

2.2.1 ICT use and Well-being: Short Literature Review

As follows, we shortly review the four organizing themes that were described in detail in Chapter 1.4.1.1 (see Table 1-2) to structure the heterogeneous literature on ICT use and well-being.

The first theme refers to the type of ICT use investigated, differentiating between function and content. As regards function, some studies examine ICT use for both information and communication purposes (e.g., Ayyagari/Grover/Purvis 2011), while others solely investigate use of ICTs for communication purposes, mostly with respondents as recipients of ICT-mediated communication (e.g., Butts/Becker/Boswell 2015). As regards content, the majority of research focuses on work-related ICT use, either during working hours (e.g., Day et al. 2012) or after hours (e.g., Ferguson et al. 2016).

The second theme, conceptualization of independent variable(s), indicates that four approaches can be distinguished. The extent of ICT use – measured as frequency or duration of use – is the most commonly studied antecedent of well-being (e.g., Derks et al. 2015). Second, the impact of ICTs' material properties inherent in the technology itself, such as complexity, uncertainty, or malfunctioning (e.g., Ayyagari/Grover/Purvis 2011; Day et al. 2012) is studied. Third, several studies examine demands resulting from ICT use, such as increased workload or availability expectations, as drivers of well-being (e.g., Day et al. 2012; Ragu-Nathan et al. 2008). Finally, two recently published studies have investigated features of ICT events as antecedents (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015).

The third theme concerns the underlying theoretical perspective on ICT use and shows that the majority of existing literature regards ICT use as a stressor or a demand. This research stream relies largely on theories on stress and depletion (e.g., Hobfoll 1989; Lazarus/Folkman 1984) and examines ICT use primarily as a cause of impaired well-being (e.g., Srivastava/Chandra/Shirish 2015). Conversely, several studies acknowledge the potential of ICT use to be both a stressor/demand and an asset. These studies also investigate resources associated with ICT use as well as beneficial outcomes (e.g., Dettmers/Bamberg/Seffzek 2016; Diaz et al. 2012), but often lack a theoretical framework. One recent exception is the

study by Butts/Becker/Boswell (2015), who draw on affective events theory to theoretically explain differential effects of ICT use on well-being.

The fourth theme, study design, reflects the proposed temporality of the relation between ICT use and well-being. It shows that most studies traditionally examine this link with cross-sectional designs at the between-person level (e.g., Boswell/Olson-Buchanan 2007). Recently, an increasing number of studies have examined the relationship between daily ICT use and well-being over several consecutive days, adopting a within-person approach. The majority of these studies measure ICT use and indicators of well-being at the same time once a day (e.g., Butts/Becker/Boswell 2015).

Overall, the thematic review shows that prior studies largely examine between-person relationships of work-related ICT use and well-being, with a focus on the extent of ICT use or properties of ICTs as antecedents. Together, these studies find both detrimental and beneficial effects of ICT use for individuals' well-being, underlining ICTs' double-edged nature. Yet, with the stressor/demand perspective dominant in previous literature, studies finding detrimental effects far exceed those providing evidence for beneficial consequences.

With regard to detrimental effects, research shows that the extent of work-related ICT use after hours is related to increased work-life conflict as well as to impaired recovery (Dettmers et al. 2016; Ferguson et al. 2016). Moreover, studies examining ICTs' properties or demands accompanying ICT use find positive relationships with work-life conflict, strain, and burnout (Ayyagari/Grover/Purvis 2011; Day et al. 2012), and negative relatinships with job satisfaction and performance (Ragu-Nathan et al. 2008; Tarafdar/Pullins/Ragu-Nathan 2015). Further, studies on the effects of ICT use events' features find significant effects on momentary perceptions of well-being, that is, increased momentary anger, momentary work-life conflict, (Butts/Becker/Boswell 2015), and episodic stress (Galluch/Grover/Thatcher 2015).

As regards beneficial effects of ICT use, research suggests that using ICTs is associated with increased flexibility and autonomy, enhances individuals' ability to fulfill work-life demands, and fosters work-related outcomes such as effectiveness, feelings of accomplishment, and work satisfaction (Diaz et al. 2012; Towers et al. 2006). Moreover, perceived control and predictability of ICT use have been shown to increase psychological detachment and reduce emotional exhaustion (Dettmers/Bamberg/Seffzek 2016).

2.2.2 Limitations of the Literature and the Present Research Objectives

Although extant research provides valuable insights into the consequences of ICT use for individuals' well-being, our literature review reveals several major limitations, indicating the

need for more holistic and theoretically grounded approaches. First, prior research relies heavily on theories that illuminate the detrimental nature of ICT use, while studies also investigating its beneficial effects widely lack theoretical underpinning. Together, these observations indicate the need to develop theory that explains the double-edged effects of ICT use found in previous work: a theory that explains why, how, and under what circumstances ICT-mediated communication exhibits beneficial or detrimental effects on well-being. Accordingly, our goal is to build and test a theoretical framework illuminating these double-edged effects of ICT-mediated communication on individual well-being.

Second, most preceding research disregards that each ICT-mediated communication event may vary in its nature and, thus, that the consequences of ICT-mediated communication for well-being may vary between events. Two pioneering studies that applied event-based approaches (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015) highlight the importance of conceptualizing ICT-mediated communication as an episodic activity, with outcomes that vary event-by-event. In line with this notion, the present research takes an event-based perspective, studying the consequences of single ICT-mediated communication events.

Third, the two studies investigating effects of features of ICT-mediated communication events (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015) derived those features from previous research, particularly on communication in group discussions and by email. Yet, theories on emotions and stress (Frijda 1986; Lazarus 1966; Lazarus/Folkman 1984) emphasize that individuals' subjective evaluation of a stimulus is decisive for the emergence of affective or stress reactions, respectively. Thus, we argue it is important to capture ICT users' subjective perception of ICT-mediated communication events to truly understand what kind of events have the potential to impact affective states and well-being. Accordingly, we employ an explorative approach to identify those features of an ICT-mediated communication event that are significant *from the ICT user's perspective*. In particular, we draw on users' subjective descriptions of ICT-mediated communication events to understand which features are most salient for individuals and, therefore, likely to influence their affective state and well-being (O'Driscoll/Cooper 1996).

Fourth, prior research falls short in fully elucidating the dynamic within-person interplay between ICT use and both momentary and prolonged well-being: The majority of studies focus on rather stable, between-person effects (e.g., Diaz et al. 2012; Tarafdar/Pullins/Ragu-Nathan 2015). Further, preceding day-level studies are limited by focusing only on the indicators of prolonged well-being (e.g., Derks et al. 2016; Lanaj/Johnson/Barnes 2014), while previous event-level studies solely investigate momentary reactions (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015). The present research integrates

these separately studied outcomes to disentangle the causal relationships between discrete ICT-mediated communication events, momentary affective states, and prolonged well-being. In particular, we examine how ICT-mediated communication events influence momentary affective states, as well as how these accumulate over the course of a day to spill over to individuals' end-of-day well-being.

Finally, as regards the type of ICT use, the vast majority of prior research focuses on work-related ICT use (e.g., Butts/Becker/Boswell 2015; Dettmers et al. 2016). While this is an important realm, ICTs also enable individuals to be connected to their personal life anywhere and anytime (Muhl 2003; Sproull 2000). Thus, personal ICT use might influence individuals' well-being in both work and non-work domains. In fact, personal ICT use at work has been shown to enhance perceptions of work-life balance by allowing individuals to meet personal responsibilities and maintain personal relationships (Ladkin et al. 2016; Rose 2015). Personal ICT use has also been found to decrease work strain (Chesley 2014). Moreover, most prior research focuses on participants' role as recipients of ICT-mediated communication, disregarding the bidirectional nature of communication. To gain a complete picture of the effects of ICT-mediated communication on well-being, the present study includes both work-related and personal ICT-mediated communication events, and investigates participants in both recipient and sender roles. Thereby, we control for the possibility that these different types of ICT-mediated communication events differentially affect individuals' affective state and well-being.

Taken together, our research aims to develop new, more differentiated and holistic theoretical insights into the dynamic relationship between ICT-mediated communication and well-being, whilst addressing important limitations of prior research. In particular, taking an event-based perspective, we aim to build and test theory that explains why, how, and under what circumstances ICT-mediated communication events – whether for work-related or personal purposes, and as communication sender or recipient – have beneficial or detrimental effects on individuals' momentary and prolonged well-being.

2.2.3 Theoretical Framework

As a theoretical lens for studying ICT-mediated communication events and well-being, we draw on affective events theory (Weiss/Cropanzano 1996), as described in more detail in Chapter 1.3.1. In sum, affective events theory highlights the role of discrete events as predictors of within-person variance of emotional states, attitudes, and behaviors. In particular, the theory suggests that events that are affectively significant for an individual elicit an emotional reaction in some way (Cropanzano/Dasborough/Weiss 2017; Weiss/Cropanzano 1996). Events are proposed to be of affective significance if individuals

assess them as relevant to their personal desires, goals, and values. What sort of affective reactions are caused by an affective event depends on the events' specific characteristics (Weiss/Cropanzano 1996). In turn, individuals' affective reactions to an event may influence affect-driven behaviors and attitudes, with the latter impacting individuals' judgment-driven behaviors (Weiss/Cropanzano 1996). Thus, affective events theory suggests that individuals' affective reactions mediate the relationship between discrete events and attitudes and behaviors (Weiss/Beal 2005; Weiss/Cropanzano 1996).

Based on the notion that ICT-mediated communication is an episodic activity that unfolds in discrete events, affective events theory provides three meaningful implications for research on the consequences of ICT-mediated communication. First, the theory highlights the important role of events in explaining within-person changes in individual-level outcomes, pointing to the potential of affectively significant ICT-mediated communication events to predict within-person effects of ICT use (Butts/Becker/Boswell 2015). Second, affective events theory emphasizes that an event's affective significance is the result of a subjective evaluation process. Hence, to understand what kind of ICT-mediated communication events are affectively significant, researchers needs to capture individuals' subjective perceptions thereof. Third, the theory illuminates the intervening role of affective states (Weiss/Cropanzano 1996), indicating that these should mediate the link between discrete ICT-mediated communication events and individual-level outcomes.

Transferring these implications to our study, we suggest that ICT-mediated communication events, contingent upon their specific nature, might be perceived as affectively significant and, thus, elicit affective reactions, which in turn cause changes in individuals' well-being. While affective events theory does provide a valuable macrostructure for investigating events as causes of affective reactions and changes in attitudes and behaviors (Weiss/Beal 2005), it does not specify what kind of events are of affective significance, as this is highly context-specific. Hence, to develop an affective events theory framework applicable in the context of ICT-mediated communication, it is necessary to "fill in the blanks" of the macrostructure provided by this theory (Weiss/Beal 2005). In the context of our research objective, this means that we need to understand which specific features constitute the affective significance of ICT-mediated communication events.

2.3 Qualitative Study

The goal of our qualitative study was to identify features that characterize ICT-mediated communication events as affectively significant and may, therefore, affect these individuals' affective states and well-being. To assess an event's affective significance, individuals

evaluate its relevance to their personal desires, goals, or values (Weiss/Cropanzano 1996). Therefore, capturing individuals' subjective evaluation of ICT-mediated communication events is key to understanding which features characterize affectively significant events. To this end, we employed the critical incident technique (Flanagan 1954), and used in-depth interviews to ask participants to detail critical incidents of ICT-mediated communication and these incidents' impact on them.

While the critical incident technique was originally developed to analyze detailed reports of activities and behaviors in specific job situations in order to improve programs and procedures (Flanagan 1954), the technique has been widely applied as a qualitative research method in other research fields than job analysis only (Butterfield et al. 2005), such as analyzing critical psychological concepts, states, and experiences (e.g., Nadin/Williams 2012; O'Driscoll/Cooper 1996). We used critical incident technique as it focuses on analyzing participants' own perceptions of situations that they themselves experienced as particularly salient and significant for their well-being (O'Driscoll/Cooper 1994). Thereby, applying critical incident technique ensures to capture those incidents that have real bearing on the individual's life and well-being. Further, in-depth interviews allow researchers to capture participants' subjective appraisal and accurate portrayal of these events and their reactions to them (O'Driscoll/Cooper 1994, 1996). Hence, combining the critical incident technique and in-depth interviews allowed us to shed light on those features of ICT-mediated communication events that have affective significance.

2.3.1 Sample and Procedure

To address our first research question, we sought to sample individuals who communicated via ICTs not only for personal purposes but also as part of their jobs. Hence, we chose to sample knowledge workers primarily involved with the "creation, distribution, or application of knowledge" (Davenport 2005, p. 11). Knowledge workers typically have access to multiple ICTs at work, and ICT-mediated communication is often required to accomplish their tasks (Wajcman/Rose 2011).

We conducted interviews with 50 participants, all personal or professional contacts of the authors. We ensured that all participants were knowledge workers by reviewing their job description. As all participants were living and working in Germany, the interviews were conducted in German. Forty-four percent of the participants were female and their age ranged from 23 to 66 years, with an average age of 41.6 years. Twenty-nine participants were married, 17 in a committed relationship, and four were single. Sixty percent had children, among whom the average number of children was 1.9. In terms of their jobs, the majority of participants (78%) worked in the private sector, in a diverse range of industries including

financial services, chemicals and pharma, engineering, and information technology. Average job tenure was five years. Ten participants were ranked as top managers, seven as middle managers, 14 as executives, and 19 had no managerial responsibilities. We opted for sampling a cross-section across different industries and job levels to ensure that our results were not bound to a particular industry or position, thereby increasing the generalizability of our findings.

To ensure comparability, we used a semi-structured interview guide that allowed us to ask similar questions across study participants; however, we also asked idiosyncratic questions to follow up on interesting responses. After informing each participant about the interview's theme and structure, we asked them to provide information regarding their personal and occupational background, followed by a number of questions relating to work-life balance and boundary management. Questions regarding participants' typical ICT use behavior, especially their handling of ICT-mediated availability and communication, were asked in the last part of the interviews. Following principles of critical incident technique, we asked participants to delineate at least two ICT-mediated communication events they had experienced as particularly positive and negative, respectively, as well as their affective reactions to these incidents. As the interviews were conducted as part of a research project on work-life balance, the interview questions referred to ICT-mediated communication events with work-related/personal contacts in the personal life/work domain, respectively. Some interviewees also described ICT-mediated communication events with work-related contacts in the work domain or with personal contacts in their personal lives.

During the interviews, which were conducted via telephone, participants were allowed to speak at length and without interruption. The interviews lasted between 28 and 70 minutes, with an average of 48.5 minutes. All interviews were recorded and transcribed verbatim, yielding 539 single-spaced pages of transcripts in total. However, in the course of the analyses described below, we focused on participants' descriptions of ICT-mediated communication events.

2.3.2 Data Analysis

To identify the features of affectively significant ICT-mediated communication events, two of the authors coded all interview sections in which participants described critical ICT-mediated communication events and their affective reactions, following procedures described by Strauss/Corbin (1990).[5]

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[5] The two coders are native German speakers. The data analysis was conducted in German. Interview questions, quotes, and codes were translated for the working paper.

The first step in the analysis process was to conceptualize our interview data by labelling phenomena, that is, scrutinizing incident by incident in regard of what it represents and giving the same label to similar phenomena (Strauss/Corbin 1990). Accordingly, we independently examined the interview data to derive preliminary conceptual labels for the emerged phenomena, thereby remaining close to the participants' depiction. Second, we compared conceptual labels against another and gradually merged labels describing the same underlying phenomenon into more abstract categories. With this process of categorization, the preliminary conceptual labels were hence aggregated to a higher order conceptual level (Strauss/Corbin 1990). Third, in the course of the analytic process, we discussed and revised these categories in several joint coding meetings, further aggregating categories that conceptually overlapped and discarding categories that did not fit the data properly (Corbin/Strauss 1990; Strauss/Corbin 1990). For example, we noticed that when an event was described as being urgent, it was accompanied with a demand to act, which was repeatedly present as the relevant underlying phenomenon. Thus, we combined them into a single category labeled "need for action". Further, as for example the category "length of the ICT-mediated communication event" was present very seldom in the data, its relevance could not be proven in the course of the analytic process and hence was discarded.

This iterative analysis process yielded four features characterizing ICT-mediated communication events that participants experienced as affectively significant, as well as several codes reflecting discrete emotions such as anger, irritation, or happiness. To classify the wide variety of affective states described in the interviews, we drew on the circumplex model of affect (Russell 1980), because this model allows for reducing complexity: As detailed in Chapter 1.2.3.1, the circumplex model of affect suggests that any affective state can be described along its two basic dimensions: arousal and pleasure. Arousal reflects the intensity of an affective reaction, while pleasure refers to its quality and distinguishes positive from negative emotions (Moors 2009; Russell 1980). Combining these two dimensions allows for describing various basic affective states: for example, feeling excited is characterized by high arousal and high pleasure (Russell 1980).

2.3.3 Results

Our data analysis suggests four features characterizing affectively significant ICT-mediated communication events: valence, disturbance, need for action, and synchronicity. Table 2-1 provides definitions and exemplary quotes for each of the four features. We now describe each feature and the affective reactions elicited.

Table 2-1: Features of Affectively Significant ICT-mediated Communication Events

Feature	Description	Exemplary Quotes
Valence	Evaluation of the content of an ICT-mediated communication event as either positive or negative.	"Friday night at around 11 pm, I got the message that a candidate signed the contract. It had been a very difficult project. I was really glad about that, and the weekend was great then." (N-m-34)
Disturbance	Extent to which an ICT-mediated communication event is perceived as disruptive. Disturbance depends on the event's timing and importance.	"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 forced a decision. I was in my office; the people for my next appointment were already outside my door, waiting. Of course, I felt extremely disrupted; I didn't understand why she acted like that and I was angry, too." (T-m-28)
Need for action	Demand to act immediately after an ICT-mediated communication event (urgent need for action or little sense of urgency to act).	"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." (T-m-24)
Synchronicity	Type of communication channel that is used during an ICT-mediated communication event (synchronous or asynchronous communication channel).	"A client called me several times on my mobile phone and wanted to hear my opinion on some topics and I couldn't make her understand that I didn't have time. […] I was really annoyed." (E-f-14)

2.3.3.1 Valence

The feature valence refers to individuals' evaluation of an ICT-mediated communication event's content as negative or positive. Content typically perceived as negative included: (a) news about failure, problems, or things not working out as planned or hoped for; (b) bad news related to personal relationships and affiliation; and (c) information about medical conditions or death. Participants reported that ICT-mediated communication events with content perceived as negative triggered intense negative affective reactions, such as anger or fear. This is illustrated by the following quote:

"A sick family member called and the doctor's results were negative. […] I sat in front of my laptop when that person called and my heart was beating and I was scared." (E-f-16)

Content typically perceived as positive included: (a) information about accomplishments, solutions, or things that worked well; (b) good news related to personal relationships and affiliation; and (c) news about health and birth. ICT-mediated communication events that conveyed positive content elicited positive affective reactions of low- to high-intensity, such as satisfaction or joy, as the following quote illustrates:

"We are strongly involved with recruiting issues. When a colleague sends me an email on the weekend that an applicant, who we really wanted to hire, accepted the offer, that's a very positive message. […] I get the information, I'm happy, and it's done." (T-m-24)

Accordingly, we found that the valence of the content of ICT-mediated communication events affected individuals' affective reaction, with events with positive valence enhancing and events with negative valence impairing affective states.

2.3.3.2 Disturbance

This feature refers to the extent to which an ICT-mediated communication event was perceived as interfering with an activity in which the individual was currently emotionally, cognitively, or behaviorally involved. One reason for perceiving an event as disturbing was its inconvenient timing, occurring while individuals were involved in something else and felt they lacked the necessary resources to adequately cope with the interfering ICT-mediated communication:

"Last Friday, my girlfriend called me a couple of times to settle some things. Each time, it was about the same issue but she called two or three times. For two of these calls, I was sitting in a client meeting and forgot to turn off my cell phone. It rang, and I saw it was her and rejected her call. […] At that moment, that did disturb me." (N-m-38)

However, while prior research points to the interruptive nature of ICT-mediated communication (Tams et al. 2015), our interview data suggested that users did not perceive all interrupting events as disturbing, specifically, when they felt they had the resources to deal with the interfering ICT-mediated communication event:

> "Three or four weeks ago, my girlfriend got a raise. She called me, [...] I was alone in my office, and we had time to chat and agreed to meet for dinner in the evening. That surely was very positive." (E-m-12)

Besides timing, evaluation of disturbance was also associated with the perceived importance of an interrupting ICT-mediated communication event. Some interviewees described evaluating whether the utility and value of an ICT-mediated communication event justified the interruption. If this evaluation resulted in perceiving an interruption as unworthy, the event was perceived as disturbing, as the following quote illustrates.

> "At that moment, I was implementing something and took the call, because I thought it was important. And then he said something like 'Long time no see.' I was annoyed, asking myself, 'Is this really necessary now?'" (N-m-7)

The interview data showed that ICT-mediated communication events experienced as disturbing are emotionally significant and elicited rather intense negative affective reactions, such as irritation, anger, or stress. In contrast, when individuals perceived disturbance as low, the same event elicited neutral or positive affective reactions:

> "When I sit at my desk and work on something calmly and get a text-message with a picture of my kids eating ice-cream – that is a positive feeling. When the same thing happens during a meeting, [...] it would cause some stress." (M-f-50)

2.3.3.3   Need for Action

This feature refers to ICT-mediated communication events that confronted individuals with a demand to act immediately after the event. These actions typically involved solving an urgent problem, often requiring individuals to abandon their present activity and/or location to focus on the new task. When ICT-mediated communication events created such instant need for action, interviewees experienced negative affective states such as stress or panic. Individuals' negative affective reactions were particularly intense if their resources to act as required, such as time, scope, or competencies, were limited. The following quote illustrates this notion:

> "My company called […]. They said I have to come to work immediately although it was my husband's birthday and our house was full of guests. […] I was angry. I felt under pressure at that moment, because the house was full of guests. I was unhappy, very unhappy." (N-f-30)

In contrast, our interview data suggested that momentary affective states were not affected when the ICT-mediated communication event was "purely informative, without any need for action" (N-f-3).

2.3.3.4 Synchronicity

Synchronicity refers to the type of communication channel used for ICT-mediated communication. In situations in which communication was received via synchronous channels, such as phone or video calls, many interviewees reported experiencing pressure to respond immediately. These interviewees explicitly stated that they felt their autonomy was restricted by synchronous communication channels, as outlined by one participant:

> "It was mainly because of the communication channel: Any other channel except calling would have been fine, because I could have responded when I wanted and when I had the time to deal with it." (T-m-28)

Consequently, receiving communication via synchronous channels elicited negative affective reactions, such as anger or irritation:

> "What I do not like at all is speaking on the phone. […] I hate when one of my coaches calls and asks coaching questions. […] I would prefer if they emailed me and asked when I have time for a call. […] Some people call and steal half an hour or more, to me, that is outrageous." (N-f-1)

In contrast, communication events mediated by asynchronous channels, such as e-mails or text messages, tended to provide individuals with "more freedom of choice" and, therefore, more "control over the communication behavior" (M-f-21), which was associated with more positive affective states.

2.3.4 Summary of the Findings

We inductively derived four features from our qualitative data – valence, disturbance, need for action, and synchronicity – that characterize ICT-mediated communication events as affectively significant, meaning that they prompt individuals to react in some way emotionally to these events. Although these features are conceptually distinct, it is important to note that they are not mutually exclusive, as a discrete ICT-mediated communication event is likely to be characterized by more than one feature. In line with this, interviewees often described events by reporting on multiple features. This is illustrated by the following depiction of an event characterized by negative valence, need for action, and a synchronous communication channel, combining to yield intense negative affective reactions.

> "I'm sitting in a meeting, noticing that the plumber of our house-building project has called three times. When he calls for the fifth time, I leave the meeting room and get to hear unpleasant messages. So, first, I have a problem and, second, I need to go back to

the meeting. Now my thoughts are at home. At that moment I feel stressed, helpless, aggressive." (T-m-25)

Likewise, the following description of an ICT-mediated communication event characterized by positive valence, low disturbance, and a synchronous communication channel depicts a different combination of features that elicited rather intense positive affective reactions.

"We got the apartment; I got a call at work. I had time at that moment and was really happy. […] I was sitting at the computer, writing a text. I could easily answer the phone, that was no problem." (N-f-9)

2.4 Research Model and Hypothesis Development

Integrating the findings from our qualitative study with affective events theory, we develop a research model and hypotheses linking ICT-mediated communication events to individual well-being (cf. Figure 2-1), which will then be tested in our quantitative study. In line with affective events theory, our interview data indicated that ICT-mediated communication events are causes of distinct affective reactions dependent on the nature of the event. Moreover, our analyses allowed us to specify what constitutes affectively significant ICT-mediated communication events: Individuals experience ICT-mediated communication events characterized by at least one of the four features we identified as affectively significant. Consequently, the four features, individually or simultaneously, influence individuals' momentary affective states. These immediate, direct effects of the features of ICT-mediated communication events on individuals' momentary affective states – which we refer to as episodic effects – form the first part of our research model (cf. Figure 2-1). As regards the valence and intensity of the affective reactions elicited by these features, the interview data only allowed deducing tendencies for some of the features. Accordingly, we derive the following undirected hypotheses:

Hypothesis 1: An individual's perception of an ICT-mediated communication event's (a) valence, (b) disturbance, (c) need for action, and (d) synchronicity is related to the individual's momentary affective state.

Moreover, in accordance with affective events theory, we contend that affective states mediate the relationship between the features of ICT-mediated communication events and well-being. Individuals' affective reactions to events may not be limited to eliciting immediate changes in individual well-being, as reflected in individuals' momentary affective states but may also accumulate over time to produce prolonged effects on well-being, including, for example, end-of-day well-being (Bono et al. 2013; Williams et al. 1991). When

experiencing more positive events and, hence, more positive affect throughout a day, individuals are suggested to build resources that positively affect their daily well-being (Bono et al. 2013; Fredrickson 2001). Similarly, experiencing more negative events throughout a day produces more negative affective reactions. As a result of heightened negative affective state, well-being should be lower on days when individuals have experienced more negative events (Williams et al. 1991; Zohar/Tzischinski/Epstein 2003). In support of this notion, recent empirical studies on affective events theory show that the work events individuals experience over the course of a day not only elicit momentary affective reactions but also spill over to the evening, influencing individuals' end-of-day stress level, detachment, and fatigue (Bono et al. 2013; Zohar/Tzischinski/Epstein 2003).

Integrating this line of argument with the results of our qualitative study, we propose that the effects on momentary affective states of the features of ICT-mediated communication events accumulate to elicit fluctuations in more prolonged individual well-being indicators. More specifically, the episodic effects of the features of ICT-mediated communication events an individual experiences over the course of a day should accumulate and spill over to the evening, influencing the individual's end-of-day well-being. Thereby, the relationship between ICT-mediated communication event features and end-of-day well-being should be mediated by individuals' aggregated affective states. These indirect, aggregated effects of the features of ICT-mediated communication events on end-of-day well-being – which we refer to as spillover effects – constitute the second part of our research model (cf. Figure 2-1).

Hypothesis 2: An individual's perception of ICT-mediated communication events' (a) valence, (b) disturbance, (c) need for action, and (d) synchronicity aggregated over the course of a day are related to the individual's end-of-day well-being.

Hypothesis 3: The relationship between an individual's perception of ICT-mediated communication events' (a) valence, (b) disturbance, (c) need for action, and (d) synchronicity, aggregated over the course of a day, and the individual's end-of-day well-being is mediated by the individual's momentary affective state, aggregated over the course of the day.

Figure 2-1: Hypothesized Research Model (Study 1)

Episodic effects — Spillover effects (features and affective states are accumulated across all events a day)
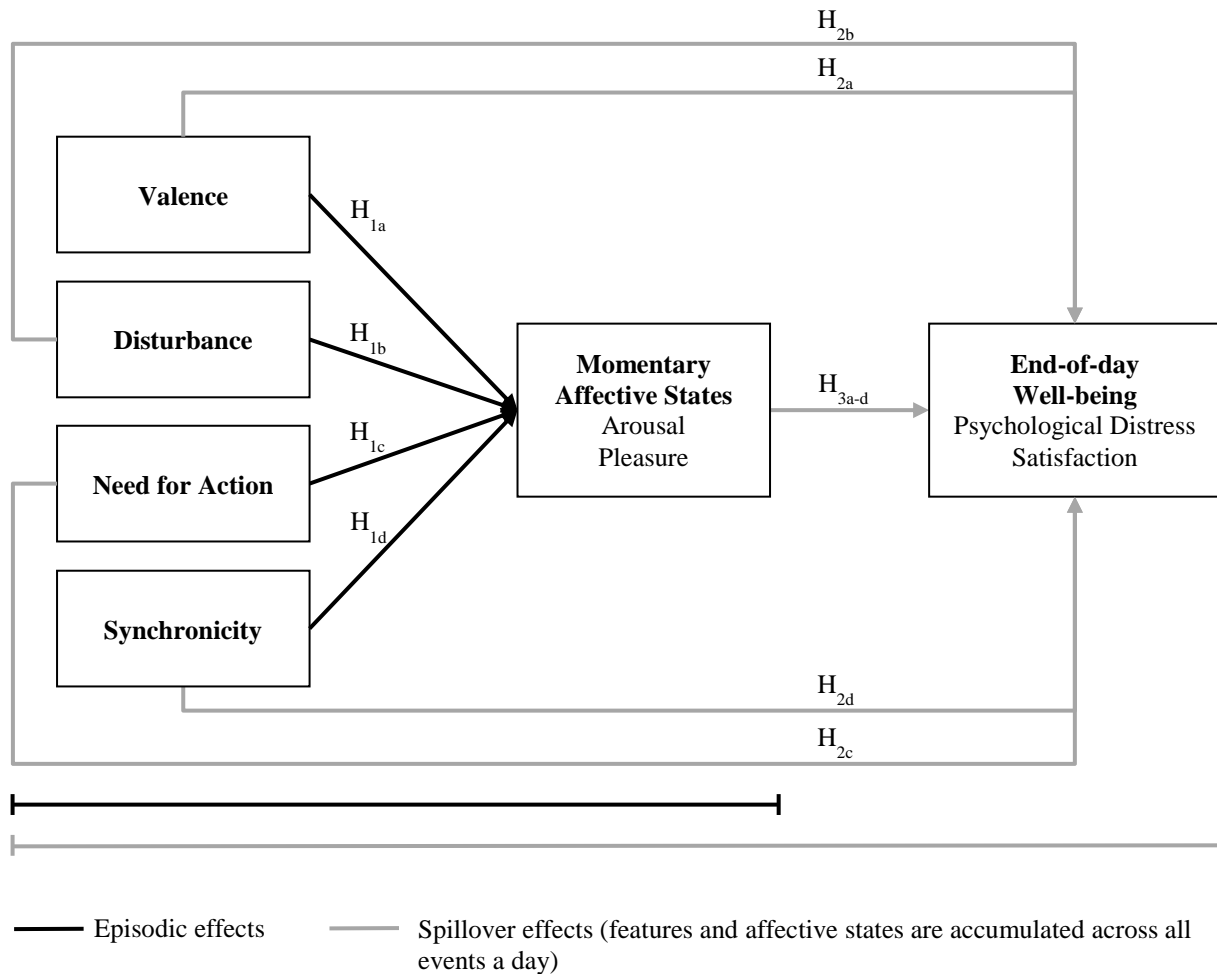
2.5 Quantitative Study

2.5.1 Sample and Procedure

Again, we sampled knowledge workers, as ICT-mediated communication is an essential part of their job (Wajcman/Rose 2011). Participants were recruited via four companies whose human resource heads had agreed to support the study. These companies represent four industries (IT, automotive supply, consulting, and public administration), varying in size from 18 to 8,000 employees. Prior to the start of data collection, the firms used email to inform knowledge work employees (categorized according to their job description) about the study. Moreover, employees had access to more detailed information via the firms' intranet and during on-site information sessions.

To empirically investigate our model and shed light on the relationships between ICT-mediated communication event features, momentary affective states, and end-of-day well-being, we conducted a quantitative study using experience sampling methodology (ESM). ESM "features repeated measurements of the same participants as they go about their daily lives" (Fisher/To 2012, p. 865), and enables examination of dynamic within-person relationships while controlling for stable between-person influences (Bolger/Davis/Rafaeli 2003; Fisher/To 2012). As such, applying ESM allowed us to examine the same participants' reactions to different ICT-mediated communication events, and to capture within-person fluctuations in well-being.

We collected data from each participant at four times each day over the course of two weeks (Monday – Saturday; 12 days total). At each designated time, participants received an email in their work and/or personal email account (depending on their choice) with a link to an online survey. At three times each day (9:00 am, 2:00 pm, and 6:00 pm), participants were invited to complete a short survey about a recent communication event, i.e., one they had experienced on that day since the last survey invitation, and their affective state in this situation. Each event survey was available for three hours to prevent participants from having concurrent access to multiple event surveys. At 8:00 pm each day, participants were invited to report on their end-of-day well-being in an evening survey. In addition, prior to the two-week ESM period, participants completed an initial online survey containing questions referring to their job, personality, typical ICT use, well-being, and demographics. As an incentive, all participants received an individualized data-based feedback report, including recommendations on how to improve well-being and optimize ICT use. Moreover, participants had the chance to win an online shop voucher with a value of EUR 100.

The initial survey was completed by 589 employees, all of whom were subsequently contacted during the two-week survey period. In total, 493 participants completed 7,707 event surveys. Of these, 3,865 were removed as the communication events they referred to were not ICT-mediated, resulting in the exclusion of 30 participants. Further, 17 participants and 1,141 events were dropped due to missing values. Moreover, we excluded any participant who responded to fewer than three event surveys. In total, 453 participants completed 3,012 evening surveys. Matching event and evening surveys required the removal of a further 15 participants from the sample. The participants who were included in the analyses and those who were excluded did not differ significantly regarding the demographic variables and the control variables at the person level.

Together, these procedures resulted in a final sample of 333 participants and 2,537 event observations to test episodic effects and, of these, 318 participants and 1,355 observations to test spillover effects. All 333 participants were living in Germany. They worked in various

departments, including information technology (28.2%), sales and key account management (19.5%), research and development (12.3%), operations and production (8.4%), human resources (3.9%), controlling and accounting (3%), and others (24.7%). Seventy-one percent of the 333 participants were male, 88% were married or living with a partner, and 59% have at least one child. The mean age was 45.15 years ($SD = 9.16$ years), and 38.06 working hours (as contracted) was the average per week ($SD = 4.60$). Regarding the participants' position, 48.3% were employees without managerial responsibilities, 33% were project or team leaders without formal managerial responsibility, and 18.7% were managers.

2.5.2 Measures

In the event and evening surveys, we mainly used single-item measures, for two reasons. First, as individuals' recent experiences and states are suggested to be rather unidimensional and concrete, single items have proven to be reliable and valid measures in prior ESM studies (e.g., Bono et al. 2013; Fisher/To 2012). Second, Fisher/To (2012) recommend using short questionnaires and, hence, short measures when conducting ESM studies in order to maintain participants' motivation to respond regularly.

In the event survey, the four features of ICT-mediated communication events identified in our qualitative study were assessed with one item each. Valence was measured with the item, "How would you evaluate the content of the communication?," with a response scale ranging from 1 = "negative" to 5 = "positive". Disturbance was measured with the item, "How much did you feel disturbed by the initiation of this communication event?," on a response scale ranging from 1 = "not at all" to 5 = "very much". Need for action was assessed with the item, "This communication event resulted in a need for me to act immediately," and a dichotomous response scale comprising 0 = "no" and 1 = "yes". To assess synchronicity, participants were asked to report the communication channel used, which was then coded as asynchronous (labeled "0") for email, SMS/messengers, and chat, or synchronous (labeled "1") for phone and video calls.

To measure participants' affective states, we opted for a scale that covers the broad variety of affective states reported by participants in the qualitative study while also being sufficiently concise to be applied in an ESM study. In particular, we used the self-assessment manikin (SAM, Bradley/Lang 1994), a validated pictorial scale that measures momentary affective states along the two dimensions of the circumplex model of affect, arousal and pleasure (Russell 1980). For each dimension, the scales comprised five pictures arranged on a continuum, ranging from 1 = calm to 5 = aroused, for arousal, and from 1 = unpleasant to 5 = pleasant, for pleasure.

In the evening survey, we assessed end-of-day well-being by measuring two indicators: psychological distress and satisfaction. With these indicators, we aimed to depict the broad concept of well-being (see Chapter 1.2.3), covering negative and positive states, as well as emotional states and satisfaction (e.g., Diener et al. 1999). Psychological distress refers to a mental state characterized by negative emotions and thoughts (Selye 1974; Watson/Clark/Tellegen 1988). It was measured with the two items, "Today I feel distressed" and "Today I feel irritated" (adapted to a daily measure from Watson/Clark/Tellegen 1988), on a response scale ranging from 1 = "not at all" to 7 = "extremely". Satisfaction, which herein refers to an individual's overall evaluation of their quality of life that day (Pavot/Diener 1993), was measured by a single item adapted to day-level from Pavot/Diener (1993): "When I think about today, I am satisfied." The 7-point Likert scale ranged from 1 = "strongly disagree" to 7 = "strongly agree".

Moreover, we included several control variables in the analyses. At the event level, we controlled for initiator and content. In the qualitative study, the majority of interviewees described events in which they were receiving communication. While this peculiarity might stem from framing interview questions in the context of ICT-mediated availability, we decided to control for whether a communication was sent or received by including the item, "Who initiated the communication?," with a dichotomous response scale of 0 = "Me" and 1 = "My communication partner(s)" in the event survey. Further, we controlled for the communication's content to account for the potentially differential effects of work-related and personal content. To measure content, we asked participants whether the event involved work-related topics, personal topics, or both, measured with a dummy variable ("1" if applicable, "0" if not applicable), using personal content as the reference group.

At the person level, we controlled for trait negative affect (trait NA) and job demands to account for important, rather stable predictors of well-being and stress (Demerouti et al. 2001; Watson/Clark/Carey 1988), both assessed in the initial survey. Trait NA refers to a stable affective level of subjective distress, and was measured with ten items of the positive and negative affect schedule (PANAS) on a response scale ranging from 1 = "never" to 7 = "always" (Watson/Clark/Tellegen 1988). Job demands refer to characteristics of the job perceived as sources of stress, and were measured with four items developed by Karasek (1979) on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree").

2.5.3 Data Analysis

In this study, ICT-mediated communication events were nested within days, and days were nested within persons. To account for this multilevel data structure, we used hierarchical linear modeling (HLM) to test the hypotheses, using HLM 7 software (Raudenbush/Bryk

2002). HLM allows differentiating within-person variance from between-person variance: By using HLM, we can account for dependencies among observations caused by the nested data structure – that is, repeated measurements per person in this study – in the parameter estimates and model error components on each data level (Beal/Weiss 2003; Hofmann 1997).

To examine episodic effects, we modeled the relationships of ICT-mediated communication event features with arousal and pleasure (Hypothesis 1). Hence, testing episodic effects involved two levels of analyses, the level of the event (within-person, Level-1), and the level of the person (between-person, Level-2). To examine spillover effects, variables in the event survey were aggregated across the maximum of three events over the course of a day and linked to psychological distress and satisfaction (Hypotheses 2 and 3). Accordingly, spillover effects likewise involved two levels of analyses, the level of the day (within-person, Level-1), and the level of the person (between-person, Level-2). In essence, HLM then allows the regression equation describing the relationship between our dependent and independent variables at the event-level and day-level to vary between persons. Accordingly, the regression coefficients, i.e., intercept and slope, are estimated for each individual at Level-1, and each regression coefficient is then treated as the dependent variable at Level-2 (Hofmann/Griffin/Gavin 2000; Raudenbush/Bryk 2002).

Following recommendations on analyzing data nested within persons, within-person (Level-1) predictors were centered around the individual's mean score on the respective variable and between-person (Level-2) predictors around their grand means (e.g., Hofmann/Griffin/Gavin 2000). The effects of the events' features on affective states and well-being can thereby be studied whilst effectively controlling for any differences among the individuals, since the between-person variation from Level-1 predictors is removed (Enders/Tofighi 2007; Raudenbush/Bryk 2002).

Before testing our hypotheses, we examined the within-person and between-person variance of the Level-1 outcome variables by testing a series of unconditional models in HLM to determine whether HLM is required (Tabachnick/Fidell 2014). At the event level, 66% of the variance in arousal and 74% in pleasure is within-person. At the day level, 63% of the variance in arousal and 72% in pleasure is within-person. Finally, 52% of the variance in psychological distress and 63% in satisfaction is within-person. In total, these results suggest that using multilevel modeling to test our hypotheses is appropriate.

2.5.4 Results

Table 2-2 and 2-3 report the means, standard deviations, and correlations of the study variables; however, it should be noted that the correlations do not cover the nested data structure.

2.5.4.1 Hypotheses Tests of Episodic Effects

Table 2-4 presents results for the effects of the four features of ICT-mediated communication events on arousal and pleasure. Hypotheses 1a, 1b, 1c, and 1d respectively predict that valence, disturbance, need for action, and synchronicity are related to an individual's momentary affective state. Our results showed that valence was negatively related to arousal ($b = -.13$, $p < .01$) and positively related to pleasure ($b = .38$, $p < .01$). Disturbance and need for action were positively associated with arousal ($b = .26$, $p < .01$ for disturbance; $b = .20$, $p < .01$ for need for action) and negatively associated with pleasure ($b = -.29$, $p < .01$ for disturbance; $b = -.16$, $p < .01$ for need for action). Synchronicity was unrelated to arousal ($b = -.04$, n.s.) and positively associated with pleasure ($b = .15$, $p < .01$). As regards the control variables, results revealed the following effects. The Level-1 control variable initiator was unrelated to both arousal ($b = -.02$, n.s.) and pleasure ($b = .01$, n.s.); work-related content was unrelated to arousal ($b = .10$, n.s.) and negatively related to pleasure ($b = -.24$, $p < .01$); and the combination of work-related and personal content was unrelated to both arousal ($b = .02$, n.s.) and pleasure ($b = -.11$, n.s.). The Level-2 control variables trait NA and job demands were positively associated with arousal ($b = .24$, $p < .01$ for trait NA; $b = .10$, $p < .01$ for job demands) and negatively associated with pleasure ($b = -.24$, $p < .01$ for trait NA; $b = -.08$, $p < .01$ for job demands). Together, the results suggest support for Hypotheses 1a, 1b, and 1c, and partial support for Hypothesis 1d.[6]

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[6]We also ran analyses controlling for the arousal and pleasure measured in the previous event survey, acknowledging that these may influence affective state at the next event. Analyses revealed no significant effects of pre-arousal and pre-pleasure, and did not show noticeable differences compared to the results excluding the pre-variables. Accordingly, and because including pre-variables eliminated more than half of the data, we report the results without controlling for pre-arousal and pre-pleasure.

Table 2-2: Descriptive Statistics, Correlations, and Reliabilities among Study Variables (Event-level)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
Level 1													
1. Valence	2.70	1.09	–										
2. Disturbance	1.85	1.09	-.23**	–									
3. Need for action	.44	.50	-.17**	.23**	–								
4. Synchronicity	.75	.43	.00	.05*	.06**	–							
5. Initiator	.48	.50	-.05**	.21**	.03	-.02	–						
6. Work-related content	.73	.45	-.16**	.19**	.24**	.06**	.05*	–					
7. Work-related + personal content	.13	.33	.02	-.12**	-.11**	.05*	-.06**	-.62**	–				
8. Arousal	1.97	1.03	-.20**	.45**	.26**	.01	.05*	.12**	-.08**	–			
9. Pleasure	3.61	1.04	.32**	-.53**	-.28**	.02	-.09**	-.20**	.10**	-.55**	–		
Level 2													
10. Trait NA	2.89	.83	-.16**	.16**	.07**	.03	.01	-.02	.03	.20**	-.20**	(.87)	
11. Job demands	4.96	1.04	-.09**	.14**	.11**	.09**	-.04*	.07**	-.01	.15**	-.13**	.14**	(.80)

Note: $n_{Level\ 1}$ = 2,537; $n_{Level\ 2}$ = 333. Internal consistency statistics (Cronbach's alphas) for Level 2-variables are displayed in parentheses on the diagonal.
* p < .05
** p < .01

Table 2-3: Descriptive Statistics, Correlations, and Reliabilities among Study Variables (Day-level)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
Level 1														
1. Valence	3.56	1.58	–											
2. Disturbance	2.32	1.47	-.24**	–										
3. Need for action	.75	.77	-.20**	.24**	–									
4. Synchronicity	1.25	.80	-.10**	.10**	.34**	–								
5. Initiator	.83	.78	-.13**	.22**	.26**	.29**	–							
6. Content	7.92	3.30	-.22**	.21**	.25**	.16**	.08**	–						
7. Arousal	2.46	1.39	-.19**	.45**	.23**	.01	.03	.15**	–					
8. Pleasure	4.85	1.35	.35**	-.55**	-.29**	-.05	-.13**	-.27**	-.53**	–				
Psychological														
9. distress	2.82	1.48	-.13**	.38**	.18**	.09**	.03	.18**	.37***	-.36**	–			
10. Satisfaction	4.74	1.46	.05	-.25**	-.15**	-.04	-.03	-.11**	-.26**	.35**	-.57**	–		
Level 2														
11. Trait NA	2.90	.83	-.17**	.18**	.06*	.04	.01	-.02	.20**	-.20**	.31**	-.25**	(.87)	
12. Job demands	4.96	1.05	-.09**	.17**	.13**	.12**	-.01	.12**	.16**	-.15**	.20**	-.13**	.12**	(.81)

Note: $n_{Level\ 1}$ = 1,355; $n_{Level\ 2}$ = 318. Internal consistency statistics (Cronbach's alphas) for Level 2-variables are displayed in parentheses on the diagonal. For day-level analyses, the five-point response scales for valence, disturbance, arousal, and pleasure were transformed to range from 1 to 7, and then averaged across all events per day; need for action, synchronicity, and initiator were cumulated across all events per day; the dummy variables for content were recoded into a continuous variable, with 0 = no work-related content, 5 = both work-related and personal content, and 10 = work-related content only, and then averaged across all events per day.
* $p < .05$
** $p < .01$

Table 2-4: HLM Results for Episodic Effects on Momentary Affective States: Arousal and Pleasure (Event-level)

	Momentary Affective States						
	Outcome: Arousal				**Outcome: Pleasure**		
Variable	**b**	**SE**	**t**		**b**	**SE**	**t**
Intercept	1.91	.06	33.13**		3.81	.05	74.83**
Level 1							
Valence	-.13	.03	-4.89**		.38	.03	12.56**
Disturbance	.26	.02	10.92**		-.29	.02	-12.51**
Need for action	.20	.04	5.44**		-.16	.03	-4.91**
Synchronicity	-.04	.04	-.91		.15	.04	3.81**
Initiator	-.02	.04	-.49		.01	.03	.21
Work-related content	.10	.06	1.79		-.24	.05	-5.09**
Work-related + personal content	.02	.07	.29		-.11	.06	-1.82
Level 2							
Trait NA	.24	.04	5.67**		-.24	.04	-6.45**
Job demands	.10	.03	3.08**		-.08	.03	-2.68**
σ^2	.42				.34		
Pseudo-R^2	.40				.58		

Note: $n_{\text{Level 1}} = 2{,}537$; $n_{\text{Level 2}} = 333$. Pseudo-R^2 is the proportional reduction in prediction error on Level 1 compared to the unconditional model ($\sigma^2 = .70$ for arousal; $\sigma^2 = .80$ for pleasure). *b* is the unstandardized HLM regression coefficient.
*$p < .05$
**$p < .01$

2.5.4.2 Hypotheses Tests of Spillover Effects

To test for the total and indirect effects on psychological distress and satisfaction, we applied stepwise mediation analysis (Baron/Kenny 1986). First, we examined the total effects of the four aggregated features of ICT-mediated communication events on psychological distress and satisfaction (Table 2-5), as predicted by Hypotheses 2a-2d, respectively. Regarding psychological distress, the results revealed non-significant effects for valence ($b = .01$, n.s.) and synchronicity ($b = .00$, n.s.), but a positive association with disturbance ($b = .20$, $p < .01$) and need for action ($b = .10$, $p < .05$). Here, three control variables had a significant effect (content: $b = .04$, $p < .01$; trait NA: $b = .52$, $p < .01$; and job demands: $b = .23$, $p < .01$), while initiator was non-significant ($b = .01$, n.s.). With regard to satisfaction, the results revealed a negative relationship with disturbance ($b = -.10$, $p < .05$), while the remaining features show no significant effects ($b = -.01$, n.s. for valence; $b = -.08$, n.s. for need for action; $b = .06$, n.s. for synchronicity). Again, three control variables exhibited a significant effect (content: $b =$

−.03, $p < .05$; trait NA: $b = −.43$, $p < .01$; and job demands: $b = −.13$, $p < .05$), while the effect of initiator was non-significant ($b = .00$, n.s.). Together, the findings provide support for Hypothesis 2b and partial support for Hypothesis 2c, but do not support Hypotheses 2a and 2d.

As a second step, the effects of the four features on arousal and pleasure, each aggregated over the course of a day, were examined (Table 2-6). The results revealed that valence was negatively related to arousal ($b = −.11$, $p < .01$) and positively to pleasure ($b = .37$, $p < .01$). Disturbance and need for action were positively associated with arousal ($b = .25$, $p < .01$ for disturbance; $b = .20$, $p < .01$ for need for action) and negatively with pleasure ($b = −.30$, $p < .01$ for disturbance; $b = −.15$, $p < .01$ for need for action). Synchronicity was unrelated to arousal ($b = −.07$, n.s.) and pleasure ($b = .02$, n.s.). As regards control variables, initiator was unrelated to both arousal ($b = −.04$, n.s.) and pleasure ($b = 00$, n.s.), content was unrelated to arousal ($b = .02$, n.s.) and negatively related to pleasure ($b = −.03$, $p < .01$). Trait NA and job demands showed positive associations with arousal ($b = .38$, $p < .01$ for trait NA; $b = .17$, $p < .01$ for job demands) and negative associations with pleasure ($b = −.34$, $p < .01$ for trait NA; $b = −.14$, $p < .01$ for job demands).

Next, arousal and pleasure were entered as predictors of psychological distress and satisfaction in addition to the four features. The indirect effects model (Table 2-5) shows that arousal was significantly related to psychological distress ($b = .13$, $p < .01$), whereas pleasure was not ($b = −.01$, n.s.). When arousal and pleasure were entered, the coefficients of disturbance and need for action decreased or became non-significant, respectively, while all other features and the control variable initiator remained non-significant. The effects of content ($b = .04$, $p < .01$), trait NA ($b = .52$, $p < .01$), and job demands ($b = .23$, $p < .01$) remained significant. Conversely, arousal was unrelated to satisfaction ($b = −.01$, n.s.), but pleasure showed a significant relationship therewith ($b = .18$, $p < .01$). When arousal and pleasure were entered, the coefficient of disturbance became non-significant and all other features remained non-significant. The effects of content ($b = −.03$, $p < .05$), trait NA ($b = −.43$, $p < .01$), and job demands ($b = −.12$, $p < .05$) remained significant.

Table 2-5: HLM Results for Spillover Effects on End-of-day Well-being: Psychological Distress and Satisfaction (Day-level)

	End-of-day Well-being											
	Outcome: Psychological Distress						Outcome: Satisfaction					
	Total Effects Model			Indirect Effects Model			Total Effects Model			Indirect Effects Model		
Variable	**b**	**SE**	**t**	**b**	**SE**	**t**	**b**	**SE**	**t**	**b**	**SE**	**t**
Intercept	2.85	.06	48.36**	2.85	.06	48.39**	4.71	.06	82.78**	4.71	.06	82.72**
Level 1												
Valence	.01	.03	.41	.03	.03	1.18	-.01	.03	-.38	-.06	.04	-1.63
Disturbance	.20	.03	5.91**	.16	.04	4.14**	-.10	.04	-2.60*	-.01	.04	-.38
Need for action	.10	.05	1.97*	.07	.05	1.37	-.08	.06	-1.24	-.05	.06	-.86
Synchronicity	.00	.05	.08	.02	.05	.48	.06	.06	1.13	.05	.06	.83
Initiator	.01	.05	.24	.02	.05	.38	.00	.05	-.01	-.01	.05	-.12
Content	.04	.01	3.29**	.04	.01	2.92**	-.03	.01	-2.45*	-.03	.01	-2.05*
Arousal	–	–	–	.13	.04	3.53**	–	–	–	-.01	.04	-.36
Pleasure	–	–	–	-.01	.04	-.38	–	–	–	.18	.05	3.84**
Level 2												
Trait NA	.52	.07	7.36**	.52	.07	7.39**	-.43	.07	-6.27**	-.43	.07	-6.34**
Job demands	.23	.06	4.09**	.23	.06	4.10**	-.13	.06	-2.26*	-.12	.06	-2.15*
σ^2	.87			.80			1.15			1.08		
Pseudo-R_1^2	.22			.29			.15			.20		
Pseudo-R_2^2	–			.08			–			.06		

$n_{Level\ 1} = 1,355$; $n_{Level\ 2} = 318$. For day-level analyses, the five-point response scales for valence, disturbance, arousal, and pleasure were trans-formed to range from 1 to 7, and then averaged across all events per day; need for action, synchronicity, and initiator were cumulated across all events per day; the dummy variables for content were recoded into a continuous variable, with 0 = no work-related content, 5 = both work-related and personal content, and 10 = work-related content only, and then averaged across all events per day. Pseudo-R_1^2 is the proportional reduction in prediction error on Level 1 compared to the unconditional model ($\sigma^2 = 1.12$ for psychological distress; $\sigma^2 = 1.35$ for satisfaction). Pseudo-R_2^2 is the proportional reduction in prediction error on Level 1 compared to the total effects model. *b* is the unstandardized HLM regression coefficient. *$p < .05$; **$p < .01$

Table 2-6: HLM Results for Effects on Momentary Affective States: Arousal and Pleasure (Day-level)

Variable	Momentary Affective States					
	Outcome: Arousal			Outcome: Pleasure		
	b	*SE*	*t*	*b*	*SE*	*t*
Intercept	2.47	.06	44.42**	4.89	.05	96.75**
Level 1						
Valence	-.11	.03	-3.32**	.37	.03	10.85**
Disturbance	.25	.03	7.68**	-.30	.03	-9.71**
Need for action	.20	.05	4.13**	-.15	.04	-3.70**
Synchronicity	-.07	.05	-1.40	.02	.04	.65
Initiator	-.04	.05	-.76	.00	.04	.06
Content	.02	.01	1.18	-.03	.01	-2.69**
Level 2						
Trait NA	.38	.07	5.65**	-.34	.06	-5.59**
Job demands	.17	.05	3.26**	-.14	.05	-2.87**
σ^2	.68			.51		
Pseudo-R^2	.45			.61		

Note: $n_{\text{Level 1}} = 1{,}355$; $n_{\text{Level 2}} = 318$. For day-level analyses, the five-point response scales for valence, disturbance, arousal, and pleasure were transformed to range from 1 to 7, and then averaged across all events per day; need for action, synchronicity, and initiator were cumulated across all events per day; the dummy variables for content were recoded into a continuous variable, with 0 = no work-related content, 5 = both work-related and personal content, and 10 = work-related content only, and then averaged across all events per day. Pseudo-R^2 is the proportional reduction in prediction error on Level 1 compared to the unconditional model ($\sigma^2 = 1.24$ for arousal; $\sigma^2 = 1.31$ for pleasure). *b* is the unstandardized HLM regression coefficient.
*$p < .05$
**$p < .01$

To further test the significance of the indirect effects, we conducted Sobel tests (Sobel 1982) and estimated p-values for the indirect effects with the partial posterior method (Biesanz/Falk/Savalei 2010; Falk/Biesanz 2016), as well as the 95% confidence interval (CI) around the indirect effects using the Monte Carlo method (MacKinnon/Lockwood/Williams 2004; Selig/Preacher 2008). With Sobel tests representing a very conservative default method for testing the significance of a mediation effect, researchers increasingly criticize this method due to low Type I error rates, impacting its power to detect an indirect effect (e.g., Biesanz/Falk/Savalei 2010; Preacher/Hayes 2004; Preacher/Selig 2012). The partial posterior method and Monte Carlo method are suggested to overcome these limitations (Biesanz/Falk/Savalei 2010). Further, Monte Carlo method represents a viable alternative to other established simulation methods such as bootstrapping for estimating confidence intervals for indirect effects with multilevel data (Preacher/Selig 2012).

Results of the Sobel tests show significant indirect effects of valence, disturbance, and need for action on psychological distress through arousal ($z = 2.42$, $p < .05$ for valence; $z = 3.21$, $p < .01$ for disturbance; $z = 2.69$, $p < .01$ for need for action), but not through pleasure ($z = .38$, n.s. for valence; $z = .38$, n.s. for disturbance; $z = .38$, n.s. for need for action). Further, results of the partial posterior and Monte Carlo method analyses indicate significant indirect effects of valence (indirect effect: $-.014$, $p < .01$; 95% CI = $-.028$; $-.004$), disturbance (indirect effect: $.033$, $p < .001$; 95% CI = $.014$; $.054$), and need for action (indirect effect: $.026$, $p < .001$; 95% CI = $.009$; $.047$) through arousal on psychological distress. In contrast, the indirect effects of valence (95% CI = $-.034$; $.022$), disturbance (95% CI = $-.018$; $.028$), and need for action (95% CI = $-.010$; $.015$) through pleasure on psychological distress were not significant, with zero being included in the confidence interval.

Conversely, the Sobel test results indicated a significant indirect effect of valence, disturbance, and need for action on satisfaction through pleasure ($z = 3.62$, $p < .01$ for valence; $z = 3.57$, $p < .01$ for disturbance; $z = 2.67$, $p < .01$ for need for action), but not through arousal ($z = .36$, n.s. for valence; $z = .36$, n.s. for disturbance; $z = .36$, n.s. for need for action). In support of this, partial posterior and Monte Carlo method analyses suggested significant indirect effects of valence (indirect effect: $.066$, $p < .001$; 95% CI = $.031$; $.101$), disturbance (indirect effect: $-.054$, $p < .001$; 95% CI = $-.085$; $-.026$), and need for action (indirect effect: $-.027$, $p < .001$; 95% CI = $-.051$; $-.010$) through pleasure on satisfaction, whereas the indirect effects of valence (95% CI = $-.007$; $.011$), disturbance (95% CI = $-.023$; $.016$), and need for action (95% CI = $-.019$; $.013$) through arousal were not significant. Hence, Hypotheses 3a, 3b, and 3c were partially supported. All tested indirect effects of synchronicity were non-significant (psychological distress through arousal: $z = 1.3$, n.s.; 95% CI = $-.023$; $.003$ / psychological distress through pleasure: $z = .33$, n.s.; 95% CI = $-.005$; $.003$ / satisfaction through arousal: $z = .35$, n.s; 95% CI = $-.005$; $.009$ / satisfaction through pleasure: $z = .64$, n.s.; 95% CI = $-.009$; $.019$). Thus, Hypothesis 3d was not supported.

Taken together, the results indicate that the influence of ICT-mediated communication events on momentary affective states depends on the features characterizing the events. In particular, valence, disturbance, and need for action were significantly related to arousal (reducing the prediction error by 40%), and all four features were significantly associated with pleasure, (reducing the prediction error by 58%). Furthermore, the analyses indicate that the effects of valence, disturbance, and need for action on psychological distress were mediated by arousal (reducing the prediction error by 29%), whereas their respective effects on satisfaction were mediated by pleasure (reducing the prediction error by 20%).

2.6   Discussion

ICTs have become ubiquitous in our work and personal lives, transforming human communication in both realms. In response to these developments, research investigating how ICT-mediated communication affects individuals' well-being is increasingly growing, and has identified both benefits and harm of communicating via ICT. However, our comprehensive literature review on the link between ICT use – in general or specifically for communication purposes – and well-being indicates that it still remains unclear why, how, and under what circumstances ICT-mediated communication is beneficial or detrimental to individual well-being. By breaking down ICT-mediated communication into single events, characterized by specific features, our research illuminates these central research questions. Specifically, from our qualitative study, we derived four features of ICT-mediated communication events that are decisive for the events' affective significance: valence, disturbance, need for action, and synchronicity. Our quantitative study then showed that these four features determined individuals' momentary affective reactions. Further, valence, disturbance, and need for action were shown to influence individuals' end-of-day well-being through their cumulated effects on individuals' affective states over the course of a day.

2.6.1   Implications for Theory and Research

This research contributes to an understanding of the effects of ICT-mediated communication in several respects. First, we provide differentiated insights into what kind of ICT-mediated communication events individuals perceive as affectively significant. Only recently, research has begun to acknowledge that ICT-mediated communication is composed of single, demarcable events, highlighting the importance of examining ICT-mediated communication on an event-by-event basis (Butts/Becker/Boswell 2015; Galluch/Grover/Thatcher 2015). Going beyond this initial research on event-level effects of ICT-mediated communication, our research unveils the key features of affectively significant ICT-mediated communication events *from the users' perspective*. Drawing on qualitative data from 50 knowledge workers, we inductively derived four features characterizing ICT-mediated communication events perceived by users as affectively significant. Instead of focusing on the extent of ICT use or stable properties of ICTs, future studies could draw on the features identified here to examine how the accumulation or frequency of certain types of ICT-mediated communication events affect personal and work-related outcomes, both in the short and the long run.

Second, the present research detected event-level drivers of the double-edged nature of ICT-mediated communication, allowing us to determine what kind of ICT-mediated communication events were beneficial and detrimental to individuals. Our episodic analyses showed that the quality and intensity of individuals' momentary affective reactions to ICT-

mediated communication vary depending on the four features' manifestation, after controlling for the communication's initiator and content. Specifically, ICT-mediated communication events characterized by positive valence elicited pleasant, calm affective states, while events characterized by disturbance and need for action triggered unpleasant, aroused affective states. Synchronicity was positively associated with pleasure, but unrelated to arousal, indicating that synchronous ICT-mediated communication events tended to elicit pleasant affective states independent of the level of arousal, which may include affective states such as satisfaction and excitement (Russell 1980). This finding contrasts with insights from our qualitative study, where interviewees described synchronous media as rather negative, given that these media conveyed pressure to respond immediately and restricted autonomy. A possible explanation for the unexpected positive effect of synchronicity on pleasure is that synchronous communication – while probably impairing receivers' autonomy – is considered as richer, enabling transmission of multiple, non-textual cues, instant feedback, and more personal focus (Dennis/Fuller/Valacich 2008; Sheer/Chen 2004). In line with this, synchronous communication has previously been found to be positively associated with well-being (Goodman-Deane et al. 2016).

The results of our spillover analyses show that experiencing ICT-mediated communication events characterized by negative valence, high disturbance, or need for action indirectly increased end-of-day psychological distress, while events characterized by positive valence, low disturbance, or no need for action indirectly increased end-of-day satisfaction through accumulated affective states. Unexpectedly, despite a significant episodic effect on pleasure, cumulated synchronicity had no total or indirect effect on end-of-day well-being. This indicates that accumulated synchronicity was not significant for an individual's well-being in the evening when the accumulated effects of the remaining three features are accounted for – a notion that future research could further validate.

Together, our research strongly suggests that the *nature* of ICT-mediated communication events determines whether ICT-mediated communication has a positive, negative, or non-significant impact on individuals' well-being. Therefore, our findings contribute to better understanding of the conflicting results of previous research, which mainly identifies harms (e.g., Boswell/Olson-Buchanan 2007; Lanaj/Johnson/Barnes 2014) but also points to the benefits of communicating via ICT (e.g., Diaz et al. 2012; Sayah 2013). Our findings highlight the need to shift the theoretical perspective in examining the relationship between ICT-mediated communication and well-being. Instead of regarding ICT-mediated communication generally as a demand or an asset, research should acknowledge that the effects of ICT-mediated communication might vary on an event-by-event basis, and turn to the features of single events to gain insights into the drivers of its double-edged nature.

Third, our research contributes to disentangling the specific *mechanisms* underlying the relationship between ICT-mediated communication events and end-of-day well-being. Including both the episodic and spillover effects of ICT-mediated communication, we build and test theory of within-person effects linking such communication events to fluctuations in well-being. Thus, our mixed-methods study provides the missing link between respective insights from studies on event-level and day-level effects of ICT-mediated communication. Our results demonstrate that the effects on end-of-day psychological distress are mediated by accumulated arousal, while the effects on end-of-day satisfaction are mediated by accumulated pleasure. In other words, experiencing above-normal ICT-mediated communication events producing heightened states of arousal throughout a day resulted in experiencing increased psychological distress at the end of the day, regardless of whether these events were pleasant or unpleasant. Conversely, on days when individuals experienced more ICT-mediated communication events eliciting increased states of pleasure than normal, their end-of-day satisfaction was increased, regardless of whether these events were characterized by low or high arousal. These findings provide evidence that ICT-mediated communication events can trigger certain affective states that build over the course of a day and, in turn, elicit fluctuations in individual's end-of-day well-being.

It is important to note here that ICT-mediated communication might trigger two different processes: detrimental, stress-inducing processes, on the one hand, and beneficial, resource-building processes on the other hand (Bono et al. 2013; Fredrickson 2001). Future research should capture both to gain a more comprehensive understanding of the consequences of ICT-mediated communication. Moreover, further research is needed to test whether the causal chain identified here, linking ICT-mediated communication events, momentary affective states, and end-of-day well-being, is transferable to other ICT use events and individual-level outcomes.

Together, our mixed-methods study answers Weiss/Beal's (2005) call to specify the macrostructure of affective events theory with regard to the context of ICT-mediated communication. In particular, we determine the nature of affectively significant ICT-mediated communication events, and specify the processes of how these events relate to momentary affective states and prolonged well-being. Therefore, our research contributes to our theoretical understanding of the relationship between ICT-mediated communication and well-being. Moreover, it lays the foundation for a more differentiated theory of ICT-mediated communication's impact on individual-level outcomes.

Finally, we extend research on ICT-mediated communication and well-being by including both work-related and personal ICT-mediated communication events in our studies. Our results demonstrate that on days when individuals experienced more ICT-mediated

communication events with only work-related content than normal, they reported lower end-of-day well-being. Conversely, when ICT-mediated communication touched on personal topics, it tended to have beneficial effects. It is important to note that content had a direct impact on our quantitative study's two indicators of well-being at the end-of-day. Because prior research has heavily focused on work-related ICT use, both in general and for communication purposes (e.g., Boswell/Olson-Buchanan 2007; Derks et al. 2016), the possibility that the outcomes studied might also be affected by personal ICT use, or that personal ICT use moderates the effects of work-related ICT use (Chesley 2014), has been widely disregarded to date. Based on our results, we strongly recommend that future theorizing and empirical research examine both work-related and personal ICT use to comprehensively explain fluctuations in individuals' well-being resulting from ICT use.

2.6.2   Practical Implications

By highlighting that whether ICT-mediated communication has beneficial or detrimental effects on individual well-being depends on the nature of single ICT-mediated communication events, this research provides important implications for organizations and employees. Our findings challenge the rationale of organizational policies aiming to minimize work-related ICT-mediated communication during non-work time, such as turning off Blackberry servers after hours (Volkswagen AG, BBC News 2012) or allowing employees to automatically delete incoming emails while on vacation (Daimler AG, BBC News 2014). Based on the assumption that using ICTs for work-related communication during non-work time is generally detrimental, these measures aim to prevent its negative consequences. While such initiatives may help to reduce the occurrence of detrimental ICT-mediated communication events, they also run the risk of preventing beneficial events.

Instead, our research lays the foundation for more differentiated handling of ICT-mediated communication. Our findings show that whether ICT-mediated communication has beneficial or detrimental effects on individuals' well-being depends on the valence, disturbance, need for action, and synchronicity of single ICT-mediated communication events. Accordingly, employees should be aware of the circumstances under which communicating via ICTs is beneficial or detrimental to their own and their communication partner's well-being. First, given that ICT-mediated communication events with positive valence enhance individuals' affective states and well-being, employees should ensure they include positive information – e.g., regarding goal attainment or positive feedback – whenever appropriate. Second, employees should be sensitized to the detrimental effects of ICT-mediated communication events' perceived disturbance. Organizations should encourage all employees to frankly express when they feel disturbed by a communication request and would prefer to

communicate at a different time. In addition, organizations should consciously shift from an "always online" culture, instead creating an atmosphere allowing employees to autonomously go offline, whenever they need to work unimpeded or to avoid being disturbed during personal time. Third, employees, especially those with managerial responsibilities, should be aware that ICT-mediated communication events may have detrimental effects when they create an instant need for action. Being transparent about priorities in advance and providing others with adequate resources to cope with urgent matters, for example, by extending their scope of action, may help to prevent these unfavorable effects. Fourth, employees may benefit from discussing the appropriateness of using synchronous or asynchronous communication channels, depending, for instance, on the content of the message to be conveyed and employees' personal preferences. Finally, organizations might benefit from allowing employees to engage in personal ICT-mediated communication during working hours. Such communication for personal purposes can increase individual well-being, as shown in the present study, and may serve as a buffer for negative effects (Chesley 2014).

2.6.3 Limitations and Future Research Directions

Our empirical research has several strengths. First, critical incident technique allowed us to identify features of affectively relevant ICT-mediated communication events from the users' perspective. With our mixed methods approach, we also overcome a key limitation of the critical incident technique, namely, the risk of participants reporting on rather extreme situations that may insufficiently reflect ordinary, everyday life experiences of ICT-mediated communication. Instead, our mixed methods design allows the everyday relevance of the features identified in our qualitative study to be validated by collecting data on recent ICT-mediated communication events in our ESM study. Moreover, in the quantitative study, we combined event-level data with end-of-day well-being measures. While the latter substantiates the causality of relationships between the constructs measured in the event and evening surveys (Butts/Becker/Boswell 2015), the data we used to test the episodic effects of event features on affective states were collected at the same point in time. This leaves room for alternative causal ordering, with individuals' momentary affective state affecting their perception of an event. However, this procedure was necessary to capture individuals' affective reaction as immediately as possible after a specific ICT-mediated communication event.

Furthermore, in our ESM study we used a combination of interval- and event-contingent reporting, requiring participants to report on events at prescribed times, as recommended when discrete events in a given period of time are of interest (Fisher/To 2012). Yet future research may benefit from combining event-contingent with signal-contingent reporting, that

is, using technology to automatically detect ICT-mediated communication events and send a survey signal immediately after an event. This approach would allow for capturing a larger, more representative number of ICT-mediated communication events per day. Further, it would enable to avoid recall biases.

In addition to capturing single ICT-mediated communication events, future studies should control for the overall extent of ICT-mediated communication in which an individual is involved over the course of a day. Such a holistic study design may be used to not only validate the present findings but also provide insights into the relative importance of and interaction between the nature and the extent of ICT-mediated communication.

In the present research, we concentrated on identifying features characterizing affectively significant ICT-mediated communication events, and exploring their direct and indirect effects on individuals' well-being. Future research could extend the present framework to include moderating effects, and investigate whether the features interact with one another to amplify or buffer the effects we found. Moreover, further studies might investigate the relative importance of the features identified here in combination with other communication event features suggested in the literature, such as affective tone, time required (Butts/Becker/Boswell 2015), emoticons (Byron 2008), or non-instrumental content (Galluch/Grover/Thatcher 2015).

Finally, our research focused on the relationship between ICT-mediated communication events, affective states, and prolonged well-being. While well-being is an important precursor of performance (Wright/Huang 2012), affective states are also suggested to explain within-person fluctuations in performance, having an immediate, direct impact on performance-related behaviors (Beal et al. 2005; Fisher 2003). Hence, future studies could expand the proposed theoretical framework by additionally investigating changes in individual performance due to affectively significant ICT-mediated communication events, thereby providing employees, managers, and organizations with recommendations for using ICTs in healthy and productive ways.

2.7   Conclusion

Our study highlights the powerful role of events for understanding the effects of ICT-mediated communication on individuals' well-being. Drawing our theoretical frame from affective events theory, we identified four features of ICT-mediated communication events that determine whether well-being is positively or negatively affected. We found that ICT-mediated communication events not only influence momentary affective states but also spill over to end-of-day well-being. Together, our findings highlight the need for a differentiated,

event-based approach to analyzing ICT-mediated communication that considers both momentary and prolonged outcomes. Thereby, this research contributes to a more nuanced look at the double-edged effects of ICT-mediated communication on well-being.

3 Understanding Boundary Management in the Age of Cross-border Availability[7]

3.1 Motivation

Individuals are active managers of the boundaries of their work and personal lives. The ways in which individuals manage these boundaries can be arrayed on a continuum from segmentation to integration. Segmentation implies rather inflexible and impermeable boundaries, with transitions between work and personal life domains requiring some effort on the side of the individual, whereas integration is characterized by rather flexible and permeable boundaries which allow individuals to easily transit between life domains (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996). The flexibility and permeability of the boundaries around work and personal life can diverge, depending on the direction of cross-border movement (Clark 2000; Kossek/Lautsch 2012). As a result, if individuals manage their work and personal life boundaries asymmetrically, transitions from work to personal life might be easier and occur more frequently than transitions from personal life to work or vice versa. Hence, individuals' boundary management is a bidirectional phenomenon (Hecht/Allen 2009; Kossek/Lautsch 2012), requiring distinction between degree of segmentation of work from personal life, i.e., work-life segmentation, and degree of segmentation of personal life from work, i.e., life-work segmentation.

With ICTs pervading individuals' work and personal lives (Ayyagari/Grover/Purvis 2011), how individuals handle availability across the boundaries of life domains has become an important aspect of how they manage the interface between work and personal life (Sayah 2013; Wajcman et al. 2010). On the one hand, ICTs enable work-life availability, that is, they allow individuals to be connected with work contacts beyond the boundary of the work domain, such as engaging in work-related email communication after hours. Work-life availability affects an individual's management of their personal life boundary. In particular, it fosters the flexibility and permeability of the latter and, thus integration of work into personal life (Ashforth/Kreiner/Fugate 2000; Boswell/Olson-Buchanan 2007). Over the last decade, research on consequences of work-life availability has grown dramatically. While

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[7] This chapter is based on a joint working paper (Reinke/Gerlach/Stock 2018).

some studies suggest that using ICTs to stay connected to work after hours enhances individuals' flexibility and feelings of effectiveness and work satisfaction (Diaz et al. 2012; Towers et al. 2006), the majority of research provides evidence for the detrimental impact of work-life availability on individual well-being. For example, work-life availability has been shown to lead to blurring of boundaries between work and personal life, increased work-life conflict, and impaired recovery (e.g., Boswell/Olson-Buchanan 2007; Dettmers et al. 2016; Park/Fritz/Jex 2011).

Yet, studying the phenomenon of ICT-enabled work-life availability, and thereby, the integration of work into personal life domain by means of ICTs, implies studying only one side of the coin. Boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) proposes that transitions between work and personal life may occur in both directions. Likewise, ICTs allow individuals not only to be available for work contacts in personal life but also to be available for personal contacts in work life (Sayah 2013), which we refer to as life-work availability. Life-work availability, such as taking personal phone calls at work, increases the work boundary's flexibility and permeability, thereby facilitating the integration of personal life into the work domain.

This bidirectional nature of a person's boundary management has been barely acknowledged in previous research. This is particularly problematic since ICTs provide individuals with new means of managing work and personal life boundaries asymmetrically. For example, individuals can use their personal smartphone to be available for personal contacts during work, but turn off a company-supplied smartphone on weekends to stop work-related communication from entering their personal life. With the increasing dissemination of ICTs, the means for asymmetrical boundary management are enhanced. By acknowledging this phenomenon, the present study contributes to a more holistic understanding of the antecedents and consequences of bidirectional boundary management in the age of cross-border availability. In particular, this study is guided by three research goals, described in detail as follows.

The first goal of the present research is to contribute to our understanding of how individuals' management of both the personal life and the work boundary is shaped by new demands that come along with cross-border availability, i.e., rising cross-border availability expectations (Derks et al. 2015; Dettmers/Bamberg/Seffzek 2016). In the present study, we focus on *perceived* cross-border availability expectations. With increasing dissemination of ICTs, individuals may perceive rising availability expectations within their organization to be available for work-related matters in their personal life (Park/Fritz/Jex 2011; Piszczek 2017). Although these availability expectations may differ considerably between teams within the same organization and between hierarchy levels (Mazmanian 2013), prior research has

focused on general organizational availability expectations (e.g., Fenner/Renn 2010; Piszczek 2017) instead of distinguishing between the availability expectations of supervisors and coworkers. In addition, with ICTs also allowing individuals to be constantly connected to their personal life, individuals may face rising expectations from their personal contacts to be available while they are at work (Matusik/Mickel 2011). However, availability expectations of personal contacts have been largely excluded in prior research. We suggest that the availability expectations of each of these groups (supervisors, coworkers, and personal contacts) have a distinct impact on how individuals manage their personal life boundary or work boundary, respectively. Thus, going beyond previous research, the present study investigates supervisors', coworkers', and personal contacts' availability expectations as integral antecedents, and examines their impact on the individual's work-life or life-work segmentation, respectively.

The second goal of the present study is to shed light on how bidirectional boundary management behavior affects individual well-being. While dozens of studies have investigated the link between boundary management and well-being, insights gained from prior research are limited in two important ways. First, prior studies largely examine individuals' boundary management preferences and supplies, instead of investigating their *actual* boundary management behavior (Matthews/Barnes-Farell/Bulger 2010). While these studies underline the importance of congruence between preferences and supplies for individuals' well-being (e.g., Chen/Powell/Greenhaus 2009; Kreiner 2006), they do not explain how the specific boundary management *behaviors* that individuals exhibit relate to well-being. Second, as indicated by the comprehensive literature review in Chapter 1.4.2, studies that do investigate boundary management behavior focus primarily on work-life segmentation (e.g., Barber/Jenkins 2014; Carlson et al. 2015; Powell/Greenhaus 2010). As a result, they disregard (1) the bidirectional nature of boundary management, and thus the possibility that work and personal life boundaries might be managed asymmetrically (Clark 2000; Kossek/Lautsch 2012), and (2) potential differences in the effects of work-life and life-work segmentation. To add to a differentiated understanding of how potentially asymmetrical boundary management affects well-being, we capture individuals' actual work-life and life-work segmentation behavior and study their discrete effects on well-being.

The third goal is to enhance our limited understanding of the conditions under which given boundary management behaviors have beneficial or detrimental effects on well-being. Prior research, particularly studies on cross-border availability, has emphasized the detrimental effects of integrating work into personal life, indicating that segmentation may be more beneficial for individuals' well-being as opposed to "boundary blurring" (Derks/Bakker 2014; Derks et al. 2014). However, building on person-environment fit theory (Caplan 1983;

French/Caplan/Harrison 1982; Harrison 1985), we argue that high work-life and life-work segmentation might not be generally beneficial for well-being, but exert different effects that depend on the individual's boundary management preferences. Accordingly, we investigate whether individuals' work-life and life-work boundary management preferences moderate the relationships of their actual boundary management styles with well-being. Thereby, our study provides individuals and organizations with implications for avoiding undesired consequences and for fostering positive effects of boundary management in the age of cross-border availability.

Together, the present study contributes to a more thorough understanding of cross-border availability expectations, individuals' boundary management behavior, and its impact on their well-being. By investigating both work-life and life-work segmentation and their differential antecedents and discrete effects, this study integrates and expands prior theoretical considerations and empirical findings into a comprehensive and nuanced framework for understanding boundary management in the age of cross-border availability. We test our research framework with data from 401 employees collected at two points in time.

3.2   Theory and Hypothesis Development

To develop a research model linking ICT-related availability expectations, individuals' bidirectional boundary management behavior, and well-being, the present study integrates key concepts of boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) with current research findings. Furthermore, we build on the person-environment fit approach to boundary management (Edwards/Rothbard 1999; Kreiner 2006) to derive hypotheses on the moderating effects of boundary management preferences on the relationship between work-life and life-work segmentation and well-being. The resulting model is depicted in Figure 3-1.

Figure 3-1: Hypothesized Research Model (Study 2)
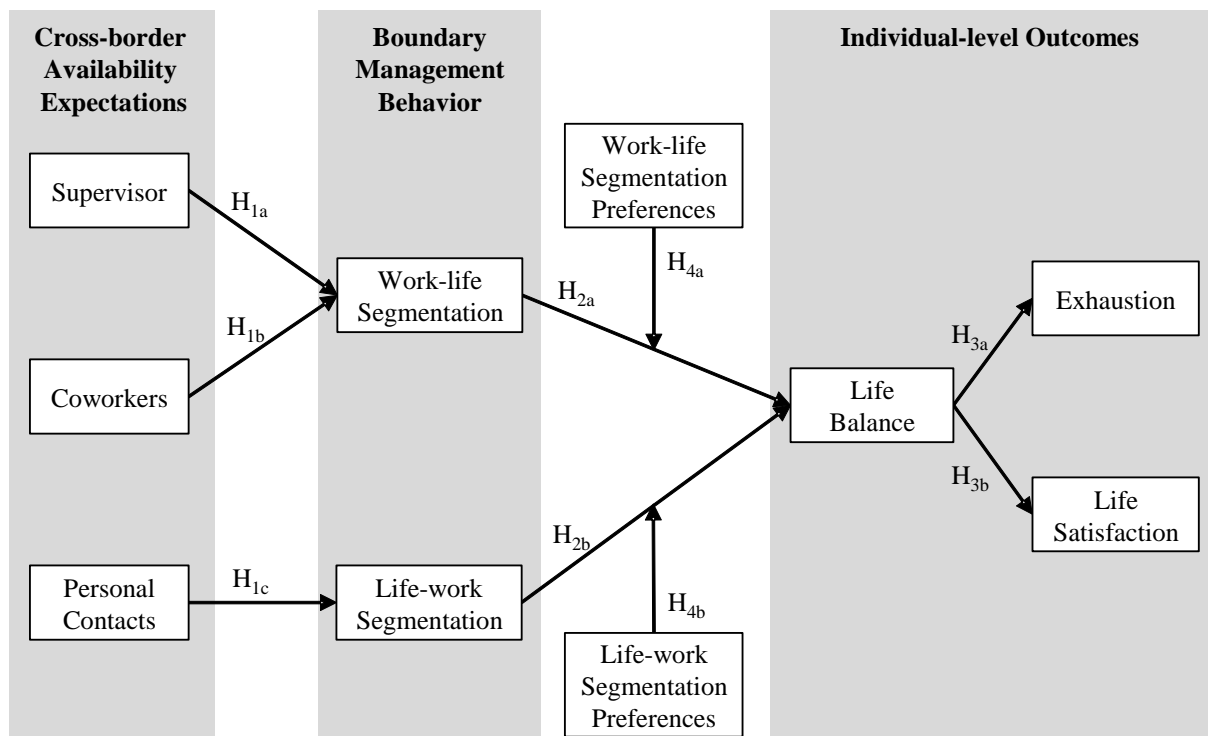
As described in more detail in Chapter 1.3.2, boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) explains how individuals create and manage boundaries around their work and personal life domains. In sum, these boundaries can be described in terms of their flexibility, that is, the degree to which they are elastic and can be temporally or spatially changed, and their permeability, that is, the extent to which they allow elements of one domain to enter the other (Ashforth/Kreiner/Fugate 2000). Key to boundary theory is that individuals vary on a continuum in the degree to which they prefer to and do segment or integrate their work and personal life. 'Segmenters' prefer clear and thick boundaries around their work and personal life, while 'integrators' prefer flexible and permeable boundaries (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996).

Extending boundary theory, Clark (2000) and Kossek/Lautsch (2012) suggest that individuals may prefer to and manage their work and personal life boundaries asymmetrically, for example, having a flexible and permeable boundary around one domain but a clear and thick boundary around the other domain. To reflect this third aspect of boundary management, i.e., directionality, the present study differentiates between work-life segmentation and life-work segmentation, and examines their differential antecedents and effects on well-being.

3.2.1 Cross-border Availability Expectations as Antecedents of Bidirectional Boundary Management Behavior

Research indicates that with the increasing ubiquity of ICTs, employees face rising organizational expectations to be available and responsive to work issues anytime and anywhere (Derks et al. 2015; Mazmanian 2013; Mazmanian/Orlikowski/Yates 2013). Since expectations shared in organizations imply obligations, they put employees under pressure to show desired behaviors – inside and outside organizations (Hammer et al. 2004). Accordingly, the increased organizational availability expectations are suggested to play a critical role in individuals' boundary management behavior (Dettmers/Bamberg/Seffzek 2016). In fact, prior studies show that employees increase their work-life availability when they perceive this is expected in their organization (e.g., Fenner/Renn 2010; Piszczek 2017).

Yet, these prior studies focus on organizational availability expectations, neglecting that perceived availability expectations may considerably differ within organizations (Mazmanian 2013). In particular, findings from a qualitative study indicate that individuals may perceive distinct expectations from supervisors and coworkers (Mazmanian 2013), however, the majority of prior research does not differentiate between availability expectations of these two groups. To illuminate if and how those expectations differ in their effects on individuals' boundary management, we differentiate between supervisor availability expectations and coworker availability expectations, referring to the degree to which individuals perceive their supervisors/coworkers demand for availability via ICTs in personal life.

Supervisors' expectations are suggested to play a key role in influencing employees' behavior (Carmeli/Schaubroeck 2007; Eden 1984). Individuals may perceive availability expectations from their supervisor either because supervisors explicitly state their expectations or because they observe their supervisors' own work-life availability as signaled for instance by sending work-related emails on weekends. Being motivated to show aspirations to perform effectively, employees feel pressure to fulfill their supervisors' expectations and, thus engage in the – explicitly or implicitly – expected work-life availability behavior (Derks et al. 2015; Mazmanian 2013). When employees respond to their supervisor availability expectations with higher work-life availability, they increasingly integrate their work into their personal life. Accordingly, we argue that supervisor availability expectations should reduce the segmentation of work from personal life.

Hypothesis 1a: Supervisor availability expectations are negatively related to work-life segmentation.

Similarly, coworkers might expect each other to be available beyond working times and outside the work space. Perceptions of these availability expectations should impact

individuals' behavior, above and beyond supervisor availability expectations. With increasing ubiquity of ICTs in their organization, employees may start to note the availability patterns of their coworkers (Mazmanian 2013; Mazmanian/Orlikowski/Yates 2013) or coworkers may explicitly communicate the extent of work-life availability expected of other team members. In line with social learning theory (Bandura 1977), employees should feel motivated to align their own work-life availability behavior with that of their coworkers in order to remain part of the group and to prove their commitment to their coworkers. Further, employees may feel pressure to fulfill availability expectations in order to avoid impeding the communication flow and productivity in their team (Bandura 1977; Mazmanian/Orlikowski/Yates 2013). Together, we suggest that individuals who perceive their coworkers as holding high work-life availability expectations should comply with these expectations and increase their work-life availability. Hence, perceiving coworker availability expectations should reduce the extent to which individuals segment work from personal life.

Hypothesis 1b: Coworker availability expectations are negatively related to work-life segmentation.

In addition, individuals might confront rising availability expectations from their personal contacts, demanding them to be available via ICTs when they work (Matusik/Mickel 2011). Yet, the impact of these personal contact availability expectations on individuals' boundary management behavior has been widely neglected thus far. As individuals are fundamentally motivated to maintain positive relationships with relevant others, they engage in behaviors aimed at satisfying this motivation (Baumeister/Leary 1995). Building on this notion, we argue that individuals should be motivated to avoid belying availability expectations of family members and friends. Accordingly, when individuals are faced with personal contact availability expectations, they should increase their availability for personal contacts in the work domain. Hence, when individuals perceive personal contact availability expectations, they should reduce segmentation of personal life from work. Accordingly, we hypothesize:

Hypothesis 1c: Personal contact availability expectations are negatively related to life-work segmentation.

3.2.2 Individual-level Outcomes of Bidirectional Boundary Management Behavior

Research on the consequences of boundary management behavior for individual-level outcomes largely investigates effects on constructs related to work-life balance, such as work-life conflict or work-life interferences (e.g., Derks et al. 2015; Kubicek/Tement 2016). As elucidated in Chapter 1.2.2.2, we build on recent developments in the work-life balance literature and examine life balance as the focal outcome of bidirectional boundary

management behavior in this study, thereby following the perspective that individuals may differ in their perceptions of work-life balance, depending on an their individual priorities, values, and aspirations (Greenhaus/Allen 2011; Maertz/Boyar 2011). Accordingly, we postulate that individuals should perceive their life balance as high, when their involvement in relevant life domains is in accordance with their personal standards and aspirations.

Most prior research on the relationship between boundary management behavior and constructs related to life balance points to the beneficial effects of segmentation. For example, work-life segmentation was found to be associated with reduced work-life conflict (Carlson et al. 2015; Hecht/Allen 2009; Kubicek/Tement 2016; Matthews/Barnes-Farell/Bulger 2010), and boundary creation around work-related ICT use in personal life was found to be positively related with psychological detachment (Barber/Jenkins 2014). In support of this, integration of work into personal life by use of ICTs was found to increase work-life conflict and impair psychological detachment (Boswell/Olson-Buchanan 2007; Park/Fritz/Jex 2011). Similarly, two studies found that life-work segmentation is related to reduced life-work conflict (Hecht/Allen 2009; Matthews/Barnes-Farell/Bulger 2010).

These results are in line with boundary theory, which postulates that segmentation should help individuals to reduce interferences between life domains, and thus to engage in each life domain without distractions from the other domain (Ashforth/Kreiner/Fugate 2000). Integrating this line of argument with previous findings on the beneficial effects of segmentation, we propose that individuals who segment work from personal life, or personal life from work, respectively, should be better able to engage in these life domains in congruence with their personal standards and aspirations and, thus should evaluate their life balance as high. Extending previous research by taking into account the bidirectional nature of boundary management, we investigate the consequences of work-life and life-work segmentation individually and test their discrete effects on life balance.

Hypothesis 2a: Work-life segmentation is positively related to life balance.

Hypothesis 2b: Life-work segmentation is positively related to life balance.

Life balance, in turn, should be a critical antecedent of individual well-being (Maertz/Boyar 2011; Wayne et al. 2017). As indicators of individual well-being, we examine life satisfaction, which represents an important positive indicator, and exhaustion, which is a core negative indicator of well-being (e.g., Maslach/Schaufeli/Leiter 2001; Pavot/Diener 1993). When evaluating their life balance, individuals compare their actual involvement to their personal standards and aspirations. When individuals feel that their personal standards and aspirations are insufficiently fulfilled by their actual life balance experiences, this appraisal process results in a perceived misfit and they experience tension as result, which should

impair well-being as indicated by increased levels of exhaustion and reduced satisfaction with their life as a whole (Edwards/Caplan/Harrison 1998; Edwards/Rothbard 1999; Lazarus/Folkman 1984). Conversely, perceiving congruence between experiences and aspirations implies that individuals' personal aspirations and standards are being fulfilled. This fulfilment should produce enhanced levels of well-being, thereby reducing exhaustion and increasing life satisfaction (Edwards/Caplan/Harrison 1998; Edwards/Rothbard 1999). In line with this notion, individuals perceiving congruence, that is, perceiving their life as balanced, should experience less exhaustion and greater levels of overall satisfaction with their life.

Hypothesis 3a: Life balance is negatively related to exhaustion.

Hypothesis 3b: Life balance is positively related to life satisfaction.

3.2.3 Moderating Effects of Boundary Management Preferences

As discussed above, individuals who engage in work-life and life-work segmentation should perceive their life balance as higher, which, in turn, should increase well-being. However, as individuals differ in their segmentation/integration preferences, the strength of the relationship between boundary management behavior and life balance may vary, contingent on these preferences (Ashforth/Kreiner/Fugate 2000; Piszczek 2017). Person-environment fit theory provides a valuable theoretical lens to explain these potential moderating effects (Caplan 1983; French/Caplan/Harrison 1982; Harrison 1985). Person-environment fit theory posits that the person and the environment interact with one another to affect individual well-being, with a congruence between the two resulting in improved well-being, whereas a mismatch has detrimental effects on individuals' well-being (Edwards/Caplan/Harrison 1998; e.g., French/Caplan/Harrison 1982).

Kreiner (2006) has applied the person-environment fit approach to boundary management, arguing that one specific boundary management behavior might not inherently be more beneficial than the other. Rather, he suggests investigating the fit between individuals' boundary management preferences and their organizations' general supply of these preferences (Kreiner 2006). Transferring this approach to the investigation of individuals' actual boundary management behavior and life balance, a greater degree of segmentation may not inherently be better for every individual. Instead, the positive effect of work-life and life-work segmentation on life balance should differ depending on the extent to which individuals' segmentation preferences comply with their actual segmentation behavior. Following this notion, we argue that the positive relationship between work-life segmentation and life balance should be stronger among individuals with higher work-life segmentation

preferences, because these individuals experience engaging in high work-life segmentation as being congruent with their preferences. Following person-environment fit theory, this perceived congruence between individuals' actual experiences and their personal aspirations should reduce stress and conflict and therefore result in higher levels of life balance (Kreiner 2006). In contrast, if individuals with higher work-life segmentation preferences engage in low work-life segmentation, they perceive a mismatch between their actual experience and personal preferences. According to person-environment fit theory, this mismatch creates a state of tension, which should result in lower levels of life balance (Edwards/Caplan/Harrison 1998; Kreiner 2006). The same mechanism should apply to life-work segmentation, such that that life-work segmentation should more strongly affect life balance when life-work segmentation preferences are higher.

Hypothesis 4a: Work-life segmentation preferences moderate the positive relationship between work-life segmentation and life balance, such that the relationship is stronger when work-life segmentation preferences are higher.

Hypothesis 4b: Life-work segmentation preferences moderate the positive relationship between life-work segmentation and life balance, such that the relationship is stronger when life-work segmentation preferences are higher.

3.3 Method

3.3.1 Sample and Procedure

Again, participants were knowledge workers recruited from four companies based in Germany, representing various industries (IT, automotive supply, consulting, and public administration). We sampled knowledge workers, as ICT-enabled connectivity and availability typically is of great significance for those employees' work (Wajcman/Rose 2011).

In order to reduce common method bias (Podsakoff et al. 2003; Podsakoff/MacKenzie/Podsakoff 2012) and to capture the enduring effects of availability expectations, we collected data in two waves six weeks apart via online surveys. The first survey assessed availability expectations, boundary management preferences, and control variables, whereas boundary management behavior, life balance, exhaustion, and life satisfaction were assessed in the second survey. Before we started the data collection, the human resource head of each company informed employees who do knowledge work via email and the companies' intranet about the study. In addition, we offered more detailed information to interested employees during on-site sessions. As an incentive, all participants

received an individualized feedback report with recommendations on how to optimize their cross-border availability and improve their life balance and well-being. Moreover, participants could take part in a lottery to win an online shop voucher with a value of EUR 100.

The first survey (t_1) was completed by 589 employees who were subsequently contacted six weeks later (t_2). Of those, 68.1% completed the second survey, resulting in a final sample of 401 participants. In the final sample, 69.3% were male, 88.5% were married or in a relationship, and 60.5% had at least one child who lived with them. The mean age was 45.64 years (SD = 9.04). On average, participants had been working in their company for 16.14 years (SD = 9.27), with 37.8 weekly working hours (as contracted) on average (SD = 5.06). The sample includes employees of various departments, including information technology (30.2%), sales and key account management (19.2%), research and development (10.7%), operations and production (8.2 %), human resources (4.5 %), controlling and accounting (3.5 %), and others (23.7 %). Finally, 18.4% were managers, 32.7% were project or team leaders without formal managerial responsibilities, and 48.9% were employees without managerial responsibilities.

3.3.2   Measures

We drew on validated scales whenever possible to measure the latent variables. If necessary, some scales were developed, slightly modified or refined in order to capture the study's research approach. Details of the scales used are described as follows. An overview of the study variables and their respective indicators as well as their quality criteria is provided in the appendix (see Table A 1).

Availability expectations were measured for each group of persons, differentiating between supervisor availability expectations (α = .91), coworker availability expectations (α = .90), and personal contact availability expectations (α = .92), which were measured with two items each on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). A sample item for supervisor availability expectations is "Usually, my supervisor expects me to respond to incoming calls or messages when I am not at work". The wording of the items was adapted for coworkers and personal contacts, respectively. A sample item for personal contact availability expectations includes "Usually, my personal contacts expect me to respond to incoming calls or messages when I am at work."

To measure boundary management preferences, that is, work-life segmentation preferences (α = .86) and life-work segmentation preferences (α = .65), we used three items from the segmentation preferences scale developed by Kreiner (2006), assessed on a 7-point Likert

scale (1 = "strongly disagree" to 7 = "strongly agree"). One sample item for work-life segmentation preferences reads "I prefer to keep work life at work." To assess life-work segmentation preferences, we adapted the item's directionality (e.g., "I prefer to keep my personal life out of my work").

Actual boundary management behavior was assessed by the two variables work-life segmentation (α = .84) and life-work segmentation (α = .82), which were measured by three items each on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). To measure individuals' actual boundary management behavior, we followed the approach by Powell/Greenhaus (2010) and adapted items from the segmentation preferences scale (Kreiner 2006). Particularly, participants were asked to indicate the extent to which they agreed with each item with regard to the past six weeks; that is, since the first survey. One sample item for work-life segmentation is: "I left work behind when I went home." To measure life-work segmentation, we modified the items' directionality. One sample item is: "I left my personal life behind when I went to work."

Life balance (α = .96) was assessed with four items developed by the authors since so far, no validated measure of the construct as conceptualized in the current study was available. The scale is provided by the four items "Overall, I was able to live my life in all domains just as I wished", "On the whole, I feel that I was the person I wished to be in all domains of my life", "On balance, how I involved myself in the domains of my life matches my ideal image", and "Overall, I am convinced that I shaped all domains of my life as I ideally would want them to be." Again, participants were asked to indicate the extent to which they agreed to each item with regard to the past six weeks on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). To validate the measure, we conducted a validation study with 83 participants (mean age is 35 years, 50.6% are male, 68.7% are married or in a relationship). Results of confirmatory factor analysis (CFA) suggested adequate fit for the one-factor model (χ^2/df = 1.86; RMSEA = .10; CFI = .99, SRMR = .01). Further, we tested the scale's discriminant validity in its nomological net, including satisfaction with work-life balance (Valcour 2007) as well as work-life conflict and life-work conflict (Netemeyer/Boles/McMurrian 1996). Results for the distinction between life balance and satisfaction with work-life balance suggested that a two-factor model (χ^2/df = 2.16; RMSEA = .12; CFI = .95, SRMR = .04) fits the data significantly better than a one-factor model ($\chi2$/df = 13.19; RMSEA = .38; CFI = .49, SRMR = .26). We found similar results regarding work-life conflict, with the two-factor model (χ^2/df = 1.14; RMSEA = .04; CFI = .99, SRMR = .04) fitting the data better than the one-factor model (χ^2/df = 12.0; RMSEA = .36; CFI = .54, SRMR = .22), as well as with life-work conflict (two-factor model: χ^2/df = 1.31; RMSEA =

.06; CFI = .99, SRMR = .05; one-factor model: χ^2/df = 10.24; RMSEA = .33; CFI = .57, SRMR = .23).

Exhaustion (α = .91) was measured using the five-item scale for exhaustion from the Maslach Burnout Inventory General Survey (Schaufeli et al. 1996). Items were assessed on a 7-point scale, ranging from 1 = "never" to 7 = "daily". A sample item includes "I feel burned out from my work."

Life satisfaction (α = .90) was assessed with five items using the satisfaction with life scale (Diener et al. 1985; Pavot/Diener 1993). Participants were asked to rate the extent to which they agreed with each item on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). A sample item is: "I am satisfied with my life."

Moreover, we included several control variables in the data analyses. To account for potential effects on the endogenous variables in the model of other significant variables known from the literature, we controlled for job involvement (α = .76), personal life involvement (α = .87), job demands (α = .83), and job autonomy (α = .73). These are considered as potentially important predictors of individuals' boundary management (for more details, see Chapter 1.4.2), life balance, and well-being (Boswell/Olson-Buchanan 2007; Demerouti et al. 2001; Frone/Russell/Cooper 1992). Job and personal life involvement present the degree to which individuals' job and personal life, respectively, is central to their self-concept (Kanungo 1982). Job involvement was measured with four items from Kanungo (1982). For personal life involvement, the items used for job involvement were modified, as previously done by Frone/Rice (1987), to assess family involvement. Job demands represent job characteristics individuals' perceive as sources of stress and were measured with four items from Karasek (1979). Job autonomy describes the extent to which a job allows individuals freedom in decision making and carrying out their work tasks and was assessed by three items from the autonomy scale of the Work Design Questionnaire (Morgeson/Humphrey 2006). All items of the four control variables were assessed on a 7-point Likert scale, ranging from 1 = "strongly disagree" to 7 = "strongly agree".

3.4 Data Analysis

We tested our hypotheses using structural equation modeling (SEM) with Mplus 7 software (Muthén/Muthén 2012) based on maximum likelihood method. SEM presents a valuable analytical approach that combines exploratory factor analysis with regression analysis, estimating the relationships of latent variables with their measured indicators, i.e., the measurement model, and the relationships between the latent variables, i.e., the structural model, simultaneously. Hence, SEM allows for analyzing relationships between latent

variables while accounting for their indicators' measurement errors (e.g., Kline 2016; Williams/Vandenberg/Edwards 2009). To assess the goodness of fit of the specified model, we drew on various fit indexes using recommended cutoff values (Homburg/Klarmann/ Pflesser 2008; Hu/Bentler 1999), including the chi-square goodness of fit (cutoff value close to χ^2/df = 3.00), root mean squared error of approximation (RMSEA, cutoff value close to .06), comparative fit index (CFI, cutoff value close to .95), and standardized root mean squared residual (SRMR, cutoff value close to .08).

3.5 Results

Table 3-1 shows the means, standard deviations, and correlations among the study variables.

3.5.1 Measurement Model

We first tested our measurement model to assess the construct validity of the eight study variables and the four control variables. Results suggest that the measurement model fits the data well (χ^2/df = 1.87; RMSEA = .05; CFI = .94, SRMR = .05), with each item loading significantly on the respective latent variable ($p < .001$).

3.5.2 Hypotheses Testing

We then continued by specifying paths between latent constructs as proposed in our hypothesized model to test the direct effects, while controlling for paths from all four control variables to all endogenous variables. Results indicate that the hypothesized model including direct effects has good overall fit (χ^2/df = 1.97; RMSEA = .05; CFI = .93; SRMR = .06). Hence, we continued with examining our research hypotheses.

With regard to the effects of others' availability expectations on individuals' boundary management behavior, the relationship between supervisor availability expectations and work-life segmentation was not significant ($\beta = .01$, $p = .95$), whereas coworker availability expectations were negatively related to work-life segmentation ($\beta = -.22$, $p < .01$). Similarly, personal contact availability expectations were negatively associated with life-work segmentation ($\beta = -.23$, $p < .001$). Thus, the results supported Hypotheses 1b and 1c, but not Hypothesis 1a. Regarding the effects of individuals' boundary management behavior on life balance, work-life segmentation was positively related to life balance ($\beta = .51$, $p < .001$). Contrary to expectations, life-work segmentation was negatively related to life balance ($\beta = -.12$, $p < .05$); hence the results supported Hypothesis 2a, but not Hypothesis 2b. Finally, life balance was negatively related to exhaustion ($\beta = -.57$, $p < .001$) and positively related to life satisfaction ($\beta = .67$, $p < .001$), providing support for Hypotheses 3a and 3b. Together, 22.6%

of the variance in work-life segmentation and 14.3% of the variance in life-work segmentation was explained. Further, the model explained 39.4% of the variance in life balance, and 53.9% of the variance in both exhaustion and life satisfaction.

To test the moderation hypotheses, we added latent interaction terms to our model in a subsequent step (Klein/Moosbrugger 2000). The results show that the relationship between work-life segmentation and life balance was stronger for participants with higher work-life segmentation preferences ($\beta = .17$, $p < .05$), supporting Hypothesis 4a. Contrary to Hypothesis 4b, life-work segmentation preferences did not moderate the relationship between life-work segmentation and life balance ($\beta = -.04$, $p = .82$). Figure 3-2 shows all standardized paths for the hypothesized model including direct and moderated effects.

Figure 3-2: SEM Results for Direct and Moderated Effects
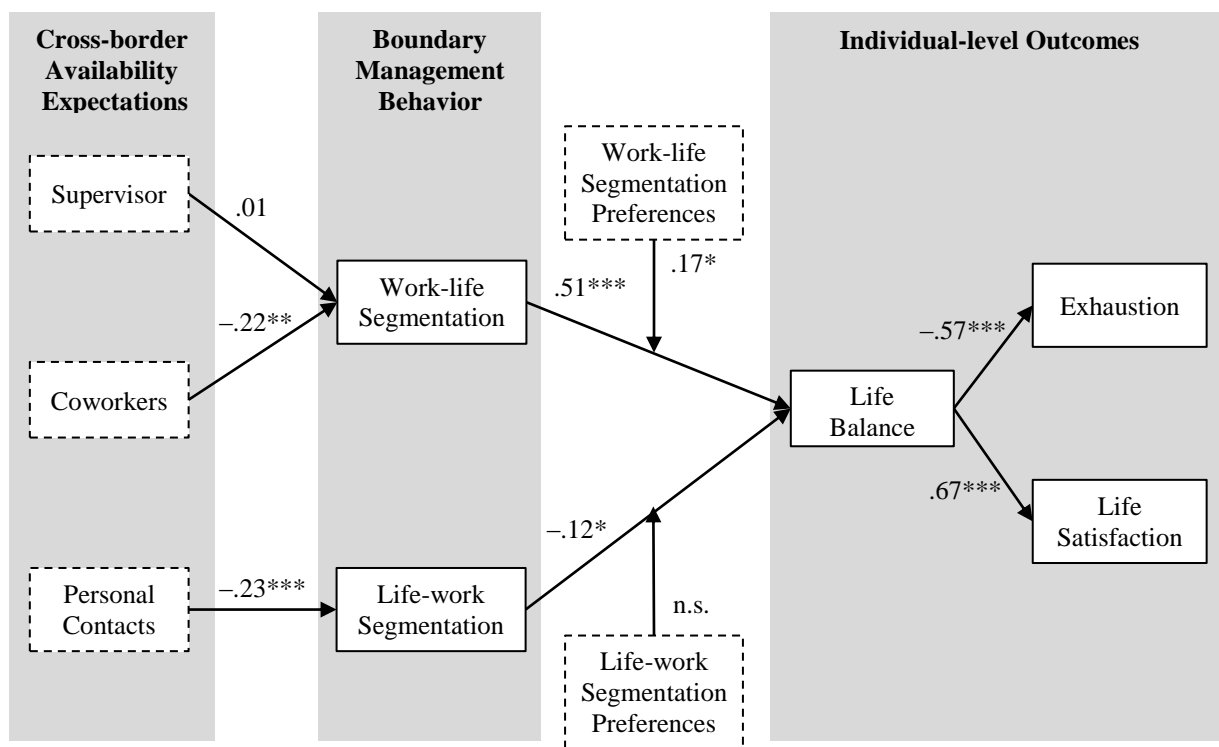
Control variables (work-life segmentation/life-work segmentation/life balance/exhaustion/life satisfaction):
Job involvement ($-.30$***/n.s./.25**/n.s./.20**); personal life involvement (n.s./n.s./.12*/n.s./.22***)
Job demands ($-.15$*/.21***/$-.14$**/.22***/n.s.); job autonomy (n.s./$-.20$**/.20***/$-.19$***/n.s.)
Note: $N = 401$. Results show standardized paths coefficients.
*$p < .05$; **$p < .01$; ***$p < .001$; n.s. = non-significant.

– – – Variables measured at t_1. ——— Variables measured at t_2.

Table 3-1: Descriptive Statistics, Reliabilities, and Correlations among Study Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Job involvement	4.45	1.01	(.76)													
2. Personal life involvement	5.71	0.99	-.38**	(.87)												
3. Job demands	4.98	1.11	.22**	-.03	(.83)											
4. Job autonomy	5.23	1.04	.16**	.06	-.02	(.73)										
5. Supervisor availability expectations	2.87	1.65	.19**	-.09	.36**	-.09	(.91)									
6. Coworker availability expectations	2.66	1.49	.16**	-.11*	.31**	-.06	.59**	(.90)								
7. Personal contact availability expectations	4.17	1.62	-.01	.12*	-.01	-.02	.13**	.15**	(.92)							
8. Work-life segmentation preferences	5.08	1.28	-.28**	.32**	-.05	-.13**	-.10*	-.12*	-.03	(.86)						
9. Life-work segmentation preferences	3.72	1.13	-.03	-.08	.01	-.23**	.09	.07	-.19**	.34**	(.65)					
10. Work-life segmentation	3.55	1.50	-.30**	.16**	-.28**	.02	-.25**	-.32**	-.12*	.31**	.16**	(.84)				
11. Life-work segmentation	4.31	1.37	.06	-.08	.18**	-.18**	.12*	.02	-.21**	.24**	.45**	.19**	(.82)			
12. Life balance	4.40	1.32	.00	.12*	-.22**	.27**	-.21**	-.11*	-.11*	-.11*	-.12*	.44**	-.11*	(.96)		
13. Exhaustion	3.36	1.32	.00	-.07	.29**	-.31**	.24**	.14**	.08	.15**	.08	-.34**	.12*	-.65**	(.91)	
14. Life satisfaction	4.85	1.17	.09	.20**	-.09	.22**	-.10	-.06	-.17**	-.05	.00	.16**	.01	.62**	-.50**	(.90)

Note: $N = 401$. Internal consistency statistics (Cronbach's alphas) are displayed in parentheses on the diagonal.

p < .05; **p* < .01.

To date, SEM methodologies for testing interaction effects are limited, as for example fit statistics are not available for models including latent variable interactions and neither is the proportion of variance explained by the interaction effect (Maslowsky/Jager/Hemken 2015). Therefore, following previous approaches (Direnzo/Greenhaus/Weer 2015; Peng et al. 2012), we conducted supplementary hierarchical regression analyses to test the significant moderating effect in order to overcome limitations and discrepancies in the literature on methodologies for interaction effects. The results of hierarchical regression analyses were consistent with SEM analyses (see Table A 2). We depict the interaction effect in Figure 3-3. Simple-slope tests (Cohen et al. 2003) further suggest that there was a positive relationship between work-life segmentation and life balance for individuals with high work-life segmentation preferences (simple slope $B = .55$, $t = 8.73$, $p < .001$), whereas the relationship was nonsignificant for individuals with low work-life segmentation preferences (simple slope $B = .19$, $t = 1.59$, $p = .11$). Additionally, we assessed the overall fit of the model including the latent interaction term based on a two-step approach. This approach suggests to obtain fit indices and ensure a good fit of the model without interaction terms as a first step, and then to compare the model without interaction terms (Model 1) to the model including the significant latent interaction term (Model 2) by use of log-likelihood ratio test (Klein/Moosbrugger 2000; Muthén 2012). This model difference test based on log-likelihood ratio test allows examining whether a linear structural equation model – which has already been inspected for good model fit – represents a significant loss in fit compared to an interaction model (Gerhard et al. 2015; Klein/Moosbrugger 2000; Maslowsky/Jager/Hemken 2015). As aforementioned, Model 1 showed good overall fit ($\chi^2/df = 1.97$; RMSEA = .05; CFI = .93; SRMR = .06), and results of the log-likelihood ratio test confirmed that Model 1 represented a significant loss in fit compared to Model 2 (Δ-2log-likelihood (1) = 9176.26; $p < .001$). Together, these results suggest that Model 2, the model with the interaction term, fits our data best.

Figure 3-3: Work-life Segmentation Preferences as a Moderator of the Relationship between Work-life Segmentation and Life Balance
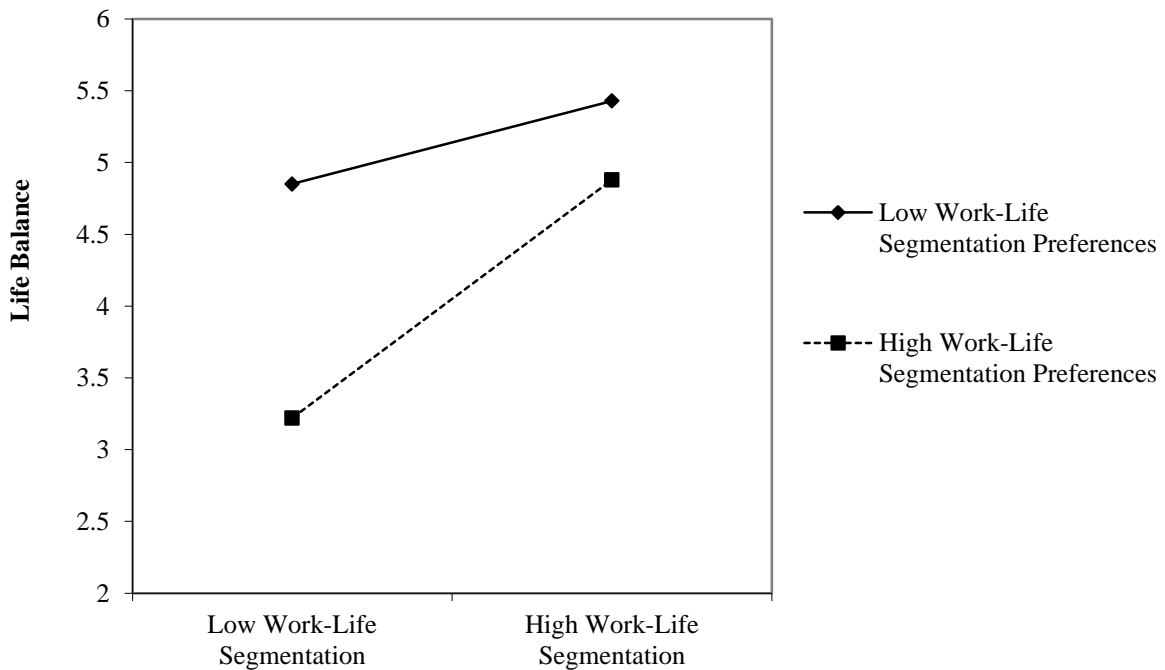
3.6 Discussion

With increasing ubiquity of ICTs, ICT-enabled cross-border availability creates both new opportunities and challenges for individuals' boundary management. Previous research studying antecedents and outcomes of boundary management in the age of cross-border availability largely highlights the detrimental effects of integrating work into one's personal life (e.g., Boswell/Olson-Buchanan 2007; Derks/van Mierlo/Schmitz 2014; Park/Fritz/Jex 2011). However, with their focus on individuals' management of their personal life boundary, these studies largely disregard the bidirectional nature of individuals' boundary management behavior. In contrast, the present research takes a holistic approach and investigates antecedents and effects of both individuals' work-life and life-work segmentation. Specifically, we show that perceived availability expectations of coworkers and personal contacts have the power to alter how individuals manage the boundaries of both their work and personal life. Further, the results show that work-life and life work segmentation have opposing effects on individuals' life balance: While work-life segmentation enhances life balance, life-work segmentation reduces life balance, which, in turn, is strongly related to exhaustion and life satisfaction. Finally, our study suggests that individuals' boundary

management preferences play an important role in determining whether a given boundary management behavior is beneficial or detrimental for individual well-being.

3.6.1 Theoretical Implications

The present study contributes to research on boundary management in the age of cross-border availability in several ways. First, our research framework conceptually differentiates between work-life and life-work segmentation, which is particularly relevant as ICT-enabled cross-border availability impacts how individuals manage both their personal life boundary and their work boundary (Sayah 2013). Our results underline the importance of acknowledging the directionality of boundary management behavior by conceptually differentiating between work-life and life-work segmentation, as an individual may not only engage in work-life and life-work segmentation to a different extent (Clark 2000; Kossek/Lautsch 2012), but the two constructs also impact life balance in *opposite* directions. With boundary theory (Ashforth/Kreiner/Fugate 2000; Nippert-Eng 1996) focusing on the two key concepts of flexibility and permeability to describe individuals' boundary management on a continuum from segmentation to integration, our findings provide strong empirical support for adding directionality as a third key concept. Thereby, our research emphasizes that individuals' boundary management should rather be depicted on two distinct segmentation-integration continuums depending on directionality (Bulger/Matthews/Hoffman 2007; Hecht/Allen 2009); a notion that conceptually extends boundary theory.

Second, our study sheds light on how individuals' bidirectional boundary management behavior is shaped by the rising availability expectations of others. The present study extends previous research by investigating the perceived availability expectations of three groups: supervisors, coworkers, and personal contacts. With regard to work contacts, our results show that coworker availability expectations are negatively related to work-life segmentation, while – contrary to our hypotheses – supervisor availability expectations are unrelated to work-life segmentation. An explanation for the strong impact of coworker availability expectations might be that, in times of increased team work and less hierarchical organizational structures, employees depend on more frequent and intensive interactions with coworkers compared to supervisors to accomplish their tasks (Chiaburu/Harrison 2008; Ferris/Mitchell 1987). To avoid impeding their team's communication flow and task fulfillment, individuals might be more inclined to permanently fulfill their coworkers' availability expectations, while those of their supervisors might not significantly impact their permanent, actual boundary management behavior. Accordingly, although supervisor availability expectations may generally influence a team's availability culture (Mazmanian 2013), coworker availability expectations might outweigh the former's impact on actual work-life segmentation behavior.

With regard to personal contact availability expectations, the results show a negative effect on life-work segmentation, such that higher expectations lead to a higher integration of personal life into the work domain. This finding shows that personal contact availability expectations are key determinants of individuals' boundary management behavior which need to be included in future studies to gain a complete picture of how demands accompanying cross-border availability affect individuals.

Third, the present study contributes to a more holistic understanding of the impact of individuals' actual bidirectional boundary management behavior on their well-being. Contrary to our expectations, results of the present study show that work-life segmentation and life-work segmentation have opposing effects on life balance. Hence an individual's work and personal life might not only have asymmetrical boundaries (Clark, 2000; Kossek & Lautsch, 2012) but management of these boundaries may also have asymmetrical effects on individual-level outcomes. While the positive relationship of work-life segmentation with life balance is consistent with the majority of previous research (e.g., Carlson et al. 2015; Derks/van Mierlo/Schmitz 2014; Hecht/Allen 2009), the negative effect of life-work segmentation on life balance is surprising. Together, these findings indicate that individuals should benefit from engaging in asymmetrical boundary management; that is, increasing the flexibility and permeability of the work boundary to enable the integration of personal life, while maintaining rather clear and thick personal life boundaries to separate work from personal life. One explanation for these asymmetrical effects of work-life and life-work segmentation might involve two opposing mechanisms. On the one hand, life-work segmentation should reduce interferences between the two domains, which should increase life balance. But at the same time, life-work segmentation might reduce positive spillover from personal life to the work domain (Powell/Greenhaus 2010). Although this notion should be true for both directions, their relative effects seem to be contingent on directionality. While previous studies show that work-life segmentation is more strongly related to reduced work-life conflict than to reduced positive work-life spillover (Carlson et al. 2015; Powell/Greenhaus 2010), our results suggest that life-work segmentation might be more strongly related to decreased positive spillover than to decreased life-work conflict, with the costs of life-work segmentation outweighing its benefits and reducing life balance. Future studies may benefit from investigating these underlying mechanisms by examining both work-life and life-work segmentation and their respective effects on inter-domain interferences, positive spillover, and life balance.

Fourth, our research contributes to our understanding of the conditions under which a given boundary management behavior enhances or impairs well-being. In particular, our results suggest that the strength of the positive effect of work-life segmentation on life balance varies

depending on individuals' work-life segmentation preferences. Consistent with person-environment fit theory (Caplan 1983; French/Caplan/Harrison 1982; Harrison 1985), for individuals with high work-life segmentation preferences, life balance is significantly higher when these preferences are fulfilled – that is, when they are able to segment work from their personal life – than when they engage in low work-life segmentation. It is important to note here that our results indicate that individuals with low work-life segmentation preferences maintain high levels of life balance irrespective of whether they engage in high or low work-life segmentation. An explanation might be that individuals with low work-life segmentation preferences – while liking work-life integration – may not perceive high work-life integration as a requirement that needs to be fulfilled in order to achieve high life balance. Hence, for these individuals, engaging in high instead of low work-life segmentation may not result in experiencing a mismatch that creates a strong state of tension, such that both low and high work-life segmentation could be associated with high levels of life balance.

Contrary to our hypothesis, life-work segmentation preferences did not moderate the relationship between life-work segmentation and life balance. This finding indicates that low life-work segmentation is beneficial for an individual's life balance, irrespective of their personal preferences. This consistently beneficial effect of life-work integration might result from positive feelings, such as pleasure and effectiveness that may come with integrating personal life into work; for example, receiving emotional support or successfully coordinating personal matters (Chesley 2014). Nevertheless, our findings underline the necessity to examine the boundary conditions of the link between boundary management behavior and individual-level outcomes.

3.6.2 Practical Implications

Our research also has several implications for practice. Together, our findings suggest that organizations should create working conditions that allow employees to segment their work from their personal life to the extent of their preferences, while allowing for the integration of personal matters into work. Facilitating these boundary management behaviors would contribute to their employees' life balance which, in turn, prevents exhaustion and increases life satisfaction. Together, these three are indicators of employees' well-being and, thus, important predictors of job performance and turnover intention (Tenney/Poole/Diener 2016; Wright/Huang 2012).

Our study identifies two levers for organizations aiming to support their employees in aligning their actual work-life segmentation with their preferences. First, organizations could prevent the development of availability expectations that force employees into unwanted degrees of work-life segmentation. For instance, all employees should be sensitive to the

impact of their availability expectations on their coworkers' work-life segmentation behavior. Managers should be encouraged to openly discuss perceived and actual availability expectations with their teams and to explicitly highlight that team members are allowed to engage in heterogeneous work-life availability behaviors (Mazmanian 2013). Second, organizations could sensitize their employees for their individual boundary management preferences and encourage them to communicate those to their supervisors and coworkers. Further, organizations should facilitate various degrees of work-life segmentation among their employees instead of forcing them into high or low work-life segmentation by, for instance, turning off Blackberry servers after hours (Volkswagen, BBC News 2012) or deleting email communication during holidays (Daimler AG, BBC News 2014).

To enable life-work integration, organizations could allow their employees to communicate with their personal contacts and take care of personal matters while they are at work. As this bares the risk of interferences and unwanted interruptions that may impair task performance, organizations should ask employees to openly discuss perceived and actual availability expectations with their personal contacts and find ways to bring those in line with their work responsibilities. For instance, employees could inform their personal contacts about time frames in which they are best available or unavailable at work.

3.6.3 Limitations and Future Directions

One limitation of the present study is that, while we differentiate between supervisor and coworker availability expectations in regard of work contacts, we do not differentiate between family and friends in regard of personal contacts. Since availability for family matters may be more closely linked to fulfilling responsibilities and needs (Sayah 2013) than availability for friends, future studies might investigate various groups both in the individual's work life and personal life in order to gain a more complete picture of how availability expectations form boundary management behaviors. With regard to supervisor and coworker availability expectations, it should be noted that they were relatively low on average in the present sample. As our sample covers a variety of industries and departments to enhance the generalizability of our findings, future research might benefit from focusing solely on industries that are eminently susceptible to an organizational "always online" culture in order to validate our results.

Second, while the present study finds that work-life and life-work segmentation have opposing effects on life balance, the potentially underlying mechanisms of these relationships – namely, inter-domain conflicts and positive spillover – need empirical investigation. Hence future studies could examine the effects of individuals' bidirectional boundary management

behavior on inter-domain conflicts, positive spillover, and life balance to contribute to our understanding of the distinct effects of work-life and life-work segmentation.

Third, while we separated the measurement of availability expectations and boundary management preferences from that of all endogenous variables by six weeks to allow for testing causality and reducing common method bias (Podsakoff et al. 2003; Podsakoff/MacKenzie/Podsakoff 2012), future studies could measure individuals' boundary management and well-being at different points in time to examine the former's enduring effects on individual-level outcomes.

Lastly, this study relies on self-report data. Future studies on boundary management might gain fruitful insights from additionally collecting data from relevant others in both work and personal life domains. In particular, future research could include perceived availability expectations and 'true' availability expectations as indicated by supervisors, coworkers, family members, and friends themselves. This approach would enable to capture differences between perceived and 'true' availability expectations and to investigate their distinct and relative impact on individuals' boundary management behavior.

3.7 Conclusion

The present study shows that rising availability expectations in individuals' work environment and in their personal life shape how they actually manage the boundaries of their personal life and work. We also find that work-life segmentation and life-work segmentation exert opposing effects on life balance, indicating that asymmetrical boundary management is beneficial for well-being. Further, the present study underlines the importance of enabling individuals to align their boundary management preferences with their actual behavior. Together, our study highlights the importance of taking a holistic approach and investigating both work-life and life-work segmentation to fully understand antecedents and outcomes of boundary management in the age of cross-border availability.

4 Discussion

The ubiquity of ICTs in our work and personal lives has transformed how individuals communicate as well as how they manage the boundaries around their life domains, involving both benefits and harm for individual well-being. In response to these developments, this thesis aimed to shed light on the factors that may determine whether positive or negative consequences coming along with the ubiquity of ICTs are prevalent. These insights would allow for pointing out opportunities for fostering positive effects and avoiding negative effects to ultimately maintain or increase individual well-being. To reach this overarching goal, two empirical studies with distinct conceptual and methodological foci were conducted, examining ICT-mediated communication (study 1) and bidirectional boundary management in the age of cross-border availability (study 2). In the following, main findings of both studies are shortly summarized and integrated. Thereby, the insights gained from the empirical studies are examined with regard to the overarching research goals and research questions as defined in Chapter 1.5. On this basis, overall theoretical and practical implications derived from integrating findings of both studies are presented. Finally, overarching limitations of this thesis and overall directions for future research on the consequences coming along with the ubiquity of ICTs for individual well-being are outlined.

4.1 Main Findings

The two studies conducted in this thesis aimed to shed light on the determining factors that may influence when the consequences of the ubiquity of ICTs are positive or negative for individuals' well-being. Together, the findings of the two studies suggest three such determinants: event-specific features, personal preferences, and the life domain concerned. In the following, the research goals and findings of each study are condensed first. Second, the findings of both studies are integrated, showing under which conditions well-being should be affected positively or negatively.

In particular, study 1 aimed to shed light on why, how, and under what circumstances ICT-mediated communication is positively or negatively related to individual well-being by taking an event-based perspective. Thereby, two research questions were investigated using a mixed-methods study:

(1) Which features of ICT-mediated communication events trigger individuals' momentary affective reactions?

(2) How do affectively significant ICT-mediated communication events influence individuals' momentary and prolonged well-being?

The first research question was answered by conducting an interview study. Drawing on qualitative data, four features that are affectively significant *from the users' point of view* were inductively derived: valence, disturbance, need for action, and synchronicity. The second research question was examined with a quantitative ESM study, which showed that these four features had an episodic effect on individuals' momentary affective states arousal and pleasure. Moreover, valence, disturbance, and need for action were shown to have spillover effects on individuals' end-of-day well-being through their cumulated effects on affective states over the course of a day, with arousal mediating the relationships between the three features and end-of-day psychological distress, and pleasure mediating the relationships between the three features and end-of-day satisfaction. Furthermore, results revealed that the event-level control variable content affected both momentary affective states and end-of-day well-being. Together, these findings allowed (1) to determine what kind of ICT-mediated communication events had beneficial and detrimental impact on individual well-being, depending on the manifestation of event-specific features, and (2) to disentangle the specific mechanisms underlying the dynamic relationship between ICT-mediated communication events, momentary affective states, and end-of-day well-being.

In contrast, study 2 applied a different context, focusing on the demands coming along with ICT-mediated communication *across* the boundaries of work and personal life, i.e., cross-border availability. Specifically, this study aimed to illuminate how these demands – rising cross-border availability expectations – shape individuals' bidirectional boundary management behavior, and how this, in turn, affects their well-being. Accordingly, this study examined three research questions, using a two-wave study:

(1) How is individuals' bidirectional boundary management behavior shaped by others' cross-border availability expectations?

(2) What are the discrete effects of individuals' actual work-life and life-work segmentation on their well-being?

(3) Is a certain boundary management behavior most beneficial for individuals' well-being or do the effects of individuals' bidirectional boundary management behavior on well-being vary depending on individual characteristics?

The first research question was answered by showing that not only availability expectations from coworkers but also availability expectations held by personal contacts shaped how individuals actually managed the boundaries around their personal life and work, such as that they increasingly integrated their work into their personal life and their personal life into their work, respectively, as a response to these perceived expectations. Further, the study revealed that work-life segmentation and life-work segmentation exerted opposing effects on life balance, as work-life segmentation was found to enhance and life-work segmentation was found to impair life balance, thereby answering the second research question. Moreover, the results showed that individuals preferring high work-life segmentation experienced impaired life balance when they could not engage in work-life segmentation, while the relationship between life-work segmentation and life balance was not moderated by life-work segmentation preferences. Together, these findings shed light on differential antecedents and effects of bidirectional boundary management, and identified conditions under which the effects of boundary management on well-being may vary.

Integrating these findings, both empirical studies underline the relevance of investigating the consequences coming along with the ubiquity of ICTs, as individuals' short-term and long-term well-being were shown to be affected. Thereby, results from both studies emphasize the need to take a *differentiated* perspective when studying the consequences that come along with the prevalence of ICTs: In sum, the studies suggest that the effects of ICT-mediated communication as well as of boundary management on individual well-being vary, depending on important factors that have widely been disregarded in preceding research such as event-specific features, personal preferences, and life domain concerned. Thereby, the two empirical studies provide new insights on the circumstances under which the consequences coming along with the ubiquity of ICTs are positive or negative for individual's well-being. Findings suggest that well-being may be enhanced when individuals experience more ICT-mediated communication events characterized by positive valence, low disturbance, no need for action, and personal content, as well as when they engage in asymmetrical boundary management, that is life-work integration and work-life segmentation. In contrast, well-being may be impaired when individuals experience more ICT-mediated communication characterized by negative valence, high disturbance, an instant need for action, and work-related content, as well as when individuals who hold high work-life segmentation preferences engage in work-life integration in response to perceiving high availability expectations.

4.2 Overall Theoretical Contribution

A key contribution of this thesis is its differentiated research approach to studying the consequences of the ubiquity of ICTs based on theoretical underpinning. On the one hand, ICT-mediated communication was examined from an event-level perspective drawing on affective events theory, and on the other hand, individuals' bidirectional boundary management in the age of cross-border availability was investigated based on boundary theory. Aside from specific implications resulting from the two empirical studies as described in Chapter 2 and 3, respectively, this thesis provides several implications on a superordinate level, differentiating between implications from a theoretical/conceptual perspective, a content-related perspective, and a methodological perspective.

With regard to the theoretical/conceptual perspective, this dissertation brings along three important implications. First, the thesis provides a comprehensive literature review (Chapter 1.4) which integrated research from various disciplines such as management, psychology, and information systems, presenting a structured overview of preceding studies both in regard of their conceptual emphases and in regard of their key findings. Developing a framework of organizing themes for each research field, the extensive review showed that the existing literature is very heterogeneous and often unclear in regard of the type and conceptualization of the variables of interest studied. For example, many preceding studies do not explicitly state which type of ICT use in regard of its function and content is studied or the type purportedly studied does not match the measurement. This renders it considerably difficult to compare and condense findings of prior research in order to draw valid conclusions. Hence, the thesis demonstrates with its comprehensive review the urgent need to be more precise about which constructs of interest and type of ICT use is being studied in order to further integrate and disentangle the heterogeneous and even contradictory findings in future studies.

Second, building on this, the dissertation contributes to research by applying differentiated conceptualizations of ICT-mediated communication and boundary management. In particular, this thesis acknowledged that ICT-mediated communication is an episodic activity, which has been largely disregarded by previous research. Accordingly, study 1 examined affectively significant features of ICT-mediated communication events as the focal subject of research, as opposed to focusing on overall effects of ICT use on well-being by studying extent of ICT use or material properties (e.g., Diaz et al. 2012; Ragu-Nathan et al. 2008). In addition, this thesis acknowledged that individuals engage in ICT-mediated communication not only for work-related purposes but also for personal purposes, and thus included both work-related and personal ICT-mediated communication in the mixed-methods study, controlling for their differential impact. Similarly, this dissertation conceptually differentiated between work-life and life-work segmentation in study 2, specifically taking into account the bidirectional nature

of individuals' boundary management (Hecht/Allen 2009; Kossek/Lautsch 2012). With the empirical findings indicating that the effects vary depending on the situation and directionality, the dissertation emphasizes the need for a shift in the theoretical perspective, turning to a more differentiated view of how the ubiquity of ICTs affects individuals' well-being. Such a shift will further help to gain a more nuanced picture of the specific conditions that determine whether well-being is affected positively or negatively in the context of ICT use.

Third, this dissertation contributes to our theoretical understanding of the consequences of the prevalence of ICTs by applying and extending relevant theories. In particular, by examining the relationship between ICT-mediated communication events and well-being within the theoretical framework of affective events theory (Weiss/Cropanzano 1996), the thesis answered the call of Weiss/Beal (2005) to specify the macrostructure of affective events theory in the context of ICT-mediated communication, and contributes to our theoretical understanding of the double-edged effects of ICT-mediated communication. Further, this dissertation provided further empirical support to conceptually extend boundary theory (Ashforth/Kreiner/Fugate 2000) by adding a third dimension, directionality. Thereby, this thesis demonstrates the need for theoretical underpinning in future studies, as such an approach enables to integrate ambiguous relationships and underlying mechanisms of these relationships in an explanatory framework.

With regard to the content-related perspective, a key contribution of the dissertation to research is that specific determinants were detected which might affect when individuals' well-being is enhanced or impaired in the context of ICT use. Together, the findings of the two studies suggest three major factors which may determine when the consequences of the ubiquity of ICTs are beneficial or detrimental for individuals' well-being – event-specific features, personal preferences, and life domain concerned. In more detail, first, the results of study 1 highlighted the powerful role of ICT-mediated communication events in predicting fluctuations in individuals' well-being. Thereby, the study provided new insights on the drivers of the double-edged nature of ICT-mediated communication, that are, affectively significant features of ICT-mediated communication events: valence, disturbance, need for action, and synchronicity.

Second, the results of study 2 demonstrated the importance to examine the conditions under which certain boundary management behaviors have positive or negative effects on individuals' well-being, as well-being was impaired when individuals were not able to align their work-life segmentation preferences with their actual boundary management behavior. Thereby, the dissertation provided empirical support for the importance of examining the interaction between individuals' boundary management behavior and their distinct, personal

preferences and perceptions of their boundary management to understand positive and negative effects of boundary management on well-being (Kossek et al. 2012).

Third, the thesis highlights the important role of individuals' personal life domain – in terms of personal ICT-mediated communication and integration of personal life into work – to explain fluctuations in individual well-being, as both studies hint at positive influences of the personal life domain on well-being: In study 1, in addition to the features' effects, personal ICT-mediated communication had a positive effect on individual well-being. Consistent with this finding, study 2 revealed that boundary management had opposing effects on well-being contingent upon directionality, as work-life segmentation was found to enhance but life-work segmentation was found to impair well-being. Integrating these findings strongly supports the notion that life-work integration might be beneficial for individuals' well-being – as shown in study 2 – since it is associated with positive states of mind such as increased pleasure, reduced psychological distress, and increased satisfaction – as shown in study 1. This positive influence of the personal life domain on well-being found in both studies underpins the notion that the integration of personal life into work – in general and via ICT-mediated communication – is a critical yet widely understudied phenomenon. In line with this, research further suggests that personal ICT use may represent an important resource for individuals for example by enabling employees to reach out to personal contacts for support, and thereby serve as a buffer for negative effects on well-being (Chesley 2014). Hence, future research might benefit from studying both sides of the coin, including influences of individuals' personal life domain to gain a comprehensive understanding of fluctuations in individuals' well-being in the context of ICT use.

Finally, as regards the methodological perspective, this thesis contributes to research by unveiling mechanisms underlying the effects of ICT-mediated communication as well as demands associated with cross-border availability. In study 1, episodic as well as spillover effects of features of ICT-mediated communication events were investigated with hierarchical linear modeling. Thereby, the study was able to capture within-person dynamics, demonstrating how effects of ICT-mediated communication events may accumulate over the course of a day to elicit within-person changes in end-of-day well-being. Further, study 2 investigated the complex relationship between cross-border availability expectations, bidirectional boundary management, and well-being with structural equation modeling. This methodological approach allowed to simultaneously depict antecedents and distinct effects of individuals' bidirectional boundary management behaviors on their well-being. Thereby, the thesis was able to examine the unique contribution of work-life segmentation and life-work segmentation to explain variance in life balance, and to detect their opposing effects on individual well-being.

4.3 Overall Practical Contribution

In general, this thesis shows that the ubiquity of ICTs not only presents new challenges for individuals but likewise offers opportunities to enhance their well-being – depending on characteristics of the situation, personal preferences, and the life domain concerned. Thereby, the dissertation points out pivotal ways and conditions under which positive effects on well-being may be fostered and negative effects may be avoided. With well-being as an important predictor of job-related outcomes such as absenteeism, turnover intentions, and performance (Tenney/Poole/Diener 2016; Wright/Huang 2012), the dissertation provides employees as well as organizations with several overarching implications based on empirical investigations to create a healthy and productive work environment.

As a key contribution to practice, this thesis indicates the strong need to turn to differentiated, personalized measures in order to effectively avoid negative effects and enhance positive effects on well-being, as opposed to implementing rather inflexible, undifferentiated organizational measures such as turning of Blackberry servers after hours (Volkswagen AG) or automatically deleting incoming emails while on vacation (Daimler AG). Accordingly, a promising way to handle the increasing prevalence of ICTs in a healthy and productive manner is to create a work environment in which employees are aware that the effects of ICT use are not inherently positive or negative but vary across situations, individuals, and the life domain concerned. In particular, this thesis points to three overall levers for organizations and employees.

First, organizations should sensitize employees in regard of situational circumstances under which ICT-mediated communication is beneficial or detrimental for their own and their communication partners' well-being. To raise awareness of these differential effects, organizations may implement mandatory trainings for managers and employees on suitable ways of ICT-mediated communication which consider the positive and negative effects of the features valence, disturbance, need for action, and synchronicity on well-being. On this basis, employees may collectively develop communication strategies and guidelines to foster positive effects and avoid negative effects, such as deliberately increase communication of positive feedback, or openly communicate to their team when they need to work unimpeded. Thereby, such trainings may help to establish shared norms for ICT-mediated communication in the organization (Orlikowski et al. 1995) which take into account event-specific effects.

Second, organizations should encourage managers and employees to openly discuss their distinct cross-border availability preferences and expectations in regular meetings, and explicitly allow for heterogeneous practices of cross-border availability and general boundary management (Mazmanian 2013). In particular, managers should encourage their employees to

reflect about how they prefer to be available for work in their personal life, and which level of work-life segmentation they prefer. At the same time, employees should make themselves aware of the cross-border availability expectations they explicitly or implicitly convey to their team, for example by sending emails at the weekend, and that these expectations may – also unintentionally – influence how their coworkers manage the boundary of their personal life, which, in turn, may have detrimental effects on their well-being. Accordingly, managers should regularly schedule team meetings in which team members openly discuss their personal preferences and expectations in order to create transparency, unveil unintended behavior patterns, and raise awareness that they may have distinct work-life segmentation preferences. Hereby, team members might be advised to record that increased work-life availability and integration are not seen as a signal of better performance in order to reduce perceived pressures of increasing work-life availability. On this basis, teams may consciously allow for heterogeneous practices of work-life availability and work-life segmentation, acknowledging and respecting that team members vary in their personal preferences and practices (Mazmanian 2013). For instance, team members may explicitly record who has a segmentation preference, and who has an integration preference, and schedule meetings or phone calls accordingly. This should help to avoid the development of availability expectations and an undesired "always online" culture in a team, and consequently to allow employees to align their boundary management behavior with their preferences.

Third, organizations should explicitly communicate that employees are allowed to integrate their personal life into work, for instance by engaging in personal ICT-mediated communication at work. Although this measure appears unorthodox at first glance, findings of both studies indicate that employees' well-being, and in turn, their performance, should benefit from positive effects of personal ICT-mediated communication and life-work integration such as increased feelings of pleasure and satisfaction, and increased life balance. Naturally, it is a requirement for employees to ensure that their performance does not suffer due to numerous personal interruptions. Hence, organizations could encourage their employees to discuss their preferred level of life-work integration and availability expectations with their personal contacts, and reach agreements on how and when they can engage in personal ICT-mediated communication or take care of personal matters at work.

In sum, this thesis suggests that organizations are advised to openly and deliberately discuss consequences and demands associated with ICT use, for example in trainings and regular meetings. Thereby, organizations may gradually create a work environment in which employees are aware of, accept and respect proper ways of ICT-mediated communication and heterogeneous practices of cross-border availability and boundary management.

4.4 Overall Limitations and Recommended Areas for Future Research

Overall, this thesis contributes to research on the consequences of the prevalence of ICTs for individual well-being, providing various implications for research and practice. Yet, the dissertation also exhibits several overall limitations which, combined with the thesis' findings, indicate additional pathways for future research.

First, with regard to a conceptual/content-related perspective, the thesis examined two important conceptualizations of ICT use, that is features of ICT-mediated communication events on the one hand and demands associated with cross-border availability on the other hand, in two separate studies. Yet, future research might benefit from integrating these two distinct conceptual approaches in one holistic model. Accordingly, future studies might specifically focus on cross-border ICT-mediated communication events – including both work-related events in personal life and personal events at work – and investigate the effects of cross-border availability expectations on the frequency of such events.

Second, while both studies identified specific circumstances under which the consequences of the ubiquity of ICTs are beneficial or detrimental for individual well-being – event-specific features, personal preferences, and the life domain concerned – the thesis did not integrate these findings. For example, moderating effects of personal characteristics on the within-person relationship between features of ICT-mediated communication events and well-being were not included. Accordingly, future studies may investigate cross-border ICT-mediated communication events and examine whether the effects of the features identified here vary depending on boundary management preferences (Butts/Becker/Boswell 2015). For example, the negative effect of disturbance on well-being might be stronger for individuals with high work-life segmentation preferences. In addition, future research may include other potential moderators such as feeling in control of ICT use (e.g., Dettmers/Bamberg/Seffzek 2016) or coping strategies. Investigating these moderating effects may further help to determine how positive effects of cross-border ICT-mediated communication events may be fostered and negative effects may be avoided. Moreover, including personal characteristics as moderators of the relationship between events and well-being would further specify the macrostructure of affective events theory (Weiss/Beal 2005) in the context of ICT use.

Third, as regards a methodological perspective, both studies exhibit limitations with respect to identifying causal mechanisms. While both studies employed study designs with more than one time of measurement (ESM study and two-wave study), some of the tested models also included relationships between constructs measured at the same time, which implies that alternative causal ordering cannot be ruled out completely. Further, both studies relied on self-report data. Hence, future studies should challenge and validate the causal effects

proposed here using other survey designs: In particular, to measure the causal effects of an event's features on momentary well-being, future studies might include objective measurements of momentary well-being, such as blood pressure (e.g., Bono et al. 2013). Thereby, spikes in blood pressure due to specific events could be monitored, facilitating to detect causal effects. Further, using longitudinal study designs that measure cross-border availability expectations, boundary management behavior, and its distinct outcomes at separated points in time would present a fruitful approach to investigate the causal mechanisms underlying the antecedents and effects of boundary management behavior.

4.5 Conclusion

Preceding research on the consequences of the ubiquity of ICTs suggests that ICTs are a double-edged sword for individuals' well-being, and that they have the power to increasingly blur individuals' personal life boundary, which reduces well-being. The aim of this dissertation was to provide a more nuanced picture of the conditions under which these positive or negative effects associated with the ubiquity of ICTs are prevalent, with the ultimate goal to foster positive consequences and avoid negative consequences to increase individual well-being. Accordingly, the thesis analyzed the drivers of the double-edged nature of ICT-mediated communication by taking an event-level perspective, and further studied antecedents and effects of individuals' management of both their personal life and work life boundary. Findings suggested that effects of ICT-mediated communication on momentary well-being vary on an event-by-event basis, depending on event-specific features, and that these effects may spillover to end-of-day well-being. Further, the dissertation showed that boundary management behavior is shaped by demands coming along with ICTs, i.e., cross-border availability expectations, leading to higher boundary blurring. Yet, it was likewise revealed that boundary blurring is not always detrimental, as work-life integration and life-work integration were found to have opposing effects on well-being, which further varied depending on boundary management preferences. With these new insights, the thesis contributed to a more differentiated empirical and theoretical understanding of individuals' boundary management and well-being in the age of ICT use. Accordingly, this thesis concludes with a call to take a more nuanced perspective when studying the consequences coming along with the ubiquity of ICTs, and likewise to implement more differentiated, individualized measures in organizations in order to successfully establish healthy and productive ways of using ICTs.

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Appendix

Table A 1: Overview of the Study Variables and their Corresponding Indicators (Study 2)

Study Variables	Item-to-total correlation	Factor loading	Time of measurement
Supervisor Availability Expectations			t_1
Usually, my supervisor expects me to…			
1. … be available when I am not at work.	.84	.90	
2. … respond to incoming calls or messages when I am not at work.	.84	.94	
Coworker Availability Expectations			t_1
My coworkers expect me to…			
1. … be available when I am not at work.	.82	.95	
2. … respond to incoming calls or messages when I am not at work.	.82	.87	
Personal Contact Availability Expectations			t_1
Usually, my personal contacts expect me to…			
1. ... be available when I am at work.	.85	.98	
2. ... respond to incoming calls or messages when I am at work.	.85	.86	
Work-life Segmentation Preferences			t_1
1. I prefer to keep work life at work.	.73	.82	
2. I do not like work issues creeping into my private life.	.75	.83	
3. I like to be able to leave work behind when I go home.	.75	.83	
Life-work Segmentation Preferences			t_1
1. I prefer to keep my personal life out of my work.	.31	.42	
2. I like to be able to take care of personal matters when I am at work.*	.56	.76	
4. I prefer to switch between work-related and personal matters, when I wish to do so.*	.54	.75	

Study Variables	Item-to-total correlation	Factor loading	Time of measurement
Work-life Segmentation			t_2
1. I took work-related topics home with me	.66	.74	
2. I left work behind when I went home.	.78	.87	
3. I drew a clear boundary around my personal life.	.70	.82	
Life-work Segmentation			t_2
1. I left my personal life outside of work.	.71	.85	
2. I took care of personal matters when I was at work.*	.58	.65	
3. I left my personal life behind when I went to work.	.73	.84	
Life Balance			t_2
1. Overall, I was able to live my life in all domains just as I wished.	.88	.90	
2. On the whole, I feel that I was the person I wished to be in all domains of my life.	.88	.90	
3. On balance, how I involved myself in the domains of my life matches my ideal image.	.90	.93	
4. Overall, I am convinced that I shaped all domains of my life as I ideally would want them to be.	.91	.94	
Exhaustion			t_2
1. I feel burned out from my work.	.84	.91	
2. I feel used up at the end of the workday.	.85	.92	
3. I feel emotionally drained from my work.	.82	.90	
4. I feel tired when I get up in the morning and have to face another day on the job.	.65	.66	
5. Working all day is really a strain for me.	.65	.66	
Life Satisfaction			t_2
1. In most ways my life is close to my ideal.	.84	.91	
2. The conditions of my life are excellent.	.76	.82	
3. I am satisfied with my life.	.83	.91	
4. So far I have gotten the important things I want in life.	.73	.75	
5. If I could live my life over, I would change almost nothing.	.64	.67	

Table A 2: Results of Supplemental Hierarchical Regression Analyses (Study 2)

Independent Variables	Dependent Variable: Life Balance		
	Model 1	Model 2	Model 3
Control variables			
Job involvement	.05	.17***	.15**
Personal life involvement	.12*	.09	.15**
Job demands	-.23***	-.10*	-.10*
Job autonomy	.25***	.20***	.17***
Basis effects			
Work-life segmentation		.47***	.51***
Life-work segmentation		-.15**	-.09
Moderation effects			
Work-life segmentation preferences			-.22***
Work-life segmentation preferences x work-life segmentation			.10*
Life-work segmentation preferences			-.02
Life-work segmentation preferences x life-work segmentation			.07
R^2	.13	.31	.37
Adjusted R^2	.12	.30	.35
Incremental R^2	-	.18	.06
F-Value	14.97***	29.21***	22.61***
$N = 401$. Hierarchical regression analyses were conducted using standardized variables. Results show standardized regression coefficients. $*p < .05; **p < .01, ***p < .001.$			

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Eidesstattliche Erklärung

Hiermit versichere ich, dass ich die vorliegende Dissertation mit dem Titel „Always Online: Boundary Management and Well-being of Knowledge Workers in the Age of Information and Communication Technology Use" selbständig und nur unter Verwendung der angegebenen Quellen und Hilfsmittel angefertigt habe.

Darmstadt, den 03.04.2018

Kathrin Reinke