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Karlene Cousins Daniel Robey

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An interpretive study of mobile work practices

Karlene Cousins

Department of Decision Sciences and Information Systems, Florida International University, Miami, Florida, USA, and

Daniel Robey

Department of Computer Information Systems, Georgia State University, Atlanta, Georgia, USA

Abstract

Purpose – The purpose of this paper is to explore the role that mobile technologies play in mobile workers' efforts to manage the boundaries between work and non-work domains. Previous theories of work-life boundary management frame boundary management strategies as a range between the segmentation and integration of work-life domains, but fail to provide a satisfactory account of technology's role.

Design/methodology/approach – The authors apply the concept of affordances, defined as the relationship between users' abilities and features of mobile technology, in two field studies of a total of 25 mobile workers who used a variety of mobile devices and services.

Findings – The results demonstrate that the material features of mobile technologies offer five specific affordances that mobile workers use in managing work-life boundaries: mobility, connectedness, interoperability, identifiability and personalization. These affordances persist in their influence across time, despite their connection to different technology features.

Originality/value – The author found that mobile workers' boundary management strategies do not fit comfortably along a linear segmentation-integration continuum. Rather, mobile workers establish a variety of personalized boundary management practices to match their particular situations. The authors speculate that mobile technology has core material properties that endure over time. The authors surmise that these material properties provide opportunities for users to interact with them in a manner to make the five affordances possible. Therefore, in the future, actors interacting with mobile devices to manage their work-life boundaries may experience affordances similar to those the authors observed because of the presence of the core material properties.

Keywords Mobility, Affordances, Interpretivist research, Mobile systems

Paper type Research paper

Introduction

The pervasiveness of mobile computing devices and services has generated numerous projections for the growth of the mobile workforce. The International Data Corporation (IDC) estimates that the worldwide mobile worker population will increase from just over one billion in 2010 to more than 1.3 billion by 2015 (IDC, 2012), and companies increasingly encourage employees to "bring your own device" (BYOD) for both personal and business use[1]. These trends portend shifts in the traditional boundaries between work and non-work activities. By enabling work that is freed from geographical and temporal constraints, mobile technology may increase individual productivity by enabling work during periods formerly spent at home or while traveling. Some empirical studies, e.g. (Govindaraju and Sward, 2005) associate the use of mobile technologies with

improved management of work-life boundaries. Organizations may also benefit from increased individual productivity and the ability to access mobile workers who are traveling or working from remote sites.

Despite such positive outcomes, negative consequences of mobile technologies may occur. One danger is that work that can occur "anytime, anywhere" may become work "all the time, everywhere," thereby removing time for non-work activities (Davis, 2002). Mobile workers may lose control over boundaries between work and personal activities (Jackson *et al.*, 2006) and experience more stress (Ahuja *et al.*, 2007; Tietze, 2002) and the deterioration of communication, office and personal relationships, and work productivity (Middleton and Cukier, 2006; Prasopoulou *et al.*, 2006; Quesenberry and Trauth, 2005). Thus, prior research suggests that mobile technology may be implicated in both positive and negative outcomes related to the management of work-life boundaries.

The purpose of this study is to improve the understanding of the ways in which mobile technology contributes to the management of the work-life boundaries of mobile workers. Mobile workers are people who spend time traveling and working at different locations, who use mobile technologies in their work, and whose work involves some level of knowledge intensity and communication with others (Axtell *et al.*, 2008; Daniels *et al.*, 2001). Our approach is to study how mobile technologies' affordances are implicated in the strategies and tactics used by mobile workers to manage their work-life boundaries. We define affordances as action possibilities emerging from the relationship between actors and technology. Across two studies conducted four years apart, we interviewed and/or observed 25 mobile workers who used a variety of mobile computing devices. We sought to answer the research question:

RQ1. How are mobile technology's affordances implicated in the work-life boundary management practices of mobile workers?

Our results and discussion contribute to the IS literature on mobile technology and to the literature on work-life boundary management by identifying specific affordances that enable management of the boundaries between work and non-work domains.

We begin by reviewing relevant literature on work-life boundary management. Our conclusion from this review is that established theories provide useful concepts to guide the study of mobile workers' boundary management practices but that they fail to incorporate technology affordances into their explanations. Accordingly, we also review relevant literature on mobile technology to identify specific affordances that are related to work-life boundary management. We then describe the research methods, report our findings, and discuss our theoretical contribution. We then address the limitations of our studies and conclude with suggestions for future research.

Work-life boundary management
Research on the management of work-life boundaries developed well before the advent of mobile information technologies, yet it remains relevant to our research purpose. The discourse on managing work-life boundaries reflects both negative and positive views. Much research in human resource management emphasizes the negative consequences of blurring work-life boundaries (Ashforth *et al.*, 2000; Clarke, 2000; Duxbury *et al.*, 1992; Perlow, 1998, 1999). However, the literature also includes more positive views. For example, Greenhaus and Powell (2006) argue that work and family commitments do not necessarily conflict and that positive experiences in one role can enrich experiences in the other role. Thus, a prominent theme of this literature is finding ways

to promote positive consequences while minimizing the negative. A key assumption is that better management of the boundaries between work and non-work will result in desirable states of psychological well-being in which conflicts between work and non-work activities are either resolved or avoided (Greenhaus and Beutell, 1985; Kreiner *et al.*, 2009). This state is generally referred to as work-life balance. We assume that well managed boundaries may remove ambiguity regarding role expectations and reduce role conflict, leading to success in fulfilling role requirements in both work and personal domains (Major *et al.*, 2002).

The study of work-life boundary management is based in work-family border theory (Clarke, 2000) and work-life boundary theory (Ashforth *et al.*, 2000; Nippert-Eng, 1996), which emerged simultaneously to explain how individuals manage both work and family life domains (Bulger *et al.*, 2007). Clarke (2000) defines social borders, or boundaries, as the lines of demarcation between work and family domains that specify where domain-specific behavior begins and ends. Social borders may be physical, temporal and psychological in nature (Clarke, 2000). A physical border defines where domain-relevant behavior takes place; a temporal border defines when domain-specific behavior takes place; and a psychological border consists of social rules that specify the cognitive, behavioral and emotional states that are appropriate for particular domains.

Social boundaries may vary in strength depending on their degrees of permeability and flexibility (Bulger *et al.*, 2007). Permeability refers to the extent of interruptions by one domain in another, while flexibility refers to the capacity of individuals to relax a boundary. Strong boundaries are less permeable and less flexible than weak boundaries. While strong boundaries separate domain activities, weak boundaries allow both work and personal domains to blend, or blur, in a "borderland" that includes activities from multiple domains (Clarke, 2000; Desrochers *et al.*, 2005; Greenhaus and Powell, 2006; Nippert-Eng, 1996). For example, a mobile worker may enact weak boundaries by accepting all interruptions via mobile phone calls regardless of their origin and regardless of the time and place of the interruption. Alternatively, a mobile worker might strengthen those boundaries by diverting interruptions to voicemail. In this example, the features of mobile phones allow the mobile worker to manage the boundaries between work and non-work.

Boundary management refers to both the strategies and tactics used to establish, maintain and modify social boundaries between work and family (Nippert-Eng, 1996). Boundary management strategies may be viewed along a continuum between extreme integration and extreme segmentation of life domains (Ashforth *et al.*, 2000; Nippert-Eng, 1996; Tietze, 2002). When personal and work domains are fully integrated, no distinction is made between activities that belong to either home or work, or where and when activities should occur. As in our previous example, the boundaries between domains are purposefully weakened. Blending work and personal activities may allow actors to achieve equal attentiveness and connection with valued activities regardless of their domain of origin (Morris and Madsen, 2007). By contrast, when home and work domains are completely segmented, the boundary between domains is clear and unchangeable. Segmenting work-life domains allows actors to focus exclusively on one domain at a time (Major *et al.*, 2002).

Recent research has challenged the descriptive value of the integration-segmentation continuum (Bulger *et al.*, 2007; Golden and Geisler, 2007; Hislop and Axtell, 2011; Kreiner *et al.*, 2009; Moen *et al.*, 2008). Studies suggest that boundary management may involve separate strategies applied within each relevant domain (Bulger *et al.*, 2007; Powell and

Greenhaus, 2010). For example, a segmentation strategy may be applied at home to prevent work interference, while an integration strategy may be applied at work to facilitate family interference and other social activity (Hislop and Axtell, 2011). Other research suggests that boundary management strategies fall into qualitatively distinct clusters that may evolve over individuals' lives (Moen *et al.*, 2008). Thus, rather than choosing boundary management strategies along a restricted continuum ranging from segmentation to integration, individuals may vary practices depending on their ability and willingness to employ integration and segmentation strategies in different situations (Bulger *et al.*, 2007; Kreiner *et al.*, 2009).

Boundary management tactics include behavioral tactics that involve other individuals or technologies; temporal tactics that determine when work and other activities are performed; physical tactics that regulate spatial distances between work and other activities; and communicative tactics that set expectations for other domain members (Kreiner *et al.*, 2009). Such tactics regulate micro-role transitions (Ashforth *et al.*, 2000) in which actors apply a mixture of segmentation and integration strategies to minimize the cost, or difficulty, of role border crossing. In segmentation strategies, actors may engage in tactics like establishing rites of passage across the boundaries between roles. For many traditional workers, commuting by automobile from office to home may be understood as a rite of passage between the work and personal domains. By contrast, integration strategies may involve fewer such rituals and be executed with little psychological or physical effort. However, integration requires more frequent micro-role transitions than segmentation and therefore risks the negative consequences of blurring role distinctions.

Although cognizant of the relevance of mobile technologies, studies of work-life boundary management tend to neglect full consideration of information technologies (Boswell and Olson-Buchanan, 2007; Cousins and Robey, 2005; Hill, Hawkins and Miller, 1996; Kreiner *et al.*, 2009; Richardson and Benbunan-Fich, 2011; Senarathne Tennakoon *et al.*, 2013). To compensate for this neglect, we turn next to a review of empirical studies of mobile technology affordances and work-life boundary management.

Mobile technology affordances and work-life boundary management
It is often challenging to articulate the role that IT artifacts might play in existing theories which have downplayed their potential importance. Based on an emerging discourse on the materiality of IT artifacts (Leonardi *et al.*, 2012; Mutch, 2013), we adopt the concept of affordance to understand how technology might be implicated in work-life boundary management. The concept of affordance is frequently applied in the field of human computer interaction as a means of guiding computer interface design (Norman, 1988). The concept is also increasingly used to explain how the material properties of artifacts, including mobile technology, influence the ways that artifacts are used (Arnold, 2003; Baron, 2008; Leonardi and Barley, 2008; Leonardi, 2011; Ling, 2004; Markus and Silver, 2008; Orlikowski, 2010; Robey *et al.*, 2013). Acknowledging the materiality of artifacts helps to overcome tendencies either to neglect technology completely or to theorize technology from a purely interpretive perspective, for example as "text" (Hutchby, 2001).

We adopt a relational view of affordances, which we understand as the relationship between material artifacts and their social contexts of use. Although Gibson (1979) originally coined the term affordance to refer to invariant characteristics of physical objects, later debates in ecological psychology and technology studies have positioned

affordances as a characteristic of the relationship between objects and actors (Chemero, 2003; Ling, 2004; Markus and Silver, 2008; Robey *et al.*, 2013; Stoffregen, 2003). Defining affordances as relationships averts the need to specify affordances in terms of a potentially limitless set of material properties, which for mobile technology would change each time new artifacts appeared. A relational approach resonates with Orlikowski and Scott's (2008) arguments about sociomateriality as "mutually dependent ensembles," which treats actors and objects as interdependent systems. Affordances are seen as potentials for action that depend on both the material properties of objects and the ability of actors to perceive and use them. Material artifacts thus become necessary conditions for affordances, but are not the affordances themselves (Markus and Silver, 2008).

Unfortunately, existing classifications of affordances found in the literature (e.g. Arnold, 2003; Treem and Leonardi, 2012; Zammuto *et al.*, 2007) have little in common, suggesting that a finite set of affordances is not easy to define a priori. Depending on the organizational context of specific technology applications, novel affordances are likely to arise (Jonsson *et al.*, 2009; Pollock *et al.*, 2009). Nonetheless, our review of studies of mobile technology reveals repeated references to the affordances of mobility, identifiability and connectedness. The studies reviewed below therefore provide a useful starting point for understanding the affordances of mobile technologies in practice.

Mobility
Mobility is typically defined as the user's potential to move freely across space and time while engaging with a mobile device. Mobility is a crucial affordance of mobile technology (Hislop and Axtell, 2007). Mobility may vary across heterogeneous mobile workers depending on the location of mobile work and how workers' time is divided between home, office and other places (Hislop and Axtell, 2007).

Kristoffersen and Ljungberg (2000) classify mobility as traveling, wandering and visiting. Traveling is going from one place to another in a vehicle, for example, an airplane trip from one city to another. Wandering, by contrast, is a form of local mobility where an individual walks around for an extended time. Visiting refers to stopping at a location and spending time there before moving to another location. Communications technology embedded within a mobile device affords these kinds of mobility while preserving the capacity for voice exchange, mobile collaboration, and execution of commercial transactions. For example, mobile workers can be office-based yet use mobile technology while traveling to customer locations (Axtell *et al.*, 2008) and when visiting unconventional work spaces such as coffee shops, airports, trains, cars and airplanes (Laurier, 2001).

As users exercise mobility, they may also engage in place making, which Brown and O'Hara (2003) define as the practice of using, managing and manipulating physical space to support mobile computing activities. The social norms, spatial and material characteristics of space shape mobile workers' tasks and behavior (Hislop and Axtell, 2009). Thus, place making occurs as the mobile worker reconceptualizes the space around them to make it more amenable to their mobile computing needs (Hislop and Axtell, 2009). Place making can assume different forms, including cocooning and encampment (Ito *et al.*, 2009). Cocooning involves using mobile devices to shelter users from active engagement with physical surroundings. For example, mobile workers may block out the ambient conversations in a café by using headphones. Encampment involves using portable media to construct personal work spaces in public places such as cafés and libraries and vehicles such as trains (Axtell *et al.*, 2008).

Thus, a variety of work practices can be afforded by the features of mobile IT artifacts to support the unique mobility requirements of diverse mobile workers.

Identifiability
Mobile technology affords users the potential to associate a mobile device or service with a single authorized individual, thus allowing the user to assume a unique identity. Identifiability is made possible through material features such as the subscriber information modules (SIM) card in mobile phones to which a unique phone number linked to the mobile user is assigned. Identifiability is also enabled on laptops and smartphones by PIN codes, user names and passwords that uniquely identify the device and user.

Two practices enabled by the affordance of identifiability are self-presentation and distant mobile co-presence. In self-presentation, users can make their behaviors, knowledge, locations, preferences and network connections visible to others as they move. Distant mobile co-presence (Arminen, 2009; Ling, 2008; Towers *et al.*, 2006) is the practice of occupying physical space and virtual space simultaneously. Creating mobile distant co-presence displaces mobile workers from their physical environments by focusing attention elsewhere, a phenomenon described by Gergen (2002) as "absent present." Self-representation and distant mobile co-presence may become part of a user's boundary management strategy (Baron, 2008). For example, mobile parenting is identified by Arminen (2009) as a way for mobile workers to stay in touch with children via technology while traveling away from home for work purposes.

Connectedness
Connectedness affords users rapid access to and constant communication with other users so that the domains of the mobile workers' life can be more closely connected (Palen, 2002; Lal and Dwivedi, 2009). Mobile devices with e-mail and text messaging installed support either integration or segmentation strategies by making mobile workers available at times and in places that once preempted such communication (Palen, 2002). Extensive connectedness can shift the temporal ordering between work and personal activities (Prasopoulou *et al.*, 2006). For example, workers may choose to execute initial contacts with clients upon rising early in the morning, then engage with family members (whether co-located or not), and later follow up with clients via phone calls or text messages. Connectedness also means that mobile professionals may never need to disconnect from their mobile technology, allowing continuous communications at all times. For instance, free-lancers and self-employed professionals may make themselves continuously available to clients through their mobile devices to avoid losing potential business and to manage client relationships (Sadler *et al.*, 2006a).

Connectedness may also facilitate the practice of multi-tasking, or the performance of multiple tasks at the same time. Much of the literature on mobile multi-tasking is focused on the use of mobile technology while driving an automobile (Laurier, 2001). In a non-driving context, Sadler *et al.* (2006b) note how mobile workers conduct phone conversations intermittently with other activities. Workers may also become adept at using mobile IM and e-mail to communicate with multiple partners simultaneously while traveling (Reinsch *et al.*, 2008). In general, managing time in mobile work can be tailored to individual needs, as afforded by the technology (Nansen *et al.*, 2010).

Our review of literature on the affordances of mobile technologies reveals a clear interest in understanding the role of technology features in supporting the boundary-management practices of mobile workers. However, less attention has been directed towards defining and theorizing the concept of affordances. In most studies of mobile work practices, researchers treat mobile technology in a descriptive fashion, and consequently mobile technology's implications for work-life boundary management remain under-theorized. Despite this limitation, the above literature helps to establish support for the relationship between affordances and work-life boundary management practices, which comprises the focus of our investigation. The following section describes the research methods used to answer our research question:

> *RQ1.* How are mobile technology's affordances implicated in the work-life boundary management practices of mobile workers?

Method
Research design
Considering individuals as the unit of analysis, we conducted two qualitative field studies to understand how mobile workers used technology to manage their work-life boundaries. Using the interpretive approach (Klein and Myers, 1999), we conducted the first study with 11 workers in 2004 and the second study with 14 different workers in 2008. Based on referrals, we recruited potential subjects via e-mail, providing them with the name of the person who had referred them and an overview of the study. In all, we conducted qualitative interviews with 25 mobile technology users who were engaged in a variety of work situations and used a variety of mobile technologies at least 50 percent of the time.

The analysis in Study 1 guided data collection in Study 2. We also revisited the literature between Studies 1 and 2 in order to deepen theoretical insight into our initial data analysis. Conducting two phases of data collection separated by analysis applies the principle of theoretical sampling, which is fundamental to qualitative research (Mason, 2002). The analysis across Studies 1 and 2 allowed us to confirm results across studies, derive new theoretical insights, and increase the credibility of our analysis (Miles and Huberman, 1994).

Because four years elapsed between the studies, the results of Study 2 shed light on the possibility that affordances endured across time despite differences in mobile technology over the two time periods. In 2004, most of the mobile workers in our study used laptops and analog, digital and PCS cellular phones. The use of smartphones such as Blackberries and Hewlett Packard IPAQs was just emerging. Most of the mobile workers in our sample connected to the internet with cable modems, very few used aircards and Wi-Fi hotspots, and none of them used built-in wireless modems. In 2008, most respondents used laptops and smartphones such as Nokia, Blackberries and iPhones. 2008's respondents used aircards, built-in wireless modems, 2G mobile networks and Wi-Fi hotspots, and mobile e-mail, instant messenger and business and personal applications more extensively than the respondents in 2004. Thus, users in 2008 had more opportunities to connect to the internet and other mobile computing services. Despite these differences in specific devices and services, the same affordances enabled work-life boundary management practices in both studies, and we found no evidence of completely new affordances associated with the newer technologies.

Data collection
Summary information about respondents for both studies is provided in Table I. In Study 1, the first author interviewed 11 mobile workers over a period of six months in 2004. The subjects included three types of mobile computing users: six office-based workers, three home-based workers employed by organizations, and two self-employed home-based workers (see Table I). The six office-based workers all worked at HomeLender[2], a large mortgage finance institution, which provided them with an office at the corporation's site. Although office-based, the HomeLender employees spent less than 50 percent of their time at the office and the rest of the time traveling locally. They were given laptop computers to facilitate work while they were mobile. Two of the home-based workers worked from a home office furnished by their employers. The third home-based worker operated out of the office of a major customer, from which he serviced other customers as required. Finally, the two self-employed users worked out of their home offices, which they furnished themselves.

The interview guides were based on concepts drawn from the literature on mobile work practices, e.g., the temporal, spatial and contextual conditions of mobile work (Kakihara and Sorensen, 2001). We used semi-structured interviews that included questions about the background of the organization and the user, travel patterns, devices and services used, past practices, current interaction patterns and future goals with regard to technology use. The researcher also asked users how they collaborated and used technology in their personal and business lives across time, space and social context. Including two follow up interviews with one subject and one follow up interview with two subjects, we conducted a total of 15 interviews in Study 1, lasting an average of 90 minutes.

We used observations in Study 1 to supplement some of the interviews. Observations included demonstrations of mobile technologies to complement stories about their use. Because interviews with participants sometimes occurred in locations away from their offices, this facilitated the observation of work experiences. For instance, one respondent was interviewed at a café with wireless internet service as he installed a newly acquired wireless card. In other cases, subjects were interviewed by telephone while they were traveling or working in a remote location. In such cases, the researcher was able to witness users' experiences first hand.

In Study 2, the first author conducted telephone interviews with 14 different respondents over a three month period in 2008. These mobile workers were located in different regions of the US and Canada and could not be observed directly. The respondents included three office-based workers, nine home-based workers employed by organizations, and two home-based self-employed workers. Two of the office-based workers worked at a company offering wireless broadband personal communication services to selected metropolitan areas in the US. The other office-based worker managed the Technology Unit in the Biology Department at a large public research university. The other nine home-based workers worked from home offices equipped by their employers. Two of them worked for a Fortune 100 global information technology services firm. Three others worked for a Fortune global 500 leader in mobile internet solutions. Three others worked for a small organization that developed business intelligence solutions for enterprises. The remaining subject worked for a small provider of financial supply chain integration solutions. The three home-based self-employed workers were consultants who worked from home offices that they equipped themselves. Interviews conducted in Study 2 lasted 60 minutes on average.

Table I.
Demographics
of mobile
computing users

Subject	Work group	Marital status	Gender	Occupation	Mobile work habits	Organization
Study 1						
TG	Office based	Married/children at home	Male	Vice President of Sales	Work at workplace, satellite office, home and other places	Mortgage lender
SW	Office based	Married/children at home	Female	Junior Sales Officer	Work at workplace, satellite offices and home	Mortgage lender
NC	Office based	Married	Male	Assistant Vice President of Sales	Work at workplace, and satellite offices	Mortgage lender
RK	Office based	Single	Male	Loan Officer	Work at workplace, home and other places	Mortgage lender
BE	Office based	Married	Female	Assistant Vice President of Marketing	Work mainly at workplace	Mortgage lender
MR	Office based	Married	Male	Network Engineer	Work mainly at workplace	Mortgage lender
MS	Home based	Married	Male	Quality Engineer	Work at customers' sites and other places	Original equipment and parts manufacturer for automotive industry
RS	Home based	Single	Male	Territory Manager & Client Services Representative	Work at home, customers' sites and other places	Company A – large Fortune 100 technology
TN	Home based	Single	Male	Pharmaceutical Sales Representative	Work at home, customers' sites and other places	Large pharmaceutical company
MG	Home based/self employed	Engaged with child	Male	Microsoft Certified Trainer & IT Consultant	Work at home, customers' sites and other places	Self employed Microsoft trainer
TH	Home based/self employed	Divorced with child	Male	Microsoft Certified Trainer & IT Consultant	Work at home, customers' sites and other places	Self employed Microsoft trainer
Study 2						
TX	Home based	Married	Female	IT Consultant	Work at home, customers' sites and other places	Company A – large Fortune 100 technology company (USA)

Subject	Work group	Marital status	Gender	Occupation	Mobile work habits	Organization
GF	Home based	Married with children	Male	Territory Sales Manager	Work at home, customers' sites and other places	Company B – large mobile technology company (Canada)
JM	Home based	Married	Female	Professional Services Manager	Work at home	Financial supply chain solutions integration company
DV	Home based	Married with children	Female	Chief Operating Officer	Work at home	Business intelligence company
CD	Home based self employed	Married with children	Male	IT Consultant	Work at home, customers' sites and other places	Self employed
AJ	Office based	Single/Engaged	Male	Project Manager	Work at home, office and other work sites	Company C – mid-sized mobile telecommunications company
GT	Home based/self employed	Single	Male	Business Development Consultant	Work at home, customers' sites and other places	Self employed
WH	Home based	Married with children	Male	Channel Manager	Work at home, customers' sites and other places	Company B – large mobile technology company (Canada)
RE	Home based	Married with children	Male	Systems Engineer	Work at home, customers' sites and other places	Company B – large mobile technology company (Canada)
MH	Home based	Single	Female	HR Director, Project Manager	Work at home	Business intelligence company
ML	Office based	Married with children	Male	IT Manager	Work at home, customers' sites and other places	US University
BC	Office based	Married with children	Male	Cell Site Engineer	Work at office and other work sites	Company C – mid-sized mobile telecommunications company (USA)
SI	Home based	Single	Female	IT Solution Lead	Work at home	Business intelligence company
MT	Home based	Married with children	Female	Director	Work at home, customers' sites and other places	Company A – large Fortune 100 technology company (USA)

Table I.

Selected questions from the interview guide for both studies are shown in Appendix 4. All interviews except one were audio recorded and transcribed, and the unrecorded interview was summarized immediately following the interview. Anonymity of all respondents was ensured.

Data analysis

Analytical approach. We carried out an iterative process of data collection and analysis (Glaser and Strauss, 1967) across the two studies. This approach allowed us to use insights drawn from prior respondents to direct the interviews and observations of successive respondents. Analysis applied three types of codes to the interview transcriptions: descriptive, interpretive and pattern codes. Descriptive coding entailed the assignment of codes based on the nature of the phenomena and involved little interpretation (Miles and Huberman, 1994). We then converted the descriptive codes to interpretive codes by assigning abstract meanings to the descriptions. We developed pattern codes, which are meta-explanatory or inferential codes that identify an emergent theme, configuration or explanation. We used the pattern codes to pull our data into more meaningful and parsimonious units of analysis (Miles and Huberman, 1994). In all coding operations, text segments often reflected multiple practices that, while analytically separable, were not separated in the practices explained by our respondents. Thus, individual text segments could be taken as evidence of more than one kind of boundary management practice. Miles and Huberman (1994) regard the multiple coding of qualitative text as useful in exploratory studies where no established indexing categories exist. This approach is also consistent with content analysis which recognizes that "[…] any one piece of qualitative text is likely to address more than one topic or concept at a time" (Mason, 2002, p. 151). We next describe how we applied this analytical approach across the two studies.

Study 1. In Study 1, we analyzed the data in three rounds of coding. In the first round we developed a master list of descriptive codes (Miles and Huberman, 1994) based on concepts from work-life theory. As shown in Appendix 1, descriptive codes included physical, temporal and psychological properties of border transitions; border composition processes; border flexibility, permeations, crossing and keeping; the domains and place of technology use; and users' effectiveness.

Using an inductive approach, the analysis also consisted of comparisons across individual respondents on each of the coded categories. These similarities in the way that respondents managed work-life boundaries were developed in a round of interpretive coding intended to combine descriptive codes into conceptual categories (Miles and Huberman, 1994). Interpretive codes included concepts such as managing spatial constraints, negotiating accessibility and disconnection.

A third round of coding involved grouping interpretive codes into pattern codes reflecting broader border management strategies (Miles and Huberman, 1994). Pattern codes represented theoretical concepts related to space utilization, managing accessibility, and managing transitions. These concepts and an updated review of the literature guided the development of the interview protocol used in Study 2.

Study 2. In Study 2, we conducted three rounds of data analysis. In the first round, we applied the pattern and interpretive codes from Study 1 to the newly collected data from Study 2. Our analysis confirmed the codes developed in Study 1 and identified new interpretive codes. In round 2 we organized the set of practices described by

individuals in both studies into an expanded set of pattern and interpretive codes. These are shown in Appendix 2 along with descriptions of the practices. Within this expanded set was a new category of practice, managing time, which described strategies that mobile workers used to manage their temporal boundaries.

In round 3 of Study 2, we refined our categories to produce the more parsimonious set of strategies and work practices shown in Appendix 3, which also provides examples from the data for each interpretive coding category. It became more evident that the material properties of the technology played a central role in how users managed work-life boundaries. We therefore created coding categories to index users' references to specific affordances that were integral to work-life boundary management. Although our earlier literature review identifies some ways to classify technology affordances, we found them too limited because they focus on a specific mobile device (i.e. the mobile phone; Arnold, 2003), describe affordances at the organizational rather than individual level of analysis (Zammuto *et al.*, 2007), or are too broad.

In the final step of our analysis we asked the respondents to evaluate a summary of the theoretical framework that resulted from the data analysis and interpretation (Jonsen and Jehn, 2009). The subjects confirmed that the theoretical framework made conceptual sense. Thus, we authenticated the results by using three independent sources to support our findings: interviews, observations and informant feedback (Miles and Huberman, 1994).

Results
Our results reveal three strategies that mobile workers apply to manage work-life boundaries: managing physical boundaries, managing temporal boundaries and managing psychological boundaries. As Table II shows, each of these strategies is comprised of several specific practices, representing recurrent patterns of behavior enabled by the affordances of mobile technology. The work practices and strategies are associated with five specific affordances: mobility, connectedness, interoperability, identifiability and personalization. Three of these are consistent with those mentioned in the prior literature review; two additional affordances emerged from our data analysis. In the following sections, we first describe these five affordances followed by a description of the mobile work practices that they enable.

Technology affordances
As shown in Table III, we define five affordances reflecting the relationship between mobile workers' perceptions and abilities and the material characteristics of the technologies available to them.

All of these affordances can be illustrated in a single work practice for managing work-life boundaries described by DV, a female Chief Operating Officer of an IT company, married with two children and working from home. DV used a smartphone and laptop, both of which she configured for work and family purposes. For DV, work was occasionally integrated with physical exercise. By arranging mobile devices on the elliptical exercise machine in her home office, she was able to attend business meetings and respond to messages while exercising:

> I take a laptop and I put it on the elliptical where people usually put magazines and I remote-desktop into my computer. […] And I attend the GoToMeeting [a web conferencing application] from my elliptical. Or if I'm getting an instant message, I can get it right

Strategy	Work practices	Description	Enabling affordances
Managing physical boundaries	Selecting space	Selecting appropriate work and personal spaces for mobile technology use	Mobility, interoperability, connectedness
	Configuring space	Transforming locations into venues for personal or business use of mobile technologies by arrangement and configuration of mobile technology and other entities in the space available according to personal preferences	Mobility interoperability, connectedness
Managing temporal boundaries	Scheduling	Using mobile technology to plan the sequence and duration of work-life events	Mobility, connectedness, interoperability, personalization
	Converting dead time to productive time	Using mobile technology to manage activities within time periods during which a worker is potentially unable to be productive	Mobility, connectedness
	Multi-tasking	Performance of multiple tasks at the same time with some being carried out via mobile technology	Mobility, connectedness, identifiability
Managing psychological boundaries	Technology designation rules	Rules used to determine the relative separation and combination of mobile devices, applications and data	Mobility, personalization, identifiability, interoperability
	Boundary permeation rules	Social rules to accept or divert attempted boundary permeations arriving through mobile technologies	Mobility, connectedness personalization identifiability
	Connection and disconnection rules	Rules for when it is appropriate to disconnect mobile devices	Mobility, connectedness

Table II.
Strategies, associated work practices and enabling affordances

Affordance	Description
Mobility	The potential for the user to move freely and easily while transporting or engaging with a mobile device
Connectedness	The potential to engage with the mobile technology to establish communications
Interoperability	The potential to use mobile technology to share information, data and resources across various heterogeneous devices and applications
Identifiability	The potential to associate a mobile device or service with a single authorized individual, thus allowing the user to represent a unique identity
Personalization	The potential to select mobile technology options and settings to match user's personal preferences or needs

Table III.
Affordances associated with mobile technology use

there while I'm on the elliptical and I can answer it right there. I'll actually take the laptop and I'll connect it to the TV and then I have a Bluetooth keyboard and so I'll just have the keyboard there [on the elliptical] and not the whole laptop (DV, Chief Operating Officer, 2008).

In this example, each affordance identified in our study contributes to work-life integration. Mobility allowed DV to mount the laptop computer on the exercise machine for use in a non-work space, thereby increasing the flexibility of the physical boundary between home and work and contributing to a strategy of work-life integration. Connectedness is illustrated by DV's ability to use the laptop to connect to the web conferencing application via the internet, thus increasing the flexibility of the temporal boundary by facilitating exercise during a meeting held during working hours. Interoperability is demonstrated by DV's use of the Bluetooth keyboard to enable connections between laptop and TV monitor. This allowed her to create a personal area network to support work in a non-work space, thus increasing the spatial flexibility of the physical boundary. The identifiability affordance allowed DV's participation in the web conference to be authorized via her unique password. She also disclosed her work role in her IM application even though multiple roles were being performed simultaneously, thereby managing the psychological boundary. Personalization is demonstrated by DV's separation of IM contacts into groups (one for work, a second for family) on her laptop. This separation also enabled the management of the psychological boundary. Each of these five affordances arises from the interaction between the material properties of the technologies and the user, thus generating potential for using mobile technologies to manage the boundaries between work and life domains. We now discuss how the affordances emerged during the two time periods when we conducted the studies.

Managing physical boundaries
Mobile workers performed work-life activities across a variety of spaces resulting in varying degrees of flexibility and permeability of physical boundaries. The two main tactics for managing physical boundaries were the work practices of selecting space and configuring space.

Selecting space. Mobile technology afforded mobile workers options to select from a variety of work and non-work spaces. Selection of space could facilitate either a segmentation or an integration strategy depending on the activity being performed, the spatial location, and the time of day. Spaces in our study included vehicles (automobiles, trains, and airplanes), "camping areas" (Ito *et al.*, 2009) (waiting rooms, parks, and cafés), homes, and employee and client offices.

Managing space in vehicles began with the choice of transportation mode. One practice was choosing a transportation mode that allowed a greater variety of activities (both work and non-work) to be accomplished while moving. For example, in Study 1 MG a Microsoft certified trainer, selected trains instead of automobiles so that he could avoid operating a motor vehicle. As MG engaged his aircard and laptop, the connectedness and mobility affordances supported the management of his work-life boundaries while on the train:

> I opted to take a train from New York to Vermont and the train back from Vermont to New York just so that I can have the hours on the train to do work. […] And I found myself more relaxed as well (MG, Microsoft Trainer, 2004).

When not inside vehicles, mobile workers often used mobile technology to work in camping areas such as hotel rooms, parks, cafes and airport lounges, which were converted into spaces that could accommodate either work or personal activities. Mobile users chose public places based on the availability of internet access, refreshments, showers (e.g. airport lounges) and other resources supportive of mobile

work. Even when working from their own homes, some mobile workers carried mobile technology to nearby parks, cafés, and bookstores when they desired a change of environment for work. Mobility and connectedness afforded the use of the space for these purposes. For example, in Study 2 JM used her laptop to work at Barnes & Noble or Starbucks stores near her home. On occasion, she also brought her smartphone along on walks in the park with her husband so that she could work while they spent time together:

Even if my husband wants to go to the park and I know I have to test a couple of things – I can commit to doing that because I know I can do it from my phone (JM, Professional Services Manager, 2008).

Managing work-life boundaries within the space of home involved the selection of specific rooms to equip with mobile technology for work purposes. In Study 2 DV's choice led to difficulties in managing work-life boundaries because she rarely moved from the bedroom. On some days she woke up in the morning and walked directly to her desk to check e-mails:

So you start responding, and then you realize that you got to your desk at 6 in the morning. It is now after midnight, you are so tired that you're gonna go get in bed. You haven't showered or brushed your teeth or combed your hair that day. You probably used the bathroom twice (DV, Chief Operating Officer, 2008).

To manage her space more effectively, DV moved to a different house where she dedicated one room as a work area where mobile technology was predominantly used, so she "[…] could actually close the door and put a key in the lock at the end of the day." In DV's case, mobility and connectedness allowed her to use mobile technologies to strengthen the boundary between work and personal activities because different activities could occur in separate rooms.

Similarly, in Study 1 TN chose to dedicate a specific room in his home as a work area. TN used his home office to work all night on his docked Fujitsu handheld computer, resulting in the deliberate blurring of work-life boundaries:

When you are at home you can sit in your office in your house coat and your PJ's in front of your computer […] And that if there is a report that's due and for some reason you have fallen behind, you can work all night in the comforts of your own home. It's absolutely wonderful (TN, Pharmaceuticals Sales Representative, 2004).

In TN's case, mobility and connectedness allowed him to use mobile technologies to blur the boundary between work and personal activities because work could take place after traditional working hours in a dedicated space in his home.

Configuring space. Mobile workers exercised discretion in choosing vehicles large enough to accommodate work while driving. Arranging mobile devices so that they could be easily accessed while moving was a common approach to configuring space within vehicles. For instance, in Study 1 MS arranged his truck's cab as a mobile office during his long drives to client sites:

The last truck I rented was a Dodge pickup. It had 4 power outlets in it. I plug in my phone. I plug in my laptop. I plug in my CB. All those things were going at one time. If a car did not have multiple power outlets I don't want it. It's not useful. I need to be able to set stuff up so that it is useful and I can see things while I am going someplace. Or if I pull over I want a comfortable position to work from (MS, Automotive Quality Engineer, 2004).

The configuration of vehicle space gave MS the discretion to make his work-life boundaries more permeable as he traveled. The affordances of mobility, interoperability and connectedness allowed MS to work and to communicate with those in his personal life while driving, thus supporting a work-life integration strategy.

Similarly, in Study 2 MH configured vehicle space to take advantage of various gadgets including a navigation system and a phone system that was integrated with the car's audio system via Bluetooth technology:

> It comes in really handy because I don't have to use my handset. Basically all of my phone calls come through my speaker system in my car. So I can answer or hang up the call from my steering wheel (MH, HR Director, 2008).

Like MS, MH also configured vehicle space to make her work-life boundaries more permeable as she traveled. And like MS, MH was able to rely on the affordances of mobility, interoperability and connectedness to work and communicate with those in her personal life as she traveled, supporting a work-life integration strategy.

Across the studies, users varied their engagement with the mobility, connectedness and interoperability affordances to manage physical boundaries. In 2004, most respondents could only connect to computing resources through a cable modem once they arrived at their destination. Thus, these respondents mostly engaged with the mobility affordance to facilitate "visiting" and "traveling" by either carrying their mobile devices to work at a specific location. Very few respondents used mobile devices to access local and remote computing resources as they traveled in vehicles. In 2008, mobile devices became smaller, lighter, more powerful and had advanced capabilities to be constantly connected to computing resources through Wi-Fi and cellular wireless networks. Most users in 2008 used smartphones with internet connectivity that combined phone, PDA and computing capabilities as users moved from place to place. Accordingly, respondents in 2008 reported more practices where they engaged with the mobility and connectedness affordances to wander around a specific location. For examples, JM used her mobile phone to connect to computing resources at work while wandering through a park with her husband, and GF used his phone to send e-mail while on the golf course with friends.

Users in 2004 did not have as many opportunities to engage with the interoperability affordances as those in 2008 did. For instance in 2004, MS reported instances where he placed his laptop on the console of his truck to answer e-mails while at a stoplight and positioned his mobile phones strategically so that he could reach them as he drove. Features were not available for MS to integrate his mobile devices with his car's systems apart from power outlets. In contrast, in 2008 MH reported being able to use Bluetooth to connect her mobile devices to her car's integrated phone system, using the controls on the steering column as she drove. Overall, from 2004 to 2008, advances in the material features of mobile technology resulted in more opportunities for engaging with the interoperability affordance to effect more seamless work-life boundary transitions.

Managing temporal boundaries
Tactics for managing temporal boundaries included work practices that used mobile technologies to regulate the sequence and duration of work-life transitions. These practices included scheduling, converting dead time into productive time, and multi-tasking vs working sequentially.

Scheduling. In Study 1, mobile workers used wireless PDA's such as Palm Pilots to schedule work-life activities using applications such as Outlook. For example, TH, a Microsoft trainer, synchronized his Outlook calendar with his personal and work activities, across his HP IPAQ pocket pc, his Toshiba tablet computer and his desktop computer. The interoperability affordance allowed him to synchronize data across mobile devices while the personalization affordance allowed him to create time segments devoted to work and personal matters. While mobile, TH depended on his pocket pc to stay on schedule. The following illustrates how the absence of the mobility, personalization and interoperability affordances made it difficult for TH to remain on schedule:

> I was distraught. Because I didn't have my calendar. When I was going to meet people I had no concept of time. It warned me 15 minutes before so I knew I was in walking distance. So it notified 15 minutes on my pocket pc, my tablet and if I am using my desktop it would notify me on my desktop. So I switch between all three (TH, Microsoft Trainer, 2004).

In this instance, TH could not benefit from the interoperability affordance to access the personal and work calendars that he previously synchronized across devices and applications. Further, TH could exploit neither the mobility affordance to carry his schedule with him, nor the personalization affordance to alert him of upcoming appointments while on the move. Thus he found it difficult to remain on schedule.

In Study 2, some mobile workers in our sample scheduled work-life activities using mobile versions of applications such as Outlook and Franklin Covey. Workers also used home versions of collaboration software such as Microsoft Homeserver and Outlook to schedule activities in the home. Like Study 1, the interoperability and personalization affordances played a role in scheduling. The interoperability affordance allowed users to synchronize data across mobile devices and family members' business and personal calendars while the personalization affordance allowed mobile workers to create time segments devoted to work and personal matters. For example, by using shared calendars on his mobile device, CD was able to schedule his work-life transitions to mesh with those of other household members:

> I try to put in all my time constraints and requirements. Whether they be personal or business. I have one calendar that has everything, basically. […] My family, they each have a calendar in Outlook. And since I run everything out of the house, we're able to share them (CD, IT Consultant, 2008).

The material properties enabling interoperability were just emerging in 2004, and mobile users were just learning about the possibilities for managing physical, temporal and psychological boundaries. In contrast, respondents in 2008 were more able to exploit the interoperability affordance. This distinction was reflected in the small number of respondents in 2004 who owned aircards or synchronized data across devices and applications, compared to the large number of respondents in 2008 who described practices to make devices and applications interoperable. For instance, RK a respondent in Study 1 from HomeLender, reported how he learned to synchronize his calendar across work and personal devices with an aircard:

> I called Matt over in IT. I just asked him. I have got the wireless card in my Compaq I have got my Sony PDA, with the PC with Windows and all that is integrated and I have got my cell-phone with the same carrier T-mobile. I know I can forward emails and rates to my cell phone, can I coordinate my PDA with my cell phone and the laptop all to be synchronized? Is there anyway I can connect all three to where I am never out of the loop? You know if I have one

device where one is down and one is missing I am still alive in some sort of fashion. – Is there a better way to do this? (RK, Loan Officer, 2004).

HomeLender associates also mentioned a test of wireless PDAs and aircards and that the organization planned to issue aircards to associates with laptops at the conclusion of the pilot testing. In contrast, users in 2008 frequently reported practices that involved interconnecting disparate devices, synchronizing data across devices and applications, and interfacing mobile technology's material properties with physical environmental artifacts.

Others used connectedness to increase the flexibility and the permeability of the temporal boundary between work-life domains. As such, executing activities outside the time periods where such activities are traditionally performed was a common practice in both 2004 and 2008. For SW, a respondent in Study 1, connectedness allowed her to stay in contact with colleagues and customers outside traditional work hours. However, the main person she collaborated with using her work laptop after hours was her boss, who "[…] would not expect me to be online at 6:00 AM in the morning although we were emailing back and forth" (SW, Junior Loan Officer, 2004).

For DV, a respondent in Study 2, mobile technology provided the capacity to execute activities outside the time periods where such activities are traditionally performed, thus supporting her integrated boundary management strategy:

It's not that I work 8 to 5, Monday through Friday, or 8 a.m. to 8 p.m. I've been on the phone at 2 in the morning but it didn't mean that I started talking at 7[a.m][…]. I probably went to the mall that afternoon. So it's not that I work so many more hours (DV, Chief Operating Officer, 2008).

Connectedness also facilitated the construction of rigid temporal boundaries in both 2004 and 2008. For example, in Study 1, BE established rigid temporal boundaries during personal time but left allowances for work emergencies:

I don't check my emails on the weekend, after hours, unless there is something pressing that I need to check. Normally I don't check it on the weekends (BE, VP Marketing, 2004).

Likewise, in Study 2 BC defined a rigid temporal boundary between work and non-work activities by turning his mobile phone off when his traditionally defined work-day ended:

Between the hours of say 6 [a.m.] and 6 [p.m.], half the day is for work. The other half is mine. If I shut the phone off and don't answer it till 6 [a.m.] the next day, I don't have a problem with that. Whatever happens happens. Whatever didn't happen didn't happen. It makes no difference to me (BC, Cell Site Engineer, 2008).

Converting dead time into productive time. Another time management practice used by many of the mobile workers in our sample was converting dead time into productive time. In manufacturing settings, dead time refers to a period when a worker is unproductive because of a machine malfunction or interrupted flow of materials. For mobile workers, dead time occurred while waiting for a flight, when traveling between destinations, and while waiting in a client's office. Even though before mobile technology, workers could use dead time by performing activities such as reading books or reports, mobile users could use mobile technology to transform periods of dead time into opportunities to increase productivity. One valuable technology enabling the productive use of dead time was the aircard, which enabled connection between a laptop computer and the internet wherever a cell phone signal was available.

For example, MG traveled on trains with a smartphone, laptop, aircard and GPS. Mobility and connectedness allowed him to use the mobile devices to prepare for training: "Rather than drive and have six hours of dead time, I took the train so I could utilize those hours" (MG, Microsoft Trainer, 2004).

Similarly, JM, a respondent in Study 2, explained how the aircard eased her worry about wasting time on the road:

> Before I got my air card, when I would drive to Georgia – oh my God, that would be eight hours of wasted time to me – because I honestly can't drive and be on the Internet or anything like that. – Now I have the air card. I'm okay (JM, Professional Services Manager, 2008).

The decision to use mobile devices during dead time resulted in either an integration or segmentation strategy. For instance, when dead time occurred during traditional working hours, mobile workers could use mobile technology either to increase work productivity or to carry out personal activities. Conversely, when dead time occurred during traditional personal time, mobile workers could also use technology to work. The mobility and connectedness affordances enabled the conversion of dead time into productive time.

Multi-tasking. Users who overlapped tasks during the same time period explained how they used mobile technology for integrating work-life activities. For example, in Study 1 RK was one of the few respondents who owned a laptop with wireless connectivity. He described how he integrated work-life activities using mobility and connectedness while running errands on the weekend:

> I try not to work on the weekend. But usually I end up having to. – If an agent calls me on the weekend, they are showing houses – And my agent says "I need to pre-qualify somebody. Can you do that now?" I keep my laptop in my car with me, load it up, plug it into my cigarette lighter in my car, power it up and I can upload and take a loan app (RK, Loan Officer, 2004).

Respondents in Study 2 also described multi-tasking activities. GF explained how mobility and connectedness helped him to conduct business between golf shots:

> You hit your shot then while you're walking you finish the email, or you have your headset on and you get really good at being on a conference call while you're concentrating on that 10 foot putt that's gonna win you $10 from your friends (GF, Territory Sales Manager, 2008).

Although the same affordances were present in both time periods, there were subtle differences in how users perceived them. One difference was how subjects with and without aircards in 2004 exploited the connectedness affordance. Those subjects in 2004 without aircards did not use mobile technology to connect to the internet in cafés and while traveling on public transportation. When asked, many could not visualize a lifestyle where carrying mobile devices to connect to the internet and work in places previously dedicated to non-work activity was possible. However, subjects who owned aircards in 2004 exhibited many of the practices that subjects in 2008 took for granted, and exploited the connectedness affordance more extensively than those without. Aircard users connected to the internet for either work or personal activities in cafés and on public transportation, intertwined work and personal activities, and worked well beyond traditional work hours. There were also differences between 2004 and 2008 in how users exploited the interoperability affordance. Subjects in 2008 were more familiar with the interoperability affordance and often synchronized data and applications across many heterogeneous devices, making it easier to effect work-life boundary transitions. In contrast, subjects in 2004 were just learning about the

possibility to integrate applications and data across PDA's, laptops and desktops. A fascinating finding was how some subjects in 2004 were able to visualize the possibilities for engaging with mobile technology's affordances once they encountered their material properties. For instance, once RK came into possession of his PDA, laptop with aircard and desktop with the same applications across them, he was able to perceive a new way of working using the interoperability affordance. Subsequently, he initiated the synchronization of data and applications across all three devices so that he would "always be in the loop," even though, initially, he was unaware that such synchronization was possible.

Managing psychological boundaries

Mobile users managed transitions between work and family domains by constructing rules governing when mobile technology use was appropriate for one domain but not the other. Blending psychological boundaries occurred when a mobile user applied similar rules for using mobile technology in their work and family domains. Mobile users managed their psychological boundaries using three types of rules: technology designation rules, boundary permeation rules, and connection/disconnection rules.

Technology designation rules. The rules governing use of mobile technology to manage psychological borders were derived in part from organizational policy. Technology designation rules helped to guide the separation and combination of mobile devices, applications and data. To ensure the security of corporate data, organizations often prohibited the use of corporate mobile technology for personal use. Technology designation rules also arose from users' desires to separate their personal and work domains, a common practice in both studies. In Study 1 TN, a pharmaceutical representative, described why he separated devices, data and applications for personal and work purposes:

> I do a lot of things on my personal computer that are not work related. – I have a separate email address as well and everything that I do on my computer (Fujistsu handheld computer) for the company is routed through the company's server. And there are some things that are obviously private such as – bill paying, emailing my friends about personal things. It's just easier for me to keep them separate because I don't want to have to worry about whether or not something might have been inappropriately routed to someone in the organization (TN, Pharmaceutical Sales Representative, 2004).

In this instance, TN relied on the personalization affordance to designate devices, data and applications to specific domains.

Similarly, in Study 2 JM consciously designated her BlackBerry to support her professional role and her iPhone to support her personal roles. JM's decision was intended to keep work from overwhelming her family obligations:

> I put my personal stuff on my Mac with my iPhone, and so personal stuff like doctor's appointments, graduations, birthdays, anniversaries, dinner with somebody on Friday, drinks with somebody, that all goes personal (iPhone). But gotta be in New York, gotta be in Chicago, that stuff goes in the work BlackBerry. – When I go to the doctor's office and they're like, "So look, here's your next appointment," the first thing I do is whip out my BlackBerry and then the second thing I do is look at my personal [iPhone] (JM, Professional Services Manager, 2008).

In this instance, JM relied on the mobility and personalization affordances to implement boundary rules that designated different devices to each domain.

Others managed psychological borders by combining professional and personal matters into the same technology devices and applications. In DV's role as an executive in an information services firm, she was expected to be constantly available to corporate demands. Since her personal objective was to succeed professionally, DV designated a single mobile device for both family and work domains so that she could execute transitions more quickly: "I don't want to have two cell phones; I don't want to have two laptops; that just would not work for me." The identifiability, personalization, and interoperability affordances enabled DV to maintain her integration strategy. Identifiability allowed DV to identify which mobile e-mail addresses were work or personal. Personalization allowed her to maintain separate e-mail addresses and data on a single mobile device, and interoperability allowed the integration of personal and work data from different sources on a single device.

Boundary permeation rules. Mobile workers also developed social rules to accept or divert attempted boundary permeations arriving through e-mail, voicemail, and IM. Through the personalization, identifiability and connectedness affordances, users could establish a unique online presence and to inform others of their availability for boundary permeations. For example, mobile workers in both studies applied the constant availability rule to satisfy personal objectives to attend to both family and work domains equally. MG, a respondent in Study 1 used IM on his laptop to inform both business and personal domain members of his location, availability, current activity and even state of mind. MG described how identifiability and connectedness enabled this integrated boundary management practice, even while actively engaged in training:

> My fiancée and I have access to each other almost 24/7 if I am online and she is online at work. – I never ever let my students know. I could be in a middle of a lecture and up would come a question and I would notice her name highlighted on my personal screen and I would just make note of it so that at the next opportunity I can respond to it. (MG, Microsoft Trainer, 2004).

Although mobile workers sometimes had fixed working hours, employers often expected them to be constantly available and responsive. As a result, mobile users were pressured to accept permeations of their psychological boundaries, using mobile technology's connectedness affordance. For instance, SI, a respondent in Study 2, used e-mail and IM on her laptop and smartphone to make herself continuously available for business permeations. She explained the rationale for the constant availability rule: "It's been told to us. We have to be online as much as possible because we're a virtual company." However, SI did not accept IM permeations from her personal domain. Therefore personalization, identifiability and connectedness facilitated different rules for the work and personal domains, thus supporting a mixed segmentation/integration strategy.

Mobile workers in both studies also used selective technology features to delay permeations by scheduling appropriate times, places and contexts to accept or process permeations. For example, in Study 2 RE preferred a smartphone for e-mail, internet services, and voice conferencing. As RE moved from place to place, mobility and connectedness allowed him to selectively accept or divert domain permeations:

> If somebody's sending me an e-mail at 10 at night, that's probably because they need my attention at 10 at night, whether it's a customer or a friend. So I like being able to get it at that time and then I can decide I'll either respond to that tomorrow or no, this looks like something I need to respond to immediately (RE, Systems Engineer, 2008).

In contrast, respondents in Study 1 spoke mostly about engaging with the personalization affordance for filtering phone calls rather than filtering e-mails, as most respondents did not have access to e-mail on their mobile phones. Mobile users in 2004 developed prioritization schemes for phone calls, and how they prioritized phone calls differed across informants. For instance, MS described the following prioritization scheme on a phone without e-mail capability:

It's called caller id. I have a phone that can filter out where the calls are from. If the calls are not from the right place you go straight to voice mail. On the other hand if you call a certain number and you are the right person then it automatically rings and it rings in a special way (MS, Automotive Quality Engineer, 2004).

Overall, the material features of different mobile technologies across the two studies resulted in different capabilities for mobility, personalization and connectedness in 2004 and 2008.

Connection/disconnection rules. Mobile users also developed rules governing the connection and disconnection of mobile devices. In Study 1 many users felt obliged to accept work related intrusions at home in order to conform to organizational norms. Thus, they needed to negotiate the terms governing these interruptions with family members. NC, a mortgage loan officer in Study 1 relied on the mobility and connectedness affordances of his cell phone and pager to remain connected to work during personal time. NC described the negotiations with his wife to accept the mobility and connectedness affordances as follows:

When I first started in this business […] I had a cell phone and my pager was on at night. My wife would be mad. […] I trained her. I basically got her to the point where if my pager went off her counter (response) was "sounds like money." So I kind of got her into the idea that that's how I make money and so from that perspective we kind of worked through that (NC, Assistant Vice President of Sales, 2004).

Similarly in Study 2 some mobile users never disconnected from either work or life domains because mobility and connectedness supported their preferred integrated boundary management strategy. For RE, a systems engineer in Study 2:

There really isn't a time when I disconnect. It's always on unless I'm on a plane or out of cell service – on a remote mountain somewhere, I'm pretty much always connected. […] And I do find it fairly conducive to […] both personal and work life to be always connected (RE, Systems Engineer, 2008).

Although some mobile users constantly accepted permeations from their work and life domains, others applied rules to determine whether or not to accept permeations. Constant connection through mobile technology resulted in some mobile workers unwittingly extending the time to work and neglecting personal matters. For example, in Study 2 SI shared her concerns about constant availability: "So it's really hard for me to just be available all the time. But I find that I can't really stop it. […] It's a struggle."

Other mobile users regularly disconnected from the work domain in order to have more personal time. In Study 1 TH disconnected from both his work and personal domains on a regular basis:

I am always connected. People know how to get in touch with me. You can text message me. You can email me. I just turn off all the equipment. I just don't get online. – It happens once maybe I would say once every 3 weeks or something like that (TH, Microsoft Trainer, 2004).

Similarly, in Study 2 GF disconnected from his work domain because he believed that time off was important to remaining productive:

> I work in an environment where people are connected 7 by 24 and just because they're sending an email at Saturday night at 9 they expect an answer. Well, I don't work that way. – Through the normal run of business, there is switch off time. – Because if I'm constantly connected I am actually less productive (GF, Territory Manager, 2008).

In both cases, the connectedness affordance supported the rule to disconnect from work and personal domains as needed.

In Study 2, all respondents had wireless capability on phones and laptop computers. In contrast, only four of eleven respondents in Study 1 had wireless capability installed on their mobile computers, and only three had PDAs with wireless capability. Although HomeLender planned to issue wireless modems to all loan officers in 2004, only one loan officer owned a wireless modem which he connected to his mobile computer. Thus, although most respondents felt the need to be constantly connected through their mobile devices, there were limitations to the connectedness affordance as it was mostly available through analog mobile phones, pagers or when respondents docked their mobile computers and connected to the internet via cable modems. There were also limitations to the mobility affordance as most mobile users in 2004 did not have the capability to access the internet and send and receive e-mails via their mobile phones while on the move. Further, some users in 2004 reported that they did not intend to engage in some of the mobile practices enabled by connectedness and mobility that users in 2008 took for granted. For example, when asked if working in Starbucks on a mobile computer with a wireless modem was a possible option, NC a HomeLender company executive responded:

> I am not taking my computer with me. – I don't want to. I don't need to. If I go someplace for lunch and somebody needs to access information and it's in my computer, they can wait till I get back (NC, Assistant Vice President of Sales, 2004).

Overall, the way users engaged with mobile technologies affordances changed dynamically to match the changes in their preferences for connection or disconnection to work-life domains.

Discussion
We sought to understand how mobile technology's affordances are implicated in the management of physical, temporal and psychological boundaries of mobile workers. Table IV presents the research question and summarizes the answers that our research generated.

As summarized earlier in Table II, our results demonstrate a variety of work practices enabled by the affordances emanating from the relationship between mobile users' abilities and mobile technology's material properties. Employing the lens of affordances allows us to organize our findings into three categories describing consistent ways that mobile workers use the material features of mobile technologies to manage the physical, temporal and psychological work-life boundaries. We identify five specific affordances: mobility, connectedness, interoperability, identifiability, and personalization. Mobility, connectedness and interoperability are suggested by prior studies on mobile technology use, and we confirm their relevance in our study. Further, we identified personalization and interoperability as additional affordances. These affordances emerge as human actors exercise discretion over the selection and

Research question	Answers
How are mobile technology's affordances implicated in the work-life boundary management practices of mobile workers?	
(1) Mobile technologies afford boundary management practices.	Mobile technology affordances include mobility, identifiability, personalization, interoperability and connectedness. These affordances are implicated in practices of managing physical, temporal and psychological boundaries
(2) Core material properties of mobile technology generate the same affordances over time.	The core material properties of mobile technologies include small size, light weight, connection to digital resources and portability. These core material properties enable the affordances implicated in workers work-life management strategies. Actors interacting with mobile devices in the future may experience affordances similar to those we observed because of the presence of the core mobile material properties. The work-life management practices we observed may endure over time but in a different form, if these core mobile material properties persist
(3) Mobile technologies afford a diversity of boundary management practices.	Mobile workers engage with mobile technology's affordances to control and effect work-life boundary transitions resulting in mixed strategies which vary along the integration-segmentation continuum for each user. As mobile technology's affordances evolve, they make work-life boundary transitions and reinforcement easier

Table IV.
Summary of
research questions
and answers

use of mobile technologies and their deployment to support work-life boundary management strategies.

Our inclusion of affordances as an explanatory concept extends theories originally developed to explain work-life boundary management. Our findings explain how and why technology affordances are implicated in individuals' strategies for managing work-life boundaries. Although Kreiner *et al.* (2009) include technology as one of several boundary management tactics, our analysis places technology affordances in a more central theoretical role. Given the widespread availability and use of mobile devices and services, the inclusion of technology's material features represents a needed extension of work-life boundary management theory. Discussions of three specific implications of mobile technology affordances comprise the remainder of this section.

Mobile technologies afford boundary management practices
The work-life boundary management literature describes strategies for managing physical, temporal and psychological work-life boundaries. Our results indicate that mobile technology's affordances are directly implicated in the management of each these boundaries. We therefore contribute to the prior literature by showing that work practices comprising boundary management strategies are enabled by mobile technology affordances. This contribution compensates for the neglect of technology in existing theory.

Specifically, the findings suggest two practices associated with managing physical boundaries: selecting and configuring space. Affordances such as connectedness,

interoperability and mobility enabled the management of physical boundaries by allowing mobile workers to select a greater variety of places to work. Once situated physically, workers configured their surroundings to support mobile computing activities in both work and non-work domains and to execute work-life domain transitions. These findings are consistent with Brown and O'Hara's (2003) description of manipulating space to support mobile computing activities, and practices such as camping in public spaces and using mobile computing activities to create cocoons so as to avoid active engagement with physical surroundings (Ito *et al.*, 2009). For these users, the personalization affordance was not associated with physical boundary management because physical boundary practices focused on the manipulation of spatial characteristics to support mobile work. In contrast, the personalization affordance refers to the potential to adjust the mobile device's options and settings to support users' preferences.

The results also suggested three practices associated with managing temporal boundaries. The interoperability affordance facilitated collective scheduling of family and work activities, and both connectedness and mobility were directly implicated in the practices of multi-tasking and converting dead time into productive time. The connectedness affordance enabled individuals to manage temporal boundaries so that the demands of both domains were met. For many, mobile technology enabled more frequent temporal transitions between domains, allowing both domains to receive attention when needed (Morris and Madsen, 2007).

Our findings suggest three social rules relevant to managing psychological boundaries. Technology designation rules allow mobile workers to separate domains by assigning different mobile devices to different domains. Personalization and identifiability affordances are directly implicated in this practice. Rules governing boundary permeation, connection and disconnection also supported psychological boundary management. Connectedness affords boundary permeations, while also implying the ability to connect or disconnect when desired. Personalizing mobile devices to regulate boundary permeations allow mobile workers to honor commitments to be available to either domain, thus meeting both work and non-work obligations. This ability to be "absent-present" online (Gergen, 2002) allows mobile workers to focus attention to different domains as necessary.

Core material properties of mobile technology generate the same affordances over time
Our second contribution stems from our two-study design, which included technologies and their affordances in time periods four years apart. This allowed us to identify the core material properties of mobile technologies that make the affordances implicated in mobile workers' work-life management strategies possible. Although our sample included mobile workers who used diverse devices with varied material features that changed across time, we observed affordances that endured across both time periods. Specifically, from 2004 to 2008 mobile technologies remained small, light weight, and portable with the potential to be connected to the internet and other computing and information services anytime, anyplace. This is an important contribution because it shows that affordances are not necessarily tied to specific material features. Rather, features associated with advancing technical devices may continue to reflect what we call core affordances of mobile technologies.

Since 2008, new mobile technologies have emerged that embody these same properties. These mobile technologies include larger smartphones, tablets, and e-readers with internet connectivity; more pervasive and faster mobile network

connectivity such as 3G and 4G networks; and the greater availability of personal and business mobile "apps." Wearable mobile devices such as smart watches and Google glasses extend mobile technology's affordances for carrying out work-life boundary management practices. Although different from the technologies used in our sample, current mobile technologies embody the same core material properties of small size, light weight, and connectivity that the mobile devices in our samples in 2004 and 2008 possessed.

We surmise that the core material properties of mobile technology allow users to exploit the same five affordances identified in our study and in prior research. Thus, the work-life management practices we observed may endure over time, but in different forms and degrees. For example, respondents in 2008 seemed to exercise more control over work-life activities than those in 2004. In the future, while the same boundaries and management practices exist, mobile devices may create more opportunities for users to control boundaries and effect micro-role transitions. Accordingly, they may engage in more diverse boundary-management practices. Work-life management practices may also change over time as mobile technologies become more advanced. For example, users wearing Google glasses or smart watches may configure space on their own bodies by choosing how to wear those devices. These speculations are consistent with prior research that suggests that the affordances of one technology are similar across different settings and time periods because the material features of the technology place limits on people's interpretations and possibilities for use (Leonardi and Barley, 2008; Leonardi, 2011; Treem and Leonardi, 2012).

Mobile technologies afford a diversity of boundary management practices

Our third contribution corroborates criticism in the work-life boundary management literature concerning the segmentation-integration continuum (Bulger *et al.*, 2007; Golden and Geisler, 2007; Kreiner *et al.*, 2009; Moen *et al.*, 2008). Our sample shows a diversity of approaches to managing work-life boundaries that cannot be comfortably located along a single continuum ranging from segmentation to integration of work-life domains as suggested by prior research (Ashforth *et al.*, 2000). Although a few respondents in our study expressed preferences for segmentation, most described practices that included both segmentation and integration in various combinations. As Henfridsson and Lindgren (2005) found, mobile workers accessed mobile technology to facilitate micro transitions between work and personal activities that were independent of physical locations or time of day. Mobile technologies also afforded users' choices to make more frequent, intermittent transitions between life domains (Golden and Geisler, 2007). Moreover, mobile workers in our study were not necessarily consistent across their strategies of managing physical, temporal and psychological boundaries. Rather, they altered and personalized their practices depending on changing needs. In some instances, workers who welcomed intrusions from family during work time resisted intrusions from work during personal time. These findings are consistent with those of recent studies (e.g. Hislop and Axtell, 2011; Richardson and Benbunan-Fich, 2011; Senarathne Tennakoon *et al.*, 2013) and supportive of Bulger *et al.*'s (2007) conclusion that patterns of work-life boundary management may differ depending on the domain of reference. Overall, our findings strongly suggest that mobile technology's affordances are implicated in mixed strategies that combine elements of both segmentation and integration.

In summary, our research demonstrates the value of theorizing technology as affordances. The theory of affordances positions mobile technology's numerous material features as necessary but not sufficient conditions for managing work-life boundaries (Markus and Silver, 2008). As our findings show, a relatively small number of affordances are identified in our study, and they represent the relationship between specific material features and users interested in managing work-life boundaries. These affordances do not determine or dictate the users' strategic approach to boundary management because users perceive technologies differently and have different work-life management preferences. Rather, the affordances related to mobile technologies may support the execution of both extremes of segmentation and integration, as well as mixed strategies.

Limitations

Our results should not be taken as an exhaustive classification of either boundary management practices or technology affordances. As we noted earlier, existing typologies of mobile technology affordances share little in common, and new categories of affordances are likely to emerge in different empirical contexts. Moreover, although we analyze them separately, mobile workers' boundary management strategies are interdependent partly because mobile workers are always situated in both space and time. Kreiner *et al.* (2009) argue that some conceptual overlaps are to be expected in the study of work-life boundary management and, in practice, the effects of multiple tactics may be synergistic, "creating a multipronged approach to negotiating the work-home boundary" (p. 724). Further, while our aim is to identify distinct affordances and practices, we recognize that future research might reveal categories that are not included in our results.

Our choice of a focused inquiry on a restricted sample of mobile workers poses some obvious limitations. We sampled workers because they were highly mobile and used multiple devices and services to support their work. As a result, we are unable to offer direct comparisons between mobile workers and either stationary workers or workers who do not use mobile technologies to manage work-life boundaries. However, our study offers greater insight into the uses of mobile technologies than studies of place-bound workers, and it provides the foundation for designing a broader comparative study of work practices afforded by mobile technologies.

Our study is also limited by its reliance on interviews and, in Phase 1, observation as data sources. Thus, our account relies upon the testimony of mobile workers rather than that of co-workers, family members or supervisors. Given this lack of contexualization, we could not "triangulate" a respondent's account of managing their transitions between work and family domains with other family members. This limitation can be offset by more intensive research that engages more contextualized empirical evidence.

We are also limited in our ability to support conclusions about the psychological state of well-being that the concept of work-life balance implies (Grzywacz and Carlson, 2007). Unfortunately, the notion of work-life balance is problematic because it fails to separate boundary management from psychological responses. Accordingly, Grzywacz and Carlson (2007) propose to distinguish the concept of work-life balance from the boundary management activities that promote the desired goal of balance, or psychological well-being. For these reasons, our focus is restricted to work-life boundary management rather than work-life balance. Future research could focus on understanding how mobile technology's affordances contribute to feelings of

psychological well-being and/or imbalance. Because work-life balance also depends upon individual preferences (Desrochers *et al.*, 2005), and differences such as gender (Powell and Greenhaus, 2010), conclusions about affective outcomes of mobile work practices require a more extensive study including additional factors. For example, future research could study the various forms of external social pressure on individual boundary management strategies, including the institutional context that helps to define appropriate behaviors (Ashforth *et al.*, 2000; Rothbard *et al.*, 2005). In some high-technology professions, working long hours has become an institutionalized expectation (Jackson *et al.*, 2006), and few workers in our sample were free from such pressures. A more complete analysis of the sources of work (and family) pressures that condition work-life boundary management would be welcome.

For some, a more critical perspective is indicated, in which mobile technology's affordances are associated with oppression of employees, extensions of work time, and increased monitoring of employees (Perlow, 1998; Tapia, 2004). A more critical reading of our findings might, for example, focus on the power relations between mobile workers and their employers. Several of our respondents confessed some despair in trying to have more time for personal activities while they sought career advancement. A critical reading might also focus on gender discrimination, technology addiction and personal health. Our analysis has not staked out an ideological position on such issues, in part because we lack the contextual data necessary to perform a more critical analysis of respondents' lives. Rather, we seek mainly to understand how technology affords boundary management, as represented in personal interviews and observations. However, future research could entertain a more critical perspective while also acknowledging that mobile technologies are often associated with positive as well as negative outcomes for mobile workers.

Conclusions
In conclusion, as work continues to become detached from specific times and places, the management of work-life boundaries will become increasingly important, especially for mobile workers. Our study supports a new perspective on the role that mobile technology plays in mobile workers' management of work-life boundaries. The technology affordances of mobility, connectedness, personalization, identifiability, and interoperability support individual strategies for managing physical, temporal and psychological work-life boundaries. By theorizing the relationship between the material characteristics of technology and mobile users in terms of affordances, we grant technology a central rather than peripheral role in explaining work-life boundary management practices and helps to compensate for the neglect of technology in work-life boundary management theories.

In the future, mobile technologies for work-life boundary management may enable new organizational processes and policies that are were impossible to achieve before their introduction. Mobile technologies' affordances make possible substantial shifts in organizational governance, communication and employee surveillance. Hopefully, our study's findings could support expanded investigations of organizational governance and human resource management related to mobile work.

The prevalence of mobile work promises to increase along with the proliferation of mobile technology's features and applications. Our analysis of mobile workers differs from many prior investigations by focusing on the relationship between the material properties of technology and mobile workers' abilities and preferences. The affordances ensuing from this relationship help to explain how mobile technologies enable and

constrain workers' efforts to manage work-life boundaries. We show that mobile workers engage resourcefully with the material features of mobile technologies to produce affordances that are incorporated into their work practices. As a result, they are able to manage the physical, temporal and psychological boundaries that separate their work and non-work domains.

Notes

1. We refer to the devices in question as "mobile technology," which are defined as lightweight, mobile IT artifacts "that encompass hardware (devices), software (interface and applications), and communication (network services)" (Jarvenpaa *et al.*, 2005, p. 8). Over the past decade, mobile devices include mobile phones, pagers, smart phones, personal digital assistants (PDAs), laptop computers, tablet computers, handheld computers and navigation systems (Tarasewich and Nickerson, 2002; Varshney and Vetter, 2002).

2. The names of all companies and individuals studied are pseudonyms.

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Further reading

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Appendix 1

Descriptive codes	Subcodes
Border composition	Physical
	Temporal
	Psychological
Border blending	
Border permeations	Work to home
	Home to work
	Intra domain permeations
	Diversions of permeations
Border keepers	Domain members as border keeper
	User as border keeper
	Negotiation
Border crossing	Home to work
	Work to home
	Intra domain
Border flexibility	Temporal
	Physical
	Psychological
	Technological
Domain	Work
	Home
	Separation
	Integration

Table AI.
Phase 1 – descriptive
codes – Round 1 of
data analysis

Pattern codes	Interpretive codes	Description
Managing space	Managing mobility	Carrying devices from one location to the other to facilitate work
Practices of organizing technology and other artifacts in a physical location to support mobile computing activities	Configuring space	Arrangement and configuration of devices, networks and other artifacts in the space available to support computing activities
	Managing spatial constraints	Working around restrictions placed on technology use due to limitations in space and unavailability of resources
Managing time	Scheduling time	Using mobile technology to define the sequence and duration of work-life events
Practices of managing time to carry out work-life events	Managing polychronic time	Using mobile technology so as to carry out work and life events simultaneously Not sticking to a pre-determined work schedule
	Managing monochronic time	Managing time so as to carry out work like events individually Sticking to a pre-determined work schedule

(*continued*)

Table AII.
Phase 2 – Work-life
management
strategies identified
in Round 2 of
data analysis

Pattern codes	Interpretive codes	Description
	Managing dead time	Managing periods during which a worker is unable to use mobile technology because of unavailability of mobile resources
Managing accessibility	Integrating and segmenting technologies	Integrating or segmenting mobile technologies according to work or life domains
Practices of managing communications, interruptions and availability to others for direct interaction	Negotiating access	Negotiating periods of availability via mobile technology with influential domain members in work and life domains
	Conforming to organizational policy	Reference to organizational policy and organizational and societal norms to influence accessibility through mobile devices
	Managing online presence	Representing users' status or context such as current location, mobile device in use and availability
	Disconnection	Managing accessibility by switching devices off
Managing transitions	Managing connections to work and home life	Managing how mobile technology is used to make the transition from home to work and vice versa
Practices of using mobile technologies to switch between work and family activities	Managing transitioning activity	Using mobile technologies to facilitate spontaneous and frequent switching from work to life activities and vice versa
	Intertwining and separating work and family	Using mobile technologies to blend or separate work and life activities

Table AII.

Pattern codes	Interpretive codes	Sample descriptive quote
Managing physical boundaries	Selecting space	I was at the gym one time and my PDA actually came in handy because I got an e-mail that I definitely would've missed if I didn't have it with me. – I was actually on the treadmill and I was typing the messages as I was running – I was actually preparing for it by bringing it [PDA] with me (MH)
	Configuring space	Yeah, I have a laptop table that temporarily is in my vehicle that my laptop sits on. It's connected to my GPS with my wireless card and if I'm at a stop light or some of the cell sites, but I'm still in my vehicle, I use that to access e-mails (AJ)
Managing temporal boundaries	Scheduling time	Pretty much if it's not on my Outlook calendar for work – in my BlackBerry, it doesn't happen. Outlook is like the center for me, and then the same thing for home. I have my Outlook for home that syncs with my iPhone. If it's not in there, I usually forget about it and I don't do it (JM)

Table AIII.
Final set of pattern codes

Pattern codes	Interpretive codes	Sample descriptive quote
	Converting dead time to productive time	The technology [smartphone] that I have allows me to be productive, whereas people who are not as connected, that would be dead time for them because they can't really do anything. […] As a matter of fact, those times, believe it or not, are some of the most productive times because I don't have a lot of distractions, I'm just sitting there focused on getting stuff done or trimming the inbox down to size or you know, getting people active on different things where I can really focus with a minimum of distraction (GF)
	Multi-tasking vs working sequentially	So having that flexibility through a mobile device is really important. […] Because of the convenience that it affords you. The example I guess I could use would be the ability to stay connected and complete a work task predominantly – you know via e-mail while you're running to your child's school to pick him up from school for example because the school's not gonna wait around for you to pick him up at your leisure. You have to pick him up at a designated time so at the same time you might need to get an e-mail out – or respond to an e-mail because you're in the middle of a customer issue (SH)
Managing psychological boundaries	Technology designation rules	I still have my personal mobile device and it's kind of like inconvenient to carry two mobile phones on the road; […] You know I have my other business, which I want to make sure that I don't mix and match the personal with the company's technology. So I just said I'd rather carry two mobile devices rather than having them mixed and then I know which phone rings for what (TX)
	Boundary permeation rules	We all have to have an instant messenger ID so that we can communicate easily with each other. So usually as soon as I log on to my laptop I sign in. And then I sign out in the evening. If I'm a meeting or something or if I can't be interrupted I'll put it on busy. If I leave the house to go get something to eat I'll put out to lunch. I usually stay online now. […] So if it's something that's important and I'm not responding back to a coworker then they can try to call me or something. As opposed to waiting for my response (SI)
	Connection and disconnection rules	I turned off the phone. […] Because that's my leisure time. Because I am always connected. – I just turn off all the equipment. I just don't get online (TH)

Table AIII.

Appendix 2. Selected questions from the interview guides

Interview guide Study 1:

(1) What's the policy for integrating personal devices with company devices?

(2) What are the different roles that you play in a business context?

(3) What are the different roles that you play in a personal context?

(4) How do you use the environment to interact on a business level? (frequency, who and with what, where, when)

(5) How do you use the environment to interact on a personal level? (frequency, who and with what, where, when)

(6) How do you prioritize tasks while mobile?

(7) How do you know the best way to contact someone?

(8) How do people know the best way to contact you?

(9) How do you personalize the environment?

(10) What are the advantages of using the environment?

(11) How does the environment make life more difficult? (Please tell a story)

Interview guide Study 2:

(1) What are the different roles that you play in a business context?

(2) What are the different roles that you play in a personal context?

(3) How do you use mobile technology to manage your accessibility?

(4) How do you represent yourself online through mobile technologies?

(5) Do you disconnect? Why or why not? What are the consequences of disconnection

(6) Do you use mobile technologies while you travel? Please describe how?

(7) How do you use mobile technology once you arrive at your destination?

(8) Do you use mobile technology to combine work and family activities? How?

(9) Please tell a story of how you used technology to manage a personal issue that arose while you were doing work?

(10) Please tell a story of how you used technology to manage a work issue while at home?

About the authors
Dr Karlene Cousins is an Associate Professor in the College of Business at the Florida International University. Her research agenda is focused on the examination of the effects of mobile computing environments on organizations and society; and the legal and regulatory issues impacting the use and innovation of IT. A licensed attorney, she has worked with IT companies on regulatory, data privacy and intellectual property issues. In academia, she is most known for her work in the empirical examinations of evolving work practices as a result of the capability of mobile technology to accommodate both work and life activities. She has published articles in journals such as the *European Journal of Information Systems*, *Communications of the ACM*, *Decision Sciences* and *Journal of the AIS*. She is past Managing Editor of *Information and Organization* and has served as Associate Editor for the *ICIS Conference on Information Systems*, Dr Karlene Cousins is the corresponding author and can be contacted at: kcousins@fiu.edu

Dr Daniel Robey is an Emeritus Professor of Computer Information Systems at the Georgia State University. His current research deals with the consequences of information systems in organizations and the processes of system development and implementation. This research includes empirical examinations of information systems development work and of the effects of a wide range of technologies on organizational structure and patterns of work. It also includes the development of theoretical approaches to explaining the development and consequences of information technology in organizations. Professor Robey is Editor-in-Chief of *Information and Organization*. He also serves on the editorial boards of *Organization Science*, *Information Technology and Management*, and *Information Technology & People*.

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