Call me on Sunday: Permanent availability and employee well-being*

Elena Shvartsman†
WHU and IZA

Sabine Sonnentag‡
University of Mannheim

Susanne Steffes§
ZEW and University of Cologne

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Abstract

We address how work-related communication during off-work hours through emailing and phone calls is associated with employee well-being in terms of work-to-family conflict, mental health, and job satisfaction. According to the insights of boundary theory (Ashforth et al., 2000), the interference between work and private life domains is detrimental to employee well-being. However, research on this question is, so far, inconclusive. We conjecture that this, among other things, owes to the nature of the previous studies, which often do not disentangle associated factors of work-related off-work communication such as an individual's work demands or assume a short-term perspective only. We attempt to tackle this issue by utilizing representative employer-employee linked data from Germany. Our rich data allow us to estimate a long-term association net of various confounding factors.

While we can neither establish a statistically significant relationship between mental health nor job satisfaction and work-related off-work communication, we find a strong association between work-related off-work communication and work-to-family conflict. This relationship also holds for within-individual comparisons. However, once we account for individual fixed effects, the coefficient estimates drop in size. Hence, our results suggest that there must be self-selection of individuals who are less sensitive to leisure interruptions into jobs associated with work-related off-work communication.

JEL-Classification: J28, M50, M54, O33
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†WHU – Otto Beisheim School of Management, Burgplatz 2, 56179 Vallendar, Germany, email: elena.shvartsman@whu.edu

‡University of Mannheim, Schloss Ehrenhof Ost, D-68131 Mannheim, Germany, email: sonnentag@uni-mannheim.de

§Corresponding author: Centre for European Economic Research (ZEW), L 7, 1, P.O. Box 103443, 68034 Mannheim, Germany, email: susanne.steffes@zew.de

1 Introduction

The advances in information and communication technology (ICT) have contributed to blurred boundaries between work-life and leisure. As a result, work-related communication during off-working hours by means of emailing and phone calls has become pervasive for most white-collar workers. While managers and policy makers have been discussing for years how to protect employees from detrimental effects of such working behavior, research on the associated consequences such as psychological well-being is so far inconclusive. Hence, with this study, we aim to contribute to the ongoing debate by analyzing how – in the long-run – work-related communication during off-working hours affects employee well-being.[1]

Work-related communication during off-working hours has received scarce attention in the economic literature, but has been addressed by several other academic disciplines, in particular, management, organizational psychology, and sociology. The attention of this literature is mainly attributed to the question of how dealing with work-related matters during off-working hours relates to individual experiences and functioning at the intersection between work and the home domain. The general perspective in this literature has been that work-related communication during off-working hours violates the boundaries (Ashforth et al., 2000) between work and non-work life, increases the perceived interference of one's work and private roles, often referred to as "work-family conflict" (Greenhaus and Beutell, 1985), and has adverse effects on employee's well-being (Schlachter et al., 2018).

Overall, the findings of this literature are inconclusive, but tend towards – in the short-run – higher strain and work-family conflicts when workers communicate by means of ICT about work in their leisure time and stay mentally connected to their work (Ferguson et al., 2016; Butts et al., 2015; Derks et al., 2014; Boswell and Olson-Buchanan, 2007; Lanaj et al., 2014). Derks et al. (2014) argue that off-working communication on work-related topics negatively affects employee well-being through aggravated role detachment. However, other studies focus on the simultaneity of negative and positive effects (Hunter et al., 2017). Wajcman et al. (2010) for instance, find a negative relationship between the number of hours an employee spend using the Internet while working at home and detrimental work-to-family spillovers. Furthermore, several contributions focus on "technology-assisted supplemental work" (Eichberger et al., 2020; Fenner and Renn, 2004), i.e., they define work-related ICT use during off-work hours as additional work. Consequently, these studies presume that ICT use during leisure entails longer working hours. Hence, it often remains unclear whether the detrimental relationship between such working behavior and psychological well-being outcomes is driven by the work-related ICT use during off-working hours itself or by the extension of working hours.

Yet, all these studies have various shortcomings. Some of them rely on non-representative cross-sectional survey data which cannot account for intra-individual variation (an exception is Wajcman et al., 2010). Hence, such studies cannot account for self-selection which would be important since it is likely that individuals choose occupations and employers (and the associated working conditions) according to their preferences and not at random. An alleviation to this

[1] In this paper, we use the term "leisure interruptions" to refer to technology-based work-related communications (e.g., phone calls, responding to emails) during off-working hours.

problem are diary studies which use daily intra-individual variation of working behavior to provide valuable insights into the dependence of well-being on working schedules (Lanaj et al., 2014; Wajcman et al., 2010). As in many survey studies, external validity is a challenge with this method too, since these studies usually rely on non-representative samples. Moreover, it is inherent to the design and focus of these studies that they cannot to provide insights into the long-term impact of well-being associated with work-related communication during leisure. However, this would be desirable, since from a theoretical perspective short-term effects can both aggravate or vanish due to adaptation. While the gold standard to address external validity and causality problems entailed by self-selection would be a large-scaled randomized controlled trial, it is barely possible in this context.

We therefore aim to fill the current gap in the literature by addressing the question of how work-related off-work communication during non-working hours affects well-being with longitudinal, representative data. Such data allow to control for self-selection, infer about long-term effects of leisure interruptions, and facilitate external validity. In specific, our analysis draws on a representative longitudinal employer-employee data from Germany, the linked personnel panel (LPP). With these data we analyze the effects of frequently occurring leisure interruptions due to work-related communication on work-family conflict, mental health, and job satisfaction. Moreover, we address whether a simultaneous increase in working hours aggravates the relationship between well-being and work-related off-work communication. We do so both incorporating actual working hours and accounting for heterogeneities with respect to changes in working hours.

With our economic perspective, we consider work-family interference and the detrimental effects of a job on mental health as a part of effort costs, while job satisfaction is a measure of job utility. We investigate the impact on work-family conflict which is *"a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect. That is, participation in the work (family) role is made more difficult by virtue of participation in the family (work) role"* (Greenhaus and Beutell, 1985, p. 77). Work-family conflicts can be bidirectional with work demands impacting on the family domain (work-to-family conflict) and family demands impacting on the work domain (family-to-work conflict). In this paper, we focus on work-to-family conflict, since leisure interruptions by work-related communication have their origin in the work domain.

Meta-analytical evidence of longitudinal studies shows that work-to-family conflict predicts psychological and physiological strain (Nohe et al., 2015).[2] In the context of work-related communication during off-work hours it is not clear though, whether other channels than role blurring which manifests itself in the work-to-family conflict can have an impact on mental health too. We therefore investigate the direct impact of work-related off-work communication on psychological well-being.[3] We operationalize an established mental health measure, the WHO 5 mental

[2]Moreover, work-to-family conflict predicts an increase in turnover intentions over time (Mauno et al., 2015; Nohe et al., 2014) and tends to be positively related to absenteeism (Väänänen et al., 2008).

[3]The concept of well-being captures a broad range of individual states referring to a person's *"optimal psychological functioning and experience"* (Ryan and Deci, 2001, p. 142). Research on employee psychological well-being has focused on affective and psychosomatic aspects of well-being (Sonnentag, 2015). It has demonstrated that low psychological well-being – as becomes evident in feelings of high tension, exhaustion, or somatic complaints – is associated with poor employee performance (Taris and Schreurs, 2009; Wright and Staw, 1999).

well-being index, to test for effects of work-related leisure interruptions on mental health.

Even if well-being is reduced when the employee works regularly during leisure time, the impact on the job utility is still unclear. Psychological and/or monetary resources could compensate the increase in costs or the weight of these costs in the utility function could be too small to have a significant impact. In order to shed light on this, we additionally take the job satisfaction as an outcome which measures job utility (Freeman, 1978). Job satisfaction as an attitude towards one's job (Judge et al., 2001), i.e., *"a positive or negative evaluative judgement of one's job or job situation"* (Weiss and Cropanzano, 1996, p. 2), comprising both affective and cognitive components.

Our results indicate that frequent leisure interruptions caused by work-related communication by means of emailing and phone calls increase the perceived work-to-family conflicts. These results decline, once individual fixed-effects are accounted for, which we regard as an indication for strong self-selection into jobs. Also, leisure interruptions appear to increase perceived work-to-family conflicts when accompanied by increases in actual working hours. Finally, we can neither establish a statistically significant relationship between mental health nor job satisfaction and work-related off-work communication.

The remainder of this paper is structured as follows. In Section 2, we present the background literature, which underlie this research. In Section 3, we present the data and the key variables of this analysis. Section 4 continues with the empirical strategy. In Section 5, we present our results, which we discuss in Section 6. Finally, Section 7 concludes this study.

2 Background Literature

Traditionally, work and home life are spatially and temporarily separated, although employees might differ in the degree to which these life domains are integrated (Matthews and Barnes-Farrell, 2010). Work and home life take place in different locations and during different times of the day and week. According to boundary theory (Ashforth et al., 2000; Clark, 2000), people use various approaches and strategies to navigate between these domains by creating, maintaining, and crossing the associated boundaries. When the desired level of segmentation between domains is disrupted, i.e., when boundaries are violated, conflict between life domains occurs (Kreiner et al., 2009). For instance, when work intrudes into the home domain, work-to-family conflict increases.

Technology contributes to a change in the boundaries between life domains (Ollier-Malaterre et al., 2019). Particularly, technologies that enable employees to complete work-related duties outside a formal work-site, e.g. at home, and beyond formal working hours blur the spatial and temporal boundaries between work and home. Engaging in work-related off-work communication such as answering a work-related phone call or responding to work-related emails at home will create episodes of work-to-family conflict (Maertz Jr. and Boyar, 2011) which become evident in several ways.

Engaging in work-related communication while being at home will reduce the actual time one can be available for activities at home and family duties. For instance, answering work-related emails at home, will limit the time one can spend with family members (time-based conflict). Second, even after having finished the actual work-related tasks, attention may still be directed

to work, constraining full mental presence at home via high psychological transition costs (Chen and Karahanna, 2018). Finally, work-related communication activities might result in negative affective experiences (e.g., anger or frustration, Butts et al., 2015) which in turn impact social interactions at home (strain-based conflict).

Several cross-sectional empirical studies have documented the association between work-related technology use during off-job time and work-to-family conflict (Boswell and Olson-Buchanan, 2007; Fenner and Renn, 2010; Ferguson et al., 2016). Diaz et al. (2012) for instance take a non-random sample of 193 non-academic employees working at a university in the US in order to investigate the relationship between communication technology use after work hours and work-to-family conflicts as well as job satisfaction. Within-person variation is used in diary studies where individuals participate in a daily survey or time study and researchers use the variation in the working behavior in order to identify the relationship with the outcome variable (Hunter et al., 2017; Lanaj et al., 2014; Wajcman et al., 2010). Lanaj et al. (2014), for instance, show a negative relationship of late-night work-related smartphone use and the sleep quantity as well as the next day's work engagement and a positive with morning depletion. The adverse relationship is buffered by the level of job control, hence, some employees even benefit from the leisure interruption.

Though many studies show adverse effects, shifting working hours into leisure time could also contribute to flexibility in scheduling one's private and professional lives resulting in a decrease in strain and work-to-family interference (Hunter et al., 2017; Wajcman et al., 2010). To reconcile these findings, studies such as Ragsdale and Hoover (2016) investigate effect heterogeneity owning to, for instance, individual segmentation preferences (Butts et al., 2015; Derks et al., 2016; Gadeyne et al., 2018) or the associated working conditions such as job demands and general job pressure (Gadeyne et al., 2018; Ward and Steptoe-Warren, 2013).[4]

According to Hunter et al. (2017) the utility of the interruption (measured via goal obstruction and facilitation) is also an important mediator of the relationship between boundary violations and work-to-family conflict. Also Diaz et al. (2012) develop a similar hypothesis and show empirically that communication technology use during non-work hours is positively associated with job satisfaction. They argue that the flexibility in shifting autonomously work demands is the central driver of this relationship. Such a contradictory view on work-related internet use during off-working hours is also addressed in Wajcman et al. (2010). On the one hand, it is perceived as an increase of schedule flexibility and on the other hand employees may feel negatively affected. In their diary study on a representative sample on Australian employees they find a negative relationship between work-related internet use during leisure time and detrimental work-to-family spillovers. Interestingly, they account for other working conditions which are likely to affect work-life balance like for instance the frequency of stressful working conditions, a mismatch between actual and desired working hours and working schedule. However, the study is based on data from the beginning of the century, hence, it presumably covers a sample of employees which is not comparable with today's internet users.

[4]Segmentation preferences imply that employees differ regarding their preferences for integrating work and family roles and that those with weak segmentation preferences suffer less or even benefit from shifting work into leisure time.

Though diary studies (and others) show adverse relationships with work-to-family conflicts, for a number of reasons, these might be transient and not persistent over time. First, work-to-family conflict is influenced by a broad range of personal, work-related, and family-related variables (Bowling et al., 2015; French et al., 2018; Michel et al., 2011), with work-related off-work communication being only one factor among many. Although work-related off-work communication is likely to create episodes of work-to-family conflict after starting to use work-related technology at home, the overall impact of work-related off-work communication on work-to-family conflict should be rather limited over longer periods of time when other factors (e.g., personality, a child's health status) continue to exert their influence on work-to-family conflict.

Second, over longer periods of time, when employees feel that work-related off-work communication contributes to a high level of work-to-family conflict that they find undesirable, they might adapt to the situation of using work-related technology at home and they may engage in behavioral strategies that will alleviate the negative impact of work-related off-work communication. Adaptation theories suggest that although people may suffer in the short run from adverse circumstances, over time they adjust to these, at least partially, so that the associated negative impact decreases (Brickman et al., 1978; Diener et al., 2006). In the case of work-related off-work communication, employees will experience that their home life may suffer because they spend time on work-related issues during off-job time, but over time they may regard work-related off-work communication as something habitual. Since they are used to engage in work-related off-work communication, it no longer results in elevated levels of work-to-family conflict.

Finally, people may use strategies that reduce the negative impact of work-related off-work communication on their home life. For instance, in line with the SOC (selection, optimization, and compensation) framework (Baltes and Heydens-Gahir, 2003). For instance, they may decide to use work-related technologies only during specific time periods (e.g., after children went to bed) or only for specific purposes (e.g., responding to emails, but not taking phone calls), they might use the technology in a more efficient way (e.g., using templates for email response). Also, they may enact compensation strategies (e.g., planning quality time with family members on specific days in order to counteract the potential negative implications of work-related off-work communication which might have occurred on other days). In addition, employees even may see benefits in engaging in work-related off-work communication because they hope that this may help them to get more work done and to be approachable during non-work time (Braukmann et al., 2018). As a consequence, work-related off-work communication will cease to have an impact on work-to-family conflict.

We have argued that work-related off-work communication could increase work-to-family conflict (though the long-run magnitude of this impact is rarely predictable). In turn, this working behavior should be negatively related to job satisfaction and mental health if effort costs cannot be compensated by other resources. There is already evidence, that increased work-to-family conflict which results from work-related off-work communication is negatively related to employee psychological well-being (Amstad et al., 2011): when employees experience that work interferes with their home life, they experience strain symptoms such as tension or exhaustion because they feel that they cannot address both work and family demands in a satisfactory way. Longitudinal studies have shown that indeed work-to-family conflict predicts

an increase in strain symptoms – thus, reduced well-being – over time (Nohe et al., 2015). However, we are not aware of studies which investigate the longitudinal consequences of the direct relationship between work-related off-work communication and well-being.

With respect to reduced job satisfaction and in line with the source-attribution perspective, research has shown that in case of work-to-family conflict employees tend to blame the assumed cause of their conflict which in case of work-to-family conflict is a person's job (Poposki, 2011). Accordingly, the evaluation of one's job becomes more negative which is reflected in a lower level of job satisfaction. Indeed, meta-analytical evidence – mainly based on cross-sectional research – shows that work-to-family conflict is negatively related to job satisfaction (Shockley and Singla, 2011). Again, there is no empirical evidence on the direct long-run impact of work-related off-work communication on job satisfaction.

To the best of our knowledge, we are the first to provide an economic study on the long-run impact of work-related off-work communication on several well-being outcomes. Nevertheless, in the economic literature, there is some evidence on the relationship between working conditions and various well-being outcomes. Generally speaking, this evidence suggests that working conditions characterized by self-determination, such as job control or autonomy, may enhance employee well-being (e.g., Cottini and Lucifora, 2013), while the opposite is true for employer-exerted control (e.g., Shvartsman and Beckmann, 2015). It has also been shown that discretion with respect to the location of work, i.e., working from home, can have significant positive effects on employee productivity (Bloom et al., 2014). In their experiment, workers only work during regular hours at home, nevertheless, Bloom et al.'s (2014) findings may support the idea that the discretion to shift some tasks into off-work hours could well represent a resource for employees. Yet, it should be noted that the effects on well-being are far less clear. Furthermore, the relationship between working hours and well-being outcomes has received substantial attention in the literature (Bell et al., 2012; Robone et al., 2011; Wooden et al., 2009), with evidence suggesting that in particular a working hours mismatch, i.e., working more than desired, may impair individual well-being. Moreover, White et al. (2003) show evidence that long working hours are positively associated with work-to-home spillovers.

The fact that longer working hours, irrespective of the place of execution, are negatively related to work-to-family conflicts is a challenge for our purpose. Starting with Fenner and Renn (2010) one strand of the literature relates the off-work use of technology directly to supplemental work and focuses on the impact of work extension on outcomes like employee well-being (Eichberger et al., 2020). In contrast to this literature, we see the work-related communication during off-working hours independent of an increase in working hours. Nevertheless, we are aware that an increase in working hours is often a concomitant phenomenon of off-working communication and it is of particular importance to take this into account.

3 Data and Variables

The Linked Personnel Panel (LPP)

For this analysis, we use data from the German Linked Personnel Panel (LPP), which is provided by the Institute for Employment Research (IAB). The LPP is a novel panel data set attached to

the IAB Establishment Panel, but limited to private sector establishments operating in manufacturing and services with at least 50 employees subject to social security.[5] The LPP contains establishment level information from the Establishment Panel, a survey of these establishments' human resources (HR) representatives, and is linked to a survey of a random draw of these establishments' employees. Here, we use the first three waves of the LPP. The establishment surveys were conducted in 2012, 2014, and 2016, whereas the corresponding employee surveys were conducted subsequently in 2013 (starting in December 2012), 2015, and 2017. Furthermore, administrative data of the employer records to the social security institutions are available for each individual.

In each wave, the raw data contain interviews of HR representatives from approximately 800 establishments. In addition, around 7,000 employees are interviewed each wave. While employer interviews are conducted with a personal interviewer at the establishment site, employees are called by the interviewers at home (CATI). The fact that the employees are contacted via their private address (without the knowledge of their management) should avoid any measurement errors due to the influence of the management. Around 70% of the interviewed employees agreed for their data to be merged with the establishment surveys.

We use the first three waves and run estimations on the employee level. Since our main identification strategy requires data in panel structure (compare section 4), we restrict the sample to those individuals who participated at least twice in the survey. Furthermore, we omit unskilled individuals as well as those with actual working hours larger than 60 hours per week from our sample. We believe that the first group is likely unaffected by such work-related off-work communication via email and phone. On the opposite, the latter group is likely mainly comprised by individuals with extraordinary responsibilities (e.g., upper management) and exhibits not only distinctively different selection patterns into work practices, but has also considerably differing preferences for role blurring as compared to the general population. Hence, the inclusion of these groups would make our results prone to biases by outliers. Finally, we limit our main analysis to full-time employees only, since we believe that the motives for work-related off-work communication may be distinctively different for part-time employees. Most importantly, part-time employees' time-off does not necessarily coincide with the time-off of colleagues working in full-time.[6] For our main analyses, we end up with a sample of 1,981 employees and 4,439 observations (average panel length 2.2 years) who are employed in 526 establishments. Table A.1 in the Appendix shows descriptive statistics of the sample.

Outcome variables

We consider a short version of the work-to-family conflict index according to Netemeyer et al. (1996), which consists of three items. The individuals are asked to respond to which extent the following items to apply on a 1 ("fully applies") to 5 ("does not apply at all") scale: (*i*) The demands of my work interfere with my home and family life, (*ii*) The amount of time my job

[5]For further information on the IAB Establishment Panel, see Ellguth et al. (2014). The LPP is described in full detail in Kampkötter et al. (2016).

[6]Imagine, for instance, a part-time employee with child caring responsibilities, who deliberately replies to emails on his day off to assure timely information flow within his team.

takes up makes it difficult to fulfill family responsibilities, and (*iii*) My job produces strain that makes it difficult to fulfill family duties. We reverse-coded all items, which means that a higher overall score represents a higher work-to-family conflict.

As a measure of mental health we utilize the WHO5 mental well-being index, a self-rated health index on how an individual felt during the past two weeks (Bech et al., 2003). Each item is rated on a 1 "all of the time" to 6 "at no time" scale. The five items are as follows: (*i*) I have felt cheerful and in good spirits, (*ii*) I have felt calm and relaxed, (*iii*) I have felt active and vigorous, (*iv*) I woke up feeling fresh and rested, (*v*) My daily life has been filled with things that interest me. Again, all items were reverse-coded, so in the case of the WHO5 mental well-being index, a higher score signifies a higher level of mental well-being.

Our measure of job satisfaction is the response to the question "How satisfied are you currently with your job?", with answer possibilities ranging from "totally unsatisfied" (0) to "very satisfied" (10). This question is commonly used in survey data and the distribution of answers is comparable with other data, such as, for instance, the German Socio-Economic Panel (see, Kampkötter et al., 2016).

In order to transform our outcome variables to a metric scale, make regression coefficients comparable, and also facilitate interpretation, we standardize all indices and values into variables with mean 0 and standard deviation 1.[7]

Work-related off-work communication

Our explanatory variable also stems from the employee survey and is the response to the question "How often do you receive business calls or reply to emails during your leisure time?", with the answer possibilities "never" (5), "sometimes per year" (4), "sometimes per month" (3), "sometimes per week" (2), and "daily" (1).

Obviously, this question captures part but not all of the possible work-related off-work communication. According to our previous considerations, it is not only the prevalence and the frequency of off-work communication which should have an impact on the inter-role conflicts but also the desirability (i.e., voluntary or involuntary) with respect to the whether and when the communication happens. If we observed single events we could distinguish between both voluntary or involuntary communication and investigate the impact of each as well as their joint impact. In this study, we rely on an aggregate measure of work-related off-work communication and record the average frequency of such events. Although, the question pertains to the reaction of an individual to an action of someone else, it is not trivial for the interviewed person to distinguish between both and count the number of events, respectively.

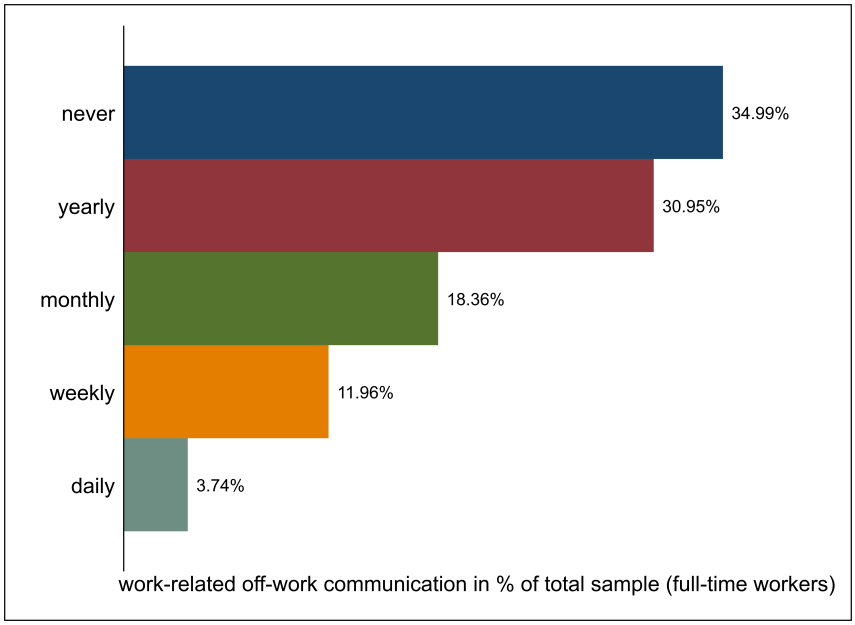
Our measure is, therefore, rather a mixture of voluntary and involuntary actions than an explicit measure of involuntary actions. It captures the passive action of being available for others ("receiving calls" and "replying to emails") on the one hand. On the other hand, replying

[7]The two indices, work-to-family conflict and WHO5 mental well-being, are standardized twice. Here, we follow the double standardization approach as in, e.g., Bresnahan et al. (2002) or Bloom et al. (2011). To this end, we first standardize the individual items, which accounts for potentially different distributions of responses to the items. Thereafter, we standardize the sum of these standardized items, in order to facilitate interpretation and make coefficient estimated comparable across outcome variables. Hence, the point estimates can be interpreted as standard deviations from the sample's mean.

to emails might be entirely voluntary if the affected individual deliberately chooses the specific moment to reply to an email, which may have been sent during office-hours. Such decisions are well imaginable if workers, for instance, use off-work time to smooth their working schedule. Apart from that, two types of voluntary work-related off-work communication are not captured by our measure. This is when an employee calls others during off-work hours or writes emails based on her own initiative.

Figure 1 plots the frequency of work-related off-work communication in our main sample (compare also Table A.2). We observe that for the majority of our observations, i.e., approximately 35 percent, this is never the case. Additionally, almost 31 percent report to have very seldom ("sometimes per year") work-related communication during leisure. Still, roughly one-third of the observations is affected by such work behavior. In specific, approximately 18 percent on a monthly, 12 percent on a weekly, and almost 4 percent on a daily basis.

Figure 1: The distribution of leisure interruptions in the utilized sample



Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Our main identification strategy relies on the intra-individual variation in the frequency of work-related off-work communication, i.e., on individuals who change their state between two interviews (which corresponds to two different data waves). Table A.3 in the Appendix presents the transitions between the different states recorded in our data.[8] This table shows, that while the states "never"/"sometimes per year" are the most rigid, the state "monthly" appears as most

[8]In this table, we group "never" and "sometimes per year", since we assume that these nuances are very unlikely to affect our outcomes of interest. We also group "daily" and "weekly". We believe that this is a reasonable approach as one can easily imagine that while one individual would consider, for instance, five leisure interruptions per week as "weekly", another individual or even the same person in a different point in time, would consider the same frequency "daily". Hence, by confining to three states only, we likely reduce potential measurement errors in the main explanatory variable. Note, that in the econometric analysis, we further group our explanatory variable into a binary variable, with daily to monthly interruptions considered as "treated" for methodological reasons.

permeable. Finally, the states "weekly"/"daily" lie in between. Hence, while some individuals never change the level of their work-related off-work communication, there is sufficient variation in our data to capture intra-individual effects over time.

4 Empirical Strategy

Baseline model and identification

We aim to investigate the relationship between the work-related off-work communication and the outcome variables which capture employee well-being. While we believe that our research setting offers several advantages – above all, it is barely possible to tackle our research question with other research designs – the identification of a causal effect is hardly possible in this non-experimental setting. Recall in this context, that we are interested in a work behavior which can but must not necessarily be induced by particular firm policies or a specific firm culture.[9] We therefore discuss potential identification problems and suggest respective solutions.

The two main challenges for our research setting are, *(i)* the fact that other working conditions which are related to the off-work communication have an impact on the outcome variables, and *(ii)* the self-selection of employees according to their preferences and experience which affect the expected utility from communicating during off-work hours.

As with many other working conditions, work-related off-work communication is determined by a variety of circumstances which are of professional and private nature. Many of them are likely to independently affect psychological well-being measures such as work-to-family conflict, mental health, or job satisfaction. For example, a management role is often related to a huge workload and communication duties which increase the likelihood of being available beyond usual office hours. At the same time, managers are more likely to be equipped with mobile communication devices. Hence, we should expect a link between the management role and our main explanatory variable. At the same time, the consequence of a management role is not only a larger workload, but potentially less capability to mentally disconnect from work, which could affect well-being.

A further potential bias in the relationship of interest is the individual selection into the working condition due to preferences and former experiences. For instance, someone who suffers a lot from role integration is less likely to select herself into according working conditions. Hence, the pure comparison between those who communicate during off-work hours and those who do not is likely to be prone to endogeneity.

We address these challenges with the following strategy: First, we carefully control for a large amount of work and private life characteristics which may have a direct but also indirect impact on the outcome variables.Second, we rely on within-individual variation, i.e., we identify the correlation of interest via individuals who experience a change in how frequently they communicate about work during leisure. Since individual fixed-effects account for time-invariant

[9] An employer could at most try to prevent work-related off-work communication could by enforcing, for instance, a non-delivery policy of emails during weekends. However, even in such a setting employees would still possess means of circumventing such a policy by using private messaging options. More so, such a policy would again refer to a specific firm only not allowing for the assessment of an average, i.e., externally valid, long-term effect.

unobserved characteristics, this approach relies on the assumption that preferences with respect to work-related off-work communication remain stable over time. Finally, the data collection process results in a sample, in which employees do not change their establishment between waves.[10] This allows us to avoid biases due to time-invariant unobserved firm characteristics which may affect how often employees communicate about work during off-work hours.

We regress an individual's i self-assessed well-being measure (work-to-family conflict, WHO5 mental well-being index, or job satisfaction) in t, denoted by y_{it} on her work-related off-work communication in t, denoted by $WROWC_{it}$, on several time-varying confounding factors, summarized by the vector X_{it}, and on a time-constant individual fixed effect α_i:

$$y_{it} = \gamma WROWC_{it} + X_{it}\beta + \alpha_i + \eta_t + \epsilon_{it}. \tag{1}$$

In equation (1), the variable $WROWC_{it}$ takes on value 1 if individual i reports daily, weekly, or monthly leisure interruptions in period t, and 0 otherwise. This means that we group observations with "daily" to "monthly" work-related off-work communication into the "treatment" category, while the states "never" and "sometimes per year" serve as control.[11] η_t is a time fixed effect captured by a time dummy variable, and ϵ_{it} denotes an idiosyncratic error term with zero mean and finite variance. In all specifications, we cluster the standard errors at the establishment level.

Selection of covariates

The main goal of the selection of our covariates, represented by the vector X_{it} in eq. (1), is to capture private and professional demands which could have a simultaneous impact on work-related communication with colleagues, business partners, or management during leisure and on the interference of this activity with one's well-being.

With respect to employment related confounders, we control for whether the individual's employment contract is on a fixed-term. We also consider whether she is a blue collar worker, is working shifts, has a flexible working hours arrangement, and the amount of actual weekly working hours. Next, we also account for the tenure with the firm (and its square), whether the individual receives bonus payments, and how many people she supervises. In order to capture occupational changes, we also include occupational fixed effects (14 dummies).[12]

The richness of the data source also allows us to control for an employee's assessment of her working conditions in several dimensions. This is a crucial element of our estimation strategy because we thereby capture changes in the working conditions which are unobserved in objective variables. For instance, we can think of an organizational change which is associated with a new

[10] Recall that the employees surveyed are a random draw from establishments, which are followed by the survey. Hence, if an employee leaves her establishment, chances are low, her new employer is among the surveyed establishments.

[11] This grouping into a binary variable is necessary, since our main estimation approach is an individual fixed-effects regression.

[12] We do not include wages as a control for the following reason: Since the availability during leisure time is a working condition which might have detrimental effects on the employee, it is likely that she will be compensated for this by an increase in hourly wages. If compensating wage differentials existed, we would capture at least part of our relationship of interest with the inclusion of wages into the specification.

assignment of tasks but not with a job change. If a worker is confronted with more tasks which are time-critical, the perceived time pressure and perceived multitasking-needs increase. This could be followed by the need to be available outside regular office-hours but even if not, the likelihood to experience an impact on well-being increases. We, hence, include ten dummies for collegiality (the extent of helping or receiving help from colleagues) and standardized variables for one's work interdependence with colleagues (two variables depicting own dependence on others and the colleagues' dependence on oneself), job autonomy, multitasking, perceived job-related time pressure, worries about job security, and the employee's perception of the company culture. The latter is depicted by two variables which comprise multiple items referring to (i) the perceived clarity of the firm's goals and (ii) the perceived supervisory support.

To what extent the professional demands interfere with private life also depends on private responsibilities and preferences for role segmentation. Hence, to capture the private context, we include the marital status, whether children are living in the household, the individual's commuting distance, and the square thereof to capture a potentially non-linear relationship. [13,14]

Finally, the time-invariant characteristics gender, age (and its square), German nationality, the level of education (7 dummies), standardized Big 5 personality traits and risk preferences,[15] the federal state (16 dummies), the industry sector (5 dummies), and the size of the establishment (available only once in the data) are captured in the individual fixed effect. Hence, these variables are not considered in our main specification according to eq. (1) which includes time-varying information only. However, we account for these variables in the OLS-regressions which we run in comparison to our main analyses. An overview of all variables used in the analysis as well as the associated descriptives can be found in Table A.1.

Effect heterogeneity

As mentioned above, we include a vector of working conditions which are often associated with work-related off-work communication and are likely to have their own relationship to well-being. A working condition which is directly linked to the variable of interest and which we hence devote special attention to, is the actual amount of hours worked during a week. As described in section 2, the relationship between work-related off-work communication and our outcome variables can either be triggered by an increase in leisure interruptions or by the increase in overall working time (which is often related).

We aim to analyze the direct link between increasing working hours, changing the status of off-work communication, and the outcome variables. We therefore specify equation (2):

$$y_{it} = \gamma_1 WROWC_{it} + \gamma_2 WT_{it} + \gamma_3 WROWC_{it} \times WT_{it} + X_{it}\beta + \alpha_i + \eta_t + \epsilon_{it}. \qquad (2)$$

In equation (2), we regress our outcome variables of interest on $WROWC_{it}$ which takes on

[13] The latter is something which is highly related to work-to-family interference and is rarely available in such data.

[14] Our family related control variables allow us to depict a long-run family situation only. However, this is in line with our general analysis, which is aimed at capturing long-term effects.

[15] These are surveyed only once in the data.

value 1 if individual i reports daily, weekly, or monthly leisure interruptions in period t, and 0 otherwise. Accordingly, WT_{it} takes on value 1 if individual i reports an increase of at least one actual working hour in period t, and 0 otherwise. Finally, the interaction term of these two dummies takes on value one if individual i experiences both leisure interruptions and an increase in actual working hours in period t. In this specification, the other regressors are in line with eq. (1), with the exception that vector X now omits actual weekly working hours, since these information is captured by the dummy WT. In eq. (2), no work-related off-work communication and no working time increases serves as reference category. By proceeding in this way, we are able to differentiate the effect of off-work communication on our outcomes of interest from an effect which may be aggravated by a simultaneous increase in work-load as represented by actual working hours.

5 Results

Well-Being and Work-Related Off-Work Communication

Work-to-Family Conflict

The goal of this study is to contribute to the understanding of how work-related off-work communication is associated with employee well-being. We begin our analysis by examining how regular, i.e., daily, weekly, or monthly, work-related off-work communication (WROWC) is related to the work-to-family conflict. The main results of this analysis are summarized in Table 1. In this Table, column (1) depicts results from an unconditional correlation, column (2) presents results according to an OLS regression, which accounts for the vector of control variables X presented in section 4. Finally, column (3) refers to results according to equation (1), which account for individual fixed effects.

The estimate for the $WROWC$ coefficient derived from the unconditional regression is statistically significant at the 1 percent level and positive. Once we account for potential confounding factors, it appears that individuals who communicate on work-related topics during non-working hours on a regular basis, i.e., at least monthly, report a statistically higher work-to-family conflict than comparable individuals as assessed with respect to observable job-related and private characteristics. The estimated effect size amounts to over 30 percent of a standard deviation and is statistically significant at the 1 percent level. Next, we run a F-test, in order to test the joint significance of the averages of all time-variant variables. Since the null hypothesis of all averages being zero is rejected, our preferred specification is the fixed effects regression.[16] Finally, we present the within individual comparison, which reveals that the previously obtained effect more than halves in size, but sustains on the same level of statistical significance, namely 1 percent. The reduced association between $WROWC$ and the perceived work-to-family conflict as compared to an inter-individual regression suggests that individuals may self-select into this type of working arrangements based on unobservable, but time-invariant characteristics such as

[16]Since the Hausman test is only valid under homoscedasticity, but we cluster the standard errors at the establishment level, we run an auxiliary regression instead of applying the usual Hausman test (see Wooldridge, 2010).

preferences with respect to role blurring between private and work lives.

Table 1: Work-to-Family Conflict and Work-Related Off-Work Communication (daily, weekly, or monthly)

Dependent variable	**Work-to-Family Conflict Index (standardized)**		
	(1) (OLS)	(2) (OLS)	(3) (FE)
Work-Related Off-Work Communication ($WROWC$)	0.515^{**} (0.040)	0.318^{**} (0.041)	0.140^{**} (0.049)
Constant	-0.175^{**} (0.025)	-2.354^{**} (0.533)	-1.531 (1.246)
Controls	NO	YES	YES
Individuals	1,981	1,981	1,981
Observations	4,439	4,439	4,439
Adj. R^2 / R^2-within	0.060	0.298	0.088

Notes: Work-related off-work communication ($WROWC$) on a daily to monthly basis. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (526 clusters). The average panel length is 2.2 years. The descriptive statistics for $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

WHO5 Mental Well-Being Index

We proceed by replacing our dependent variable, the work-to-family conflict index, by the WHO5 mental well-being index, in our analysis. The results of these regression are depicted in Table 2. The associated results reveals two key aspects. First, all estimated coefficients are by far smaller in size than those in relation to our work-to-family conflict index. Second, the association between work-related off-work communication and the WHO5 index is negative, but not statistically significant. At the most, it would be statistically significant at the 10 percent level in a cross-individual comparison. This finding means that there is – if anything – very weak evidence that individuals who regularly communicate about work during leisure have on average a lower mental well-being index than comparable individuals with respect to observable characteristics who do not regularly communicate about work during leisure. Furthermore, once we incorporate intra-individual fixed-effects into our specification, which means that we compare within individual variation thereby taking time-invariant unobserved characteristics such as preferences into account, the estimated association further drops in size and becomes statistically entirely insignificant. We conclude from this set of regressions that the direct association between work-related off-work communication and mental health is rather negligible. In other words, we do not find evidence that regular work-related communication during off-work hours is deteriorating mental well-being.

Table 2: Mental Health (WHO 5 Index) and Work-Related Off-Work Communication (daily, weekly, or monthly)

Dependent variable	**Mental Health (WHO 5 Index, standardized)**		
	(1) (OLS)	(2) (OLS)	(3) (FE)
Work-Related Off-Work Communication ($WROWC$)	0.025	−0.065	−0.017
	(0.036)	(0.036)	(0.052)
Constant	−0.009	1.184	0.441
	(0.022)	(0.513)	(1.848)
Controls	NO	YES	YES
Individuals	1,981	1,981	1,981
Observations	4,439	4,439	4,439
Adj. R^2 / R^2-within	0.0001	0.171	0.034

Notes: Work-related off-work communication ($WROWC$) on a daily to monthly basis. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (526 clusters). The average panel length is 2.2 years. The descriptive statistics for $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Job Satisfaction

If we think of work-to-family conflict and mental health as potential (effort) costs of a job, then our results suggest that work-related off-work communication is strongly associated with work-to-family conflicts, but not with mental well-being. Since we are also interested in the upside of a certain work behavior, we turn our attention to job satisfaction, which is an established economic measure for general job utility. The associated results are displayed in Table 3. As in the case of mental well-being, we again, observe relatively weak associations. Moreover, our results suggest that the associations are not statistically significant, with the exception of the unconditional correlation. Yet, even in this case, the estimated effect size of 8.7 percent of a standard deviation is minor to the respective 51 percent for the case of work-to-family conflict. We conclude that while work-to-family conflict appears to be indeed strongly associated with work-related off-work communication, the secondary measures of well-being seem to be rather unaffected. So, job satisfaction is not associated with work-related off-work communication.

Table 3: Job Satisfaction and Work-Related Off-Work Communication (daily, weekly, or monthly)

Dependent variable	**Job Satisfaction (standardized)**		
	(1) (OLS)	(2) (OLS)	(3) (FE)
Work-Related Off-Work Communication ($WROWC$)	0.087* (0.035)	0.001 (0.032)	−0.051 (0.047)
Constant	−0.030 (0.027)	0.620 (0.558)	−1.063 (1.621)
Controls	NO	YES	YES
Individuals	1,981	1,981	1,981
Observations	4,439	4,439	4,439
Adj. R^2 / R^2-within	0.002	0.338	0.120

Notes: Work-related off-work communication ($WROWC$) on a daily to monthly basis. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (526 clusters). The average panel length is 2.2 years. The descriptive statistics for $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Heterogeneity with respect to working time changes

We have previously argued that the relationship between work-related off-work communication and work-to-family conflict can be aggravated by the increase in overall working time. In order to assess this question, we run regressions according to the specification in eq. (2), where we introduce dummy regressors for both working time changes as well as leisure interruptions as well as an interaction thereof. The respective results are displayed in Table 4, where column (1) depicts the analysis for work-to-family conflict as dependent variable, column (2) pertains to the WHO 5 index, and column (3) to job satisfaction. All regressions account for individual fixed-effects, meaning that we regard intra-individual variation only.

In column (1), we see that an increase of actual working hours is associated with a larger work-to-family conflict. We also see, that keeping working hours constant regular work-related off-work communication is associated with a larger work-to-family conflict, where the coefficient estimate of approximately 12 percent roughly corresponds to our main estimate reported in Table 1. The associations between $WROWC$ and work-to-family conflict are considerably larger for individuals who report simultaneously a working time increase. The respective coefficient estimate amounts to approximately 32 percent (and is statistically significant at the 1 percent level) of a standard deviation which is more than twice as much than the main effect size. We therefore conjecture that a large share of the positive association between work-related off-work communication and work-to-family conflict owes to a simultaneous increase in work load as reflected by actual weekly working hours. For the other outcomes variables, i.e., the WHO 5 mental health index and job satisfaction, we do not find statistically significant associations at the 5 percent level. If anything, then we observe a weakly statistically significant association, i.e, at the 10 percent level, between mental health and work-related off-work communication when it is accompanied by a simultaneous increase in working hours.

Overall, we follow from this heterogeneity analysis that the assessment of whether an individual's work-to-family conflict is detrimentally affected by leisure interruptions, crucially demands to account for the associated work load.

Table 4: Employee Well-Being, Work-Related Off-Work Communication, and Working Time Changes

Dependent variable	**WFC index**	**WHO 5 index**	**Job satisfaction**
	(1) (FE)	(2) (FE)	(3) (FE)
No Work-Related Off-Work Communication & Working Time Increase ($WROWC = 0$, $WT = 1$)	0.098* (0.046)	−0.037 (0.057)	0.016 (0.049)
Work-Related Off-Work Communication & No Working Time Increase ($WROWC = 1$, $WT = 0$)	0.121* (0.050)	0.005 (0.053)	−0.042 (0.049)
Work-Related Off-Work Communication & Working Time Increase ($WROWC = 1$, $WT = 1$)	0.323** (0.070)	−0.152 (0.080)	−0.079 (0.066)
Constant	−1.185 (1.232)	0.363 (1.859)	−1.088 (1.605)
Controls	YES	YES	YES
Individuals	1,981	1,981	1,981
Observations	4,439	4,439	4,439
R^2-within	0.090	0.036	0.120

Notes: Work-related off-work communication ($WROWC$) on a daily to monthly basis. All dependent variables are standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (526 clusters). The average panel length is 2.2 years. The descriptive statistics for work-related off-work communication $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Intensity of Work-Related Off-Work Communication

Given the strong association between work-related off-work communication and work-to-family conflict, we are interested in analysing how this relationship is affected by the intensity of such work behavior.[17] First, we analyze how a transfer in and out of very frequent (i.e., daily and weekly) work-related off-work communication maps into work-to-family conflicts. We do so by omitting the monthly category from our treatment group. This re-grouping means the control group remains constant to previous specifications, but our treatment group is reduced to observations with very frequent work-related off-work communication. The results of the associated regressions are depicted in Table 5. Here, we find a relatively strong association (approximately 40 percent of a standard deviation) between leisure interruptions and work-to-family conflicts in an inter-individual comparison. This finding means that holding everything, but the occurrence of leisure interruptions constant, the work-to-family conflict is substantially larger for those who report frequent, i.e., daily or weekly, work-related off-work communication.

[17] We abstain from further investigating the relationship between job satisfaction/mental well-being and work-related off-work communication due to the rather uninformative first set of results. For the following analyses, the corresponding results for the outcome variables mental well-being and job satisfaction are available from the authors upon request.

At the same time, we find further support for strong self-selection into specific work behavior: The intra-individual effect is now statistically insignificant, while the coefficient size is in line with the main effect presented in column (3) of Table 1. This implies that the average effect of transitioning in and out of frequent work-related off-work communication is not associated with changes in work-to-family conflicts once we account for individual, time-invariant characteristics such as preferences for role blurring.

Table 5: Work-to-Family Conflict and Frequent Work-Related Off-Work Communication

Dependent variable	**Work-to-Family Conflict Index (standardized)**		
	(1) (OLS)	(2) (OLS)	(3) (FE)
Work-Related Off-Work Communication ($WROWC$)	0.681** (0.057)	0.399** (0.063)	0.185 (0.114)
Constant	−0.117** (0.027)	−2.861** (0.589)	−0.218 (1.415)
Controls	NO	YES	YES
Individuals	1,480	1,480	1,480
Observations	3,266	3,266	3,266
Adj. R^2 / R^2-within	0.066	0.306	0.094

Notes: Work-related off-work communication ($WROWC$) on a daily to weekly basis is compared to observations with a never/yearly status. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (480 clusters). The average panel length is 2.2 years. The descriptive statistics for $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Next, we elicit to what extent the intensity of work-related off-work communication is a relevant factor with respect to the work-to-family conflict. For this purpose, we split our treatment group into individuals who often communicate about work during off-work hours, which we consider to be on a weekly or daily basis, and those with rather infrequent interruptions, i.e., monthly. Hence, our "new" control group is comprised by those who communicate about work during off-work hours, but not to an "excessive" extent. The corresponding results are presented in Table 6. From this Table, it is visible, that the size of the estimated coefficient of the inter-individual comparison is only half the respective coefficient from the main analysis. From this finding we conclude that when comparing those who communicate about work-related topics during off-work hours at least on a weekly basis and those who do so at least monthly, the first group has a significantly (at the 1 percent) higher work-to-family conflict. However, there is neither a notable effect nor a statistical significance for the intra-individual comparison. We therefore infer that if somebody is regularly communicating about work during leisure an intensification of this behavior is not associated with an increase in work-to-family conflicts.

Table 6: Work-to-Family Conflict and Intensity of Work-Related Off-Work Communication

Dependent variable	**Work-to-Family Conflict Index (standardized)**		
	(1) (OLS)	(2) (OLS)	(3) (FE)
Work-Related Off-Work Communication ($WROWC$)	0.223** (0.062)	0.126* (0.054)	−0.004 (0.063)
Constant	−0.117* (0.053)	−1.678 (1.273)	5.220 (2.774)
Controls	NO	YES	YES
Individuals	545	545	545
Observations	1,192	1,192	1,192
Adj. R^2 / R^2-within	0.012	0.270	0.132

Notes: Work-related off-work communication ($WROWC$) on a daily to weekly basis is compared to observations with a monthly status. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (284 clusters). The average panel length is 2.2 years. The descriptive statistics for $WROWC$ is provided in Table A.2. The specifications in columns (2) and (3) contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.

The findings of our intensity analyses may of course owe to smaller sample sizes as compared to the main analysis, i.e., to a loss of statistical power. At the same time, they appear to support the main insight so far, namely that there is a strong underlying self-selection into specific work behavior. Given that the estimated intra-individual effects are not statistically significant, one could conjecture that mostly people who either posses according preferences or adaptation skills choose jobs with frequent communication during leisure.

Establishment Fixed-Effects

We proceed by asserting that our set of job related control variables sufficiently captures establishment-specific effects by comparing our main inter-individual specification with results from an establishment fixed effects specification. We have shown that accounting for intra-individual variation is crucial in order to establish the relationship between work-related off-work communication and work-to-family conflicts. However, by proceeding in this way, we have omitted potential time-invariant unobserved establishments characteristics which may affect the relationship of interest. That is, one could argue that our rich set of covariates does not capture all establishment-level factors which affect the relationship between work-related off-work communication and work-to-family conflict. To assert that our set of covariates is indeed sufficient, we run a regression in which we omit individual fixed effects and account for establishment fixed effects instead.The results are displayed in Table 7. In particular, Table once again presents the conditional OLS and the fixed effects estimates from Table 1, but incorporates yet another column which accounts for establishment fixed effects. When we compare this column with column (1), i.e., the previously obtained OLS results, we see that the estimated coefficients are very similar. We can therefore conclude that by including our set of job and establishment specific covariates we succeed in accounting for the associated confounding factors on the establishment level.

Table 7: Work-to-Family Conflict and Work-Related Off-Work Communication (daily, weekly, or monthly)

Dependent variable	**Work-to-Family Conflict Index (standardized)**		
	(1) (OLS)	(2) (Ind. FE)	(3) (Estab. FE)
Work-Related Off-Work Communication ($WROWC$)	0.318^{**} (0.041)	0.140^{**} (0.049)	0.272^{**} (0.044)
Constant	-2.354^{**} (0.533)	-1.531 (1.246)	-2.229^{**} (0.540)
Controls	YES	YES	YES
Individuals	1,981	1,981	1,981
Observations	4,439	4,439	4,439
Adj. R^2 / R^2-within	0.298	0.088	0.269

Notes: Work-related off-work communication ($WROWC$) on a daily to monthly basis. The dependent variable is standardized with mean 0 and standard deviation 1. The values in parentheses represent robust standard errors clustered at the establishment level (526 clusters). The average panel length is 2.2 years for individual fixed effects estimates and 8.4 observations for establishment fixed effects. The descriptive statistics for $WROWC$ is provided in Table A.2. All specifications contain a set of covariates introduced in Section 4. */** denotes statistical significance at the 5/1% level.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

6 Discussion

Discussion

Our findings from the previous section suggest that the long-term average relationship between work-related off-work communication and work-to-family conflict is positive, i.e., the more people engage in work-relate off-work communication the stronger their work-to-family conflicts. These findings are in line with those from earlier research that demonstrated that work-related off-work communication is positively related with work-to-family conflict (Boswell and Olson-Buchanan, 2007; Butts et al., 2015; Derks et al., 2016). Because we based our study on a representative sample and used a rigorous data-analytic strategy it overcomes many shortcomings of earlier research and provides a more nuanced picture on the role of work-related off-work communication for work-to-family conflict. Specifically, we show that the empirical association between work-related off-work communication and work-to-family conflict decreases when controlling for work and private life covariates as well as individual fixed effects, suggesting that past research might have overestimated the effect of work-related off-work communication on work-to-family conflict. However, we found that the increase in work-to-family conflict is particularly strong when work-related off-work communication is coupled with an increase in working time. This result suggests that adding work-related off-work communication to an already long workday is experienced as particularly disruptive.

Interestingly, work-related off-work communication was neither related to well-being nor job satisfaction. We believe that this could owe to the fact that working during leisure and engaging in work-related communication during this time can have contradictory effects on well-being. And that this can be even the case for the same individual depending on the moment of the respective leisure interruption. For instance, there might be occasions when leisure interruptions deteriorate well-being and job satisfaction because the effort invested into work-related off-work communication increases strain reactions (Butts et al., 2015; Park et al., 2020) and may make one aware of the large amount of work that needs to be done. However, there might be other occasions when the opportunity to engage in work-related communication during leisure time can be seen as a resource because it provides the possibility to reply to an email when it is most convenient time-wise. Such a resource perspective will increase well-being and job satisfaction (Ragsdale and Hoover, 2016; Sonnentag, 2018). Hence, our long-time averaging approach may have caused a counterbalance such that the two underlying effects cancelled out.

In addition, it could be that some types of work-related off-work communication are more detrimental to well-being and job satisfaction. This possibility is aggravated by the survey question, from which we derive our explanatory variable, i.e., the frequency individuals communicate about work-related topics during leisure by means of "receiving calls" and "replying to emails". The first implies a passive wording, while the latter refers to an active action. While it is well imaginable that receiving a call does not necessarily provoke a response, especially, if the phone is put on mute, the immediate event of this call will in most be perceived as an "interruption" during leisure. On the other hand, "replying to emails" does not permit any inference about when the respective email was received, which may have well been during working hours. Hence, the moment an individual replies to an email may have been deliberately chosen during leisure.

For these reasons, it is plausible that our findings could be biased downwards, since the average severity of leisure interruptions on well-being may be under-estimated.

Earlier research has shown that work-to-family conflict is related to poor well-being and low job satisfaction (Amstad et al., 2011; Nohe et al., 2015). Based on this earlier research one could expect that also in our sample increased work-to-family conflict due to work-related off-work communication should have impaired well-being and job satisfaction. However, this was not the case as work-related off-work communication was not related to well-being or job satisfaction. This pattern of finding suggests that work-related off-work communication does not operate via increased work-to-family conflict, but might be related to well-being and job satisfaction via alternative pathways such as increased autonomy about when and where to attend to work-related obligations. It might have been that the negative path via work-to-family conflict and positive (unmeasured) path via increased autonomy might have cancelled each other out.

Limitations

In this study, we analyzed how work-related off-work communication affected various aspects of private-life well-being. By setting up the study in this way, we cannot make any claims about the opposite situation, i.e., how work-life is affected by interruptions associated with private life. Albeit, these are presumably increasing because of both the rise of modern communication technologies and an increasing utilization of working from home practices. Nevertheless, we believe that this is a distinctively different research question which does not confound our implications, since there is no reason to believe that there is a systematic relationship between leisure and work interruption. That is, individuals engaging in frequent private conversations on the job are not necessarily the same people who experience frequent work-related leisure interruptions.

In our research we used a rather broad measure of work-related off-work communication, compromising leisure interruptions both by phone calls and email. Future research may want to disentangle these different types of leisure interruptions to gain an even better understanding of what specifically increases the experience of work-to-family conflict.

Next, our research setting does not permit to infer anything about a potential productivity effect of work-related communication during leisure. We address the possibility that work during leisure may present a resource to employees because of the associated scheduling flexibility, but in our understanding this merely refers to the aspect of individual time management with respect to preferences and private-life organization. Yet, more efficient time allocation may reflect in increased productivity. More so, even involuntary leisure interruptions could enhance a firm's productivity if they, for instance, facilitate a faster flow of information. Hence, our analysis is clearly limited to the aspect of individual well-being, where future research should address the associated productivity effects as well.

Also, our research design entails several limitations which should be mentioned here. First, though we address potential biases due to selection and confounders, we cannot fully rule out that our coefficients are biased. Hence, a causal statement is not possible here. Nevertheless, based on our theoretical considerations we expect a bias towards zero.

Second, the downside of our data is that we do not observe what happens during the two years of two subsequent interviews. For instance, we do not observe individuals for whom the

detrimental effects of such work practices were so severe that they dropped out of our sample, for instance, because of health issues or firm changes. Those workers who suffer the most from such working condition are expected to reduce the off-work communication again, to interrupt their employment or even leave the employer. That means, the aforementioned argument applies: If the particularly burdened individuals dropped out of our sample, our overall effect should be biased towards zero.

Third, our data do not allow us to to distinguish between voluntary and involuntary off-work communication. If we ran a diary study where we observed every single communication action, it could be interesting to make this distinction. With the available aggregate level which asks for an average over the past year, the chance to observe a mix of voluntary and involuntary actions is quite high. Moreover, in our view, it is likely that for very same individual work-related off-work communication is sometimes voluntary and sometimes rather involuntary. It is even plausible to assume that not even the affected individual can always clearly distinguish the situation.

7 Conclusion

With this study, we aimed to contribute to our understanding of how work-related communication during off-working hours affects employee well-being. We assess employee well-being in terms of work-to-family conflict, mental well-being (WHO5 index), and job satisfaction. We find that work-related leisure interruptions impair employee well-being with respect to the work-to-family conflict. This relationship also holds for within-individual comparisons. However, once individual fixed effects are accounted for, the estimated effects drop in size. At the same time, we can neither establish a statistically significant relationship between mental health nor job satisfaction and work-related off-work communication.

Overall, our results suggest that while on average work-related leisure interruptions are associated with stronger work-to-family conflicts, there must be a self-selection of individuals who are less sensitive to leisure interruptions into jobs associated with work-related off-work communication. We hence advise employers to pay attention to the prevailing company culture taking into consideration that while some employees do not experience a deterioration in their well-being from regular leisure interruptions others may well do so.

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A Appendix

Table A.1: Descriptive Statistics

Variable	**N**	**Mean**	**Std**	**Min**	**Max**
Work-to-family conflict index	4439	2.30	0.97	1	5
Job satisfaction	4439	7.57	1.61	0	10
WHO5 mental health index	4439	15.82	4.87	0	25
Female	4439	0.16	0.36	0	1
German national	4439	0.99	0.11	0	1
Age	4439	47.32	9.64	19	64
Age^2	4439	2331.97	852.45	361	4096
Commuting distance	4439	19.30	49.02	0	667.63
Commuting distance^2	4439	2775.49	21548.41	0	445728.7
Tenure	4439	15.29	9.63	0.41	41.92
Tenure^2	4439	326.44	369.15	0.17	1757.29
Married	4439	0.87	0.34	0	1
Children in the HH	4439	0.24	0.43	0	1
Fixed-term contract	4439	0.02	0.15	0	1
Actual working hours	4439	42.58	5.73	1	60
Shift work	4439	0.23	0.42	0	1
Flexible working schedule	4439	0.17	0.38	0	1
No. supervised employees	4439	9.10	33.53	0	730
Blue collar worker	4439	0.31	0.46	0	1
Bonus	4439	0.64	0.48	0	1
Interdependency (others depend on me)	4439	3.85	1.14	1	5
Interdependency (I depend on others)	4439	3.34	1.23	1	5
Job autonomy	4439	4.08	0.89	1	5
Multitasking	4439	4.26	0.84	1	5
Sorrow	4439	1.39	0.58	1	3
Risk	4439	5.74	1.75	0	10
Time pressure	4439	3.71	1.11	1	5
Extraversion	4439	3.67	0.72	1.33	5
Conscientiousness	4439	4.32	0.47	2	5
Neurotism	4439	2.65	0.72	1	5
Openness	4439	3.64	0.59	1.25	5
Agreebleness	4439	4.02	0.55	1.67	5
Company culture index (goal clarity)	4439	3.66	0.94	1	6.50
Company culture index (supervisory support)	4439	3.67	0.82	1	8
Frequency receive help from colleagues (5 dummies)	4439	4.33	0.81	1	5
Frequency provide help to colleagues (5 dummies)	4439	4.25	0.73	1	5
Establishment size	4439	1863.22	6912.84	40	64143
Education level (7 dummies)					
Time (3 dummies)					
Industry sector (5 dummies)					
Bundesland (16 dummies)					
Occupation (14 dummies)					

Std is the standard deviation.

Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Table A.2: Work-Related Off-Work Communication

	Frequency	**Percent**
Never	1,553	34.99%
Yearly	1,374	30.95%
Monthly	815	18.36%
Weekly	531	11.96%
Daily	166	3.74%

Notes: The number of observations is 4,439.
Source: Linked Personnel Panel, 2013/2015/2017, own calculations.

Table A.3: Transition Probabilities of Work-Related Off-Work Communication Frequency between Waves

	Never/Yearly	**Monthly**	**Weekly/Daily**
Never/Yearly	0.87	0.10	0.03
Monthly	0.32	0.46	0.22
Weekly/Daily	0.11	0.24	0.64

Source: Linked Personnel Panel, 2013/2015/2017, own calculations.