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What if I like it? Daily appraisal of technology-assisted supplemental work events and its effects on psychological detachment and work engagement

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Introduction: Information and communication technologies (ICT) allow employees to engage in technology-assisted supplemental work (TASW), such as continuing work tasks and being contacted by supervisors or colleagues after their official working hours. Research has found that TASW can have positive and negative effects on employee wellbeing. Yet, it remains unclear under which circumstances TASW is beneficial or harmful. Building on appraisal theories, we hypothesized that a more positive appraisal of TASW events is related to higher levels of daily psychological detachment and work engagement. We further proposed that daily psychological detachment is positively associated with daily work engagement and mediates the relationship between appraisal of TASW events and daily work engagement.

Methods: To test our hypotheses, we conducted a diary study with two surveys per day over five consecutive workdays ($N = 135$; 245 daily observations).

Results: Results of multilevel path analysis showed that a more positive appraisal of TASW was positively related to work engagement. However, appraisal of TASW events was not associated with psychological detachment and, therefore, there was no mediating effect on work engagement.

Discussion: Our results contribute to existing research by investigating potential beneficial aspects of TASW and its effects on work engagement. Future research avenues and practical implications are discussed.

KEYWORDS

appraisal, technology-assisted supplemental work, TASW events, psychological detachment, work engagement, daily diary study

Introduction

Continuous developments and innovations of information and communication technologies (ICT) have changed how, when, and where we work. ICT, such as smartphones, laptops or software solutions (e.g., cloud working options, instant messenger services), make it possible to work remotely while staying connected to work or accessing work-related information and tasks. Remote work (also referred to as mobile work, distributed work, telework or telecommuting) describes situations in which employees work at a location away from their typical office, such as their home or field offices (cf. Allen et al., 2015). As such, technology-assisted supplemental work (TASW) represents a

sub form of remote work (Fenner and Renn, 2010). TASW is defined as the performance of work-related tasks away from one's typical workplace (e.g., at home) and after one's regular working hours with the help of ICT (Fenner and Renn, 2010). It includes all types of tasks, such as answering phone calls from work-related contacts, reading e-mails or continuing to work on a specific task. Due to the high prevalence of ICT in work and private life, engaging in TASW is rather the norm than the exception for today's workforce. This development was further reinforced by the COVID-19-pandemic. Before the pandemic, around 52% of German employees engaged in work-related task during their off-job time (DGB-Index Gute Arbeit, 2016). During the pandemic, this number increased to 73% (DGB-Index Gute Arbeit, 2022).

As TASW includes different types of work-related activities, it can be used as an umbrella term for related constructs that describe work-related ICT use during off-job time. These include but are not limited to "extended availability for work", "smartphone use after hours" or "work-related ICT use after hours" (cf. Eichberger and Zacher, 2021). The majority of these studies focused on quantitative aspects of TASW (e.g., its frequency or duration; for an overview of different approaches, see Hu et al., 2021) and neglected qualitative aspects (i.e., how TASW is experienced; cf. Reinke and Ohly, 2021). To date, research yielded evidence for ambiguous effects, leading to TASW being considered as a double-edged sword (Diaz et al., 2012; Kühner et al., 2023) or the emergence of the "high-performance-low-wellbeing paradox" (Schöllbauer et al., 2021). On the one hand, TASW evokes negative outcomes for wellbeing and health, such as problems with psychological detachment (Eichberger et al., 2021; Thörel et al., 2021), impaired sleep (Lanaj et al., 2014) or increased emotional exhaustion (Dettmers et al., 2016; Thörel et al., 2021). On the other hand, research also revealed positive consequences of TASW on motivational factors, such as increased work engagement (Ragsdale and Hoover, 2016; Carvalho et al., 2021) or work satisfaction (Diaz et al., 2012).

With our study, we make the following contributions to scholarly knowledge. First, we use an event-based approach by measuring the appraisal of daily TASW events. Often, employees cannot avoid TASW events (e.g., when receiving a work-related call or having to finish an important task in the evening). Therefore, we investigate whether it is the mere *occurrence* of TASW events or the *specific appraisal* of such events (hereafter: TASW event occurrence and TASW event appraisal, respectively) that affects employees' wellbeing. We are especially interested in potential beneficial outcomes of TASW. Building on appraisal theories (e.g., Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996), we propose that a more positive TASW event appraisal on a daily basis is beneficial for employees' daily psychological detachment in the evening (i.e., not thinking about work-related issues, Sonnentag and Fritz, 2007) and their work engagement the next morning (i.e., having an energetic sense of connection to one's work, Schaufeli et al., 2006). Second, we extend research on the interplay between TASW, psychological detachment and work engagement. Doing so is important because employees' ability to detach from work enhances their work engagement (Ten Brummelhuis and Bakker, 2012; e.g., Sonnentag and Kühnel, 2016) which, in turn, leads to better performance. Previous research suggests a positive relationship between TASW and work engagement (e.g., Ragsdale and Hoover, 2016; Carvalho et al., 2021), but a negative relationship between TASW and psychological detachment (e.g., Derks et al., 2014a; Reinke and Ohly, 2021; see also a recent meta-analysis by Kühner et al., 2023). Considering both variables—psychological detachment and work engagement—along with testing the mediating role of psychological detachment may help to understand whether TASW can have both positive and negative effects simultaneously. To address these research questions, we conducted a daily diary study with two measurement points per day among knowledge workers. Our proposed model is presented in Figure 1.

Theoretical background

TASW event appraisal

Research on the effects of TASW has recently evolved from a feature-oriented approach (e.g., frequency or duration of TASW) to an event-oriented approach that focuses on the daily occurrence of TASW events (e.g., Reinke et al., 2016; Braukmann et al., 2018) and takes the appraisal of TASW into account (e.g., Eichberger et al., 2021; Reinke and Ohly, 2021; Darouei et al., 2023). As the appraisal of TASW events may vary between events (cf. Lazarus and Folkman, 1984), this shift allows to better account for employees' varying reactions and, therefore, may help to better understand differing effects of TASW on employees (Duranová and Ohly, 2016; Braukmann et al., 2018; Reinke and Ohly, 2021).

Based on the aforementioned definition of TASW, *TASW events* are discrete happenings that (a) involve using ICT for work-related tasks (b) during off-job time (cf. Braukmann et al., 2018) and (c) evoke cognitive, emotional, or motivational reactions (e.g., interest, stress, motivation; Weiss and Cropanzano, 1996). For example, an employee receives a call from their colleague (a—work-related via ICT, e.g., smartphone) in the evening (b—off-job time). The employee may feel relieved because they had received important information for solving a problem (c—reaction).

Both TASW event occurrence and TASW event appraisal can vary from day to day and from event to event. In line with appraisal theories (e.g., Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996), the specific reaction to an event depends on how it is appraised by the individual. If the individual appraises the event as beneficial for their wellbeing and goals and/or their capability to cope as high, the event is appraised as more positive which is likely to evoke positive emotions such as pride, happiness, or exhilaration (Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996). Experiencing positive emotions broadens the employee's thought-action repertoires (Fredrickson, 2001) which, in turn, enhances their wellbeing (Reinke et al., 2016). On the other hand, if the event is appraised as detrimental and the capability to cope is low, the event is appraised as negative, resulting in negative emotions and stress reactions (Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996). For example, an employee receives phone calls from colleagues on two evenings in a week. They may appraise the phone call as positive on one evening because they receive favorable information or enjoy talking to that colleague. However, they may appraise the call as

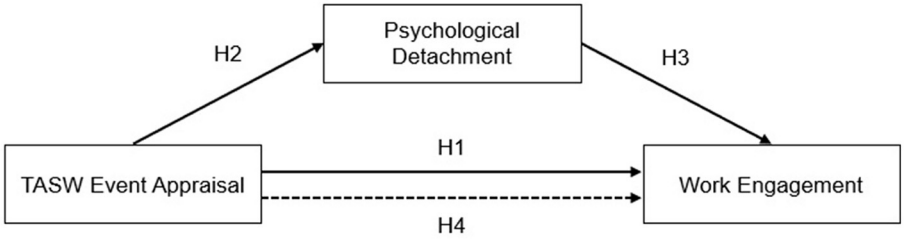

FIGURE 1
The conceptual research model. All hypotheses refers to the day level. Solid lines represent direct effects. Dotted lines represent indirect effects.

negative on the next evening because they receive unfavorable information or are disturbed while spending time with their children. As a consequence, the employee may experience positive emotions and feel more satisfied with their job on one evening, while they may experience negative emotions and stress on the other. Therefore, when a similar TASW event is appraised differently on two days, it may have different effects for the same person.

TASW event appraisal and work engagement

One aim of this study is to explore the *positive* consequences of TASW for employees by investigating their effects on work engagement. Work engagement is an affective-motivational state (Bledow et al., 2011) that is characterized by high levels of energy, involvement in work tasks, full concentration, and the willingness to invest effort in handling work-related demands (cf. Schaufeli et al., 2002). Therefore, work engagement is highly influenced by the experience of and related to the presence of positive (work-related) emotions (cf. Bledow et al., 2011).

Although meta-analytic results suggest a positive relationship between TASW and work engagement when considering both the person and day level (Kühner et al., 2023), diary studies could not confirm this positive association between TASW and work engagement at the within-person level. Whereas some diary studies found a negative relationship between daily TASW and work engagement the next day (Ten Brummelhuis and Bakker, 2012; Lanaj et al., 2014), other diary studies did not find significant associations between the two variables (Derks et al., 2015; van Laethem et al., 2018; Darouei et al., 2023). Hence, we assume that TASW event appraisal—rather than the mere TASW event occurrence—may provide valuable insights into these inconsistent results.

Building on our theoretical framework, a positive TASW event appraisal should evoke positive emotions (e.g., satisfaction, joy or enthusiasm), which, in turn, results in work engagement the next morning. Accordingly, we hypothesize:

Hypothesis 1: A more positive TASW event appraisal after hours is associated with higher levels of work engagement the following morning.

TASW event appraisal and psychological detachment from work

In addition to testing positive effects of TASW event appraisal on work engagement, we were interested in exploring positive effects on psychological detachment. Psychological detachment is a core recovery experience that implies to mentally disengage from job-related thoughts and activities during non-work time (Sonnentag and Fritz, 2007, 2015). Per definition, TASW event occurrence is negatively associated with psychological detachment, because an employee naturally thinks about work when continuing work tasks or receiving work-related e-mails and phone calls after hours. This is supported by several studies that have shown negative associations between smartphone and technology use after work and psychological detachment in the evening (Derks et al., 2014a,b; Braukmann et al., 2018; Reinke and Ohly, 2021). Interestingly, some studies have shown that specific characteristics of TASW can have beneficial effects on psychological detachment (e.g., when autonomous motivation to use ICT was high, Ohly and Latour, 2014; when employees engaged in boundary creation behavior, Barber and Jenkins, 2014).

Building on appraisal theories (e.g., Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996), we claim that it is not only the mere occurrence of a TASW event that effects psychological detachment but also its appraisal. More specifically, we argue that a more positive appraisal is associated with positive emotions. These positive emotions broaden one's momentary thought-action repertoires (Fredrickson, 2001) and, therefore, employees' attention is likely to steer away more easily from the current work experience and to expand to people, activities or subjects not related to work. As a consequence, employees with positive emotions can get more easily physically or mentally involved in non-work situations which goes along with detaching from work. For example, employees may appraise a TASW event as positive when they make visible progress or finish a task. Indeed, positive experiences have been shown to be positively related to psychological detachment (e.g., Weigelt and Syrek, 2017; Heissler et al., 2022). Contrary, a negative appraisal (e.g., employees identify a problem when working on a task or they receive unpleasant information) goes along with negative emotions. These are likely to narrow one's thought-action repertoires. Consequently, the focus of attention will be narrowed down to the work-related issues that evoked the negative emotions, resulting in problems to detach. Again, previous studies found that a more negative TASW appraisal was related to lower levels of

psychological detachment (e.g., Eichberger et al., 2021; Reinke and Ohly, 2021). However, these studies examined both positive and negative appraisal of TASW but did not examine the relationship between the effects of both positive and negative appraisal on the same outcomes (e.g., psychological detachment and sleep quality, Braukmann et al., 2018; psychological detachment, positive affect and negative affect, Reinke and Ohly, 2021). It thus remains unclear whether positive vs. negative TASW event appraisals have different effects on psychological detachment on days when TASW events occur. Therefore, we hypothesize:

Hypothesis 2: A more positive TASW event appraisal after hours is associated with higher levels of psychological detachment in the evening.

The relationship between TASW event appraisal, psychological detachment from work, and work engagement

Several studies have shown a positive relationship between psychological detachment and work engagement, both on a person and a day level (e.g., Kühnel et al., 2009; Ten Brummelhuis and Bakker, 2012; Sonnentag and Kühnel, 2016). This may be due to the replenishment of the individual's resources during a recovery period (Meijman and Mulder, 1998). Employees' resources are drained when they are exposed to work demands, but their resources can be replenished to a pre-work level during a recovery period (e.g., the evening or weekend). By mentally disconnecting from work, employees are no longer confronted with work demands (e.g., unfinished tasks or conflicts) which helps to decrease strain and replenish their resources (Sonnentag and Fritz, 2007), such as work engagement. Therefore, it can be assumed that detaching from work promotes employees' work engagement. Consequently, on days when employees can detach from work in the evening, they should experience more work engagement the next morning (Ten Brummelhuis and Bakker, 2012; Sonnentag and Kühnel, 2016). Thus, we hypothesize:

Hypothesis 3: Psychological detachment in the evening is associated with higher levels of work engagement the following morning.

Besides this direct effect, the literature suggests a mediating role of psychological detachment between work demands, on the one side, and work engagement, on the other side (cf. Sonnentag and Fritz, 2015). Studies using related constructs at the within-person level showed that psychological detachment mediates the relationship between work-related tasks after hours and work engagement (Ten Brummelhuis and Bakker, 2012). In addition to the proposed direct effect of TASW event appraisal on psychological detachment and the proposed direct effect of psychological detachment on work engagement, we suggest an indirect effect of positive TASW event appraisal on work engagement via psychological detachment. For example, an employee who finishes an important work task at home no longer thinks about work (i.e., psychological detachment) and, therefore, has more energy to perform at work (i.e., work engagement) the following day. Accordingly, we hypothesize:

Hypothesis 4: Positive TASW event appraisal after hours has a positive indirect effect on work engagement the following morning via psychological detachment in the evening.

Method

Sample and procedure

The study was conducted online in November 2020 in Germany. Respondents were recruited via an online panel provider (respondi AG, https://www.respondi.com). Registration is open for anyone, and participation in surveys is not mandatory. Participants receive bonuses for regularly participating in studies that can be exchanged for different kinds of compensation (e.g., vouchers).

Participants were invited to take part in a general survey 1 week before the diary surveys. Next, they received two daily surveys (morning and bedtime questionnaire) over the course of 5 consecutive workdays (Monday to Friday). We chose a time period of 1 week for data collection as participants had to complete two surveys per day and we aimed to retrieve a large sample with low attrition rates (e.g., Ohly et al., 2010). Previous studies using similar constructs had shown that the time period works well (e.g., Breevaart et al., 2012; Cambier et al., 2019; Eichberger et al., 2021; Reinke and Ohly, 2021). The morning survey took ~5 min to complete and had to be filled out in the morning before work. Participants could only fill out the survey if they were planning to work on the respective day. The bedtime survey took ~2 min to complete and had to be filled out before going to bed. Participants could only fill out the survey if they had worked on the respective day.

In the general survey, informed consent from all individual participants was obtained and inclusion criteria had to be fulfilled: Participants had (a) to work at least 20 h, (b) regularly between 6 a.m. and 8 p.m., (c) were not allowed to do shiftwork or on-call duty, and (d) had to engage in TASW (at least "seldom"). For our final sample, we only included data from participants who provided at least one matching day-level data set (evening survey and the following morning survey) and if the processing time per item was more than 1 s in all daily surveys. We could only include data points from Monday evening until Friday morning, resulting in a maximum of four matching data sets per person.

In the general survey, 466 respondents qualified for participation in the daily surveys. Of these 466 respondents, 240 failed to provide at least one matching day-level survey set. Another 11 participants were excluded for completing the surveys too quickly (i.e., processing time per item was under 1 second). Therefore, the final sample for our analyses consisted of 215 participants (89 women, 41.4%) who completed a total of 686 daily survey sets. Age ranged from 20 to 65 years ($M = 43.69$ years, $SD = 11.16$); 32.6% reported having at least one child living at home. The most frequent educational level was master's degree or diploma (30.2%), followed by vocational training (25.6%), high school degree (13.0%), and bachelor's degree (11.6%). Participants worked in diverse industries, including the service sector (23.3%), finance and insurance (9.8%), and IT/telecommunications (8.4%). The professional experience ranged from 1 to 46 years ($M = 15.52$ years, $SD = 11.91$), and the mean working time was 38.65 hours per week

($SD = 6.39$), ranging from 20 to 60 hours. Participants had either full-time or part-time jobs or were self-employed (79.1%, 10.7% and 10.2%, respectively); 30.7% had leadership responsibilities.

Measures

The general survey assessed demographics. In the daily surveys, we measured our study variables.

TASW event occurrence and TASW event appraisal

We measured TASW event occurrence and TASW event appraisal after hours in the evening survey. Following appraisal theories (Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996), we assessed TASW event occurrence and TASW event appraisal after hours separately. For TASW event occurrence, we build on validated scales measuring TASW in general (Fenner and Renn, 2010; e.g., Derks and Bakker, 2014) and the event taxonomy developed by Braukmann et al. (2018). We adapted two items measuring TASW event occurrence. We measured TASW event occurrence with the items "Today, in my free time, I continued to work on or completed unfinished work tasks" (TASW event *continuing work tasks*) and "Today, I was contacted in my free time for professional reasons (e.g., via smartphone, e-mail, SMS)" (TASW event *being contacted*). Participants were asked to indicate if they had experienced the events in the evening (1 = yes, 0 = no).

When participants indicated TASW event occurrence, they were asked to also indicate TASW event appraisal. The items read "How did you feel about continuing or completing unfinished work tasks today?" (TASW event *continuing work tasks*) and "How did you feel about being contacted today in your free time for professional reasons?" (TASW event *being contacted*). As we were interested in the effects of TASW event appraisals, we chose to use a scale ranging from a negative, through a neutral to a positive labeling. Consequently, both items were rated on a 5-point scale ranging from −2 (*very stressful*) to 2 (*very enriching*), with 0 as a neutral mean. For days on which both events were appraised, we included the mean of both TASW event appraisals in our main analysis.

Psychological detachment

We measured psychological detachment with regard to the previous evening in the morning survey, using four items from the Recovery Experience Questionnaire (REQ; Sonnentag and Fritz, 2007), adapted for day-specific assessment. A sample item is "Yesterday evening, I forgot about work". Responses were provided on a 5-point Likert scale ranging from 1 (*I fully disagree*) to 5 (*I fully agree*). The within-person Cronbach's α was 0.88; the between-person Cronbach's α was 0.98.

Work engagement

We measured work engagement with regard to the upcoming work day in the morning survey, using the nine-item Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006), adapted for daily predictive assessments. Sample items are "When I think of the upcoming workday, I am full of energy" for vigor, "…I am enthusiastic about my work" for dedication, and "…I am looking forward to working intensively" for absorption. Responses were provided on a 5-point Likert scale ranging from 1 (*I fully disagree*) to 5 (*I fully agree*). The within-person Cronbach's α was 0.88; the between-person Cronbach's α was 0.99.

We presented the items measuring psychological detachment on a separate webpage and temporally before the items assessing work engagement.

Construct validity

We ran multilevel confirmatory factor analyses (CFA) with latent factors at the day and the person level to examine the construct validity of our measures. We specified three different models containing the items of psychological detachment and work engagement (items on TASW event occurrence and TASW event appraisal are excluded as these display manifest items). Specifically, we modeled a 1-1-model, a 2-1-model and a 2-2-model. The results can be obtained from Table 1. Overall, model 3 had a good model fit and fit the data better than the other two models. As a result, we conclude that the measures psychological detachment and work engagement capture two distinct constructs on both levels.

Analytical strategy

For data preparation, we used IBM SPSS Statistics (Version 28). For all other analyses, we used R Version 4.1.1. Cronbach's α was calculated on both levels, using the semTools package (Jorgensen et al., 2022). Because days were nested within individuals, we calculated the intraclass coefficients (ICCs) for our study variables using the multilevel package (Bliese, 2022) and found substantial between-person variance for all day-level variables (see Table 2). As a result, we conducted multilevel path analysis using the lavaan package (Rosseel, 2012), applying the maximum likelihood estimation method with robust standard errors (MLR)[1] in both the preliminary and the main analysis.

To test our hypotheses, we modeled all relationships between our day-level variables on both analytical levels,[2] as recommended by Preacher et al. (2010). With this approach, the variance of day-level variables is decomposed into latent between-person and within-person components. Therefore, path estimates at the day-level represent within-person relationships while person-level relationships represent between-person relationships. Consequently, variance conflation is avoided and centering of

1 We also estimated our models with the ML estimator and obtained on both levels identical results for the estimates and slightly different results for the SEs and *p*-values.

2 We considered age, sex, underaged children, and having leadership responsibilities as control variables for this study. Of these, only underaged children correlated with a study variable (positively with psychological detachment). We tested our hypotheses with and without having children as a control variable and obtained identical results. Therefore, we report the results of the analysis without any control variables.

TABLE 1 Results of the multilevel confirmatory analyses.

Model	Contained factors	χ^2	χ^2/df	CFI	TLI	RMSEA	$SRMR_{within}$	$SRMR_{between}$
M1: 1-1-model	PD + WE; PD + WE	2,006.110*	130	0.729	0.674	0.145	0.340	0.704
M2: 2-1-model	PD, WE; PD + WE	905.857*	129	0.888	0.864	0.094	0.142	0.252
M3: 2-2-model	PD, WE; PD, WE	685.170*	128	0.919	0.902	0.080	0.070	0.081

PD, Psychological detachment; WE, Work engagement. In the column "Contained Factors", a plus (+) symbolizes that the different constructs are specified as one factor, a comma (,) symbolizes that the different constructs are specified as different factors.
*$p < 0.001$.

TABLE 2 Means, standard deviations (SDs), ICCs, and intercorrelations among study variables.

Variable	*M*	SD_b	SD_w	ICC	1.	2.	3.	4.
1. TASW event occurrence [a]	0.37	0.36	0.48	0.29		- [c]	−0.21***	0.08*
2. TASW event appraisal [b]	−0.12	0.73	0.83	0.39	0.02		0.25***	0.34***
3. Psychological detachment	3.58	0.86	0.99	0.61	−0.24***	0.24**		0.26***
4. Work engagement	3.17	0.88	0.94	0.82	0.09	0.39***	0.26***	

M = person-level mean. SD_b = person-level standard deviation. SD_w = day-level standard deviation. ICC = intraclass correlation (ICC1). Correlations below the diagonal are person-level correlations (for correlations with TASW event appraisal $N = 135$; for all other correlations $N = 215$), and correlations above the diagonal are day-level correlations (for correlations with TASW event appraisal $N = 245$; for all other correlations $N = 686$).
[a] 0 = no TASW event occurred, 1 = at least one of both TASW events occurred. [b] Higher values indicate a more positive appraisal. [c] As the day-level values for TASW event appraisal are only available for TASW event occurrence = 1, a correlation between both variables cannot be calculated on the day level.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

variables is not necessary (Preacher et al., 2010). To test the indirect relationship (H4), we followed recommendations by Preacher and Selig (2012) and used Monte Carlo simulation procedures. Specifically, we calculated 95% Monte Carlo confidence intervals (CIs) with 20,000 replications in the semTools package (Jorgensen et al., 2022).

Results

Descriptive analysis

The 215 participants provided 686 matching survey sets (on average 3.19 days per person). However, TASW event occurrence and, therefore, TASW event appraisal was only reported by 135 participants in 245 matching survey sets ($M = 1.81$ days per person). More specifically, 80 participants provided no data on TASW event appraisal (37.2%), whereas 62 participants provided data on TASW event appraisal on only one evening (28.8%), 42 on two evenings (19.5%), 25 on three evenings (11.6%), and six on four out of the four evenings (2.8%).

Table 2 presents the means, standard deviations at the day and the person level, intraclass correlations (ICC1) as well as bivariate correlations. We averaged the day-level variables across days to calculate all bivariate correlations on the person level. As hypothesized, all study variables correlated significantly positively with one another, both on the day and the person level. However, TASW event occurrence correlated significantly negatively with psychological detachment on both levels. A positive correlation between TASW event occurrence and work engagement reached significance only on the day level.

Preliminary analysis

In this study, TASW event appraisal was only reported on days with TASW event occurrence. Therefore, we chose to also analyze the effects of TASW event occurrence on daily psychological detachment and work engagement as a preliminary analysis. We conducted multilevel path analysis in one overall two-level model with parallel paths on both levels. Specifically, we modeled direct paths from TASW event occurrence on daily psychological detachment and work engagement as well as from daily psychological detachment on work engagement. We further modeled an indirect effect of TASW event occurrence on work engagement via psychological detachment. This model had a good fit, $\chi^2 = 75.791$, df = 6, $p < 0.001$; CFI = 0.812; RMSEA = 0.000; $SRMR_{within} = 0.000$; $SRMR_{between} = 0.002$. The results for both levels are shown in Table 3.

At the day level, most relationships were in line with previous studies. TASW event occurrence after hours was negatively related to psychological detachment in the evening (est. = −0.32, $p < 0.001$). Further, psychological detachment in the evening was positively related to work engagement the next morning (est. = 0.18, $p < 0.001$). Also, psychological detachment mediated the relationship between TASW event occurrence after hours and work engagement the next morning (est. = −0.06, CI [−0.10; −0.03]). However, TASW event occurrence after hours was not directly related to work engagement the next morning (est. = 0.04, $p = 0.445$).

At the person level, TASW event occurrence was negatively related to psychological detachment (est. = −0.73, $p = 0.019$). Further, psychological detachment was positively related to work engagement (est. = 0.35, $p < 0.001$). Contrary to the day level, TASW event occurrence was positively related to work engagement

TABLE 3 Results from the multilevel path analysis for the preliminary analysis.

Level and variable	Psychological detachment			Work engagement		
	Est.	SE	*z*	Est.	SE	*z*
Person-level						
Intercept	3.83	0.11	35.94***	1.66	0.38	4.38***
TASW event occurrence [a]	−0.73	0.31	−2.36*	0.82	0.33	2.50*
Psychological detachment				0.35	0.10	3.67***
Indirect effect [b]				−0.25	0.14	−1.78
Day-level						
TASW event occurrence [a]	−0.32	0.07	−4.62***	0.04	0.04	0.80
Psychological detachment				0.18	0.03	6.40***
Indirect effect [b]				−0.06	0.02	−3.74***
R^2 person-level	0.059			0.123		
R^2 day-level	0.043			0.081		

$N_{persons} = 215$, $N_{days} = 686$. Estimates are unstandardized estimates from one overall two-level model test in R using the lavaan package (Rosseel, 2012).
[a] 0 = no TASW event occurred, 1 = at least one of both TASW events occurred. [b] Indirect effect of TASW event occurrence on work engagement via psychological detachment.
*$p < 0.05$. ***$p < 0.001$.

TABLE 4 Results from the multilevel path analysis for the main analysis.

Level and variable	Psychological detachment			Work engagement		
	Est.	SE	*z*	Est.	SE	*z*
Person-level						
Intercept	3.37	0.09	38.51***	2.26	0.42	5.39***
TASW event appraisal [a]	0.83	0.23	3.61***	0.55	0.21	2.61**
Psychological detachment				0.32	0.13	2.56*
Indirect effect [b]				0.26	0.11	2.34*
Day-level						
TASW event appraisal [a]	0.02	0.10	0.15	0.12	0.05	2.57*
Psychological detachment				0.16	0.05	2.97**
Indirect effect [b]				0.00	0.02	0.15
R^2 person-level	0.233			0.303		
R^2 day-level	0.000			0.126		

$N_{persons} = 135$, $N_{days} = 245$. Estimates are unstandardized estimates from one overall two-level model test in R using the lavaan package (Rosseel, 2012).
[a] We used a scale ranging from−2 (very stressful) to +2 (very enriching) with a neutral middle. Higher values indicate a more positive appraisal. [b] Indirect effect of TASW event appraisal on work engagement via psychological detachment.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

(est. = 0.82, $p = 0.012$), whereas psychological detachment did not mediate this relationship (est. = −0.25, CI [−0.04; 1.15]).

Main analysis

As participants could provide TASW event appraisal only on days with TASW event occurrence, all days without TASW event occurrence were automatically excluded from the main analysis. This resulted in a smaller sample size (245 observations nested in 135 persons) compared to the preliminary analysis. Table 4 shows the results from the multilevel path analysis of our overall two-level model with parallel paths on both levels.[3] This model had a very good fit, $\chi^2 = 56.125$, df = 6, $p < 0.001$; CFI = 0.989; RMSEA = 0.000; $SRMR_{within} = 0.000$; $SRMR_{between} = 0.000$.

At the day level, the results reveal that a more positive TASW event appraisal after hours was positively related to work engagement the next morning (est. = 0.12, $p = 0.010$). Therefore, Hypothesis 1 was supported. However, we did not find a significant relationship between TASW event appraisal

3 Because of the high percentage of singletons (i.e., only one data set per person), we tested our hypothesized model with and without them and obtained identical results on the day level. Therefore, we report the results including the singletons.

after hours and psychological detachment in the evening (est. = 0.02, $p = 0.879$). Thus, Hypothesis 2 was not supported. Further, psychological detachment in the evening was positively related to work engagement the next morning (est. = 0.16, $p = 0.003$), supporting Hypothesis 3.

Hypothesis 4 suggested a positive indirect relationship between TASW event appraisal after hours and work engagement the next morning via psychological detachment in the evening on the day level. In our path analysis, we found no indirect effect (est. = 0.00, $p = 0.878$). This is supported by the calculated Monte Carlo CI of [−0.032; 0.036]. Thus, Hypothesis 4 was not supported.

Although we do not have hypotheses on the person level, we find it important to point to the following findings. In line with the day-level results, at the person level a more positive TASW event appraisal (est. = 0.55, $p = 0.009$) and psychological detachment (est. = 0.32, $p = 0.011$) were positively related to work engagement. Contrary to the day level, a more positive TASW event appraisal was also positively related to psychological detachment (est. = 0.83, $p < 0.001$) on the person level. Finally, psychological detachment mediated the relationship between TASW event appraisal and work engagement (est. = 0.26, CI [0.06; 0.50]).

Discussion

The aim of our study was (1) to investigate whether TASW event appraisal affects psychological detachment and work engagement on a daily basis and (2) whether psychological detachment mediates the relationship of TASW event appraisal on work engagement. With this, we aimed to contribute to the question of whether it is the mere occurrence of TASW events or rather their specific appraisal that affects employees' wellbeing and motivation. In the following we discuss three key findings:

First, we found no relationship between daily TASW event occurrence and daily work engagement which is in line with previous diary studies (e.g., van Laethem et al., 2018; Darouei et al., 2023). However, as hypothesized, when TASW events occurred, a positive appraisal was associated with higher levels of daily work engagement. This supports meta-analytic findings conducted at both the day and person level (Kühner et al., 2023) and is also in line with the assumption of appraisal theories (Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996) which state that it is the specific appraisal and not the event *per se* that determines an individual's reaction to the event. Interestingly, at the person level, both TASW event occurrence *and* TASW event appraisal were positively related to work engagement. That is, participants who—on average—experienced more TASW events over the course of our study also reported higher levels of work engagement. Similarly, participants who appraised the experienced TASW events as more positive in general, also reported higher levels of work engagement. This could imply that TASW occurrence can foster work engagement over a longer period of 1 week. However, it is also possible that we see a reverse effect, such that participants with—on average—higher levels of work engagement are more likely to work after hours.

Second, turning to psychological detachment, we found that the mere occurrence of TASW events after hours had a negative effect on psychological detachment in the evening. We found no association between daily TASW event appraisal and psychological detachment. Taken together, these results suggest that the daily *occurrence* of TASW events is always detrimental to employees' psychological detachment, regardless of their specific *appraisal*. These findings are in line with previous studies: in a study by Braukmann et al. (2018), participants reported lower levels of psychological detachment on days when positive as well as negative TASW events occurred. Also, Reinke and Ohly (2021) found that a (more) positive appraisal of TASW did not affect psychological detachment in the evening. To explain the effects of daily TASW events on psychological detachment we need to go back to the assumption made by the Effort-Recovery Model (Meijman and Mulder, 1998) which states that recovery can only occur when employees are not confronted with work demands. While we hypothesized a mediating effect on work engagement through psychological detachment building on the Broaden-and-Build Theory (Fredrickson, 2001), the finding of this study rather nourishes the assumption of parallel processes—health impairment and motivational process—as proposed by the Job Demands-Resources Model (Bakker and Demerouti, 2007). TASW events impair health as they negatively affect psychological detachment which serves as a measure for wellbeing. At the same time, TASW events have the potential to evoke a motivational process and lead to work engagement *if* appraised positively as discussed in the previous paragraph.

The third key finding concerns the mediating effect of daily psychological detachment. Psychological detachment in the evening mediated the relationship between TASW event occurrence after hours and work engagement the next day. In other words, daily TASW event occurrence is detrimental to employees' ability to detach from work-related issues. This lack of psychological detachment leads to employees not being able to replenish their resources to the pre-work level, resulting in lower levels of work engagement the next day (cf. Meijman and Mulder, 1998). Here, we clearly see that it is the mere occurrence that matters for psychological detachment. Turning to TASW event appraisal, we found that, contrary to our hypothesis, psychological detachment in the evening did not mediate the positive relationship between daily TASW event appraisal and work engagement the next morning. Thus, psychological detachment does not explain this relationship. We therefore turn to an alternative explanation of this process: an employee who appraises a TASW event positively (e.g., they receive praise from their supervisor during a phone call) may not stop thinking about work (i.e., they do not detach as initially argued). Instead, they continue to think positively about their work which increases their work engagement the next day. This explanation is entirely hypothetical. Future studies should therefore explore mediators, such as positive work reflection (Cropley et al., 2012; Jimenez et al., 2022). Turning to the person level, we found that the findings are reversed. Psychological detachment mediated the relationship between TASW event appraisal and work engagement. This indicates that employees who generally appraised TASW events as more positive, also reported higher levels of psychological detachment. This higher level of psychological detachment fosters employees' work engagement over the course of 1 week. However, when looking into TASW event occurrence also

at the person level, we see that TASW event occurrence taken alone is indeed harmful for psychological detachment. This lines up with the daily results.

In summary, the results of our study imply that TASW event occurrence is detrimental to employees' psychological detachment, both on the day and the person level. However, under certain circumstances—namely a positive appraisal of these TASW events—engaging in TASW after hours is beneficial for employees' work engagement on the day level and over the course of 1 week.

Limitations and future research

The first limitation of this study are the response options we used for TASW event appraisal. We were especially interested in potential positive effects of TASW events but did not want to leave out possible negative effects entirely. For reasons of parsimony, we chose to use single items for TASW event appraisal which had to be answered on a single scale. As a consequence, we chose to use a scale ranging from very stressful (representing a negative appraisal) through neutral to very enriching (representing a positive appraisal). However, this also came along with some disadvantages. Whereas appraisal theories (Lazarus and Folkman, 1984; Weiss and Cropanzano, 1996) assume that the appraisal of an event is either negative, neutral or positive, research suggests that people can perceive events as ambivalent, that is, they experience positive and negative aspects simultaneously (Ashforth et al., 2014). Specifically, the scale we used may have forced participants to average their appraisal (e.g., make an overall judgement when events had both positive and negative aspects), resulting in a neutral appraisal. Indeed, we found most TASW events were appraised as neutral. Previous studies indicate that both a negativity bias (i.e., negative aspects of events are more salient and dominant and, therefore, have a greater impact on one's perceptions and behaviors, resulting in a more negative appraisal of the event, cf. Baumeister et al., 2001; Rozin and Royzman, 2001) as well as a positivity bias (i.e., the tendency to use positive words more often and have positive experiences to a higher frequency than negative ones, cf. Podsakoff et al., 2023) exist. As both biases represent general tendencies, they may have skewed the daily appraisals on our scale in one or the other direction (Podsakoff et al., 2023).We can assume that when negativity bias is more pronounced in participants, they are more inclined to appraise TASW events as negative despite positive aspects in an event. Likewise, participants with a more prone positivity bias may have been more inclined to appraise TASW events as positive despite negative aspects. Therefore, future studies should investigate general negativity and positivity biases among participants and include separate items on positive and negative appraisal.

Second, we did not test how different features of TASW events affect TASW event appraisal. For instance, the frequency, duration, and intensity of TASW events are likely to affect how they are appraised. Receiving one short work-related call after work may be appraised differently to one long or multiple short calls due to a longer or repeated disturbance. It may also directly affect psychological detachment as a longer duration or higher frequency of TASW events decreases the time left for psychological detachment. Next, TASW event appraisal may be influenced by the predictability (synchronous vs. asynchronous availability) and content (pleasant vs. unpleasant news) of the TASW event as well as the importance of the situation when being interrupted (e.g., receiving a phone call while not being occupied vs. while spending quality time with family or friends), the motivation to engage in TASW events (i.e., controlled vs. autonomous motivation; cf. Reinke and Ohly, 2021) or the initiator of the TASW event (self- vs. other-initiated; Kühner et al., 2023). Also, more enduring variables may affect the relationship between TASW event occurrence, TASW event appraisal and their outcomes. For instance, a general obligation to engage in TASW may be perceived as feelings of external control and limited autonomy (Ohly and Latour, 2014). As a consequence, employees who feel obliged to engage in TASW events may appraise them more negatively (Chesley et al., 2013) which is likely to lead to rumination about work and lower work engagement. Next, employees' boundary management preference (i.e., preference to separate the work from other life domains vs. to integrate them, Kreiner, 2006) may affect TASW event appraisal: employees with higher segmentation preferences may appraise TASW events more negatively. Future studies should combine quantitative and qualitative aspects of TASW events as well as person-level variables which may influence the daily relationships between TASW events and different wellbeing and motivational outcomes.

Third, as stated in the extended SDM (Sonnentag and Fritz, 2015), we can assume that TASW event appraisal may moderate the relationship between TASW event occurrence and psychological detachment. Unfortunately, due to the operationalization of TASW event occurrence (yes = 1 vs. no = 0) and TASW event appraisal (only if TASW event occurrence = 1), we were not able to analyze an interaction between occurrence and appraisal. To address these limitations, future studies could apply an event-sampling design. For example, participants could fill out a short survey after every TASW event occurrence, indicating which event(s) they experienced, how they appraised them, and possibly providing additional information such as on the duration or content of the events. This may help to minimize recall bias (Shiffman et al., 2008) and provide a more nuanced picture of the relationship between TASW event occurrence and TASW event appraisal. As a result, researchers may generate a more sophisticated database, which may provide them with the information necessary to analyze interactions.

Fourth, in contrast to previous studies on TASW, we focused on solely two aspects of TASW (i.e., being contacted and continuing work tasks). We did not include other TASW events, such as self-initiated contacts using ICT (e.g., calling a colleague) or availability expectations. Therefore, we cannot rule out the possibility that additional TASW events occurred in addition to the events investigated in this study. Furthermore, as these two TASW events represent two distinct types of TASW, it would have been interesting to also calculate their specific effects on psychological detachment and work engagement separately. Unfortunately, the small sample size on the day level is already small. Conducting separate analyses for both TASW events would result in even smaller sample sizes and in power problems. Further, it needs to be mentioned that 62 participants provided only one matching data

set. Including these so-called singletons does not provide additional information on the day level (Bell et al., 2008). As there is only one data point to estimate person-level effects, the person-level estimates may be biased (Bell et al., 2008), especially for variables that are highly fluctuating from day to day. Consequently, our person-level results should be interpreted with caution. In this context, we also have to discuss that work engagement showed low variation at the day level with only 18% of variance (ICC = 0.82). Usually, we can calculate with 30% to 40% of the variance in daily work engagement (cf. Breevaart et al., 2012). This made it more difficult to find day-level effects on work engagement in our study. To increase the number of days with TASW event occurrence and TASW event appraisal, future studies should extend the survey period. This may include daily surveys over two or more work weeks as well as longer-term studies (e.g., on a weekly basis over several weeks or months). The latter would help to understand long-term and cumulative effects of TASW events.

Our data collection took place in November 2020. At the time, the second wave of the COVID-19 pandemic had started and employers were advised to allow their employees to work from home whenever possible. Also, employees were given more flexibility regarding their working hours in order to meet the demands of this particular time (e.g., avoiding internet outages during peak working hours; homeschooling and taking care of their children). Thus, employees may have shifted their working time to early mornings and late evenings or fragmented their work time into smaller but more time segments. We asked for TASW event occurrence and TASW event appraisal during the participants' free time. However, they may have perceived the events as regular work, resulting in fewer TASW event occurrence and influencing the reported TASW event appraisal. Indeed, working from home has been found to be positively related to the extent of TASW and the positive appraisal of TASW on the day level (Darouei et al., 2023). This needs to be taken into account when interpreting and generalizing the findings.

Finally, another methodological limitation concerns the timing of the daily surveys and the resulting time lags. We instructed the participants to complete the evening surveys as close to their bedtime as possible so that the time lag between the end of their work day and the survey completion would be as long as possible. With this, we aimed to maximize the period for potential TASW occurrence. As we have a diverse sample of employees (i.e., different industries and a range in the working hours per week) with different daily routines (e.g., work schedules, bedtime and wake up time), we chose a time frame for the completion (i.e., between 7 pm and 12 pm) rather than a specific time point. Therefore, we cannot rule out that participants filled out the daily surveys right after their work day or in the middle of the evening. As a consequence, participants may have reported no TASW event occurrence in their evening surveys, but engaged in TASW events afterwards. To control for the respective time lags between daily survey points, future studies should specifically ask and control for these time lags. For example, they could ask participants for the exact time of their work day's end and use the survey completion time recorded by the system. Another option is to ask participants in the morning whether they experienced TASW events after the evening survey.

In addition to the limitations addressed above, we also wish to highlight one implication for future research on TASW, extended and remote work. As ICT provide higher flexibility for employees in terms of time and place, they do not only blur the boundaries between work and private life (Mullan and Wajcman, 2019) but may also blur employees' definition of what counts as their actual working time vs. their off-job time. Hence, different employees may understand work in the evening as working time vs. work during their off-job time. As a consequence, some participants may have experienced TASW events (e.g., they continued a work task in the evening) but answered "no" to the respective items because they understood them as work extension (Mullan and Wajcman, 2019; Hoppe et al., 2023). As the question of what counts as working time and what does not can differ more and more on an individual or even the day level, future studies could ask directly what participants consider to be their working time and what is work during off-job hours (i.e., TASW)—in general (e.g., during a baseline questionnaire) or on a daily basis (e.g., during every evening questionnaire).

Practical implications

Our findings imply that employees experience TASW events in their free time regularly over the course of a week. However, TASW event appraisal and its consequences vary from day to day. Whereas the mere TASW event occurrence is detrimental to psychological detachment in the evening, a more positive appraisal of such events is beneficial for employees' work engagement the next morning. Therefore, if employees cannot avoid or wish to continue work tasks or to be available for work-related contacts after hours, they should be supported to experience positive events to the largest possible share compared to negative events (cf. Ohly and Draude, 2021). This has two major practical implications. First, arrangements regarding different forms of remote work should be individualized, and strict limits or prohibitions of TASW should be avoided (Ohly and Latour, 2014; Reinke and Ohly, 2021). Likewise, TASW should not be generally expected from employees. Both strict limitations as well as generally expected TASW can be perceived as feelings of external control and limited autonomy (Ohly and Latour, 2014) which, in turn, may result in more negative TASW event appraisals. Nevertheless, to ensure that cooperation with colleagues or customers functions well, employees and supervisors should openly discuss and communicate their preferences. For instance, they could use their e-mail signature or out-of-office notification to share information on their (non-)availability or response times.

Second, organizations could arrange trainings or workshops to raise awareness of the potential consequences of TASW (for an overview of practical examples, see Eurofound, 2021). Such trainings could help employees to identify which events may be potentially more positive or negative. Thus, employees may be supported in managing their (non-)availability times outside of regular work hours or the office. Especially when employees cannot avoid engaging in TASW (e.g., when TASW is necessary to meet their workload), this knowledge may help them to organize work tasks in such a way that they experience positively appraised TASW events.

Conclusion

Our results indicate that the mere occurrence of TASW events is detrimental to employees' psychological detachment from work—irrespective of how they are appraised. Moreover, a positive TASW event appraisal on days with TASW events was associated with higher levels of work engagement the following day. Taken together, these findings imply that engaging in TASW events after hours is detrimental to one's wellbeing but can also be beneficial for one's work engagement under certain circumstances, namely when engagement in TASW is appraised as positive. This finding sheds light into the double-edged effects of TASW (cf. Diaz et al., 2012; Kühner et al., 2023) and may help to solve the "high-performance-low-wellbeing paradox" (Schöllbauer et al., 2021). Therefore, we encourage researchers to build on our results and consider both occurrence and appraisal of TASW events in future studies along with our suggestions for more fine-grained measurement of TASW.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors upon request, without undue reservation.

Ethics statement

The studies involving humans were approved by Ethics Committee of the Department of Psychology, Humboldt-Universität zu Berlin. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

LK: Conceptualization, Data curation, Formal analysis, Investigation, Project administration, Visualization, Writing—original draft, Writing—review & editing. AD: Conceptualization, Resources, Supervision, Writing—review & editing. AH: Conceptualization, Resources, Supervision, Writing—review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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