

**JYX**



**This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.**

**Author(s):** van Zoonen, Ward; Scharp, Yuri,S.

**Title:** Managing daily work intrusions : An intervention to reduce attention residue and exhaustion

**Year:** 2025

**Version:** Accepted version (Final draft)

**Copyright:** © 2025 American Psychological Association

**Rights:** In Copyright

**Rights url:** <http://rightsstatements.org/page/InC/1.0/?language=en>

**Please cite the original version:**

van Zoonen, W., & Scharp, Y. (2025). Managing daily work intrusions : An intervention to reduce attention residue and exhaustion. *International Journal of Stress Management*, 32(4), 395-407.  
<https://doi.org/10.1037/str0000362>

**Managing Daily Work Intrusions:****An Intervention to Reduce Attention Residue and Exhaustion***International Journal of Stress Management*Ward van Zoonen\*<sup>ab</sup> and Yuri S. Scharp<sup>c</sup>

\* Corresponding Author

<sup>a</sup> Department of Communication Science, VU University, Amsterdam, the NetherlandsDe Boelelaan 1101, 1081 HV Amsterdam; [w.van.zoonen@vu.nl](mailto:w.van.zoonen@vu.nl)<sup>b</sup> Department of Management and Leadership, University of Jyväskylä

P.O.Box 35, FI-40014 University of Jyväskylä, Finland.

<sup>c</sup> Department of Human Resource Studies, University of Tilburg, Netherlands

TS Social and Behavioral Sciences, 5037 DB Tilburg, Netherlands,

[Y.S.Scharp@tilburguniversity.edu](mailto:Y.S.Scharp@tilburguniversity.edu)**Author Note**Ward van Zoonen  <https://orcid.org/0000-0002-8531-8784>Yuri S. Scharp  <https://orcid.org/0000-0001-8154-7443>**Conflict statement:** We have no known conflict of interest to disclose.**Funding:** This research was supported by Academy of Finland (grant number 356143)**Ethical Review:** The study was approved by the Ethical Committee at the University of Amsterdam (approval reference: 2020-PC-11968).**Acknowledgement:** The authors want to thank Alexander Atzberger for his efforts in the design of the study and the data collection.

**Managing Daily Work Intrusions:****An Intervention to Reduce Attention Residue and Exhaustion****Abstract**

The proliferation of technology-mediated work practices and the growing emphasis on open and multilocational work have highlighted the importance of navigating and managing work interruptions. Work interruptions are omnipresent in contemporary work environments and have accumulated abundant attention from scholars and managers during the past decades. Despite this attention, research only scarcely explored strategies employees could utilize to manage the growing number of work interruptions. Building on self-regulation theory, we propose that intrusions relate to exhaustion through attention residue but that an employee-centered planning intervention (i.e., writing ready-to-resume plans) mitigates this process.

We tested our predictions in an experimental field study utilizing a daily diary methodology ( $N = 50 \times 4 = 200$  occasions). The findings demonstrate that employees experience greater attention residue and higher levels of exhaustion on days when intrusions are more prevalent.

We argue that the findings imply that the intervention facilitates self-regulation processes.

The intervention reduces attention residue and attenuates the daily association between attention residue and exhaustion. The findings advance the literature on work interruptions and attention residue by demonstrating that writing about task progress reduces attention residue and limits the depleting effects of persisting thoughts regarding the interrupted task.

*Keywords:* intrusions, attention residue, exhaustion, ready-to-resume intervention, field experiment

## **Managing Daily Work Intrusions:**

### **An Intervention to Reduce Attention Residue and Exhaustion**

“Hey, do you have a minute?” is a familiar question for most employees. Intrusions represent “an unexpected encounter initiated by another person that interrupts the flow and continuity of an individual’s work and brings that work to a temporary halt” (Jett & George, 2003, p. 495). Wajcman and Rose (2011) estimate that the average knowledge worker experiences up to 22 intrusions each workday. Others estimate that an office worker is interrupted approximately every 3 to 11 minutes (Mark et al., 2005; Leroy & Glomb, 2018). Our increasing reliance on technologies that facilitate anytime and anywhere connectedness has exacerbated the occurrence and prevalence of work intrusions (McDaniel & Drouin, 2019; Rennecker & Godwin, 2005; Rosen et al., 2019). Indeed, completing work tasks without experiencing intrusions has become a luxury not afforded to most. Importantly, in addition to harming task progression, intrusion may also impair employee well-being (Baethge & Rigotti, 2013; Baethge et al., 2015; Lin et al., 2013; Puranik et al., 2020). Hence, research has started to devote attention to resources that may buffer the negative impact of various work interruptions, including supervisor appreciation (Stocker et al., 2019) and time-management skills (Ma et al., 2020).

Intrusions demand the expenditure of self-regulatory resources because thoughts about one task persist while working on another (i.e., attention residue; Freeman & Muraven, 2010; Leroy, 2009). Attention residue refers to a situation “in which thoughts about one task persist while performing another” (Leroy & Glomb, 2018, p. 380). This lingering activation exhausts employees (Lin et al., 2013; Newton et al., 2020). However, intrusions may also have an essential functional role in organizations, such as increased access, interactions with colleagues, and collaboration (Bush et al., 2022). In addition, research suggested a sense of relatedness (Puranik, et al., 2021) and positive affect due to task accomplishment (Sonnentag

1 et al., 2018) may result from work intrusions. Furthermore, Jett and George (2003) suggested  
2 that beneficial outcomes of intrusion may occur when such intrusions result in the  
3 transmission or exchange of information that is central to task completion. Simply banning  
4 intrusions may, therefore, coincide with unintentional, adverse consequences. Thus, rather  
5 than rooting out the sources of intrusions, mitigating their harmful implications may be more  
6 worthwhile. In this study, we draw on the self-regulation and attention residue literature  
7 (Freeman & Muraven, 2010; Leroy, 2009) to propose that employees may limit the negative  
8 consequence of intrusions by writing down their current task progression. Namely, writing  
9 down task progression may provide cognitive closure to employees and, therefore, limit  
10 lingering activation and exhaustion. Specifically, we investigate whether and how a “ready-  
11 to-resume” intervention (Leroy & Glomb, 2018) mitigates the association of intrusions with  
12 attention residue and, therefore, exhaustion (see Figure 1).

13         We aim to make several contributions. First, we contribute to research on intrusions  
14 by examining attention residue as a mechanism linking fluctuations in intrusion frequency  
15 and duration to exhaustion. While work interruptions are well-known to deplete resources  
16 and cause strain (Chen & Karahanna, 2018; Lin et al., 2013; Puranik et al., 2020; 2021), to  
17 date no research has explored how attention residue explains the connection between work  
18 intrusions and exhaustion. Prior studies on attention residue from unanticipated task  
19 switching have primarily focused on performance outcomes (Leroy, 2009; Leroy & Schmidt,  
20 2016). By proposing that attention residue represents a resource expenditure triggered by  
21 work intrusions, we provide a refined understanding of the mechanisms that link work  
22 intrusions to employee exhaustion. This is important because it advances theoretical models  
23 of workplace stress by moving beyond general notions of work intrusions as resource-  
24 depleting, while also shifting the focus on attention residue from performance-oriented to  
25 well-being-oriented perspectives, thereby highlighting its broader implications.



1 characteristics of work interruptions are the source of the interruption (internal or external)  
2 and the occurrence (concurrent or sequential; Fletcher et al., 2018). Breaks refer to planned or  
3 spontaneous recesses from work that are typically self-initiated (internal) and anticipated  
4 (sequential). Discrepancies denote inconsistencies between knowledge and expectations that  
5 may interrupt information processing and redirect attention from the task to the source of the  
6 inconsistency. Distractions are typically instigated by competing activities and environmental  
7 stimuli irrelevant to the task at hand (Jett & George, 2003). Finally, work intrusions represent  
8 unexpected encounters initiated by other people that completely and temporarily halt an  
9 ongoing task (Fletcher et al., 2018; Puranik et al., 2021; Rogers & Barber, 2019).

10         While all these interruptions may have positive and negative implications in  
11 organizations, the present study focuses on intrusions for several reasons. First, from a  
12 practical standpoint, applying the ready-to-resume plan to reduce attention residue and  
13 exhaustion is most likely effective when interruptions are unexpected and externally triggered  
14 intrusions. For instance, intrusions require employees to divide attention between competing  
15 demands (i.e., tasks; Leroy and Glomb, 2018), requiring additional self-regulatory resources  
16 (Grotto et al., 2021), whereas other (self-initiated) interruptions such as breaks may restore  
17 resources (Sonnentag et al., 2017). Furthermore, intrusions seem particularly prevalent and  
18 consequential aspects of modern digital work environments (Puranik et al., 2021). Hence,  
19 while the negative and positive implications of other types of workplace interruptions have  
20 also been acknowledged (Jett & George, 2003), for instance, for discrepancies (e.g., Lloyd et  
21 al., 2004), we suggest that the ready-to-resume plan may be particularly effective and  
22 necessary in relation to externally triggered sequential work interruptions – i.e., work  
23 intrusions – in modern work environments (Fletcher et al., 2018; Jett & George, 2003).

24 **Intrusions, Attention Residue, and Exhaustion**

1           This study examines the implications of work intrusions for attention residue and  
2 exhaustion. Work intrusions, defined as externally driven task interruptions requiring  
3 immediate attention, are known to disrupt focus and deplete energy. Various studies have  
4 shown that intrusions relate to exhaustion, which encompasses the experience of fatigue and  
5 the depletion of cognitive resources (e.g., Lin et al., 2013). Daily diary research has further  
6 demonstrated a positive association between fluctuations in intrusions and exhaustion,  
7 highlighting the dynamic nature of this relationship (Pachler et al., 2018). According to self-  
8 regulation theory, this association arises from the expenditure of limited regulatory resources  
9 (Freeman & Muraven, 2010). Self-regulation theory emphasizes the capacity of individuals to  
10 guide thoughts, behaviors, and emotions toward achieving goals and adapting to situations  
11 (Baumeister & Vohs, 2007; Carver & Scheier, 1990). The core principle of self-regulation  
12 theory concerns the idea that self-regulation relies on finite cognitive and emotional resources  
13 that are depleted by exerting effortful control (Baumeister et al., 1998). Yet, self-regulation  
14 theory recognizes that certain strategies may help conserve resources, such as planning and  
15 structuring tasks (Inzlicht et al., 2021). These ideas are particularly relevant for how  
16 interruptions, attention residue, and exhaustion interrelate since they pertain to the allocation  
17 and availability of self-regulatory resources. Shifting attention between tasks and managing  
18 competing demands in the work environment requires self-control, which relies on a finite  
19 pool of self-regulatory resources. When individuals experience frequent intrusions, they  
20 expend more of these resources, leaving them depleted and more likely to feel exhausted (Lin  
21 et al., 2013).

22           To understand how regulatory resource expenditure contributes to exhaustion, we  
23 focus on the role of attention residue. Intrusions necessitate task switching and can leave  
24 employees with lingering thoughts about the interrupted task, creating cognitive interference  
25 even as they attempt to engage with the interrupting task (Leroy, 2009). Attention residue

1 refers to the persistence of cognitive activity related to a previous task while working on a  
2 new one, leading to difficulty in fully disengaging from the interrupted task (Leroy, 2009;  
3 Leroy & Schmidt, 2016). Self-regulation theory provides a framework for understanding this  
4 phenomenon: switching tasks without sufficient cognitive disengagement consumes  
5 regulatory resources, as individuals must repeatedly redirect and refocus their attention.

6         The external origin of work intrusions makes these transitions particularly  
7 challenging, as employees are often unprepared to shift their attention, leading to greater  
8 cognitive spillover from the interrupted task (Leroy, 2009; Leroy et al., 2021). Prior research  
9 demonstrated that this cognitive spillover impairs engagement and performance on  
10 subsequent tasks (Newton et al., 2020). We move beyond a focus on task performance and  
11 suggest that lingering thoughts and resource depletion may explain the link between  
12 intrusions and exhaustion. Hence, by integrating insights from attention residue theory and  
13 self-regulation theory, this study builds on prior research to propose that attention residue  
14 mediates the relationship between intrusions and exhaustion.

### 15 **Frequency Versus Duration**

16         The indirect association between intrusions and exhaustion builds on the premise of  
17 lingering thoughts about the preceding activity. However, this may differ according to the  
18 frequency and duration of intrusions. Several studies indicate that the frequency of intrusions  
19 during a workday relates to various detrimental individual outcomes such as exhaustion,  
20 stress, fatigue, and negative affect (e.g., Fletcher et al., 2018; Lin et al., 2013; Parke et al.,  
21 2018; Puranik et al., 2021; Sonnentag et al., 2018). While resource depletion is often cited as  
22 a mechanism explaining these effects (e.g., Lin et al., 2013), we direct our focus more  
23 specifically to attention residue as a cognitive process that occurs when thoughts about an  
24 interrupted task persist while an individual attempts to focus on a new task (Leroy, 2009). In  
25 the present study, we omit explicit theorizing about the direct association between intrusions

1 and exhaustion because the existing literature suggests this association could be more  
2 complex and potentially contingent on individual and contextual factors (e.g., hostile  
3 attribution bias, prosocial motivation, excessive workload). That is, the association between  
4 intrusions and exhaustion has received mixed support (Chen & Karahanna, 2018; Cheng et  
5 al., 2020; Leroy et al., 2021; Rogers & Barber, 2019).

6         According to Leroy et al. (2020), disengaging from incomplete goals is inherently  
7 difficult due to the frustration of the need for task completion, leading to persisting goal  
8 activation in memory. The lingering cognitive load not only reduces performance on the new  
9 task but also creates challenges when returning to the original task, requiring additional  
10 cognitive resources to reorient and resume progress (Leroy & Glomb, 2018). Hence,  
11 dedicating cognitive energy to mentally focus attention on one task while lingering on  
12 another (i.e., attention residue) drains important and finite cognitive resources (Freeman &  
13 Muraven, 2010; Newton et al., 2020). In other words, having two tasks– i.e., the interrupted  
14 and interrupting task–mentally activated creates an additional cognitive load, which drains  
15 regulatory resources leading to exhaustion (Fritz et al., 2020). When this repeatedly occurs  
16 (high frequency), the impact on attention residue will likely accumulate. Following this  
17 reasoning, we argue that attention residue explains the daily association between intrusion  
18 frequency and exhaustion.

19         *Hypothesis 1:* Work intrusion frequency is positively associated with exhaustion  
20 through higher attentional residue.

21         In addition to frequency, the duration of intrusions has important implications for  
22 attention residue and exhaustion. However, research by Altmann and Trafton (2007) indicates  
23 a contrast between the duration of interruptions and their frequency, suggesting that the  
24 moment an individual starts a new task, the activation of the preceding task starts to decay. In  
25 other words, interruptions of longer duration enable an individual to commit more fully to the

1 interrupting task. Indicative of this decay in memory, research shows that the longer an  
2 individual worked on the interrupting task, the longer it took them to resume work on the  
3 interrupted task (Monk et al., 2008). Accordingly, the expenditure of regulatory resources  
4 should subside with time. In other words, longer intrusions should relate to less attention  
5 residue than brief intrusions. Taken together, we propose that on days when interruptions are  
6 longer in duration, employees experience less exhaustion due to decreased attention residue.

7 *Hypothesis 2: Work intrusion duration is negatively related to exhaustion through*  
8 *lower attentional residue.*

### 9 **Strategies to Deal with the Impact of Intrusions**

10 Intrusions drain individuals' self-regulatory resources because they force individuals  
11 to divide attention between the interrupted and interrupting task. However, writing down  
12 details regarding task progress and planning the return to the interrupted task may serve as an  
13 effective strategy to decrease attention residue and conserve cognitive resources (Leroy &  
14 Glomb, 2018). Attention residue occurs when cognitive activity related to an interrupted task  
15 persists, making it harder to fully engage with subsequent tasks and complicating the eventual  
16 return to the original task (Leroy, 2009; Leroy et al., 2020). The lingering cognitive activity  
17 not only disrupts performance on the interrupting task but also increases cognitive load and  
18 drains limited resources (Leroy et al., 2020). The "ready-to-resume" plan addresses these  
19 challenges by promoting cognitive closure.

20 Specifically, the ready-to-resume plan helps individuals reflect on, and plan for, the  
21 return to the interrupted task. This facilitates disengaging from the interrupted task by  
22 providing opportunities to achieve cognitive closure. Leroy et al. (2020) emphasize that such  
23 strategies help manage attention transitions by interrupting the automatic activation of  
24 uncompleted tasks, which would otherwise remain accessible and disrupt performance. By  
25 focusing on the resumption of tasks, the intervention reduces attention residue and conserves

1 cognitive resources. These assumptions were tested in an experiment among graduate  
2 students, demonstrating that participants who completed a “ready-to-resume” intervention  
3 showed reduced reaction times on the interrupting task, indicating lower attention residue  
4 compared to those without such an intervention (Leroy & Glomb, 2018). This suggests that  
5 planning for task resumption creates a cognitive roadmap that reduces attention residue and  
6 potentially alleviates the resource-draining effects of incomplete tasks (Leroy et al., 2020).  
7 Therefore, we propose that individuals instructed to write down details regarding the  
8 interrupted task (intervention) will experience less attention residue than employees with no  
9 instructions (control group).

10 *Hypothesis 3: Workers who are in the intervention group will experience less*  
11 *attentional residue on average than workers who are in the control group.*

12 Various studies indicate that attention residue impairs performance (Leroy, 2009;  
13 Leroy & Glomb, 2018; Leroy & Schmidt, 2016; Newton et al., 2020). However, attention  
14 residue may also undermine well-being. Self-regulation theory suggests that dedicating  
15 cognitive resources to both the interrupting and the interrupted task further exhausts the finite  
16 cognitive resources of an individual (Inzlicht et al., 2021). In addition, attention residue  
17 implies individuals will have a more difficult time transitioning to the interrupting task.  
18 However, writing down task progress details about the interrupted task may mitigate the  
19 association between attention residue and exhaustion. Namely, recording task progress details  
20 and planning where to return enables individuals to feel ready to resume the interrupted task.  
21 Therefore, the writing intervention may decrease the salience of the interrupted task in active  
22 working memory, limiting the need to utilize self-regulatory resources to address lingering  
23 thoughts. In addition, the ready-to-resume intervention can facilitate attention transition,  
24 which may help individuals switch between tasks and further limit resource consumption of  
25 attention residue (Leroy & Glomb 2018). Therefore, we expect the following:



1 instructed participants to complete the plan when faced with an intrusion of an ongoing work  
2 task. Importantly, we instructed participants to use the ready-to-resume plan when they  
3 experienced a sudden, unexpected, externally triggered intrusion that temporarily but  
4 completely prevented them from completing an ongoing work task. Examples of intrusions  
5 were provided, such as getting called into an immediate meeting, attending to an email that  
6 requires immediate follow-up, or requests from others (family or co-workers) that requires an  
7 individual to suddenly stop what they were doing. They were informed that this excludes  
8 (planned) breaks such as grabbing a cup of coffee, mind wandering, and daydreaming. We  
9 provided the following instructions: “We understand that you have a busy work schedule.  
10 The ready-to-resume plan is intended to help you navigate the busy workdays and improve  
11 efficiency while switching between tasks. Please keep track of the interruptions you  
12 experience throughout the day. When you encounter an interruption such as the one  
13 described, please complete the ready-to-resume plan before attending to the new task. At the  
14 end of the day, we will ask you to submit your ready-to-resume plan. We advise keeping the  
15 document open or at hand, as interruptions will come unannounced.”

16 Hence, the ready-to-resume plan required employees to record answers to three  
17 questions: (1) “Where do I stand? Please write down at which point of the interrupted task  
18 you left off. One or two sentences could be enough, depending on the task.” This was based  
19 on the question, “What clues do you still need to work on?” from the original study (specific  
20 to the laboratory test; Leroy & Glomb, 2018); (2) “Where do I resume? Note down at which  
21 point you will pick up the interrupted task when returning to the task.” We adapted the  
22 original question, “What issues or difficulties do you want to focus on upon your return?”  
23 (Leroy and Glomb, 2018, p. 392); Finally, (3) “What challenges are left? Please briefly write  
24 down what part of the interrupted task you find challenging and/or requires initial critical  
25 thinking once you start with the task again” was based on the following final question of the

1 ready-to-resume plan, “What the steps are you going to take upon your return to the word  
2 task in order to finish it within the time period given to you?” (Leroy and Glomb, 2018, p.  
3 392). Our changes reduced the overlap between the first and last question of the ready-to-  
4 resume plan and were made to ensure applicability across intrusion contexts beyond the  
5 laboratory setting.

6 We provided a templated Word document to jot down the answers to three guiding  
7 questions for each intrusion throughout the day. The form could be completed digitally or in  
8 paper-and-pencil style, depending on personal preference (See Table 1 for examples).  
9 Respondents were asked to keep a record of their files throughout the study and to upload it  
10 to a company server at the end of the study (either as a Word file or a picture). Compliance  
11 with the intervention exercise was examined by looking at their qualitative answers on the  
12 form (cf. Pekaar & Demerouti, 2023). The control group received no specific instructions.  
13 Consistent with Leroy and Glomb (2018: Study 3b), participants were randomly assigned to  
14 the ready-to-resume or the no-plan condition. We did not include an unrelated-plan condition  
15 because the research by Leroy and Glomb demonstrated its effects did not differ from the no-  
16 plan condition. Furthermore, comparing the intervention to the no-plan condition provides a  
17 clear baseline reflective of standard workplace conditions where no deliberate interruption  
18 planning procedures were present.

## 19 **Measures**

20 To minimize participant burden, we used abbreviated versions of the original scales  
21 and contextualized the measures to reflect the workday (Ohly et al., 2010). We estimated the  
22 reliability of the measures by conducting multilevel confirmatory factor analyses to compute  
23 the between- and within-person omega reliabilities (Geldhof et al., 2014). Omega reliability  
24 estimates are generally more accurate than alpha estimates because they do not assume

1 normally distributed items and tau-equivalence (Dunn et al., 2014). The scales were  
2 sufficiently reliable.

3 ***Intrusions.*** Intrusion frequency and duration were measured with a single indicator.  
4 Intrusion frequency was measured with the item “How many intrusions did you experience  
5 today during your workday?” and intrusion duration with the statement “What was the  
6 average duration (in minutes) of your intrusions today?”. Responses were recorded in discrete  
7 units.

8 ***Daily Attention Residue*** was measured using three items (Kanfer et al., 1994; Leroy  
9 & Glomb, 2018). Respondents rated items such as “While working on the interrupting task, I  
10 felt that my mind was partially preoccupied with the interrupted task” on a 5-point scale (1 =  
11 *strongly disagree*, 5 = *strongly agree*). The reliability was excellent ( $\omega_B = .99$ ,  $\omega_W = .77$ ).

12 ***Daily Exhaustion*** was measured with three items from the exhaustion scale (Maslach  
13 et al., 1997). Exhaustion was chosen because it represents the basic individual strain  
14 dimension of burnout and refers to feelings of being overextended and depleted of resources  
15 (Maslach & Leiter, 2008), which is of particular interest to our study on the implications of  
16 work intrusions (Chen & Karahanna, 2018). The three items were selected based on prior  
17 application in daily diary studies, yielding good reliability and validity for the exhaustion  
18 dimension of the burnout inventory (Demerouti et al., 2015). These items are: “Today, I felt  
19 burned out from my work,” “Today, I felt emotionally fatigued because of demands of my  
20 job,” and “Today, I felt emotionally drained from my work” (1 = *never*, 7 = *always*). The  
21 internal consistency was excellent ( $\omega_B = .99$ ,  $\omega_W = .86$ ).

## 22 **Strategy of Analysis**

23 Since the daily observations are nested within individuals, the dataset consists of two  
24 levels of analysis. Indeed, the intraclass correlation coefficients (ICC) derived from the  
25 intercept model indicate that a substantial proportion of the variance is located at both levels

1 of analysis (Table 2). Therefore, we conducted analyses in Mplus to account for the  
2 hierarchical structure of the data (Muthén & Muthén, 1998-2017). To test the construct  
3 validity of the measures, we conducted multilevel confirmatory factor analyses (CFA;  
4 Conway & Lance, 2010). Model fit was evaluated with the root mean square error of  
5 approximation (RMSEA), comparative fit index (CFI), and the standardized root mean square  
6 residual (SRMR) using the robust maximum likelihood (MLR) estimator. The MLR estimator  
7 is robust against deviations from normality and homogeneity in the data (Hox et al., 2010).  
8 Schweizer (2010) suggests that values up to .08 for the RMSEA, above .90 for the CFI, and  
9 below .10 for the SRMR represent an acceptable fit.

10 For the estimation of the structural models (i.e., the indirect effects model and  
11 moderated-indirect model), we centered the predictors and included their cluster means to  
12 decrease endogeneity problems (Antonakis et al., 2021). For the indirect effects model  
13 (hypotheses 1-3), we included intrusion frequency, intrusion duration, and the intervention as  
14 predictors, attention residue as the mediator, and exhaustion as the outcomes. In addition, we  
15 included autoregressive scores (lags) of the outcomes. In other words, we regressed the  
16 current observation ( $t$ ) on the scores of the preceding day ( $t-1$ ), meaning the previous day's  
17 scores were used to predict the current day's scores. For example, the current attention  
18 residue scores of a participant are predicted by their score on attention residue the day before.  
19 This procedure implies that the path coefficients represent unique changes in daily attention  
20 residue and daily exhaustion. Moreover, this approach results in more accurate parameter  
21 estimates (Wilkins, 2018). For the moderated-mediation (hypothesis 4), we also modelled the  
22 cross-level interaction as specified by Muthén and Muthén (1998-2017). Specifically, while  
23 the other paths of the models are fixed, we modeled the path from attention residue to  
24 exhaustion as random when we tested the cross-level interaction. While we provide model fit  
25 measures for the multilevel CFA and mediation analysis, Mplus does not provide these

1 indices for multilevel models that include random slopes (Muthén & Muthén, 1998-2017).  
2 Therefore, we use Bayesian Information Criterion (BIC) to compare model fit, which enables  
3 us to compare non-nested models.

## 4 **Results**

5 Table 2 presents the means, standard deviations, proportion of the variance located at  
6 the within-person level, reliabilities, and correlations among the study variables.

### 7 **Preliminary Analyses**

8 Before testing our hypotheses, we conducted several analyses to assess the validity of  
9 the data. First, we tested whether the intervention group differed from the control group  
10 regarding gender, age, business unit (e.g., Customer Success, Technology & innovation), and  
11 organizational tenure. Analyses of variance indicate that the groups did not differ in terms of  
12 age ( $F(1,48) = 1.58, p = .215$ ) or tenure ( $F(1,48) = .89, p = .327$ ). Likewise, there were no  
13 differences in gender ( $\chi^2(2) = .25, p = .884$ ) or business unit ( $\chi^2(2) = 6.13, p = .409$ ). Next, we  
14 conducted a multilevel confirmatory factor analysis model to test the construct validity of the  
15 measures. This approach decomposes the observed values of the indicators into within- and  
16 between-person level latent constructs. The measurement model consisted of latent factors for  
17 attention residue (3 indicators) and exhaustion (3 indicators). The model fit was sufficient ( $\chi^2$   
18  $(16) = 26.32, p < .05$ , RMSEA = .057, CFI = .980, and SRMR<sub>within</sub> = .040, SRMR<sub>between</sub> =  
19 .017) and better than the fit of a single-factor model ( $\chi^2(18) = 175.22, p < .05$ , RMSEA =  
20 .209, CFI = .678, and SRMR<sub>within</sub> = .153, SRMR<sub>between</sub> = .028). All factor loadings were  
21 significant ( $p < .01$ ). Hence, the results suggest that participants were distributed randomly  
22 across groups and that the scales have good psychometric properties.

### 23 **Hypothesis Testing**

#### 24 ***Within-person Analyses***

1           Table 3 presents the results of the mediation analyses (Model 1). The model fit of the  
2 indirect effects model was excellent ( $\chi^2(2) = 2.83, p = .242, RMSEA = .053, CFI = .994$ , and  
3  $SRMR_{within} = .035, SRMR_{between} = .004$ ). In contrast, the model fit of the direct effects model  
4 was inadequate ( $\chi^2(2) = 46.40, p < .001, RMSEA = .212, CFI = .662$ , and  $SRMR_{within} = .130$ ,  
5  $SRMR_{between} = .326$ ). However, it should be noted that the BIC of the direct effects model is  
6 smaller ( $\Delta BIC = 177.53$ ). This can be explained by the additional parameters included in the  
7 indirect effects model that are not significant but necessary to estimate the parameters. In  
8 other words, trimming insignificant parameters may result in superior BIC values but less  
9 accurate parameter estimates. Taken together with the model fit indices that indicate a  
10 superior fit of the indirect effects model, we continue to test our hypotheses.

11           We expected employees to experience more exhaustion on days when the frequency is  
12 higher (Hypothesis 1) and duration is lower (Hypothesis 2) of intrusions due to more  
13 attentional residue. The analyses revealed that the frequency ( $b = .026, SE = .007, p < .01; 95$   
14  $CI: .012, .040$ ), but not duration of intrusions ( $b = .022, SE = .015, p = .138; 95 CI: .290,$   
15  $.714$ ), was positively associated with attention residue. Moreover, on days when individuals  
16 experienced attention residue, they experienced more exhaustion ( $b = .502, SE = .108, p <$   
17  $.01; 95 CI: .005, .021$ ). As expected, on days when employees were interrupted more  
18 frequently, their exhaustion increased indirectly through attention residue ( $ab = .013, SE =$   
19  $.004, p < .01; 95 CI: .005, .021$ ); however, the duration of intrusions was not indirectly  
20 related to exhaustion ( $ab = .011, SE = .008, p = .177, 95\% CI: -.005, .028$ ). Hence, the results  
21 support Hypothesis 1 but reject Hypothesis 2.

### 22 *Between-person Analyses*

23           We expected the intervention to decrease attention residue (Hypothesis 3; Table 3;  
24 Model 2). The moderation model improved the fit of the data ( $\Delta -2 \text{ Loglikelihood}(13) =$

1 48.30,  $p < .001$ ). As expected, the intervention decreased attention residue ( $b = -1.42$ ,  $SE =$   
2  $.65$ ,  $p < .01$ , 95% CI: -1.66, -1.21). Hence, Hypothesis 3 was supported.

3 We hypothesized that the intervention attenuated the indirect association of the  
4 frequency and duration of intrusions with exhaustion by decreasing the association between  
5 attention residue and exhaustion (Hypothesis 4). We only analyzed intrusion frequency  
6 because we did not find support for the indirect association between daily intrusion duration  
7 and exhaustion. Unexpectedly, the intervention increased general exhaustion ( $b = 1.57$ ,  $SE =$   
8  $.65$ ,  $p < .01$ ; 95 CI: .284, 2.884). However, the intervention significantly and negatively  
9 related to the random slope of attentional residue on exhaustion ( $b = -.60$ ,  $SE = .25$ ,  $p < .05$ ,  
10 95% CI: -1.10, -.10). Simple slope tests supported the hypothesized pattern of effects (Figure  
11 2). Namely, daily attention residue was less strongly related to daily exhaustion for  
12 employees who participated in the intervention group ( $b = .499$ ,  $SE = .111$ ,  $p < .01$ , 95% CI:  
13  $.28$ ,  $.72$ ) than the control group ( $b = 1.098$ ,  $SE = .265$ ,  $p < .01$ , 95% CI:  $.58$ ,  $1.62$ ). Likewise,  
14 the indirect effect of daily intrusion frequency on daily exhaustion was lower for the  
15 intervention group ( $ab = .013$ ,  $SE = .005$ ,  $p < .05$ , 95% CI:  $.01$ ,  $.02$ ) than the control group  
16 ( $ab = .029$ ,  $SE = .012$ ,  $p < .01$ , 95% CI:  $.01$ ,  $.05$ ). Hence, Hypothesis 4 was supported.

## 17 Discussion

18 Intrusions are widespread and inevitable in most contemporary workplaces (Puranik  
19 et al., 2020). Based on the self-regulation and attention residue literature, we argued that  
20 fluctuations in the frequency and duration of intrusions would relate to exhaustion through  
21 attention residue. As self-regulation theory explains, frequent intrusions deplete finite  
22 cognitive resources, leading to exhaustion, while attention residue theory emphasizes the  
23 lingering cognitive activation of interrupted tasks. In addition, we argued that employees  
24 writing down their task progress and plan to return will attenuate this process. Indeed,  
25 individuals experienced more exhaustion on days when intrusions were frequent due to more

1 attention residue. However, employees who recorded ready-to-resume plans were able to  
2 limit attention residue and decrease the exhaustion associated with attention residue. In  
3 contrast, the impact of fluctuations in the frequency of daily intrusions on exhaustion through  
4 attention residue was stronger for employees who did not record plans. Unexpectedly, the  
5 duration of intrusions did not relate to attention residue. The findings offer implications for  
6 research and practice.

### 7 **Theoretical Implications**

8         First, the findings provide a more nuanced understanding of the implications of work  
9 intrusions in several ways. Previous research has shown that intrusions promote exhaustion  
10 (Fritz et al., 2020; Lin et al., 2013). Notably, while some studies have established a direct  
11 association (e.g., Lin et al., 2013), others have not (e.g., Chen & Karahanna, 2018), including  
12 recent diary studies on interruptions and cognitive exhaustion (Toebben et al., 2025). Hence,  
13 suggesting that the mechanisms underlying this link require further examination (Puranik et  
14 al., 2020). Our findings generally do not confirm a direct association between intrusion  
15 frequency and duration and exhaustion. Rather, our findings contribute to this ongoing debate  
16 by demonstrating that attention residue plays a central role in explaining how intrusions  
17 deplete employees' resources. This aligns with the principle of self-regulation theory that  
18 exhaustion stems from the expenditure of self-regulatory resources needed to direct efforts  
19 and manage attention.

20         Based on self-regulation theory, we argued and found that attention residue explains  
21 this association. The attention residue regarding the interrupted task represents a cognitive  
22 burden that subtracts from the finite attentional resources available. This suggests that  
23 intrusions drain resources due to lingering activation of the interrupted task. The findings  
24 highlight that the frequency of intrusions may be more detrimental for employees than their  
25 duration. The findings indicate that frequency, but not duration, is related to attention residue

1 and, therefore, to exhaustion. This reveals how intrusions impair well-being in addition to  
2 performance (Leroy & Glomb, 2018). A key limitation of the original “ready-to-resume”  
3 intervention (Leroy, 2009; Leroy & Glomb, 2018) is that it has primarily been tested in cross-  
4 sectional or laboratory settings, often using student samples. This undermines the ecological  
5 validity of the findings because controlled environments and student populations may not  
6 accurately reflect the complexities, unpredictability, and variety of real-world workplace  
7 settings. Moreover, interruptions, attention residue, and exhaustion inherently reflect  
8 fluctuating phenomena rather than stable between-person differences. Our field experiment  
9 addresses these limitations by adding realism. Specifically, we observe fluctuations in the  
10 study variables contextualized to the work setting. Hence, by leveraging the daily diary in  
11 combination with the experimental methodology, we demonstrate the intervention’s potential  
12 applicability in everyday work settings, thereby complementing and extending prior research.

13         Second, we contribute knowledge on how to manage work intrusions. The present  
14 study tested whether the ready-to-resume intervention may directly reduce attention residue  
15 and its association with exhaustion. Hence, in the context of work intrusions, the findings  
16 suggest that writing down at what point a task is interrupted and how one plans to continue  
17 upon return provides cognitive closure of the interrupted task. These findings align with  
18 research that demonstrated that effective time management might buffer the negative  
19 implications of work interruptions (Ma et al., 2020; Parke et al., 2018). Importantly, rather  
20 than avoiding or eradicating work intrusions, the findings provide evidence for a strategy  
21 employees may utilize to manage work intrusions more effectively. This finding also  
22 contributes to self-regulation theory by showcasing how utilizing specific time-management  
23 tools can improve self-regulatory processes.

24         Unexpectedly, the duration of work intrusions was unrelated to attention residue.  
25 Arguably, the relation of intrusion duration with attention residue and exhaustion is more

1 complex. For instance, this association might be further contingent on the interrupted and  
2 interrupting task characteristics. In particular, the urgency of the task may influence attention  
3 residue (Leroy & Glomb, 2018). While the activation of preceding tasks typically decays  
4 over time when individuals start a new task (Altmann & Trafton, 2007), high (vs. low)  
5 urgency of the interrupted task may result in an increase in task residue and, therefore,  
6 exhaustion over time. Namely, the duration of an intrusion directly limits the available time  
7 left for the interrupted tasks (Leroy et al., 2020). When interrupted tasks have low urgency,  
8 attention residue will likely adhere to the predictions of memory for goals framework that  
9 suggest lower attention residue over time.

10       Finally, on average, the intervention (vs. control) increased overall exhaustion.  
11 Notwithstanding this finding, we suggest that participants incurred this cost due to learning  
12 and adopting a new behavioural strategy. Developing a new habit or skill initially demands  
13 effort and focus, which may exhaust resources. However, when habituation develops over  
14 time, the depleting effects diminish. To illustrate, while driving lessons may consume a  
15 copious amount of self-regulation resources at first, the habituation of driving substantially  
16 decreases resource expenditure. Similarly, writing the ready-to-resume plan may initially  
17 increase resource consumption due to its unfamiliar nature but decrease over time. Hence, in  
18 addition to developing ways to mitigate the effect of the intervention on mean exhaustion, a  
19 fruitful avenue for future research concerns extending the timeframe of the intervention to  
20 test resource expenditure over time. In addition, future research could consider directly  
21 measuring habituation to the ready-to-resume plan. The assumption would be that as  
22 employees become more accustomed to the intervention, their proficiency and effectiveness  
23 in applying ready-to-resume plans will increase, thereby mitigating its direct effect on  
24 exhaustion.

1           Hence, while the ready-to-resume plan may serve as an effective tool to mitigate  
2 attention residue and its implications caused by intrusions, its effectiveness may vary  
3 depending on operational settings, which can impose practical limitations. The results  
4 highlight a nuanced dynamic between theoretical predictions and real-world application.  
5 Specifically, while the findings support the theoretical premise that the ready-to-resume plan  
6 mitigates the effect of attention residue on exhaustion, they also indicate that the intervention  
7 itself may contribute to resource expenditure. This suggests the intervention needs to be  
8 adapted to minimize unintended resource depletion, as evidenced by its direct effect on  
9 exhaustion.

10           The finding that the ready-to-resume plan increased exhaustion can be attributed to  
11 the cognitive effort required to complete such plans. This may be particularly true in  
12 operational settings where work interruptions are frequent and varied. Moreover, while this  
13 requires further exploration, the intervention examined here might be particularly suited for  
14 tasks that are complex and require sustained attention. For routine and less cognitively  
15 demanding tasks, the benefit of the intervention might be less pronounced. Conversely, in  
16 situations where intrusions are less frequent and involve cognitively demanding task, or when  
17 intrusions become more predictable, the intervention shows promising benefits by allowing  
18 employees to mentally prepare for task resumption. The practical value and feasibility of such  
19 ready-to-resume plans may be particularly evident for workers with a greater degree of  
20 control over their work structure, in situations where the cognitive load of the tasks  
21 outweighs the cognitive load of the intervention, and when intrusions are less frequent.  
22 Future research could examine the theoretical threshold where the intervention may no longer  
23 be beneficial, particularly in work environments with low intrusion frequency and duration.  
24 This insight advances our understanding of self-regulatory interventions by emphasizing the  
25 need to account for the cognitive and emotional costs associated with their application.

## 1 **Limitations and Future Research Directions**

2           Our study is not without limitations. First, the relatively small sample size in terms of  
3 individual participants (Level-2) and cluster size (Level-1) may imply limitations. For  
4 instance, a small sample size introduces the possibility of Type II errors and limits the ability  
5 to detect smaller effect sizes or variations across subgroups. Moreover, this may undermine  
6 the reliability of the findings. Increasing the sample size and variation in the research context  
7 will address these concerns and allow for generalizations to a broader population, whereas  
8 increasing the occasions within individuals would allow for an examination of the potential  
9 influence of habituation. In addition, this would allow for a more thorough examination of  
10 daily fluctuations. To our knowledge, because this research area is relatively novel, there are  
11 no other similar studies from which to derive parameter estimates. Hence, future research can  
12 build upon the parameter estimates calculated in the current study to conduct a priori power  
13 analyses.

14           Furthermore, several studies have included factors that may further qualify the  
15 implications of work intrusions, such as workload, time pressure (Leroy and Glomb, 2018),  
16 and self-regulatory resources (Puranik et al., 2021). In this context, it is notable that the study  
17 was conducted in 2021, at which point the covid-19 pandemic had been ongoing for 1.5  
18 years. This period included various phases of more and less intense restrictions and health  
19 risks. At the time of our study, it is reasonable to assume that most workers had adjusted to  
20 the pandemic's demands and routines. In addition, the organization's willingness to  
21 participate in this research project suggests that the initial crisis response and adjustment  
22 phase had largely settled. Furthermore, we specifically timed the study during a period of  
23 standard operational activity, without unusual peaks in workload, deadlines, or time pressure.  
24 Nonetheless, this specific context may warrant future research to explore how such factors  
25 impacted the ways intrusions are experienced. In addition, future research could explore the

1 practicality and usefulness of the ready-to-resume intervention at varying degrees of urgency  
2 and importance, synchronous interruptions versus asynchronous ones, and compare its  
3 effectiveness to merely allowing time to pass. Additionally, examining its impact during self-  
4 initiated breaks will help determine if the intervention provides added predictive validity  
5 beyond natural delays.

6         Second, while self-reports are most appropriate for private experiences such as  
7 attention residue (Conway & Lance, 2010), they may be subject to blind spots or self-serving  
8 biases when recorded at the end of each workday. A day reconstruction method could provide  
9 a more detailed examination of the duration and the complexities inherent to interruptions.  
10 For instance, the attributions of specific interruptions (e.g., content, relevance, emotional  
11 tone) are ignored (Sonnetag et al., 2018). Puranik et al. (2021) suggested that an episodic  
12 approach that considers each intrusion separately could allow for a more fine-grained  
13 understanding by including the social nature, duration, complexity, and valence of  
14 interruption episodes. However, the prevalence of work intrusions gives rise to the need “to  
15 study intrusions’ cumulative effects” (Puranik et al., 2021, p. 32; Baethge et al., 2015).  
16 Therefore, we were particularly interested in the overall experience of work intrusions,  
17 making a frequency approach more suitable.

18         Furthermore, we acknowledge that more could be done to rule out artifactual and  
19 instrumentation effects, for instance, by implementing manipulation checks to examine  
20 intervention effectiveness. However, our qualitative examination of compliance with the  
21 intervention provides confidence that the manipulation was delivered effectively and  
22 interpreted as intended by participants. Ideally, in these situations, analyses could be  
23 conducted based on comparisons between intention-to-treat (ITT) and the per-protocol (PP)  
24 principle – i.e., comparing respondents who did not comply with the intervention to those  
25 who did (Ranganathan et al., 2016).

1           Third, the current study has explicitly focused on the frequency and duration of work  
2 intrusions, ignoring the specific modes (e.g., emails versus in-person intrusions), sources  
3 (e.g., email, instant messaging software), and types of interruptions (e.g., distractions,  
4 multitasking). This is important because interruptions stemming from certain sources could  
5 be more (cognitively) demanding than other sources (Cardenas et al., 2004; Ma et al., 2020).  
6 In addition, in the context of increased remote work practices, intrusions may differ from  
7 those experienced on-site, for instance, face-to-face intrusions from colleagues are unlikely,  
8 and intrusions may also increasingly originate from nonwork sources while working off-site  
9 (e.g., Gardner et al., 2021; Junker et al., 2020; Leroy et al., 2021). Future research is needed  
10 to examine whether face-to-face intrusions and nonwork intrusions trigger attentional residue  
11 and exhaustion and whether or not the ready-to-resume plan is helpful in mitigating the  
12 implications of such interventions.

13           Furthermore, recent studies demonstrated that work interruptions might carry positive  
14 implications, such as a sense of relatedness (Puranik et al., 2021) and positive affect due to  
15 task accomplishment (Sonnetag et al., 2018). Others argued that interruptions could be  
16 experienced positively or negatively depending on subjective temporal interpretations such as  
17 time worthiness, timing, duration, and task expectedness (Feldman & Greenway, 2021).  
18 Further research is needed to examine whether and how the ready-to-resume intervention  
19 may preserve some of the positive implications of work intrusions while mitigating the  
20 negative ones. Specific avenues for further research may involve examining how a ready-to-  
21 resume plan affects temporal interpretations of interruptions and how such plans affect the  
22 nature of impromptu social interactions sparked by intrusions.

23           Finally, process evaluation of the intervention could substantially improve our  
24 understanding of the intervention outcomes (Nielsen & Abildgaard, 2013). For instance,  
25 several process variables may shed light on the intervention process and the organizational

1 and social processes in which it is embedded, such as, managerial support and employees'  
2 readiness for change (Cox et al., 2007). Furthermore, additional information about  
3 employees' active participation and evaluation of the intervention may offer a deeper  
4 exploration of what works for whom, why, how, and under what circumstances.

5 Future research should explore ways in which the intervention could be made less  
6 demanding for employees without losing the benefits of planful attention regulation. Perhaps  
7 the ready-to-resume plan can be simplified even further. Questions related to “where you  
8 stand” and “where you resume” (Leroy & Glomb, 2018, p. 384) on a certain task represent  
9 some overlap. Perhaps “where do you stand” and “what challenges are left” would provide  
10 sufficient reflection to achieve cognitive closure and plan one's return to the interrupted task.  
11 Future research could examine and contrast different ready-to-resume plans to explore the  
12 optimal balance of reflection and planning without imposing too many additional demands on  
13 employees. Similarly, exploring different outcomes (e.g., task structuring) would allow for a  
14 deeper understanding of the broader implications of ready-to-resume plans.

### 15 **Practical Implications**

16 The findings of this study offer organizations a strategy to help employees manage the  
17 negative consequences of intrusions rather than trying to eliminate intrusions from the  
18 workplace. Smooth integration in workflows and facilitating the plans through organizational  
19 ICTs such as Google Docs or Outlook may represent a fruitful avenue. This is particularly  
20 important because our findings indicate that the implementation of ready-to-resume plans  
21 may have unwanted side effects – that is, compliance with these plans may itself be taxing for  
22 employees. Hence, organizations should carefully assess whether the frequency and duration  
23 of intrusions in their work environment justify the implementation of ready-to-resume plans.  
24 To minimize the cognitive burden on employees, organizations can streamline the  
25 intervention by integrating it into existing workflows and training employees to habituate to

1 its use. Additionally, managers should evaluate whether the level of workplace intrusions  
2 represents a sufficiently significant challenge to workers before implementing such  
3 interventions, ensuring that the solution does not inadvertently create more strain than the  
4 problem it seeks to address.

5         That said, a key benefit of using ready-to-resume plans is that employees might learn  
6 to ask interrupting co-workers to wait briefly while they take time to write down their notes  
7 (Leroy & Glomb, 2018). However, as some interruptions are necessary for organizational  
8 functioning, managers should be aware of the normative expectations that may flow from  
9 using the ready-to-resume plan. Supporting the use of the ready-to-resume plan and  
10 encouraging employees to write down their plans and encouraging interruptions when needed  
11 might cascade into a culture where employees are thoughtful about interruptions and planful  
12 about task transitions.

13         Finally, although the ready-to-resume plan has been tested in the context of intrusions,  
14 the intervention may also help employees when switching between different (online)  
15 meetings. Especially in the context of remote work, the frequency of online meetings has  
16 surged, leading to what has been labeled “zoom fatigue” (Fosslien & Duffy, 2020; Nesher et  
17 al., 2021). Zoom fatigue is a term that has been *en vogue* since the COVID-19 pandemic  
18 drastically increased the reliance on and frequency of video conferencing, which leads to  
19 exhaustion among employees (Nesher et al., 2021). Online meetings have been found to be  
20 cognitively tasking, and employees typically allow themselves little time to switch between  
21 meetings, fuelling exhaustion (Fosslien & Duffy, 2020; Wiederhold, 2020). As such, using a  
22 ready-to-resume plan to find cognitive closure from the previous meeting before moving on  
23 to the next meeting might also help employees reduce fatigue from (online) meetings.

24

## References

- 1  
2 Altmann, E. M., & Trafton, J. G. (2007). Timecourse of recovery from task interruption: Data  
3 and a model. *Psychonomic Bulletin & Review*, *14*(6), 1079–1084.  
4 <https://doi.org/10.3758/BF03193094>
- 5 Antonakis, J., Bastardo, N., & Rönkkö, M. (2021). On ignoring the random effects  
6 assumption in multilevel models: Review, critique, and  
7 recommendations. *Organizational Research Methods*, *24*(2), 443–483.  
8 <https://doi.org/10.1177/1094428119877457>
- 9 Baethge, A., & Rigotti, T. (2013). Interruptions to workflow: Their relationship with irritation  
10 and satisfaction with performance, and the mediating roles of time pressure and mental  
11 demands. *Work & Stress*, *27*(1), 43–63. <https://doi.org/10.1080/02678373.2013.761783>
- 12 Baethge, A., Rigotti, T., & Roe, R. A. (2015). Just more of the same, or different? An  
13 integrative theoretical framework for the study of cumulative interruptions at  
14 work. *European Journal of Work and Organizational Psychology*, *24*(2), 308–323.  
15 <https://doi.org/10.1080/1359432X.2014.897943>
- 16 Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the  
17 active self a limited resource? *Journal of Personality and Social Psychology*, *74*(5),  
18 1252–1265. <https://doi.org/10.1037/0022-3514.74.5.1252>
- 19 Baumeister, R. F., & Vohs, K. D. (2007). Self-Regulation, ego depletion, and motivation.  
20 *Social and Personality Psychology Compass*, *1*(1), 115–128.  
21 <https://doi.org/10.1111/j.1751-9004.2007.00001.x>
- 22 Bush, J. T., Baer, M. D., Welsh, D. T., Outlaw, R., Garud, N., & Sessions, H. (2022). To  
23 what do I owe this visit? The drawbacks and benefits of in-role and non-role  
24 intrusions. *Journal of Management*, *48*(7), 1888–1917.  
25 <https://doi.org/10.1177/01492063211015288>

- 1 Cardenas, R. A., Major, D. A., & Bernas, K. H. (2004). Exploring work and family  
2 distractions: Antecedents and outcomes. *International Journal of Stress*  
3 *Management, 11*(4), 346-365. <https://doi.org/10.1037/1072-5245.11.4.346>
- 4 Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect:  
5 A control-process view. *Psychological Review, 97*(1), 19–35.  
6 <https://doi.org/10.1037/0033-295X.97.1.19>
- 7 Chen, A., & Karahanna, E. (2018). Life interrupted: The effects of technology-mediated work  
8 interruptions on work and nonwork outcomes. *MIS Quarterly, 42*, 1023–1042.  
9 <https://doi.org/10.25300/MISQ/2018/13631>
- 10 Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding  
11 common method bias in organizational research. *Journal of Business and*  
12 *Psychology, 25*, 325-334. <https://doi.org/10.1007/s10869-010-9181-6>
- 13 Cox, T., Karanika, M., Griffiths, A., & Houdmont, J. (2007). Evaluating organizational-level  
14 work stress interventions: Beyond traditional methods. *Work & Stress, 21*(4), 348-  
15 362. <https://doi.org/10.1080/02678370701760757>
- 16 Demerouti, E., Bakker, A. B., & Halbesleben, J. R. (2015). Productive and counterproductive  
17 job crafting: A daily diary study. *Journal of Occupational Health Psychology, 20*(4),  
18 457-469. <https://psycnet.apa.org/doi/10.1037/a0039002>
- 19 Dunn, T. J., Baguley, T., & Brunsten, V. (2014). From alpha to omega: A practical solution  
20 to the pervasive problem of internal consistency estimation. *British Journal of*  
21 *Psychology, 105*, 399–412. <https://doi.org/10.1111/bjop.12046>
- 22 Feldman, E., & Greenway, D. (2021). It's a matter of time: The role of temporal perceptions  
23 in emotional experiences of work interruptions. *Group & Organization*  
24 *Management, 46*(1), 70–104. <https://doi.org/10.1177/1059601120959288>

- 1 Fletcher, K. A., Potter, S. M., & Telford, B. N. (2018). Stress outcomes of four types of  
2 perceived interruptions. *Human factors*, *60*(2), 222-235.  
3 <https://doi.org/10.1177/0018720817738845>
- 4 Fosslien, L., & Duffy, M. W. (2020). How to combat zoom fatigue. *Harvard Business*  
5 *Review*, *29*.
- 6 Freeman, N., & Muraven, M. (2010). Don't Don't interrupt me! Task interruption depletes  
7 the self's self's limited resources. *Motivation and Emotion*, *34*(3), 230-241.  
8 <https://doi.org/10.1007/s11031-010-9169-6>
- 9 Fritz, C., Dalal, D. K., & Lin, B. C. (2020). Just a quick question? Relationships between  
10 workplace intrusions and employee outcomes. *Occupational Health Science*, *4*(4), 493-  
11 518. <https://doi.org/10.1007/s41542-020-00072-3>
- 12 Gardner, D. M., Lauricella, T., Ryan, A. M., Wadlington, P., & Elizondo, F. (2021).  
13 Managing boundaries between work and non-work domains: Personality and job  
14 characteristics and adopted style. *Journal of Occupational and Organizational*  
15 *Psychology*, *94*(1), 132-159. <https://doi.org/10.1111/joop.12339>
- 16 Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel  
17 confirmatory factor analysis framework. *Psychological Methods*, *19*, 72–91.  
18 <https://doi.org/10.1037/a0032138>
- 19 Grotto, A. R., Mills, M. J., & Eatough, E. M. (2021). Switching Gears: A Self-Regulatory  
20 Approach and Measure of Nonwork Role Re-Engagement Following After-Hours  
21 Work Intrusions. *Journal of Business and Psychology*, 1-17.  
22 <https://doi.org/10.1007/s10869-021-09754-3>
- 23 Hox, J. J., Maas, C. J., & Brinkhuis, M. J. (2010). The effect of estimation method and  
24 sample size in multilevel structural equation modeling. *Statistica Neerlandica*, *64*,  
25 157–170. <https://doi.org/10.1111/j.1467-9574.2009.00445.x>

- 1 Inzlicht, M., Werner, K. M., Briskin, J. L., & Roberts, B. W. (2021). Integrating models of  
2 self-regulation. *Annual Review of Psychology*, 72, 319-345.  
3 <https://doi.org/10.1146/annurev-psych-061020-105721>
- 4 Jett, Q. R., & George, J. M. (2003). Work interrupted: A closer look at the role of  
5 interruptions in organizational life. *Academy of Management Review*, 28(3), 494-507.
- 6 Junker, N. M., Baumeister, R. F., Straub, K., & Greenhaus, J. H. (2020). When forgetting  
7 what happened at work matters: The role of affective rumination, problem-solving  
8 pondering, and self-control in work–family conflict and enrichment. *Journal of Applied*  
9 *Psychology*. <https://dx.doi.org/10.1037/ap10000847>
- 10 Kanfer, R., Ackerman, P. L., Murtha, T. C., Dugdale, B., & Nelson, L. (1994). Goal setting,  
11 conditions of practice, and task performance: A resource allocation  
12 perspective. *Journal of Applied Psychology*, 79, 826–835.  
13 <https://doi.org/10.1037/0021-9010.79.6.826>
- 14 Keller, A. C., Meier, L. L., Elfering, A., & Semmer, N. K. (2020). Please wait until I am  
15 done! Longitudinal effects of work interruptions on employee well-being. *Work &*  
16 *Stress*, 34(2), 148–167. <https://doi.org/10.1080/02678373.2019.1579266>
- 17 Lambert, B. K., Caza, B., Trinh, E. N., & Ashford, S. J. (2022). Individual-centered  
18 interventions: Identifying what, how, and why interventions work in organizational  
19 contexts. *Academy of Management Annals*, 16(2), 508-546.  
20 <https://doi.org/10.5465/annals.2020.0351>
- 21 Leroy, S. (2009). Why is it so hard to do my work? The challenge of attention residue when  
22 switching between work tasks. *Organizational Behavior and Human Decision*  
23 *Processes*, 109(2), 168–181. <https://doi.org/10.1016/j.obhdp.2009.04.002>
- 24 Leroy, S., & Glomb, T. M. (2018). Tasks interrupted: How anticipating time pressure on  
25 resumption of an interrupted task causes attention residue and low performance on

- 1 interrupting tasks and how a ““ready-to-resume” ” plan mitigates the  
2 effects. *Organization Science*, 29, 380–397. <https://doi.org/10.1287/orsc.2017.1184>
- 3 Leroy, S., & Schmidt, A. M. (2016). The effect of regulatory focus on attention residue and  
4 performance during interruptions. *Organizational Behavior and Human Decision*  
5 *Processes*, 137, 218–235. <https://doi.org/10.1016/j.obhdp.2016.07.006>
- 6 Leroy, S., Schmidt, A. M., & Madjar, N. (2020). Interruptions and task transitions:  
7 Understanding their characteristics, processes, and consequences. *Academy of*  
8 *Management Annals*, 14(2), 661–694. <https://doi.org/10.5465/annals.2017.0146>
- 9 Leroy, S., Schmidt, A. M., & Madjar, N. (2021). Working from home during COVID-19: A  
10 study of the interruption landscape. *Journal of Applied Psychology*, 106(10), 1448-  
11 1465. <https://psycnet.apa.org/doi/10.1037/apl0000972>
- 12 Lloyd, C., McKenna, K., & King, R. (2004). Is discrepancy between actual and preferred  
13 work activities a factor in work-related stress for mental health occupational therapists  
14 and social workers?. *British Journal of Occupational Therapy*, 67(8), 353-360.  
15 <https://doi.org/10.1177/030802260406700804>
- 16 Lin, B. C., Kain, J. M., & Fritz, C. (2013). Don't Don't interrupt me! An examination of the  
17 relationship between intrusions at work and employee strain. *International Journal of*  
18 *Stress Management*, 20(2), 77–94. <https://doi.org/10.1037/a0031637>
- 19 Ma, J., Kerulis, A. M., Wang, Y., & Sachdev, A. (2020). Are workflow interruptions a  
20 hindrance stressor? The moderating effect of time-management skill. *International*  
21 *Journal of Stress Management*, 27(3), 252–261. <https://doi.org/10.1037/str0000149>
- 22 Maslach, C., Jackson, S. E., & Leiter, M. P. (1997). *Maslach burnout inventory*. Scarecrow  
23 Education.
- 24 Maslach, C., & Leiter, M. P. (2008). Early predictors of job burnout and engagement. *Journal*  
25 *of Applied Psychology*, 93(3), 498-512. <https://doi.org/10.1037/0021-9010.93.3.498>

- 1 Mark, G., Gonzalez, V. M., & Harris, J. (2005, April). No task left behind? Examining the  
2 nature of fragmented work. In *Proceedings of the SIGCHI conference on Human*  
3 *factors in computing systems* (pp. 321-330).
- 4 McDaniel, B. T., & Drouin, M. (2019). Daily technology interruptions and emotional and  
5 relational well-being. *Computers in Human Behavior, 99*, 1-8.  
6 <https://doi.org/10.1016/j.chb.2019.04.027>
- 7 Monk, C. A., Trafton, J. G., & Boehm-Davis, D. A. (2008). The effect of interruption  
8 duration and demand on resuming suspended goals. *Journal of Experimental*  
9 *Psychology: Applied, 14*(4), 299–313. <https://doi.org/10.1037/a0014402>
- 10 Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus User's guide (8th edition)*. Los Angeles,  
11 CA: Muthén & Muthén.
- 12 Neshor Shoshan, H., & Wehrt, W. (2021). Understanding ““Zoom fatigue””: A mixed-method  
13 approach. *Applied Psychology*. Ahead-of-Print. <https://doi.org/10.1111/apps.12360>
- 14 Newton, D. W., LePine, J. A., Kim, J. K., Wellman, N., & Bush, J. T. (2020). Taking  
15 engagement to task: The nature and functioning of task engagement across  
16 transitions. *Journal of Applied Psychology, 105*(1), 1–18.  
17 <https://doi.org/10.1037/apl0000428>
- 18 Nielsen, K., & Abildgaard, J. S. (2013). Organizational interventions: A research-based  
19 framework for the evaluation of both process and effects. *Work & Stress, 27*(3), 278-  
20 297. <https://doi.org/10.1080/02678373.2013.812358>
- 21 Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational  
22 research. *Journal of Personnel Psychology, 9*, 79–93. [https://doi.org/10.1027/1866-](https://doi.org/10.1027/1866-5888/a000009)  
23 [5888/a000009](https://doi.org/10.1027/1866-5888/a000009)
- 24 Pachler, D., Kuonath, A., Specht, J., Kennecke, S., Agthe, M., & Frey, D. (2018). Workflow  
25 interruptions and employee work outcomes: The moderating role of

- 1 polychronicity. *Journal of Occupational Health Psychology*, 23(3), 417–  
2 427. <https://doi-org.eur.idm.oclc.org/10.1037/ocp0000094>
- 3 Parke, M. R., Weinhardt, J. M., Brodsky, A., Tangirala, S., & DeVoe, S. E. (2018). When  
4 daily planning improves employee performance: The importance of planning type,  
5 engagement, and interruptions. *Journal of Applied Psychology*, 103(3), 300–312.  
6 <https://doi.org/10.1037/apl0000278>
- 7 Pekaar, K. A., & Demerouti, E. (2023). Crafting for sustainability: a daily diary study and  
8 self-training intervention on proactive employee engagement in  
9 sustainability. *European Journal of Work and Organizational Psychology*, 32(6), 839-  
10 857. <https://doi.org/10.1080/1359432X.2023.2255318>
- 11 Puranik, H., Koopman, J., & Vough, H. C. (2020). Pardon the interruption: An integrative  
12 review and future research agenda for research on work interruptions. *Journal of*  
13 *Management*, 46(6), 806–842. <https://doi.org/10.1177/0149206319887428>
- 14 Puranik, H., Koopman, J., & Vough, H. C. (2021). Excuse me, do you have a minute? An  
15 exploration of the dark-and bright-side effects of daily work interruptions for employee  
16 well-being. *Journal of Applied Psychology*. Advance online publication.  
17 <https://doi.org/10.1037/apl0000875>
- 18 Ranganathan, P., Pramesh, C. S., & Aggarwal, R. (2016). Common pitfalls in statistical  
19 analysis: Intention-to-treat versus per-protocol analysis. *Perspectives in Clinical*  
20 *Research*, 7(3), 144-146. <https://doi.org/10.4103/2229-3485.184823>
- 21 Rennecker, J., & Godwin, L. (2005). Delays and interruptions: A self-perpetuating paradox of  
22 communication technology use. *Information and Organization*, 15(3), 247-266.  
23 <https://doi.org/10.1016/j.infoandorg.2005.02.004>

- 1 Rogers, A. P., & Barber, L. K. (2019). Workplace intrusions and employee strain: the  
2 interactive effects of extraversion and emotional stability. *Anxiety, Stress, &*  
3 *Coping*, 32(3), 312–328. <https://doi.org/10.1080/10615806.2019.1596671>
- 4 Rosen, C. C., Simon, L. S., Gajendran, R. S., Johnson, R. E., Lee, H. W., & Lin, S. H. J.  
5 (2019). Boxed in by your inbox: Implications of daily e-mail demands for managers’  
6 managers’ leadership behaviors. *Journal of Applied Psychology*, 104(1), 19-33.  
7 <https://dx.doi.org/10.1037/ap10000343>
- 8 Schweizer, K. (2010). Some guidelines concerning the modeling of traits and abilities in test  
9 construction. *European Journal of Psychological Assessment*, 26(1), 1-2.  
10 <https://doi.org/10.1027/1015-5759/a000001>
- 11 Sonnentag, S., Reinecke, L., Mata, J., & Vorderer, P. (2018). Feeling interrupted—Being  
12 responsive: How online messages relate to affect at work. *Journal of Organizational*  
13 *Behavior*, 39(3), 369–383. <https://doi.org/10.1002/job.2239>
- 14 Sonnentag, S., Venz, L., & Casper, A. (2017). Advances in recovery research: What have we  
15 learned? What should be done next? *Journal of Occupational Health Psychology*,  
16 22(3), 365–380. <https://doi.org/10.1037/ocp0000079>
- 17 Stocker, D., Keller, A. C., Meier, L. L., Elfering, A., Pfister, I. B., Jacobshagen, N., &  
18 Semmer, N. K. (2019). Appreciation by supervisors buffers the impact of work  
19 interruptions on well-being longitudinally. *International Journal of Stress*  
20 *Management*, 26(4), 331–350. <https://doi.org/10.1037/str0000111>
- 21 Toebben, L., Casper, A., Wehrt, W., & Sonnentag, S. (2024). Reasons for interruptions at  
22 work: Illuminating the perspective of the interrupter. *Journal of Organizational*  
23 *Behavior*, 46(1), 24-42. <https://doi.org/10.1002/job.2819>
- 24 Toebben, L., Wehrt, W., Iser-Potempa, J., & Sonnentag, S. (2025). Daily synchronous work  
25 interruptions: a social-exchange perspective. *European Journal of Work and*

1        *Organizational Psychology*, 34(1), 128-143.

2        <https://doi.org/10.1080/1359432X.2024.2427052>

3        Wajcman, J., & Rose, E. (2011). Constant connectivity: Rethinking interruptions at

4        work. *Organization Studies*, 32(7), 941–961.

5        <https://doi.org/10.1177/0170840611410829>

6        Wiederhold, B. K. (2020). Connecting through technology during the coronavirus disease

7        2019 pandemic: Avoiding “Zoom Fatigue”. *Cyberpsychology, Behavior, and Social*

8        *Networking*, 23(7), 437-438. <https://doi.org/10.1089/cyber.2020.29188.bkw>

9        Wilkins, A. S. (2018). To lag or not to lag?: Re-evaluating the use of lagged dependent

10        variables in regression analysis. *Political Science Research and Methods*, 6, 393–

11        1411. <https://doi.org/10.1017/psrm.2017.4>

12

1 **Table 1**

2 *Examples of Ready to Resume Exercise*

<b>Ready to resume plan – Examples</b>			
<b>Resp</b>	<b>Where do I stand?</b>	<b>Where do I resume?</b>	<b>What challenges are left?</b>
#571	Customer journey mapping is incomplete	Complete and refine customer journey maps	Understanding customer touch points
#571	Lead nurturing content is lacking	Create more targeted lead nurturing content	Moving leads through the funnel
#043	Facing unexpected product roadblocks.	Communicate openly with the prospect & offer alternative solutions.	Managing prospect expectations while demonstrating commitment to finding a solution.
#043	Managing a complex sales cycle with multiple stakeholders.	Orchestrate a winning sales strategy & navigate internal politics.	Aligning stakeholders with varying priorities & navigating decision-making processes.
#374	Prospect needs compliance information	Provide thorough, reassuring documentation	Addressing all regulatory concerns. Gather and organize all compliance certificates
#237	Data integration between systems is problematic	Resolve integration issues	Ensuring seamless data flow. Coordinate with IT for integration support
#237	Contract approval process is slow	Streamline the approval process	Reducing sales cycle time. Identify and eliminate bottlenecks
#368	Scope creep occurring	Reinforce the definition of done and scope boundaries	Keeping the team focused. Communicate scope boundaries clearly to all stakeholders
#368	Delayed dependencies	Mitigate impact and adjust sprint plans	Keeping the sprint on track. Communicate with dependency owners
#368	Bugs found during testing	Prioritize and assign bug fixes	Ensuring timely resolution. Triage bugs based on severity

3

4

5

6

**Table 2**

*Means, Standard Deviations, Intraclass Coefficients, and Intercorrelations of the Study Variables (N = 50, N = 200 occasions)*

	<i>M</i>	<i>SD</i>	<i>I-ICC</i>	2.	3.	4.	5.
1. Intervention	—	—	—	.13	-.03	-.84**	-.82**
2. Intrusion frequency	9.46	8.76	.92	—	.23	.03	-.08
3. Intrusion duration	4.97	5.41	.75	-.02	—	.12	.01
4. Attention residue	2.78	.96	.33	.19**	.10	.99(.77)	.91**
5. Exhaustion	2.73	1.02	.27	-.01	-.01	.80**	.99(.86)

*Note.* \* $p < .05$ ; \*\* $p < .01$ ; *I-ICC* = Proportion of the variance located at the within-person level. Correlations above the diagonal are based on between-person averages, whereas correlations below the diagonal are based on daily observations. The coefficients on the diagonal without brackets represent between-person omega reliabilities, whereas the coefficients between brackets represent within-person omega reliabilities.

**Table 3**

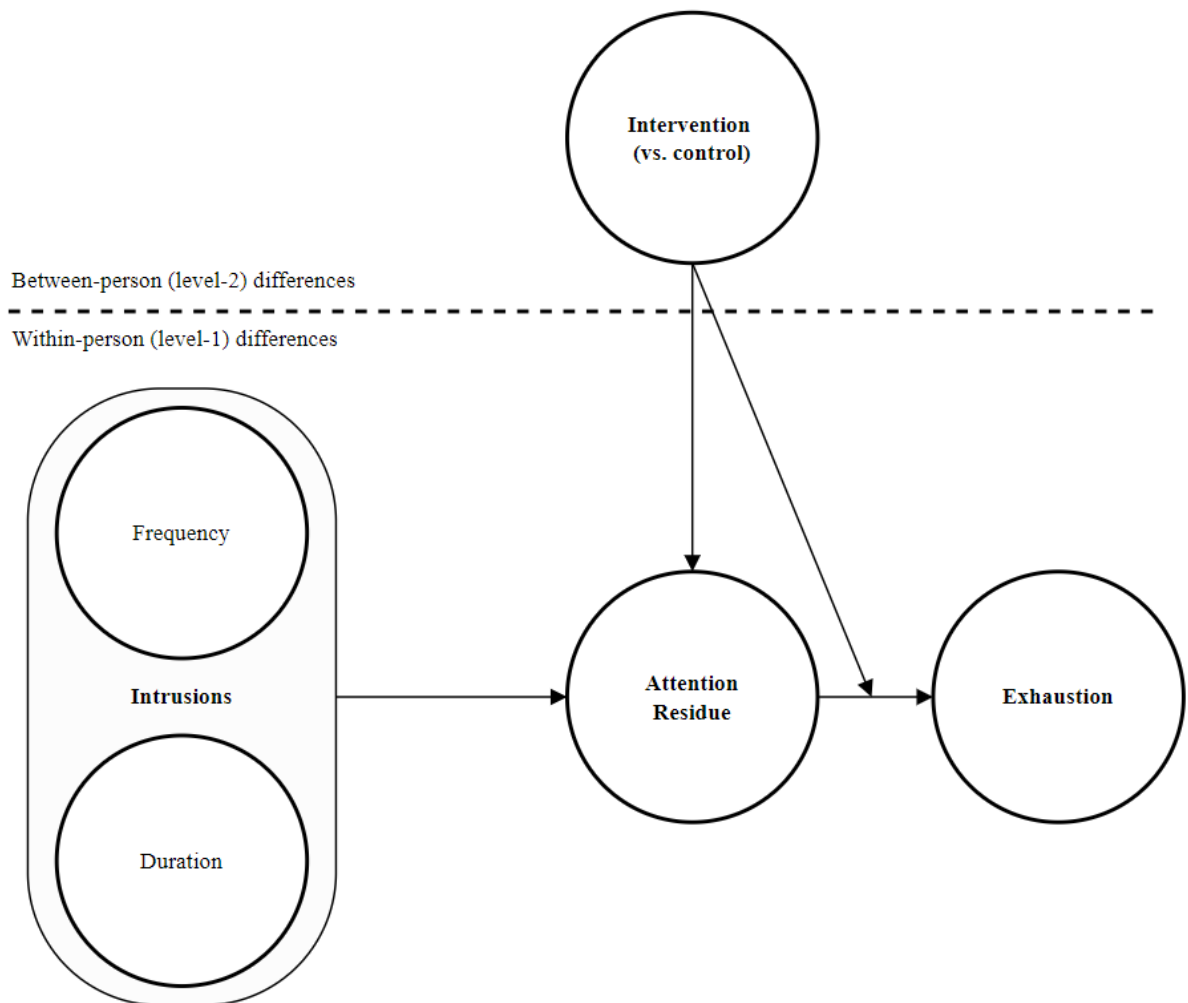
*Multilevel unstandardized path estimates for the models estimating daily attentional residue and daily exhaustion (N = 50, N = 200 occasions)*

	Directs effects model (Model 0)		Indirect effects model (Model 1)		Moderated-indirect effect model (Model 2)	
	Exhaustion $\gamma(SE)$	Attentional Residue $\gamma(SE)$	Exhaustion $\gamma(SE)$	Attentional Residue $\gamma(SE)$	Exhaustion $\gamma(SE)$	Attentional Residue $\gamma(SE)$
<i>Level 1</i>						
Intercept ( $\gamma_{00}$ )	—	2.76(.12)	—	2.76(.12)	—	—
Intrusion frequency ( $\gamma_{10}$ )	-.01(.01)	.03(.01)**	-.01(.01)	.03(.01)**	-.01(.01)	-.01(.01)
Intrusion duration ( $\gamma_{20}$ )	-.03(.02)	.02(.02)	-.03(.02)	.02(.02)	-.03(.02)	-.03(.02)
Attentional residue ( $\gamma_{30}$ )	.50(.11)**		.50(.11)**		.80(.16)**	
Lagged Attentional residue ( $\gamma_{40}$ )		-.26(.13)*		-.26(.13)*		
Lagged Exhaustion ( $\gamma_{50}$ )	-.17(.10)		-.17(.10)		-.18(.11)	
<i>Level 2</i>						
Intercept ( $\gamma_{00}$ )	1.33(.34)	.71(.10)	1.33(.34)	.71(.10)	.26(.46)	
Intervention ( $\gamma_{01}$ )	.06(.31)	-1.42(.13)**	-.06(.31)	-1.42(.13)**	1.57(.65)*	
Intrusion frequency ( $\gamma_{02}$ )	.02(.02)	.02(.02)	-.02(.02)	.02(.02)	-.01(.01)	
Intrusion duration ( $\gamma_{03}$ )	.03(.04)	.02(.04)	-.03(.01)**	.02(.04)	-.03(.01)**	
Attentional residue ( $\gamma_{04}$ )	.51(.23)*		.51(.23)*		.30(.41)	
Cross-level interaction						
Intervention × Attentional residue ( $\gamma_{11}$ )					-.60(.25)**	
Variance Components						
Within-person variance ( $\sigma^2$ )	.18(.03)*	.89(.07)**	.18(.03)*	.89(.07)**	.15(.03)**	
Intercept variance ( $\tau_{00}$ )	.06(.02)**	.19(.07)**	.06(.02)**	.19(.07)**	.19(.16)	
Slope variance ( $\tau_{11}$ )					.04(.03)	
Intercept-slope covariance ( $\tau_{01}$ )					-.09(.07)	
Additional information						
RMSEA	.212		.053			
CFI	.662		.994			
SRMR <sub>within</sub>	.130		.035			
SRMR <sub>between</sub>	.326		.004			
BIC	594.504		772.030		765.137	
Parameters	17		21		25	

Note. \*  $p < .05$ ; \*\*  $p < .01$ .

**Figure 1**

*The Conceptual Model of the Hypothesized Relationships*



**Figure 2**

*Cross-level Moderating Effect of the Intervention on the Association Between Daily Attention Residue and Daily Exhaustion*

