



Dealing with Work Interruptions: The Moderating Effect of Coping on Task Performance

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Abstract

Workflow interruptions are frequent daily stressors at work, often related negatively to performance. In the literature, two issues remain unsolved: First, some researchers called to consider negative quadratic effects of interruptions on performance. Second, while previous research has studied some strategies with which employees may reduce the performance decline under interruptions, such as time management skills, further strategies were unknown. Problem- and emotion-focused coping represent potent strategies to deal with stressors. The present paper studies to what extent workflow interruptions relate negatively to individual task performance, both linearly and quadratically, and whether problem-focused and emotion-focused coping behaviors can ameliorate the anticipated negative relationship. The hypotheses are tested in an aggregated sample of a previously conducted daily diary pilot study with 37 employees of a Dutch company. Workflow interruptions did not relate to individual task performance, neither linearly, nor quadratically. Problem-focused and emotion-focused coping behaviors did not moderate the relationship. Problem-focused coping was found to correlate moderately with individual task performance. We discuss theoretical implications and advise against drawing practical conclusions on the basis of the current paper. Future research could continue studying interruptions' relation to performance, especially quadratically, considering potential strategies – coping and other behaviors to deal with the interruptions – of the interrupted person, in a within-person approach. Better understanding the study area of work interruptions may provide useful economically and for employee health.

Keywords: workflow interruptions; individual task performance; problem-focused coping; emotion-focused coping

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Challenge yourself, while reading this paper, and observe how often an interruption intercepts with the reading. Chances are that it will occur. Workplace interruptions have been found to be a frequent stressor of modern workplaces, commonly negatively related to work-related outcomes, such as job performance and well-being (Puranik et al., 2020). Ultimately, interruptions have been estimated to be costly in terms of productivity declines and healthcare costs, with a shockingly high popular estimate of over half a trillion dollars – per annum – for economic costs in the U.S., even when only based on salaries of knowledge workers (Spira & Feintuch, 2005). From an economic perspective, better understanding work interruptions hence bears great potential for ameliorating productivity losses. From an occupational health perspective, better understanding work interruptions may provide useful in stress reduction. Both perspectives may gain knowledge required to build suitable interventions.

In the literature on interruptions, there are two unresolved issues when considering the effect on performance. First, it remains unclear whether the relationship between interruptions and performance is linear or curvilinear. Second, the agency of the interrupted person and the potential for buffering against the negative effects of interruptions on performance using coping strategies, have mostly been omitted. With this paper, we aim to advance these aspects.

While the association between work interruptions and performance was mostly examined in a linear fashion, Baethge et al. (2015) called for workplace interruptions and performance to be investigated in a negative quadratic relationship. They argued that under moderate levels of interruptions, initially, more effort is exerted, resulting in increased performance. When cognitive and emotional resources would be depleted, as a function of higher interruption levels, performance will drop again eventually. We follow this idea of a

negative quadratic relationship between interruptions and performance, providing further argumentation and subsequent hypothesis testing.

The interruption literature has mostly researched workplace interruptions and their work outcomes as a given or inevitability (Pendem et al., 2022), appointing less weight to the potential in the agency of the interrupted person. Some time management strategies to cope with interruptions and to buffer against their adverse outcomes have been examined previously (Ma et al., 2020; Parke et al., 2018). It remains unclear, however, which other coping means and strategies might limit the detrimental effects of work interruptions on workplace outcomes. Other mechanisms might be at play in different parts of the timeline of the interruption. Some interruptions may be avoided altogether (Pendem et al., 2022), such as preventing people to enter the office by keeping the door shut. While time management strategies are primarily exerting their effect prior to an interruption occurring, others might be especially effective after the interruptions started to unfold. Since interruptions represent stressors (Puranik et al., 2020), people need to deal with them. We propose that problem- and emotion-focused coping behaviors reflect effective strategies to manage interruptions and study these.

With this paper, we offer theoretical advancement for the interruption literature, particularly in a potential non-linear relationship between interruptions and performance, as well as coping moderators. The research model studied is shown in Figure 1. We assess our reasoning using aggregated data previously obtained in a pilot study in a sample of employees of a Dutch company. Specifically, we test for negative linear and quadratic relationships between workflow interruption frequency and individual task performance, as well as for the moderators of problem-focused and emotion-focused coping to ameliorate the anticipated negative linear relationship.

Generally, interruptions' outcomes on performance are deemed costly. With the knowledge gained we might become more certain whether the relationship between interruptions and performance is negatively linear or quadratic. In practical terms, a negative quadratic relationship might imply that some level of interruptions would not be adverse but beneficial for performance. Understanding the nature of the relationship and whether certain coping strategies can ameliorate the detrimental effects of interruptions may provide starting points for developing more adequate interventions in organizations targeting performance and interruptions. Ultimately, this knowledge could pay off.

Interruptions Discounting Performance

Interruptions have been defined as: "An unexpected suspension of the behavioral performance of, and/or attentional focus from, an ongoing work task." (Puranik et al., 2020, p. 817). Interruptions are mostly seen as being initiated from an external source, such as a consequence of receiving messages from colleagues, supervisors, or customers while working on a primary task (Grandhi & Jones, 2015). Workers then, respectively, pay attention to the messages and might decide to reply, are distracted for instance by notification sounds and the notification content (Gupta et al., 2013). The primary task one was working on is paused without anticipation. This occurred either due to stopping task-relevant behaviors, or due to stopping to allocate sufficient attentional resources to the primary task (Puranik et al., 2020). Interruptions also depend on contextual factors in the physical work environment, such as whether one is working in a cubicle, a separated office, or from home. Further relevant are features of the interrupted person (Russel et al., 2017).

When it comes to understanding how work interruptions result in detrimental work outcomes, these results can be explained via cognitive, self-regulatory, and affective pathways (Puranik et al., 2020). On the cognitive domain, more interruptions require more attentional control, which can deplete and result in performance loss, from the interrupted person to

handle shifting attention to the interruption and back to the primary task (Gupta et al., 2013). Another explanation for performance losses via the cognitive pathway is that new and old information conflict in working memory, yielding difficulties in retrieval of relevant information (Eatchel et al., 2012). On the self-regulatory domain, one might need to deploy additional resources in order to regulate oneself and refocus on the primary task, ultimately paying with declines in performance or well-being (Hockey, 1997). On the affective domain, it is argued that the interruption may elicit different negative emotional responses, such as frustration, which may carry over back to the primary task, decreasing performance and well-being (Puranik et al., 2020).

The majority of literature on workplace interruption studies interruptions in terms of their frequency, rather than their content (Puranik et al., 2020). We also apply a frequency approach to studying interruptions in this paper. When it comes to performance, we use the definition of individual task performance by Griffin et al. (2007, p. 331-332) – termed “individual task behaviors” – which they described as “Behavior [that] contributes to individual effectiveness”. These behaviors consist of individual task proficiency, adaptivity, and proactivity. We will not further consider these aspects separately. The operationalization is more concerned with productivity, rather than accuracy. Some authors argued for positive outcomes of work interruptions on performance (Baethge et al., 2015), but the bulk of literature portrays a negative relationship between performance and interruptions (Jett & George, 2003; Puranik et al., 2020). We anticipate finding these results for individual task performance and frequency of interruptions:

Hypothesis 1: Interruption frequency is negatively related to individual task performance.

Negative Quadratic Relationship of Performance and Interruptions

It has been proposed by Baethge et al. (2015) that the often-confirmed linear negative relationship between work interruptions, their cumulation, and performance, might actually follow a negative quadratic trend. The researchers argue that under certain cumulative amounts of work interruptions, they might stimulate performance through psychosomatic processes initially, but that this effect would wear off when work interruption levels accrue higher than a certain threshold. This reasoning would follow the Yerkes-Dodson law, where performance – as a function of arousal or stimulation – pursues an inverted U trend (Teigen, 1994). Adler and Bernuban-Fich (2012) studied a similar relationship in a construct adjacent to interruptions, namely multitasking, which shares with work interruptions that at least two independent tasks are temporarily in conflict in working memory. In their experimental lab study, they found mixed results regarding the type of relationship between the degree of multitasking and task performance. When task performance was operationalized as productivity, they found a negative quadratic relationship with increasing levels of multitasking. The researchers argue that switching between tasks increases arousal, in accordance with the Yerkes-Dodson law. Returning to workplace interruptions, this reasoning is applicable to the increasing frequency of workplace interruptions, as attention needs to switch from primary to secondary tasks more often, building up arousal. This has similarities with the compensatory control model, whereby performance under increased arousal is maintained until it eventually declines as cognitive, affective, and physiological resources to maintain the performance through coping, are depleted (Hockey, 1997). We argue that individual task performance follows an inverted-U relationship as a function of arousal, induced by frequency of workplace interruptions (Zijlstra et al., 1999). In this paper, we test for a quadratic relationship of daily workflow interruptions on daily task performance.

Hypothesis 2: Interruption frequency and individual task performance are negatively quadratically related.

Moderators: Problem- and Emotion-Focused Coping Strategies

While the study of work interruptions and performance is rich in certain aspects, we lack knowledge on the agency of the interrupted person at work and their potential for moderating the relationship between interruptions and performance (Puranik et al., 2020). This is especially true when applying a frequency approach to interruptions (Baethge et al., 2015). Such knowledge is needed because the agency might significantly change the detrimental performance outcomes of task interruptions, for better or worse. The interrupted person might react to the interruption, not only to the content, for example by reading the incoming message and possibly what follows from that. They might also react to the general occurrence – for example by closing doors, or muting notifications, or to the timeline of the interruption – such as by keeping it short. Furthermore, they might employ strategies to regenerate cognitive and self-regulatory resources that were previously depleted by the interruptions (Puranik et al., 2020). For example, the interrupted person might take a break before resuming their initial task. They might exert certain strategies to cope with the interruption, in order to limit their detrimental effects on individual task performance. Analyzing the effectiveness of such strategies might shed light onto the extent to which employees can actively mitigate the adverse consequences of work interruptions.

Recently, one such strategy was identified. Ma et al. (2020) found the moderator of habitual time management to be significantly impacting the indirect negative relationship between workflow interruptions and task performance through hindrance appraisals, such that the relationship was weaker for workers high in time-management skills. However, Parke et al. (2018) studied a similar strategy, and contingent planning – time management planning that anticipates interruptions. Their results were mixed as to what extent time management strategies to cope with interruptions can buffer against the detrimental performance outcomes of interruptions. Other coping means and strategies which might limit the detrimental effects

of work interruptions on work performance remain unknown. Considering the timeline of interruptions, these strategies might particularly be deployed after the interruptions have already started to occur, hence the stressors can already exert their influence.

The focus of this paper is on problem-focused coping and emotion-focused coping with interruptions. Problem-focused coping concerns such behaviors that change or resolve the issue that generated distress, while emotion-focused coping concerns behaviors that handle the affective reaction to the distressing issue, such as frustration (Lazarus & Folkman, 1984). Problem-focused coping with interruptions could entail strategies, like limiting the duration of the interruption and taking a short break before resuming the initial task. Emotion-focused coping could include behaviors, such as positively reframing the interruption or accepting one won't be able to complete all scheduled tasks. As suggested by the transactional stress theory (Lazarus & Folkman, 1984), the stressor – here the work interruptions – would first be appraised as potentially threatening, and thereby increase negative affect. Negative affect is generally found to hinder performance (Puranik et al., 2020).

Emotion- and problem-focused coping with the stressor would attempt to reduce these detrimental effects on performance through regulating emotional distress and solution-finding respectively, and foster reappraising the event/interruption as less distressing. In support of the upkeep of primary task performance under increased interruptions, Hockey (1997) proposed that in order to maintain performance of a primary task under higher arousal, effort needs to be exerted to make use of a compensatory process, which is needed to cope with the higher arousal. Zijlstra et al. (1999) confirmed this notion of performance maintenance under higher effort. In their study, participants, at times, performed even better under the influence of interruptions. However, the authors argue that this performance maintenance and improvement was enabled through alterations in the work process, and coping with the

interruption, which required additional psychosomatic efforts. Such processes could be reflected in problem- and emotion-focused coping strategies.

Actively limiting the duration of the interruption – a problem-focused coping behavior – might, for instance, reduce the impact of the interruption on the primary task, simply by cutting the timeline of the interruption. The interruption itself can prevent workflow and the “resumption lag” (Leroy et al., 2020, p. 666) may require previously initiated and completed behaviors of the task goal to be repeated or recalled, costing additional attentional and self-regulatory resources not needed without the interruption. When limiting the duration of the interruption, subsequently, the delay between the point in time when the primary task is interrupted, and resumed, would be limited, and maybe reduced. This might possibly result in less errors in working memory regarding the primary task (Eatchel et al., 2012), ultimately making the resumption of the primary task less cognitively demanding (Zijlstra et al., 1999). Another problem-focused coping strategy in regard to workplace interruption might be for the interrupted person to take a short break before resuming the primary task. This might allow for some regeneration of cognitive and self-regulatory resources which were depleted through the interruption, maintaining performance (Hockey, 1997; Jett & George, 2003; Puranik et al., 2020). Additionally, the interrupting task is detached from the primary task and their information in working memory would conflict less, reducing retrieval errors (Eatchel et al., 2012).

As we established above, interruptions as a stressor can be seen to induce negative affect according to the transactional stress theory (Lazarus & Folkman, 1984). Emotion-focused coping, in turn, aims to regulate emotions. Positively reframing the interruption – which can be interpreted as a threat to current resources of the interrupted person – might reduce negative affect. Another emotion-focused coping strategy within the realms of interruption, accepting that one will not be able to finish all planned tasks, might significantly

lower negative affect, too. Both positive reappraisal and acceptance are commonly found to lower negative affect (Goldin et al., 2019). These behaviors would allow for better maintenance of the primary task as negative affect, which hinders performance (Puranik et al., 2020), is buffered.

Hypothesis 3a: Problem-focused coping moderates the negative relationship between interruption frequency and individual task performance, such that the relationship is attenuated when coping is high.

Hypothesis 3b: Emotion-focused coping moderates the negative relationship between interruption frequency and individual task performance, such that the relationship is attenuated when coping is high.

Methods

Sample

The data used in this paper had been gathered before in a pilot daily diary study in employees of a large Dutch company, without involvement of the primary author. Data had been collected by the examiner of this paper and colleagues. The study had been approved by the ethical committee of the University of Groningen and permission was granted by the examiner for the author to use parts of the data in anonymized form for the purpose of this paper. Data collection was executed in 2020, from May to June.

Prior to data analyses and sample description, some cases were excluded. This was necessary in two cases of the baseline survey, where the same participants filled in the survey twice. The newer responses were excluded. Furthermore, six participants who did not indicate responses to at least one of the main model variables were excluded.

The effective sample was 37 full-time employees ($M_{age} = 43.8$ years, $SD = 12.1$ years, 35.1% female). Participants had an average tenure in their function of 6.16 years ($SD = 5.06$).

When participants were asked for the highest level of education achieved, 2.7% indicated primary education, 43.2% indicated vocational secondary education, 16.2% indicated general academic secondary education, and 37.8% indicated bachelor or equivalent degree. Some participants – 16.2% – declared to supervise a number of coworkers ($M = 16.00$, $SD = 8.65$).

Procedure

The pilot study was designed with a daily diary study with convenience sampling within a large Dutch company. All information was self-reported. Participants answered a baseline survey and were invited to answer three surveys on three different times with regular intervals – in the morning at around 11:00 a.m., the afternoon at around 5:00 p.m., and evening at around 8:00 p.m. – throughout the day, for 14 consecutive days. The surveys were administered using a digital research tool, presenting information in Dutch and optionally English. There were three cohorts in the study, initiating their first responses with one week apart from the other cohort each. Informed consent was given by all participants.

Besides for sample description, this paper focuses on the daily measures. Therefore, the daily measures were aggregated. A total of $N = 299$ observations were aggregated to $n = 37$ participants with a mean of 8.09 observations per participant ($SD = 3.97$). The research model variables of the present paper were decided on prior to access to the data. Descriptive statistics were obtained using SPSS 25, inferential statistics were calculated with JASP 0.16 (JASP Team, 2021).

Measures

All model variables were measured on 5-point Likert scales (1 = very little, 5 = a great deal) and treated as continuous. The items used for the model variables are listed in the Appendix.

Daily Task Performance

Study participants self-reported their individual daily task performance on a scale of six items, adapted from Griffin et al.'s (2007) individual task behaviors. The scale had a good reliability ($\alpha = 0.73$). An example item was: "Today, I ensured my tasks were completed properly." These items were part of the daily evening survey.

Daily Workflow Interruptions

Daily workflow interruptions were indicated as responses to three items, adapted from Semmer et al. (1995), Ma et al. (2020), and Kirchberg et al. (2015). The scale had a high reliability ($\alpha = 0.81$). An example item was: "Today, how often has your work been interrupted because something important came up?" These items were part of the daily afternoon survey.

Problem-Focused Coping

Participants indicated their daily levels of problem-focused coping with interruptions using two items self-developed by the examiner ($r = 0.03, p = 0.89$). They did not correlate. The items were: "Today, when I got interrupted, I took a short break before I refocused on my initial task.", and "Today, when I got interrupted, I kept the interruption short to finish what I was working on." These items were part of the daily evening survey.

Emotion-Focused Coping

Emotion-focused coping with interruptions was measured using two self-developed items by the examiner ($r = 0.17, p = 0.40$). They did not correlate. The scored items were: "Today, when I got interrupted, I tried to see something good in the interruption.", and: "I accepted I will not be able to complete all my scheduled tasks." These items were part of the daily evening survey.

Results

Preliminary Findings

In order to proceed with hypothesis testing using linear regression, we evaluated whether the statistical assumptions held for the data in the complete, reduced, and alternative models. We checked linearity and homoscedasticity using a scatter plot, drawing predicted versus residual values. A QQ-Plot of the standardized residuals revealed no violation of the normality assumption. Outliers were not identified. We concluded that linear regression was adequate for data analyses.

Problem-focused coping correlated moderately positively with individual task performance ($r = 0.39, p < 0.05$). Problem-focused coping and emotion-focused coping correlated moderately positively ($r = 0.40, p < 0.05$), indicating a possible issue of collinearity between the two coping factors. The complete correlation matrix, including the four individual coping behaviors, is displayed in Table 1.

Hypothesis Testing

Linear Main Effects

We computed a linear regression, predicting individual task performance by entering workflow interruptions, as well as problem-focused and emotion-focused coping. The model was not significant, $R^2 = 0.16, p = 0.30$. Not in line with Hypothesis 1, workflow interruptions did not relate to individual task performance, $b = 0.04, SE = 0.19, p = 0.83, 95\% \text{ CI } [-0.36, 0.44]$. Problem-focused coping did not significantly relate to individual task performance, $b = 0.24, SE = 0.15, p = 0.12, [-0.07, 0.56]$. Emotion-focused coping, too, did not predict individual task performance, $b = 0.06, SE = 0.15, p = 0.70, [-0.26, 0.38]$. These results are portrayed in Table 2.

Curvilinear Main Effect

Another linear regression was computed to test Hypothesis 2. Centered workflow interruptions, as well as its squared term were entered to predict individual task performance, resulting in a non-significant model, $R^2 = 0.04, p = 0.57$. Hypothesis 2 was not supported.

Workflow interruptions and individual task performance were not quadratically related, $b = -0.23$, $SE = 0.25$, $p = 0.38$, $[-0.74, 0.29]$. These results are shown in Table 3.

Complete Linear Model with Interaction Effects

We entered centered workflow interruptions and centered problem-focused coping, their product term, as well as centered emotion-focused coping and its product term with centered workflow interruptions, to predict individual task performance in another linear regression. We found the model to be non-significant, $R^2 = 0.18$, $p = 0.55$. Hypothesis 3a and Hypothesis 3b were not supported by the data. Neither did problem-focused coping moderate the relationship between workflow interruptions and individual task performance, $b = 0.09$, $SE = 0.33$, $p = 0.79$, $[-0.60, 0.78]$. Nor did emotion-focused coping moderate the relationship between workflow interruptions and individual task performance, $b = 0.21$, $SE = 0.33$, $p = 0.53$, $[-0.47, 0.89]$. These results are visible in Table 4.

Reduced Linear Models and Additional Post-Hoc Analyses

Re-running the analysis using reduced linear models, to account for noise in the regressions, did not yield results that would need differing interpretation. This included reduced models for Hypothesis 1, not controlling for emotion-focused and problem-focused coping, and Hypotheses 3a and 3b, testing for one single moderator each.

Furthermore, due to the novelty of the underlying items and behaviors used to conceptualize problem-focused and emotion-focused coping, as well as the fact that the two items of each of the two factors did not correlate, we repeated the third hypotheses for the four individual coping behaviors. Specifically, we entered the four, centered, items, as well as centered workflow interruptions, together with their respective interaction term, into a linear regression. Again, the overall model was found non-significant, $R^2 = 0.37$, $p = 0.49$. None of the individual behaviors significantly moderated the relationship between workflow interruptions and individual task performance. The results of this model are given in Table 5.

Lastly, the question might evolve what would happen to problem-focused coping and emotion-focused coping under the assumption of a curvilinear relationship between workflow interruptions and performance. They could moderate the negative quadratic relationship between interruptions and performance. There is no theoretical basis for this. We ran a further exploratory post-hoc analysis. We entered into the linear regression analysis, predicting individual task performance, the centered terms for interruptions, problem-focused coping, emotion-focused coping and the two interaction terms between centered interruptions and problem-focused coping, and between centered interruptions and emotion-focused coping. Additionally, we added the squared term for centered interruptions, as well as the two product terms with both centered problem-focused coping and emotion-focused coping into the linear regression analysis. The model was not significant, $R^2 = 0.24$, $p = 0.74$. Neither problem-focused coping moderated the curvilinear relationship between workflow interruptions and individual task performance, $b = -0.72$, $SE = 1.21$, $p = 0.56$, $[-3.28, 1.83]$. Nor emotion-focused coping moderated the curvilinear relationship between workflow interruptions and individual task performance, $b = 0.64$, $SE = 1.09$, $p = 0.56$, $[-1.67, 2.96]$. These results are shown in Table 6.

Discussion

The present paper aimed to explore, argue, and test for effects of workflow interruptions on task performance, and the role of coping moderators. We argued for workflow interruptions to negatively predict individual task performance both linearly and quadratically and that problem-focused coping and emotion-focused coping would ameliorate the linear negative relationship. None of the hypotheses were supported. Reduced models, and additional post-hoc analyses did not yield significant findings related to our hypotheses. None of our proposed models predicted individual task performance. Problem-focused coping was found to correlate moderately positively with individual task performance.

Theoretical Implications

While the results regarding the negative linear and quadratic hypotheses of workflow interruptions predicting individual task performance provided no support to our argumentation, it needs to be noted that our results do not support any kind of relationship previously discussed in the literature. The data neither supported a negative linear relationship between workflow interruptions and task performance, as suggested by us and the majority of the literature (Jett & George, 2003; Puranik et al., 2020), nor did they support the notion of some researchers that the relationship might be positive (Baethge et al., 2015). Additionally, the data did neither support a linear nor quadratic relationship of any kind between workflow interruptions and individual task performance. However, we provided argumentation for both. Especially the negative quadratic relationship seems valid to be further researched (Baethge et al., 2015), foremost when considering workflow interruptions to be a stressor and thereby providing grounds of argumentation using the Yerkes-Dodson law (Teigen, 1994).

From a theoretical perspective, it is noteworthy to mention, that the argued for inverted-U relationship between workflow interruption frequency and individual task performance is likely transformed linearly as a result of individual differences and the primary task complexity (Baethge et al., 2015), such that the more complex the primary task is, the earlier the optimal performance will be reached and be leveling off, as a result of arousal (Teigen, 1994). This would imply a within-person approach to study workflow interruptions and may be related not just to the Yerkes-Dodson law, but maybe even more to the individual zones of optimal functioning (Ruiz et al., 2017).

In regard to agency of the interrupted person, we introduced four coping strategies, two problem-solving and two emotion-focused, that might mitigate the detrimental work outcomes of interruptions on performance. While the data did not support our hypotheses, we provided a novel attempt at studying strategies that the interrupted person might employ.

Again, when conceptualizing workflow interruptions as stressors, problem-focused and emotion-focused coping can be argued to be effective measures to reappraise the interruption as less distressing, and therefore buffer better against performance decreases (Lazarus & Folkman, 1984; Puranik et al., 2020). Similarly, performance losses might be buffered against by problem-focused coping and emotion-focused coping through psychological processes aiming to preserve cognitive resources (Hobfoll, 1989), regenerate them (Hockey, 1997; Jett & George, 2003), to reduce the additional costs of resuming the initial task (Leroy et al., 2020), or to reduce the workload (Puranik et al., 2020). We can note lower means for the individual behaviors of taking a short break and accepting one will not be able to finish all scheduled tasks, compared to keeping the interruption short and positively reappraising it. This might imply that despite the cross-sectional nature of the data we observed some variability in the perceived levels of the individual coping strategies. Future research could consider experimentally manipulating these strategies to see more clearly to what extent they may influence the relationship between interruptions and performance.

While we argued for problem-focused and emotion-focused coping to buffer against the detrimental outcomes of workflow interruptions on individual task performance in a linear fashion only, it might be relevant to explore further the moderators affecting the anticipated negative quadratic relationship. It could be affected such that the function of performance would have a lower kurtosis – performance increases less steeply, but starting from a higher baseline level, and level off less abruptly after having reached the threshold symbolizing maximum performance in its function. Future research should consider a theoretical basis for these ideas.

Next to our proposed but unsupported strategies of the interrupted person to deal with interruptions through problem-focused and emotion-focused coping, and the previously identified partially effective time-management strategies (Ma et al., 2020; Parke et al., 2018),

other possible and effective strategies remain unknown. Furthermore, it remains unclear whether other problem-focused and emotion-focused coping behaviors than those we operationalized might operate as effective strategies to prevent from performance decay through interruptions. It might be necessary to first study qualitatively what kinds of strategies the interrupted person employs to deal with interruptions.

Interestingly, problem-focused coping was positively correlated with individual task performance, though only marginally significant, but did not moderate the relationship between workflow interruptions and individual task performance. This is striking because problem-focused coping is conceptualized as being contingent on having been interrupted already. While it did not moderate the relationship between workflow interruptions and individual task performance, individual task performance was found to rise, given interruptions. This seems similar to findings by Parke et al. (2018), where contingent planning – where interruptions were considered for time management – was found to have positive effects on performance, no matter the interruptions. However, this would not suffice the definition of interruptions adopted in this paper (Puranik et al., 2020), as interruptions were described as necessarily being unexpected. Future research could aim to clarify these matters.

Strengths, Limitations, and Future Research

A strength of the current paper is the novel introduction of four individual coping behaviors as moderators between workflow interruptions and individual task performance. Despite non-significant findings, the paper advanced the current literature on work interruptions. An additional strength is that the paper follows a call of researchers to study possible curvilinear relationships between interruptions and performance (Baethge et al., 2015). Generally, it adds to the body of evidence in the interruption literature. Another strength of the paper is gained through the study design that had been used to collect the data. Temporal precedence was established for workflow interruptions as a predictor, as it was

measured daily in the afternoon. Individual task performance and the coping behaviors were measured daily in the evening.

What starkly limits the generalizability of our paper is the final sample used for the analyses. Even though there were almost three hundred observations, the statistical sample size for our analyses was mostly below thirty participants due to data aggregation. Future research should consider within-person analyses. Post-hoc estimations of within-person variability of the model variables revealed that within-person analyses would have been appropriate with the obtained data. Besides, all participants were employees working in the same sector. It is imaginable that the participants are accustomed to higher frequencies of interruptions in general. Since we do not have a comparison sample, it is not possible to identify whether groups of employees in other sectors have differing levels of interruption frequencies. Another limitation is marked by the non-significant correlation of the items of the coping factors. However, it was appropriate to use a mean scale score because the interrupted person likely did not use two coping behaviors simultaneously. Future research could develop broader and more reliable scales including factor analysis. Nevertheless, it might also be – as we also tested for – that some of the coping behaviors are not loading on a factor and may hence better be treated as individual behaviors and possible moderators.

In terms of history effects, it is to be noted that the participants have responded to the study during the COVID-19 pandemic. Regarding interruptions, this might make the sample less representative. Leroy et al. (2021), for instance, have identified decently elevated interruption levels since the pandemic.

Practical Implications

Although we found no significant results as to our proposed hypotheses, we can consider the finding of problem-focused coping to relate positively to individual task performance. Despite no clarified relation with interruptions, it seems for employees that

keeping the interruption short and taking a short break before resumption of the initial task, combined, may be related to performance increment. The individual behaviors did not provide a relationship with individual task performance. These results are to be viewed in perspective of the whole current paper, including the limited generalizability. We propose not to draw practical, but academic, implications.

Conclusion

With this paper we aimed to advance two unsolved issues in the interruption literature: the nature of the relationship between interruptions and performance, as well as further strategies which the interrupted person might utilize to deal with them. Workflow interruptions were not found related to individual task performance, neither linearly nor quadratically. The notion of a moderating role of problem-focused coping and emotion-focused coping to moderate the relationship between workflow interruptions and individual task performance was not supported. We discuss academic indications and conclude to not draw practical implications from the current paper.

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Table 1*Descriptive statistics and Pearson's correlations for study variables.*

	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Individual Task Performance	31	3.35	0.52	(.73)							
2. Workflow Interruptions linear	36	2.23	0.61	-.11	(.81)						
3. Workflow Interruptions quadratic	36	0.36	0.45	-.12	-.35*						
4. Problem-Focused Coping	26	2.76	0.73	.39*	-.10	.12	(.03)				
5. Emotion-Focused Coping	26	3.00	0.73	.25	.14	-.29	.40*	(.29)			
6. Taking Short Break Before Resumption	26	2.39	1.07	.34	.05	-.15	.75***	.58**			
7. Keeping Interruption Short	26	3.12	0.97	.21	-.20	.34	.69***	-.03	.03		
8. Seeing Something Good in Interruption	26	3.37	0.85	.20	-.17	-.15	.43*	.70***	.30	.32	
9. Accepting Inability to Finish all Tasks	26	2.64	1.05	.18	.34	-.30	.21	.82***	.56**	-.30	.17

Note: Cronbach's alphas are indicated in parenthesis on the diagonal. Instead of Cronbach's alpha, Pearson's correlation coefficient is indicated for Problem-Focused Coping and Emotion-Focused Coping. The values mean and standard deviation of the quadratic term of workflow interruptions are not to scale and are based on the squared values of centered workflow interruptions. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2*Regression Results for Predicting Individual Task Performance*

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Intercept	2.30	0.67	3.46	< .01	0.92	3.69
Workflow Interruptions	0.04	0.19	0.22	0.83	-0.36	0.44
Problem-Focused Coping	0.24	0.15	1.60	0.12	-0.07	0.56
Emotion-Focused Coping	0.06	0.15	0.39	0.70	-0.26	0.38

Note: *N* = 25.

Table 3*Regression Results for Predicting Individual Task Performance*

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Intercept	3.34	0.13	27.44	< .001	3.17	3.69
Workflow Interruptions, linear	-0.16	0.19	-0.86	0.40	-0.55	0.22
Workflow Interruptions, quadratic	-0.23	0.25	-0.90	0.38	-0.74	0.29

Note: *N* = 30. Linear workflow interruptions were centered prior to analysis. The quadratic term is the squared centered linear term.

Table 4*Regression Results for Predicting Individual Task Performance*

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Intercept	3.24	0.11	29.53	< .001	3.01	3.47
Workflow Interruptions	0.10	0.23	0.43	0.67	-0.38	0.58
Problem-Focused Coping	0.26	0.16	1.62	0.12	-0.08	0.59
Emotion-Focused Coping	0.02	0.17	0.11	0.91	-0.34	0.38
WFI X PFC	0.09	0.33	0.27	0.79	-0.60	0.78
WFI X EFC	0.21	0.33	0.64	0.53	-0.47	0.89

Note: *N* = 25. Workflow Interruptions were abbreviated as “WFI”. Problem-Focused Coping and Emotion-Focused coping were abbreviated as “PFC”, and “EFC”, respectively. Problem-Focused Coping and Emotion-Focused Coping were centered prior to entering in the model and prior to building their product terms with workflow interruptions, which had also been centered.

Table 5*Regression Results for Predicting Individual Task Performance*

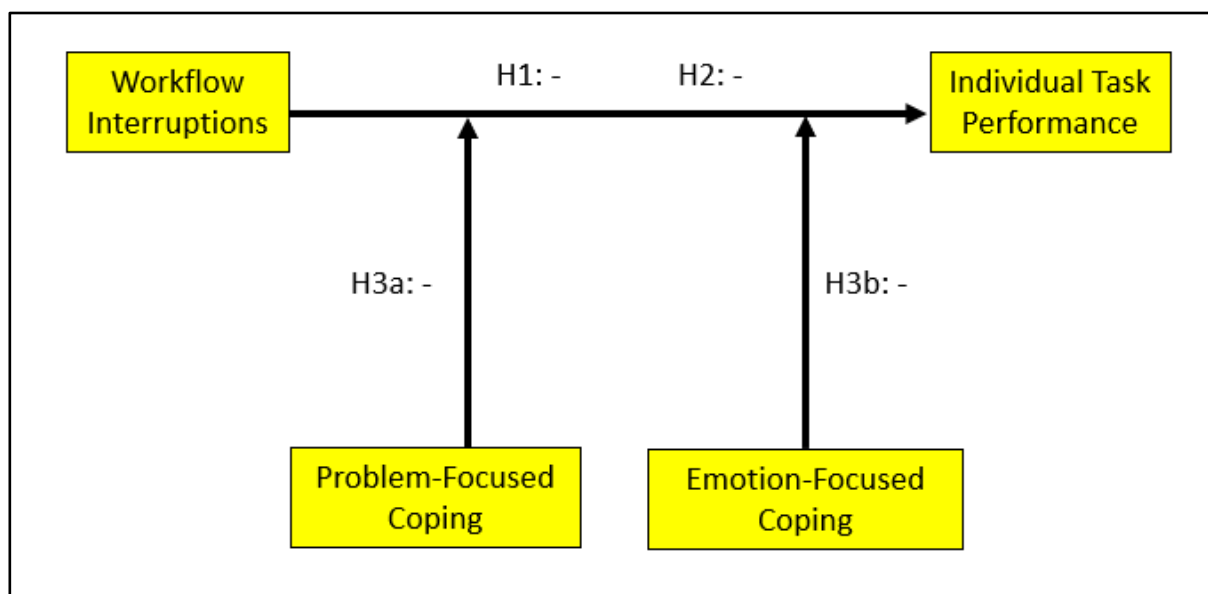
	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Intercept	3.33	0.12	27.74	< .001	3.05	3.47
Workflow Interruptions	0.13	0.24	0.57	0.58	3.07	3.59
Taking Short Break	0.09	0.16	0.56	0.58	-0.37	0.64
Keeping Interruption Short	0.14	0.13	1.14	0.27	-0.25	0.42
Seeing Good in Interruption	0.05	0.19	0.26	0.80	-0.13	0.41
Accepting Inability Finishing All Tasks	0.07	0.16	0.42	0.68	-0.35	0.44
WFI X Break	0.35	0.30	1.17	0.26	-0.28	0.41
WFI X Short	-0.60	0.37	-1.61	0.13	-0.29	1.00
WFI X Good	0.37	0.33	1.14	0.27	-1.40	0.19
WFI X Accept	-0.72	0.45	-1.59	0.13	-0.32	1.07

Note: $N = 25$. Workflow Interruptions were abbreviated as “WFI”. Taking a short break before refocusing on the initial task was abbreviated as “Break”. Trying to keep the interruption short was abbreviated as “Short”. Trying to see something positive in the interruption was abbreviated as “Good”. Lastly, accepting that one will not be able to finish all scheduled tasks was abbreviated as “Accept”. All predictors were centered prior to entering and prior to building a product term with centered workflow interruptions.

Table 6*Regression Results for Predicting Individual Task Performance*

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
Intercept	3.29	0.17	19.66	< .001	2.94	3.65
WFI (linear)	-0.03	0.30	-0.09	0.93	-0.66	0.60
WFI (quadratic)	0.16	0.82	0.19	0.85	-1.58	1.89
PFC	0.49	0.35	1.40	0.18	-0.25	1.23
EFC	-0.20	0.34	-0.59	0.56	-0.93	0.53
WFI (linear) X PFC	0.12	0.47	0.26	0.80	-0.88	1.12
WFI (linear) X EFC	-0.01	0.43	-0.02	0.98	-0.92	0.90
WFI (quadratic) X PFC	-0.72	1.21	-0.60	0.56	-3.28	1.83
WFI (quadratic) X EFC	0.64	1.09	0.59	0.56	-1.67	2.96

Note: $N = 25$. Workflow Interruptions were abbreviated as “WFI”. Problem-Focused Coping and Emotion-Focused coping were abbreviated as “PFC”, and “EFC”, respectively. “WFI (linear)”, “PFC” and “EFC” were centered prior to entering in the model and prior to building the interaction terms. “WFI (quadratic)” marks the squared centered linear term.

Figure 1*Conceptual Research Model and Overview of Hypotheses*

Note. Workflow interruptions are operationalized in terms of their frequency. H1, H3a and H3b are linear, H2 is quadratic.

Appendix

Items used for the scales.

Scale 1: Daily Individual Task Performance

On the scale below, please indicate how often you engaged in the following behaviors today.

Today, I...

1. ensured my tasks were completed properly.
 2. carried out the core parts of my job well.
 3. adapted well to changes in core tasks.
 4. learned new skills to help me adapt to changes in my core tasks.
 5. came up with ideas to improve the way in which my core tasks are done.
 6. made changes to the way my core tasks are done.
-

Scale 2: Daily Workflow Interruptions

Please indicate how frequently you were interrupted today.

1. Today, how often has your work been interrupted because something important came up?
 2. How often has your work been interrupted by your colleagues or supervisor today?
 3. How often did you have to work on unplanned tasks today?
-

Scale 3: Problem-Focused Coping

Please indicate how often you engaged in the following behaviors today.

Today, when I got interrupted during my work...

1. I took a short break before I refocused on my initial task.
 2. I kept the interruption short to finish what I was working on.
-

Scale 4: Emotion-Focused Coping

Please indicate how often you engaged in the following behaviors today.

Today, when I got interrupted during my work...

1. I tried to see something good in the interruption.
2. I accepted that I will not be able to finish all my scheduled tasks.