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RESEARCH ARTICLE

E-MAIL INTERRUPTIONS AND INDIVIDUAL PERFORMANCE: IS THERE A SILVER LINING?

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Appendix A

Constructs and Measures

Construct Definition	Operationalization	Source	Measurement Instrument
E-mail interruptions: Externally triggered temporary suspensions of an individual's primary task activities to process the content of one or more incoming e-mail messages.	We focus on **exposure to e-mail interruptions**, which represents the extent to which individuals are interrupted by e-mail over a period of time (across multiple interruption episodes). Exposure is a composite of the following dimensions (Monk et al. 2008; Stutts et al. 2005):		
	Frequency: The perceived rate at which an individual temporarily suspends his or her primary activities to handle (read, respond to and/or act upon) incoming e-mail messages.	Ratio measure; wording refined based on card sorting (n = 20) and pretests (n = 10).	Respondents were asked to indicate the number of times they temporarily suspended their primary selling activities to process (read, respond, act upon) incoming e-mails over the past work week (survey study), or work day (diary study).[1]
	Duration: The average duration of time spent by an individual each time he or she suspends the primary task activities to handle (read, respond to and/or act upon) incoming e-mail messages.	Ratio measure; wording refined based on card sorting and pretests.	Respondents were asked to indicate the average duration (in minutes) of a single typical suspension of their primary selling activities so as to process incoming e-mails.
We identify two interruption types based on the informational content of the messages and its relevance to primary activities:	Incongruent and congruent e-mail interruptions were operationalized by asking respondents to distinguish between two types of e-mails that interrupt their primary activities.[2]		

Incongruent e-mail interruptions: E-mail interruptions by messages that provide or request information or actions that are not relevant to, and that divert attention away from, primary activities.	**Exposure to incongruent e-mail interruptions:** Measured by capturing the frequency and duration of interrupting e-mails with contents related to secondary selling activities (e.g., servicing accounts; training/recruiting), or activities outside of the sales domain (e.g., general work; personal/social activities).	Ratio measure; wording refined based on card sorting and pretests.	For frequency, respondents were asked to distribute the total number of suspensions (indicated earlier) first among their primary selling activities, then among the two different types of incoming e-mail: primary and secondary e-mails. Decomposing the interruption event into subcategories and eliciting frequencies at the subcategory level helps increase recall accuracy (Menon 1997). For duration, respondents were asked whether the average duration reported earlier was similar for the two e-mail types. If a negative response was entered, the survey branched to a follow-up item that asked respondents to estimate the typical duration of each type of interruption.
Congruent e-mail interruptions: E-mail interruptions by messages that contain relevant information, reveal discrepancies, or request actions that are pertinent to performing primary activities.	**Exposure to congruent e-mail interruptions:** Measured by capturing the frequency and duration of interrupting e-mails with contents that are directly pertinent to performing the primary selling activities (e.g., information about prospect customer needs; feedback about one's selling performance).	Ratio measure; wording refined based on card sorting and pretests.	
E-mail capabilities: We focus on six e-mail capabilities used during interruption episodes:	We measured e-mail capabilities that are used during interruption episodes, the time elapsed between suspension of primary activities to process interruptions and the subsequent resumption of primary activities.		
Message organization actions: Leaving/ Deleting/ Foldering/ Archiving:† The extent to which, during interruption episodes, an e-mail recipient leaves messages in one's inbox, deletes them, or files them into folders or into archives.		Items based on definition, existing literature (e.g., Dabbish and Kraut 2006), card sorting, and pretests.	Respondents were asked how they filed— during interruption episodes—their incoming messages that interrupted their primary selling activities. They were asked to distribute 100 percentage points to indicate the proportion of messages that were filed according to each of the following options:[3] • Org1: Left incoming messages in inbox. • Org2: Filed incoming messages into folders based on message characteristics (topic, urgency, etc.). • Org3: Filed incoming messages into a general "Archive" folder (e.g., Google's Archive button). • Org4: Deleted incoming messages.
Reprocessing:† The extent to which, during interruption episodes, an e-mail recipient reexamines or processes e-mail messages (own or received from others) again.		Items based on definition, existing scales (Sarker et al. 2010; Tang et al. 2013), card sorting, and pretests.	7-point Likert-type scale (1 = Never—7 = Every time) Today, when I was processing (reading, replying to, forwarding, acting upon) the incoming e-mail messages that temporarily suspended my primary selling activities… • Rep1: I tended to revisit and re-examine the incoming messages or other related messages I stored. • Rep2: I reused information from previous related messages I saved. • Rep3: I retrieved and processed older messages again that might somehow be related to the incoming messages. • Rep4: I tended to re-read the incoming messages.

Rehearsing:† The extent to which an e-mail recipient rehearses or fine-tunes one's responses to incoming messages during interruption episodes, before sending the responses.		Items based on definition, existing scales (George et al. 2013), card sorting, and pretests.	7-point Likert-type scale (1 = Never—7 = Every time) Today, when I was processing (reading, replying to, forwarding, acting upon) the incoming e-mail messages that temporarily suspended my primary selling activities… • Reh1: I crafted my replies carefully to express my intended meaning. • Reh2: I considered how my replies might be interpreted. • Reh3: I took my time to think about my replies before sending them. • Reh4: I read my replies several times before sending them. • Reh5: I went back and corrected mistakes in my replies before sending.
Communicating in parallel:† The extent to which an individual engages in multiple e-mail conversations simultaneously (i.e., within some given interruption episode)		Items based on definition, existing scales (Sarker et al. 2010; Tang et al. 2013), card sorting, and pretests.	7-point Likert-type scale (1 = Never—7 = Every time) Today, when I was processing (reading, replying to, forwarding, acting upon) the incoming e-mail messages that temporarily suspended my primary selling activities… • Par1: I participated in several e-mail exchanges in parallel. • Par2: I communicated with multiple users at the same time. • *Par3: I carried multiple conversations simultaneously.* • *Par4: I communicated with only one person at a time. (r)*
Subjective workload: Refers to the perceived costs incurred by individuals in performing their activities (Hart and Staveland 1988). It is defined as the extent to which an individual feels his or her whole task execution (including primary activities and interruptions) is demanding (a) emotionally, (b) temporally, and (c) mentally.	We measured individuals' perceptions of their workload resulting from processing e-mail interruptions and performing their primary selling activities. Workload comprises three dimensions: emotional workload; temporal workload; mental workload.	Items based on definition, the modified NASA TLX index (Adamczyk and Bailey 2004), card sorting, and pretests.	7-point Likert-type scale (1 = Strongly disagree—7 = Strongly agree) • SW1: I felt annoyed. • SW3: I felt frustrated. • SW5: I felt that my workload is substantial. • SW6: I felt stressed. • SW8: I felt fatigued. • SW9: The rate at which my activities occurred made me feel pressured. • *SW10: I felt energized. (r)*
Mindfulness: A situation-specific state of cognitive functioning through which an individual performing his or her primary activities exhibits alertness to distinction, openness to novelty, orientation in the present, and implicit, if not explicit, awareness of multiple perspectives.	Respondents were asked to report on their cognitive state after processing the interrupting e-mails. Measured via four dimensions: novelty seeking; novelty producing; flexibility; engagement (Langer 1989).	Items based on definition, the Langer Mindfulness Scale (Langer 1989; 2004), card sorting, and pretests.	7-point global scale adapted from Langer (2004) (1 = Strongly disagree—7 = Strongly agree) After processing the incoming messages that temporarily suspended my activities… • Min1: I tended to investigate new issues that emerged in my primary selling activities. • Min2: I tried to think of new ways of doing my primary selling activities. • Min3: I became open to new ways of doing my primary selling activities. • Min4: I developed an open-mind about the issues I faced, even things that challenged my core beliefs. • Min5: I found myself very curious about issues that I faced. • Min7: rarely attended to new developments in my primary selling activities. (r)

Individual performance: The aggregated value of the behaviors that an individual performs on one's core work activities over a given interval of time.	Following prior literature (e.g., Hunter and Goebel 2008), we measured salespersons' perceived behaviors regarding their time-based efficiency and effectiveness at achieving sales objectives in their primary selling activities.[4] Salesperson performance was operationalized using two different time references in the two studies: weekly performance (survey study) and daily performance (diary study). To capture its multidimensional nature, salesperson performance was specified as a second-order formatively measured latent variable. The first-order factors had causal-formative indicators in the survey study and reflective indicators in the diary study.[5]	Items based on definition, sales literature, existing scales (Behrman and Perreault 1984; Hunter and Goebel 2008), card sorting, and pretests. In generating the survey study items, we made sure that they covered the entire content domain of primary selling activities, from prospecting to closing a sale.	7-point comparative scale. **Survey study (reference period = 1 workweek):** • Efc1: Timeliness in prospecting for potential customers. (a) • Efc2 : Efficiency in delivering sales presentations or materials. (b) • Efc3: Managing time well across the primary selling activities. (c) • Efc4: Timeliness in providing information to prospect customers. (a) • Efc5: Speed of identifying and solving prospect customer issues. (a) • Efc6: Speed of generating sales from prospect customers. (a) • Eff1: Interacting effectively with prospect customers. (c) • Eff2: Avoiding mistakes in sales presentations or materials. (c) • Eff3: Communicating my sales presentations clearly and concisely. (c) • Eff4: Solving prospect customers' problems or objections. (c) • Eff5: Developing new customers from established contacts. (c) • Eff6: Accuracy in matching prospect customer requirements with available product offerings. (c) **Diary study (reference period = 1 work day):** • Efc1: Timeliness in completing primary selling tasks. (d) • Efc2: Efficiency in carrying out primary selling activities. (d) • Efc3: Managing time well across the primary selling activities. (d) • Efc4: Speed of executing primary selling tasks. (d) • Eff1: Adequacy of my primary selling results. (d) • Eff2: Fulfillment of primary selling responsibilities. (d) • *Eff3: Negligence in executing my primary selling activities. (r) (d)* • Eff4: Avoiding errors in my primary selling activities. (d) • Eff5: Quality of my primary selling outcomes. (d) • Eff6: Success in achieving primary selling goals. (d) • Perf1: Overall, how do you rate your primary selling performance today? (d) • Perf2: In general, how well did you execute your primary selling tasks today? (d)
Control variables Knowledge: 4 items measured on a 7-point Likert-type scale; influences individual performance (e.g., Rapp et al. 2006) Effort: 3 items measured on a 7-point Likert-type scale; influences individual performance (e.g., Jaramillo and Mulki 2008) Perceived control over e-mail: 5 items measured on a 7-point Likert-type scale; influences subjective workload (e.g., Rapp et al. 2006), mindfulness (e.g., Louis and Sutton 1991), and individual performance Multitasking self-efficacy: 4 items measured on a 7-point Likert-type scale; influences subjective workload and individual performance (e.g., Basoglu et al. 2009)			
Marker variables Disposition to trust (Gefen et al. 2000): 5 items answered on a 7-point Likert-type scale (strongly disagree–strongly agree) Social desirability (Strahan and Gerbasi 1972): 10 items answered on a true/false scale (scores summed up to create overall score)			

Notes

(italics) Item dropped from final measurement scale after testing of measurement properties.
(r) Reverse-coded item.
(a) 7-point Likert-type scale (1 = Much slower—7 = Much faster)
(b) 7-point Likert-type scale (1 = Much lower—7 =Much higher)
(c) 7-point Likert-type scale (1 = Much worse—7 =Much better)
(d) 7-point Likert-type scale (1 = Far below average—7 = Far above average)
[†]Diary study only

[1]We used the term *temporary suspension* instead of *interruption* to avoid the negative connotation that comes with the latter term.

[2]To ensure we were measuring interruptions and not simply emails handled at convenient or periodic intervals outside of the primary task domain, we explicitly asked respondents to report only on the emails that led to "temporary suspensions" of their primary selling activities. Additionally, we confirmed that respondents had access to real-time notifications to their incoming messages.

[3]Since these items represent compositional data that add up to a constant sum, we transformed the data using the centered logratio transformation before using them as predictors in the model (Wang et al. 2013).

[4]We focus on behavioral–rather than outcome—performance since it is more granular representation reflecting behaviors that are assessed in terms of their contribution to sales goals, is totally under the respondent's control, and has been consistently used in the sales literature (e.g., Hunter and Goebel 2008). Also, the effects of e-mail interruptions are more likely to manifest in the more proximate behavioral components of performance, and there are many steps that come between a salesperson's behaviors and his or her end performance (Churchill et al. 1985; Hunter and Goebel 2008). We used self-reported, subjective performance measures. First, empirical evidence shows that these measures perform no worse than objective measures and have less leniency and halo errors than supervisor ratings (Churchill et al. 1985). Objective measures also introduce inequalities among sales regions, product lines, and customer accounts, and may be attributable to factors beyond the salesperson's control (Behrman and Perreault 1984). Second, self-reported subjective measures are more appropriate for evaluating behavioral outcomes of boundary-spanning individuals such as salespeople (Behrman and Perreault 1984) who perform behaviors that are less observable by managers (e.g., e-mail interactions with customers), and that do not typically reflect in performance reports. Finally, self-reported measures are more readily available and are commonly used in the sales literature (Behrman and Perreault 1984; Sujan et al. 1994).

[5]Because the survey captured experiences over an extended period of one workweek, we assumed—based on our observations in the pretesting phase—that the respondents performed the entire gamut of their primary selling activities. We thus used causal-formative indicators that tap into the different activity domains. Since the diary study captured experiences over a shorter period (two consecutive workdays), we used reflective indicators that tap into more general performance aspects.

Appendix B

Empirical Results on IT Interruption Effects

(1) Incongruent Interruptions (Interruptions Pertaining to Non-Primary Activities)		
Effects on Workload	**Effects on Performance Efficiency**	**Effects on Performance Effectiveness**
Emotional load: negative effects • Increased annoyance (Adamczyk and Bailey 2004; Bailey and Konstan 2006; Gievska et al. 2005) • Increased anxiety (Bailey and Konstan 2006) • Increased frustration (Adamczyk and Bailey 2004; Gievska et al. 2005) • Increased irritation (Baethge and Rigotti 2013; Grebner et al. 2003) • Negative emotions and well-being (Zijlstra et al. 1999) • Decreased respect (Adamczyk and Bailey 2004) ***Cognitive load: negative effects*** • Increased distractiveness (Gievska et al. 2005) • Increased cognitive load (Adamczyk and Bailey 2004; Basoglu et al. 2009; Gievska et al. 2005) ***Temporal load: negative effects*** • Increased time pressure (Adamczyk and Bailey 2004; Baethge and Rigotti 2013) ***Overall subjective workload: negative effects*** • Increased subjective workload (Galluch et al. 2015; Gupta et al. 2013; Mark et al. 2008; Baethge and Rigotti 2013)	***Task resumption time (lag): negative effects*** • Increased lag (Cades et al. 2006; Hodgetts and Jones 2006; Iqbal and Horvitz 2007; Jackson et al. 2003; Marulanda-Carter and Jackson 2012; Monk et al. 2008; Trafton et al. 2005; Zijlstra et al. 1999). – Effect is stronger for increasing difficulty of next subtask and high data carry over across task boundaries (Iqbal and Horvitz 2007), as well as for longer and more complex interruptions (Hodgetts and Jones 2006). There is also a carryover effect: effect increases eightfold by increasing interruption frequency from 1 to 3 (Zijlstra et al. 1999). – Effect is weaker for more frequent interruptions, as people learn to work faster (Cades et al. 2006), as well as for introducing blatant cues after the interruption (Trafton et al. 2005). ***Task completion time: mixed effects*** • Increased completion time (Arroyo and Selker 2003; Bailey and Konstan 2006; Burmistrov and Leonova 2003; Eyrolle and Cellier 2000; ; Jackson et al. 2003; Marulanda-Carter and Jackson 2012; McFarlane et al. 2002; Speier et al. 1997). – Effect is significant for interruptions from peers (Gupta et al. 2013), nonsignificant for simple interruptions (Burmistrov and Leonova 2003), and reversed (i.e., people work faster) for interruptions from supervisors (Gupta et al. 2013) and for simple primary tasks (Speier et al. 1997). – Effect is stronger for more frequent interruptions (Speier et al. 1997), interruptions on mobile devices rather than PC (Nagata 2006), and interruptions with thermal notification cues (Arroyo and Selker 2003) and weaker for anticipated interruptions (Nagata 2006) and interruptions similar to the primary task (Speier et al. 1997). – Simple interruptions requiring repetitive interactions are more disruptive than complex interruptions with less repetitive interactions (Nagata 2006). • No effect on completion time (Kapitsa and Blinnikova 2003). • Decreased completion time (Mark et al. 2008; Zijlstra et al. 1999). • Individuals develop strategies that over-	***Errors in task performance: mostly negative effects*** • Increased number/rate of errors (Arroyo and Selker 2003; Bailey and Konstan 2006; Burmistrov and Leonova 2003; Cades et al. 2006; Eyrolle and Cellier 2000; Hodgetts and Jones 2006; Kapitsa and Blinnikova 2003; McFarlane 2002; Monk et al. 2008; Speier et al. 1997; Trafton et al. 2005; Zijlstra et al. 1999: Russian subsample). – Effect is stronger for complex interruptions (Arroyo and Selker 2003; Bailey and Konstan 2006; Burmistrov and Leonova 2003; Eyrolle and Cellier 2000; McFarlane 2002; Speier et al. 1997) and weaker when complex interruptions are performed sequentially with the primary task (Kapitsa and Blinnikova 2003). • No effect on number/rate of errors (Hodgetts and Jones 2006; Mark et al. 2008; Zijlstra et al. 1999: Dutch subsample). ***Task omissions: negative effects*** • Increased number of task omissions (McFarlane 2002). ***Decision-making performance: negative effects*** • Decreased decision-making performance (Basoglu et al. 2009; Speier et al. 1997). – Effect is stronger for frequent interruptions (Basoglu et al. 2009; Speier et al. 1997) and reversed (i.e., people work more accurately) for simple primary tasks (Speier et al. 1997). ***Memory accuracy: negative effects*** • Decreased memory accuracy (Dodhia and Dismukes 2009; Edwards and Gronlund 1998; Oulasvirta and Saariluoma 2004). – Effect is significant when the primary task does not provide memory cues (Edwards and Gronlund 1998) and significant (Edwards and Gronlund 1998) or stronger (Oulasvirta and Saariluoma 2004; Baethge and Rigotti 2013) for interruptions similar to the primary task ***Task quality: negative effects*** • Decreased task quality (Gupta et al. 2013).

	compensate for the performance decline (Zijlstra et al. 1999). ***Total work time: negative effects*** • Increased total work time (Kapitsa and Blinnikova 2003; Zijlstra et al. 1999)	
(2) Congruent Interruptions (Interruptions Pertaining to Primary Activities)		
Effects on Workload	**Effects on Performance Efficiency**	**Effects on Performance Effectiveness**
Emotional load: mostly negative effects • Increased irritation (Baethge and Rigotti 2013; Grebner et al. 2003) • Decreased annoyance for interruptions that match attentional draw to utility (Gluck et al. 2007) ***Stress: mostly negative effects*** • Increased stress for pessimistic individuals and for negative feedback that turns attention to self (Szalma et al. 2006) • Compared to off-task interruptions, on-task interruptions provide instrumental support that decreases perceptual conflict and strain (Galluch et al. 2015) ***Cognitive load: mostly negative effects*** • Increased cognitive load for high-intensity interruptions (Robertson et al. 2006), but the effect is non-significant for interruptions that match attentional draw to utility (Gluck et al. 2007) ***Overall subjective workload: negative effects*** • Increased subjective workload (Galluch et al. 2015; Mark et al. 2008; Baethge and Rigotti 2013)	***Task resumption time (lag): mostly no effects*** • Increased completion time for interruptions occurring too early before needed (Miller 2002). • Interruptions with relevant information are less disruptive than those with irrelevant information (Czerwinski et al. 2000). ***Task completion time: mostly no effects*** • Increased completion time for interruptions occurring too early before needed (Miller 2002). ***Information processing efficiency: mostly no effects*** • Increased efficiency (Mark et al. 2008). • Decreased efficiency for negative feedback that turns attention to self and causes stress (Szalma et al. 2006).	***Errors in task performance: no effects*** • No effect on number/rate of errors (Mark et al. 2008). ***Perceived effectiveness: positive effects*** • Increased perceived effectiveness (Ang et al. 1993), especially for interruptions that match attentional draw to utility (Gluck et al. 2007). • Effect is stronger for IT-mediated interruptions as opposed to face-to-face interruptions (Ang et al. 1993). ***Decision-making performance: mostly positive effects*** • Increased decision-making performance (Earley et al. 1990), but the effect is non-significant for interruptions occurring too early before needed (Miller 2002). ***Sensitivity to error: positive effects*** • Increased sensitivity to error for composite feedback that turns attention to task and raises effort commitment (Szalma et al. 2006). ***Learning: positive effects*** • Increased learning (Robertson et al. 2004). – Effect is stronger for negotiated-style interruptions (Robertson et al. 2004). ***Objective performance: no effects*** • No effect on objective performance (Ang et al. 1993).

Appendix C

Sample Demographics

	Survey Study	Diary Study
Female/male ratio	0.76	0.46
With post-secondary degree	87%	84%
Age category mostly represented	30-39 (34%)	50-59 (35%)
Sales experience category mostly represented	10+ years (60%)	10+ years (71%)
> 5 years experience in sales	85%	79%
Positions strongly represented	Sales manager (20%); Account manager (13%); Sales rep (13%)	Sales manager (20%); Sales rep (15%); Account manager (14%)
Industries strongly represented	Retail (17%); Computer Hardware/ Software (16%); Finance, Insurance, or Real Estate (15%)	Manufacturing & Processing (16%); Finance, Insurance, or Real Estate (15%); Retail (11%)

Appendix D

Assessment of Common Method Bias Using the Marker Variable

	Survey Study						Diary Study					
Fisher-weighted mean correlation between marker items and study items	0.043						0.059					
Correlation range	From -0.261 to 0.208						From -0.203 to 0.234					
	Baseline model			Marker variable model			Baseline model			Marker variable model		
Paths	**Est.**	**SE**	**sig.**	**Est.**	**SE**	**sig.**	**Est.**	**SE**	**sig.**	**Est.**	**SE**	**sig.**
***Direct and indirect effects of exposure to e-mail interruptions*:**												
IEI → PERF (H1)	-0.03	0.04	.380	-0.03	0.04	.362	-0.13	0.05	.003	-0.13	0.05	.004
CEI → PERF (H2)	-0.04	0.04	.346	-0.04	0.04	.317	0.16	0.05	<.001	0.15	0.05	.001
IEI → SW (H3)	0.40	0.05	.000	0.40	0.05	.000	0.19	0.06	.001	0.19	0.06	.001
CEI → SW (H4)	0.07	0.05	.100	0.07	0.04	.103	0.15	0.06	.012	0.15	0.06	.011
SW → PERF (H5)	-0.14	0.06	.025	-0.14	0.06	.012	-0.21	0.05	<.001	-0.21	0.05	<.001
CEI → MIN (H6)	0.16	0.08	.032	0.16	0.07	.035	0.24	0.05	<.001	0.22	0.05	<.001
MIN → PERF (H7)	0.12	0.06	.049	0.12	0.06	.045	0.12	0.05	.011	0.11	0.05	.024
***Effects of e-mail capabilities*:**												
REP → SW (H8)	N/A	N/A	N/A	N/A	N/A	N/A	0.03	0.07	.680	0.05	0.07	.530
REH → SW (H9)	N/A	N/A	N/A	N/A	N/A	N/A	-0.02	0.06	.802	-0.03	0.08	.700
PAR → SW (H10)	N/A	N/A	N/A	N/A	N/A	N/A	0.32	0.07	<.001	0.31	0.07	<.001
LVE → SW (H11a)	N/A	N/A	N/A	N/A	N/A	N/A	0.13	0.07	.045	0.14	0.07	.036
DEL → SW (H11b)	N/A	N/A	N/A	N/A	N/A	N/A	-0.22	0.07	<.001	-0.22	0.07	.001
FOL → SW (H11c)	N/A	N/A	N/A	N/A	N/A	N/A	-0.03	0.08	.689	-0.03	0.08	.720
REP → MIN (H12)	N/A	N/A	N/A	N/A	N/A	N/A	0.21	0.05	<.001	0.22	0.05	<.001
REH → MIN (H13)	N/A	N/A	N/A	N/A	N/A	N/A	0.27	0.05	<.001	0.24	0.05	<.001
***Control variable effects*:**												
PC → SW	-0.07	0.04	.115	-0.07	0.04	.080	-0.13	0.06	.023	-0.13	0.06	.023
MSE → SW	-0.33	0.04	.000	-0.34	0.04	.000	-0.19	0.06	<.001	-0.19	0.06	.001
PC → MIN	0.34	0.14	.016	0.33	0.14	.016	0.03	0.06	.550	0.02	0.05	.701
PC → PERF	0.09	0.05	.075	0.08	0.05	.067	-0.03	0.06	.563	-0.04	0.06	.502
MSE → PERF	0.20	0.05	.000	0.19	0.05	.000	0.10	0.05	.068	0.10	0.06	.064
EFR → PERF	0.20	0.06	.000	0.20	0.06	.000	0.06	0.06	.311	0.05	0.06	.443
KNW → PERF	0.16	0.06	.006	0.15	0.06	.010	0.07	0.06	.270	0.07	0.06	.261

Notes:
IEI = Incongruent e-mail interruptions; CEI = Congruent e-mail interruptions; SW = subjective workload; MIN = mindfulness; PERF = individual performance; REP = reprocessing; REH = rehearsing; PAR = communicating in parallel; LVE = leaving messages in the inbox; DEL = deleting messages; FOL = foldering messages; PC = perceived control; MSE = multitasking self-efficacy; EFR = effort; KNW = knowledge.

Appendix E

Correlation Matrix and Composite Reliability Scores for Reflectively Measured Constructs

Table E1. Survey Study

Construct[a]	Reliability	Average variance extracted (AVE)	Mean	STD	SW	MIN	PERC	SOCC	MSE	EFR	KNW
Subjective workload (SW)	0.89	0.59	3.91	1.20	**0.77**						
Mindfulness (MIN)	0.87	0.54	5.58	0.85	-0.22**	**0.73**					
Perceived control/ personal (PERC)[+]	N/A	N/A	4.55	1.30	-0.24**	0.26**	**N/A**				
Perceived control/ social (SOCC)[+]	0.78	0.48	3.45	1.14	-0.14**	-0.26**	-0.02	**0.70**			
Multitasking self-efficacy (MSE)	0.88	0.64	5.48	1.04	-0.43**	0.40**	0.24**	0.01	**0.80**		
Effort (EFR)	0.78	0.55	5.58	0.95	-0.11*	0.53**	0.16**	-0.16**	0.34**	**0.74**	
Knowledge (KNW)	0.90	0.70	5.79	0.94	-0.25**	0.53**	0.17**	-0.14**	0.48**	0.50**	**0.83**

[a]The interruptions and individual performance constructs are not included in this table because they are not reflectively measured constructs.
**Significant at $p < 0.01$; * Significant at $p < 0.05$.
[+]PERC and SOCC are the first-order dimensions of perceived control (PC).
Bold numbers on the diagonal show the square root of the AVE. Numbers below the diagonal represent latent variable correlations.

Table E2. Diary Study

Construct[a]	Reli-ability	Average variance extracted (AVE)	Mean	STD	EFF	EFC	SW	MIN	PAR	REH	REP	PERC	SOCC	MSE	EFR	KNW
Individual performance/ effectiveness (EFF)	0.94	0.75	4.75	0.82	**0.87**											
Individual performance/ efficiency (EFC)	0.96	0.87	4.66	0.90	0.88**	**0.93**										
Subjective workload (SW)	0.96	0.79	3.56	1.22	-0.12	-0.19**	**0.89**									
Mindfulness (MIN)	0.91	0.66	4.32	0.93	0.43**	0.41**	0.12	**0.81**								
Communicating in parallel (PAR)	0.92	0.84	3.39	1.18	-0.06	-0.04	0.33**	0.31**	**0.92**							
Rehearsing (REH)	0.93	0.73	4.90	1.20	0.07	0.04	0.05	0.41**	0.17*	**0.86**						
Reprocessing (REP)	0.91	0.72	3.45	0.97	0.03	0.04	0.17*	0.35**	0.52**	0.26**	**0.85**					
Perceived control/ personal (PERC)[+]	N/A	N/A	4.19	1.40	-0.01	-0.04	-0.11	0.12	-0.05	0.06	0.02	**N/A**				
Perceived control/ social (SOCC)[+]	0.79	0.49	3.82	1.19	0.00	0.03	-0.25**	-0.12	-0.07	-0.07	-0.19**	0.35**	**0.70**			
Multitasking self-efficacy (MSE)	0.89	0.67	5.49	0.96	0.29**	0.30**	-0.20**	0.19**	0.07	0.05	0.02	0.11	0.21**	**0.82**		
Effort (EFR)	0.84	0.64	5.57	0.93	0.28**	0.23**	0.07	0.33**	0.14*	0.17*	0.10	0.00	-0.12	0.31**	**0.80**	
Knowledge (KNW)	0.87	0.62	5.63	0.90	0.28**	0.25**	0.09	0.29**	0.08	0.12	0.03	-0.02	-0.14*	0.34**	0.51**	**0.79**

[a]The interruptions and message organization constructs are not included in this table because they are not reflectively measured constructs.
**Significant at $p < 0.01$; *Significant at $p < 0.05$.
[+]PERC and SOCC are the first-order dimensions of perceived control (PC).
Bold numbers on the diagonal show the square root of the AVE. Numbers below the diagonal represent latent variable correlations.

Appendix F

Outer Model Loadings and Cross-Loadings

Table F1. Survey Study

Item	SW	MIN	PERC	SOCC	MSE	EFR	KNW
SW1	**0.78**	-0.27	-0.19	-0.02	-0.36	-0.08	-0.23
SW3	**0.83**	-0.23	-0.15	-0.09	-0.33	-0.08	-0.22
SW5	**0.41**	0.05	-0.04	-0.15	-0.12	0.09	0.07
SW6	**0.83**	-0.14	-0.18	-0.14	-0.33	-0.02	-0.16
SW8	**0.82**	-0.25	-0.22	-0.11	-0.41	-0.16	-0.27
SW9	**0.83**	-0.17	-0.18	-0.16	-0.34	-0.14	-0.22
Min1	-0.16	**0.73**	0.18	-0.22	0.30	0.47	0.42
Min2	-0.11	**0.81**	0.21	-0.23	0.26	0.41	0.41
Min3	-0.25	**0.81**	0.18	-0.20	0.32	0.39	0.37
Min4	-0.16	**0.74**	0.21	-0.23	0.29	0.36	0.40
Min5	-0.16	**0.72**	0.17	-0.17	0.31	0.38	0.34
Min7*	-0.26	**0.58**	0.19	-0.04	0.29	0.33	0.39
PC2	-0.22	0.26	**N/A**	0.02	0.24	0.16	0.17
PC3*	-0.23	-0.01	0.11	**0.47**	0.23	0.10	0.09
PC4*	-0.06	-0.22	-0.05	**0.80**	-0.07	-0.24	-0.18
PC5*	-0.04	-0.22	-0.01	**0.82**	0.01	-0.07	-0.09
PC6*	-0.18	-0.17	0.08	**0.62**	0.03	-0.10	-0.10
MSE1	-0.30	0.29	0.21	-0.03	**0.73**	0.26	0.37
MSE3	-0.28	0.28	0.17	0.05	**0.82**	0.25	0.39
MSE4	-0.33	0.39	0.23	-0.01	**0.84**	0.33	0.43
MSE5*	-0.45	0.31	0.17	0.02	**0.81**	0.24	0.36
Efr1	-0.07	0.40	0.14	-0.15	0.24	**0.80**	0.38
Efr2	-0.10	0.42	0.12	-0.09	0.20	**0.70**	0.36
Efr3	-0.07	0.37	0.10	-0.10	0.30	**0.72**	0.37
Knw1	-0.23	0.39	0.16	-0.05	0.40	0.38	**0.77**
Knw3	-0.19	0.45	0.14	-0.19	0.38	0.42	**0.87**
Knw4	-0.19	0.48	0.15	-0.15	0.38	0.41	**0.87**
Knw5	-0.22	0.44	0.13	-0.07	0.43	0.44	**0.82**

*Reverse-coded item.

SW = subjective workload; MIN = mindfulness; PERC = perceived control/personal; SOCC = perceived control/social; MSE = multitasking self-efficacy; EFR = effort; KNW = knowledge.

Table F2. Diary Study

Item	EFF	EFC	SW	MIN	PAR	REH	REP	PERC	SOCC	MSE	EFR	KNW
Eff1	**0.92**	0.85	-0.09	0.37	-0.04	0.04	0.05	-0.02	-0.04	0.27	0.24	0.27
Eff2	**0.93**	0.85	-0.08	0.41	-0.04	0.05	0.01	0.01	0.04	0.29	0.29	0.29
Eff4	**0.55**	0.42	-0.14	0.27	-0.13	0.05	0.10	0.06	-0.04	0.11	0.15	0.09
Eff5	**0.94**	0.80	-0.13	0.44	-0.06	0.08	0.00	-0.05	0.00	0.31	0.27	0.27
Eff6	**0.94**	0.82	-0.11	0.39	-0.04	0.09	-0.01	-0.02	0.03	0.26	0.26	0.24
Efc1	0.80	**0.92**	-0.12	0.40	0.03	0.04	0.06	-0.08	-0.02	0.26	0.25	0.25
Efc2	0.85	**0.95**	-0.20	0.39	-0.05	0.03	0.05	-0.05	0.03	0.30	0.23	0.22
Efc3	0.81	**0.92**	-0.19	0.38	-0.05	0.05	0.00	-0.01	0.07	0.32	0.17	0.21
Efc4	0.82	**0.94**	-0.20	0.38	-0.08	0.02	0.04	-0.01	0.04	0.24	0.20	0.26
SW1	-0.12	-0.17	**0.88**	0.12	0.31	0.05	0.16	-0.08	-0.23	-0.17	0.08	0.10
SW3	-0.09	-0.16	**0.93**	0.13	0.31	0.04	0.16	-0.07	-0.21	-0.18	0.05	0.07
SW5	-0.14	-0.20	**0.94**	0.04	0.28	0.00	0.15	-0.13	-0.26	-0.25	0.05	0.05
SW6	-0.15	-0.18	**0.88**	0.07	0.31	0.02	0.18	-0.11	-0.16	-0.15	0.02	0.01
SW8	-0.12	-0.22	**0.90**	0.12	0.28	0.05	0.18	-0.12	-0.24	-0.21	0.09	0.08
SW9	-0.01	-0.08	**0.79**	0.15	0.26	0.14	0.10	-0.09	-0.21	-0.10	0.10	0.15
Min1	0.43	0.42	0.14	**0.85**	0.26	0.30	0.27	0.06	-0.13	0.18	0.23	0.35
Min2	0.40	0.39	0.09	**0.92**	0.28	0.36	0.29	0.16	-0.09	0.17	0.29	0.28
Min3	0.36	0.37	0.09	**0.92**	0.31	0.38	0.33	0.14	-0.07	0.19	0.31	0.22
Min4	0.38	0.34	0.13	**0.86**	0.31	0.38	0.37	0.06	-0.09	0.15	0.31	0.20
Min5	0.24	0.23	0.11	**0.80**	0.33	0.37	0.39	0.07	-0.10	0.15	0.24	0.18
Min7*	0.30	0.24	-0.03	**0.45**	-0.12	0.19	-0.04	0.13	-0.09	0.03	0.21	0.12
Par1	-0.06	-0.04	0.34	0.26	**0.94**	0.13	0.48	-0.04	-0.05	0.07	0.11	0.09
Par2	-0.06	-0.03	0.26	0.31	**0.90**	0.19	0.48	-0.04	-0.09	0.07	0.15	0.06
Reh1	0.07	0.04	-0.04	0.22	0.05	**0.82**	0.08	0.00	-0.06	0.10	0.19	0.15
Reh2	0.04	-0.01	0.08	0.34	0.16	**0.88**	0.13	0.02	-0.08	0.03	0.17	0.14
Reh3	0.02	0.02	0.03	0.38	0.18	**0.84**	0.37	0.08	-0.05	0.07	0.08	0.00
Reh4	0.07	0.02	0.10	0.34	0.11	**0.91**	0.15	0.01	-0.10	0.01	0.17	0.15
Reh5	0.10	0.07	0.03	0.42	0.19	**0.83**	0.32	0.12	0.00	0.04	0.14	0.12
Rep1	0.03	0.01	0.11	0.26	0.42	0.25	**0.84**	-0.02	-0.18	0.01	0.14	0.05
Rep2	0.08	0.08	0.21	0.35	0.48	0.22	**0.90**	0.05	-0.14	0.07	0.12	0.06
Rep3	-0.12	-0.10	0.09	0.14	0.24	0.29	**0.75**	-0.02	-0.18	-0.05	0.03	-0.04
Rep4	0.02	0.05	0.14	0.35	0.53	0.19	**0.90**	0.03	-0.17	-0.01	0.04	0.00
PC2	-0.01	-0.04	-0.11	0.12	-0.05	0.06	0.02	**N/A**	0.35	0.11	0.00	-0.02
PC3*	0.11	0.13	-0.27	-0.08	-0.06	-0.03	-0.14	0.19	**0.80**	0.32	0.03	0.00
PC4*	-0.03	-0.01	-0.08	-0.10	-0.06	-0.14	-0.23	0.29	**0.64**	0.00	-0.21	-0.16
PC5*	-0.12	-0.10	-0.14	-0.09	-0.05	-0.03	-0.18	0.32	**0.75**	0.06	-0.08	-0.18
PC6*	-0.06	-0.03	-0.10	-0.07	-0.03	-0.04	0.03	0.29	**0.61**	0.01	-0.26	-0.19
MSE1	0.15	0.14	-0.12	0.17	0.10	0.08	0.03	0.07	**0.03**	0.73	0.25	0.20
MSE3	0.26	0.25	-0.14	0.19	0.07	0.07	0.05	0.13	0.15	**0.86**	0.32	0.32
MSE4	0.31	0.29	-0.11	0.17	0.08	0.02	0.07	0.05	0.16	**0.85**	0.32	0.36
MSE5*	0.22	0.27	-0.26	0.11	0.02	0.03	-0.06	0.10	0.27	**0.83**	0.15	0.20
Efr1	0.28	0.24	0.10	0.31	0.11	0.10	0.03	-0.05	-0.11	0.27	**0.88**	0.47
Efr2	0.21	0.17	0.09	0.26	0.08	0.19	0.10	0.05	-0.07	0.25	**0.86**	0.43
Efr3	0.17	0.11	-0.05	0.20	0.16	0.13	0.13	0.03	-0.12	0.23	**0.64**	0.31
Knw1	0.14	0.15	-0.04	0.11	-0.03	0.07	0.00	-0.07	-0.03	0.31	0.35	**0.66**
Knw3	0.27	0.24	0.11	0.25	0.08	0.04	0.08	-0.01	-0.16	0.23	0.35	**0.85**
Knw4	0.24	0.21	0.08	0.25	0.03	0.17	-0.03	-0.03	-0.16	0.22	0.41	**0.88**
Knw5	0.20	0.19	0.08	0.26	0.15	0.12	0.03	0.04	-0.06	0.35	0.53	**0.75**

*Reverse-coded item.
SW = subjective workload; MIN = mindfulness; PERC = perceived control/personal; SOCC = perceived control/social; MSE = multitasking self-efficacy; EFR = effort; KNW = knowledge.

Appendix G

Validation Steps for E-Mail Interruptions Exposure

Step	Description of Validation Step/Result	Figures or Tables
1	Conducting two separate large-scale studies (survey study, n = 365; diary study, n = 212) that assess e-mail interruptions exposure, and replicating the results in both studies (external validity).	
2	Conducting an additional study that asked a smaller set of respondents to record their interruptions exposure using both a shorthand version of the main survey and a log to record each interruption (event-sampling design). Comparing the results of the two methods, we found that the measures of interruptions exposure were positively correlated and showed no significant differences.	Table G1 Table G2
3	Asking the main survey and diary respondents to answer the interruptions questions with care and to consult their e-mail in-boxes if necessary (82% of survey respondents reported storing most of their e-mails).	
4	Requiring the survey and diary respondents to allocate their estimates over primary/secondary e-mails, and—for the frequency measures—requiring the survey respondents to allocate their estimates over the set of primary selling activities they performed. This decomposition approach provides cues that coincide with the natural categories used by respondents to classify events, and thus helps them to better recall their interruption events (Menon 1997).	
5	Including a validation question that computes the total time spent on interruptions (frequency * average duration) based on the individual frequency/duration estimates for the past workweek (survey study) or workday (diary study). Respondents were allowed to adjust their individual estimates based on the total time estimate.	
6	Measuring indicator weights and finding all weights to be significant on their respective e-mail interruptions exposure constructs.	Figures G1 and G2
7	Measuring variance inflation factors (VIF) for the indicators and finding them to be below the stringent threshold of 3.33 (Cenfetelli and Bassellier 2009).	Table G3

Table G1. Description of Log Study Methodology

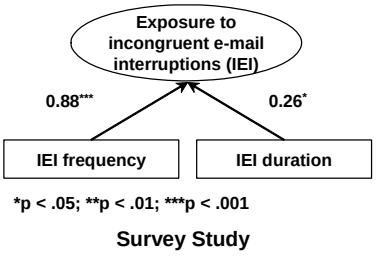
30 sales professionals completed a short online survey that included the e-mail interruptions questions from the main survey, and then completed an online log (that they were asked to print) to record all of their e-mail interruptions over a period of two workdays. The log was designed to be easy to use and minimally obstructive. It provided definitions of the key terms and asked participants to record each interruption event in a separate record by selecting the type of primary activity that was interrupted (prospecting; interacting; etc.), the type of e-mail interruption, and the start and end times of the interruption. Interruption frequency was calculated by averaging the total number of records of the two days, and duration was calculated by taking the average duration across the interruption occurrences. The responses collected through the two separate methods were correlated and tested for mean differences through a repeated measures t-test (see Table G2 for the results).

Table G2. Results of Log Study

	IEI Frequency		IEI Duration (min)		IEI Exposure		CEI Frequency		CEI Duration (min)		CEI Exposure	
	Survey	Log	Survey	Log	Survey	Log	Survey	Log	Survey	Log	Survey	Log
Mean	22.97	24.19	7.61	8.94	167.10	195.00	10.87	8.79	19.48	26.74	179.81	226.53
St Dev	14.31	9.21	5.03	8.36	180.83	132.88	5.43	4.28	21.93	11.78	143.66	162.77
Corr	0.462**		0.531**		0.771***		0.453**		0.733***		0.622***	
t-test	0.527		1.036		1.347		2.241*		2.602*		1.937	

*p < .05; **p < .01; ***p < .001

Notes: IEI = Incongruent e-mail interruptions; CEI = Congruent e-mail interruptions.



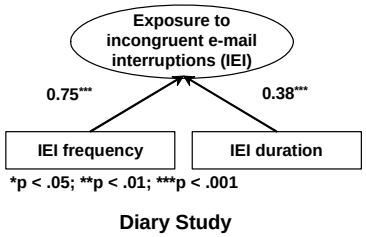
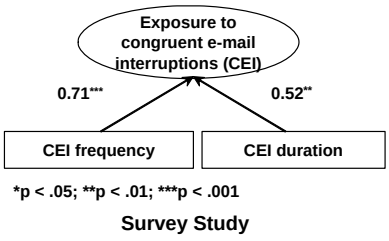


Figure G1. Indicator Weights of Exposure to Incongruent E-Mail Interruptions

Notes: IEI = Incongruent e-mail interruptions; CEI = Congruent e-mail interruptions.



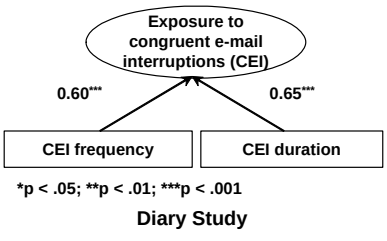


Figure G2. Indicator Weights of Exposure to Congruent E-Mail Interruptions

Notes: IEI = Incongruent e-mail interruptions; CEI = Congruent e-mail interruptions.

Table G3. Variance Inflation Factors for Exposure to Incongruent/Congruent E-Mail Interruptions

Components	VIF (Survey Study)	VIF (Diary Study)
CEI frequency	1.098	1.332
CEI duration		
IEI frequency	1.134	1.083
IEI duration		

Notes: IEI = Incongruent e-mail interruptions; CEI = Congruent e-mail interruptions.

Appendix H

Validation Steps for Individual Performance

Step	Description of Validation Step/Result	Figures or Tables
1	Ensuring through review of sales literature that the first-order constructs (efficiency/effectiveness) capture the content domain of the second-order construct (e.g., Jaramillo and Mulki 2008; Sujan et al. 1994).	
2	Establishing content validity via card-sorting analysis and pilot testing	
3	Ensuring that the indicators of efficiency and effectiveness (formatively measured in the survey study) cover the entire domain of sales activities (from prospecting to closing the sale; see Appendix A)	
4	Establishing the significance of path coefficients at the first-order level (survey study) and the second-order level (both studies, see Figure H1)	Figure H1
5	Measuring VIF at the first-order level (survey study) and the second-order level (both studies, see Table H1). With one exception, all values were below the stringent threshold of 3.33 (Cenfetelli and Bassellier 2009). VIF for effectiveness-efficiency in the diary study was 4.470. However, these dimensions were retained because they represent separate categories, as confirmed by the literature, the card sorting analysis, and the pre-tests.	Table H1

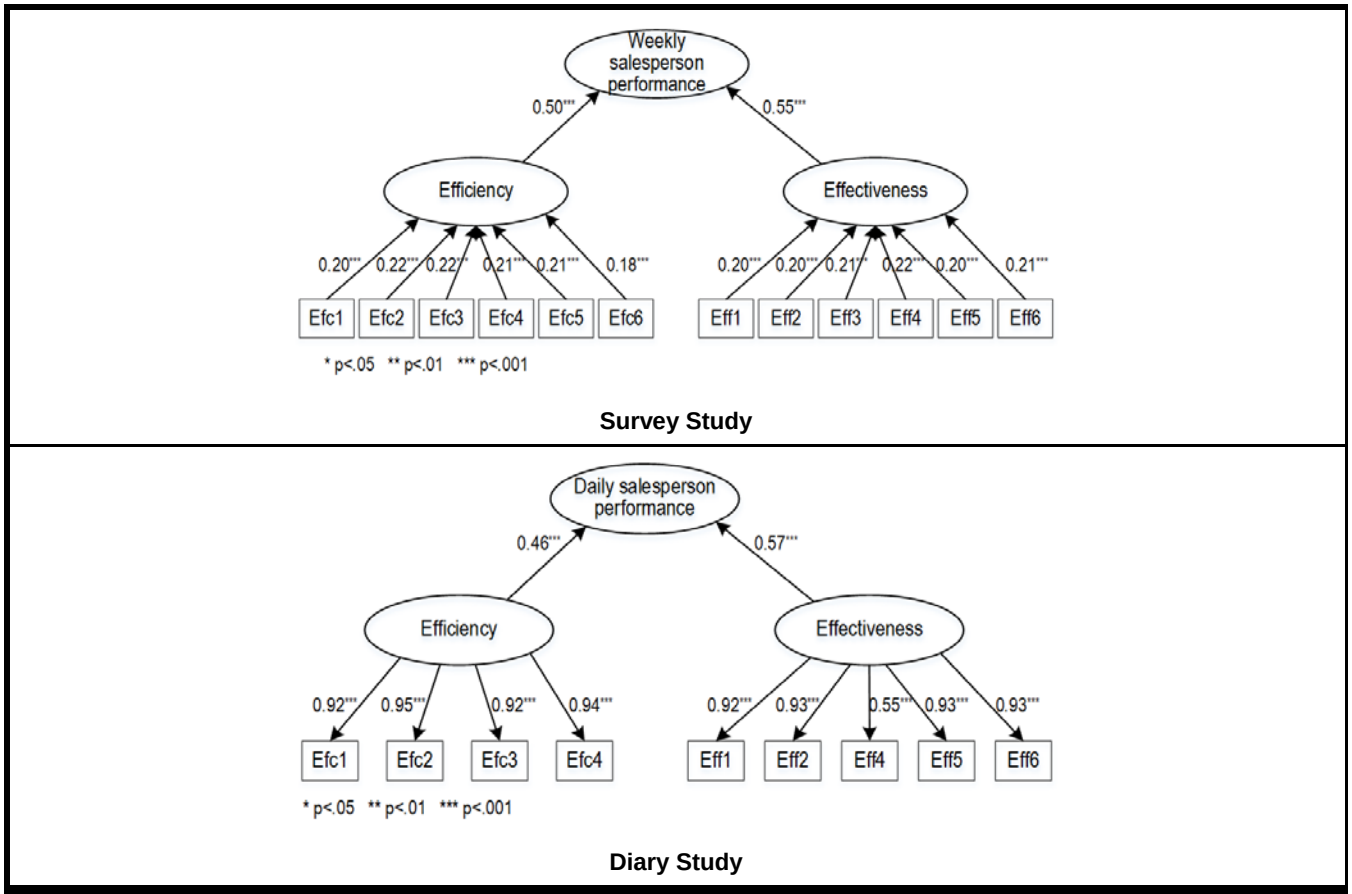


Figure H1. Path Coefficients of Individual Performance

Table H1. Variance Inflation Factors for Individual Performance		
Components	**VIF (Survey Study)**	**VIF (Diary Study)**
Efc1	1.854 - 2.332	N/A
Efc2		
Efc3		
Efc4		
Efc5		
Efc6		
Eff1	1.762 - 2.460	N/A
Eff2		
Eff3		
Eff4		
Eff5		
Eff6		
Efficiency	2.681	4.470
Effectiveness		

Appendix I

Fixed Effects, Random Effects, and Model Fit (Diary Study)

	Outcome		
	SW	**MIN**	**PERF**
Fixed Effects:			
Intercept	3.56*** (0.07)	4.32*** (0.06)	4.71*** (0.05)
IEI	0.19** (0.06)		-0.13** (0.05)
CEI	0.15* (0.06)	0.24*** (0.05)	0.16*** (0.05)
PAR	0.32*** (0.07)		
REP	0.03 (0.07)	0.21*** (0.05)	
REH	-0.02 (0.06)	0.27*** (0.05)	
LVE	0.13* (0.07)		
FOL	-0.03 (0.08)		
DEL	-0.22*** (0.07)		
SW			-0.21*** (0.05)
MIN			0.12* (0.05)
PC	-0.13* (0.06)	0.03 (0.05)	-0.03 (0.06)
MSE	-0.19*** (0.06)		0.10 (0.05)
KNW			0.07 (0.06)
EFR			0.06 (0.06)
Variance of Random Components:			
L1 variance (Residual)	0.567***	0.423***	0.324***
L2 variance	0.873***	0.426***	0.340***
Model Fit:			
R_1^2	0.123	0.089	0.036
R_2^2	0.254	0.321	0.339
Deviance	3249.5		
δDeviance	-1058.5***		

*p < .05; **p < .01; ***p < .001

IEI = incongruent e-mail interruptions (exposure); CEI = congruent e-mail interruptions (exposure); SW = subjective workload; MIN = mindfulness; PERF = individual performance; REP = reprocessing; REH = rehearsing; PAR = communicating in parallel; LVE = leaving messages in inbox; DEL = deleting messages; FOL = foldering messages; PC = perceived control; MSE = multitasking self-efficacy; EFR = effort; KNW = knowledge

Appendix J

Mediation Analyses

Table J1. Exposure to Incongruent E-Mail Interruptions and Individual Performance

	Survey Study			Diary Study		
Effect	**Est.**	**p-value[a]**	**CI[b]**	**Est.**	**p-value[a]**	**CI[c]**
Direct effect	-0.03	.522	[-0.16;0.05]	-0.13	.003	[-0.22;-0.05]
Indirect effect via subjective workload	-0.07		[-0.14;-0.01]	-0.04		[-0.07;-0.01]
Total effect	-0.09	.061	[-0.20;-0.02]	-0.16	<.001	[-0.24;-0.08]

[a]For the indirect effects, we do not provide a formal p-value since significance is based on the confidence interval.

[b]CI = bias corrected 95% confidence interval (5000 bootstrap samples).

[c]CI = 95% confidence interval estimated using the Monte Carlo method (10000 bootstrap samples).

Table J2. Exposure to Congruent E-Mail Interruptions and Individual Performance

	Survey Study			Diary Study		
Effect	**Est.**	**p-value[a]**	**CI[b]**	**Est.**	**p-value[a]**	**CI[c]**
Direct effect	-0.04	.567	[-0.11;0.13]	0.16	<.001	[0.07;0.25]
Specific indirect effect via subjective workload	-0.01		[-0.04;0.00]	-0.03		[-0.06;-0.01]
Specific indirect effect via mindfulness	0.02		[0.01;0.04]	0.03		[0.01;0.05]
Total indirect effect	0.01		[-0.03;0.03]	0.00		[-0.04;0.03]
Total effect	-0.03	.700	[-0.11;0.14]	0.14	.001	[0.08;0.21]

[a]For the indirect effects, we do not provide a formal p-value since significance is based on the confidence interval.

[b]CI = bias corrected 95% confidence interval (5000 bootstrap samples).

[c]CI = 95% confidence interval estimated using the Monte Carlo method (10000 bootstrap samples).

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