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The Challenging and Hindering Potential of Time Pressure: Qualitative Job Demands as Suppressor Variables

Miriam Schilbach¹ · Verena C. Haun² · Anja Baethge³ · Thomas Rigotti^{1,4}

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Abstract

This study aims at resolving the inconsistent findings regarding the effects of time pressure on work engagement and personal resources by considering time pressure's qualitative sources. Specifically, using the notion of statistical suppression, we argue that qualitative challenge and hindrance demands operate as suppressor variables and thus determine whether time pressure itself exerts a challenging or hindering potential. To test our assumptions, we conducted a daily diary study over the course of one workweek in a sample of 396 employees. We tested our hypotheses at the day-level. Results of multilevel structural equation modeling revealed that when controlling for qualitative challenge demands, time pressure positively related to exhaustion, but negatively related to work engagement and self-esteem. Suppression was significant. In contrast, when controlling for qualitative hindrance demands, time pressure was unrelated to work engagement, negatively related to self-esteem, and positively related to exhaustion, whereby qualitative hindrance demands did not act as a suppressor variable at the day-level. Additional analyses revealed that qualitative challenge and hindrance demands operated as suppressor variables at the person-level. In summary, when qualitative challenge demands were controlled for, time pressure operated as a hindrance demand. Yet, when qualitative hindrance demands were controlled for, time pressure operated as a challenge demand at the person-level. Our findings outline the need to account for the quality of work when assessing time pressure's effects and further highlight the relevance of suppressor variables within the field of occupational health psychology.

Keywords Time pressure · Challenge-hindrance framework · Suppressor variables · Emotional exhaustion · Work engagement · Self-esteem

Up to 53% of the European workforce state to work under time pressure “often” or “always” (see Eurostat, 2019). Similar observations were made in the USA (e.g., Carroll, 2008). Given this high prevalence and thus time pressure's potential to affect millions of employees, it is essential to comprehend time pressure's effects on employee well-being and engagement. Yet, scientific investigations yield heterogeneous relationship patterns: While some studies outlined

time pressure's positive relationship with strain as well as work engagement and personal resources such as self-esteem (Baethge et al., 2018; Prem et al., 2017; Schaufeli et al., 2008; Widmer et al., 2012), others depict its positive relationship with strain, but negative relationship with work engagement (Baethge et al., 2018; Kunzelmann & Rigotti, 2021).

Researchers previously illustrated that contextual factors such as job resources (Kühnel et al., 2012) or task illegitimacy (A. Schmitt et al., 2015) as well as time pressure's cognitive appraisal (Liu & Li, 2018; Webster et al., 2011) may provide explanations for the described heterogeneity. However, there exists another seemingly evident, yet rarely considered explanation: The qualitative sources of time pressure determine whether time pressure has positive or negative effects on engagement and personal resources. Per definition, time pressure occurs if there is insufficient time to accomplish work tasks (Ohly & Fritz, 2010). Hence, work tasks represent a source of time pressure which in turn

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encompass qualitatively distinct demands such as complexity or hassles (Drach-Zahavy & Freund, 2007; van Veldhoven et al., 2014). Drawing on the challenge-hindrance framework (Cavanaugh et al., 2000), we argue that contingent upon the source of time pressure, time pressure's effects can be challenging (i.e., positive effects on engagement, self-esteem, and emotional exhaustion) or hindering (i.e., negative effects on engagement and self-esteem and positive effects on emotional exhaustion). To better comprehend the differential effects of time pressure based on its qualitative sources, we use the notion of statistical suppression (MacKinnon et al., 2000) and thus hypothesize that time pressure will exert a challenging or hindering potential depending on what qualitative sources (i.e., qualitative challenge or hindrance demands) are controlled for. We test our hypotheses at the within-person level (i.e., at the day-level). We do so to ensure time-coupling of demands, that is, the occurrence of demands within the same time frame. This is essential given that our assumptions are based on the premise that qualitative challenge and hindrance demands represent sources of time pressure and thus, demands need to occur simultaneously.

Our study makes three core contributions. First, through disassembling time pressure and its qualitatively distinct sources, we add to the understanding of time pressure within the challenge-hindrance framework. By doing so, we accentuate the interrelatedness between the quantity and the quality of work and offer a novel perspective to the ongoing discussion of when time pressure acts as a challenge and when it acts as a hindrance demand (Baethge et al., 2018; Prem et al., 2017; A. Schmitt et al., 2015). Relatedly, by assessing the role of qualitative demands, we can provide specific implications on how to adjust work conditions such that time pressure may exert less detrimental and more beneficial effects.

Second, we contribute to the refinement and the predictive value of the challenge hindrance framework. Specifically, by distinguishing between qualitative and quantitative demands within the challenge-hindrance framework and by suggesting that qualitative demands may be a source of time pressure (i.e., a quantitative demand), we propose that there exists an interrelatedness between prototypical challenge and hindrance demands. This holds important implications for the theoretical advancement of the challenge-hindrance framework (M. A. LePine, 2022).

Third, the assumption that time pressure will only exhibit a clear challenging or hindering effect when controlling for either qualitative challenge or hindrance demands implies that qualitative demands act as suppressor variables (i.e., variables which strengthen the magnitude of the regression coefficient of another variable, e.g., MacKinnon et al., 2000). To date, suppressor variables remain scarcely integrated in the development of research questions and theoretical

considerations (David & Holladay, 2015; Widmer et al., 2012). However, failing to include relevant suppressor variables may lead to distorted relationship patterns and hence less accurate implications for theory and practice (Maassen & Bakker, 2001; Spector, 2021). With this study, we contribute to raising awareness regarding the presence and relevance of suppression within the field of occupational health psychology (see also Spector, 2021).

The Challenge-Hindrance Framework

To provide an explanation for heterogeneous findings regarding the effects of job demands on job performance or job satisfaction, Cavanaugh et al. (2000) developed the challenge-hindrance framework and suggested that there exist two different demand types: challenge and hindrance demands. Both demands require an investment of efforts and thus should positively relate to strain (Cavanaugh et al., 2000; Crawford et al., 2010). However, only challenge demands entail the potential for mastery, goal attainment, and personal development (e.g., Cavanaugh et al., 2000; Crane & Searle, 2016; Schilbach et al., 2021). In contrast, hindrance demands represent obstacles to goal attainment, relate to feelings of frustration, and threaten personal development (Cavanaugh et al., 2000; Crane & Searle, 2016). Hindrance demands must be overcome such that employees can continue working towards goals. They are frequently perceived as uncontrollable and as illegitimate or unnecessary aspects of the job (Crawford et al., 2010; Kern et al., 2021).

It is these characteristics of challenge and hindrance demands that lead to the assumption that challenge demands positively relate to employees' work motivation and personal resources, whereas hindrance demands are expected to have the opposite effect. Within the literature strand of the challenge-hindrance framework, such differential effects are commonly depicted by drawing on the concepts of work engagement (e.g., Crawford et al., 2010; J. A. LePine et al., 2005) and self-esteem (e.g., Kern et al., 2021; Kim & Beehr, 2020; Widmer et al., 2012). While the former represents a positive, fulfilling, work-related state of mind which is characterized by vigor (i.e., high levels of energy while working), dedication (i.e., being strongly involved in one's work, experiencing significance and enthusiasm), and absorption (i.e., being fully immersed in one's work; Schaufeli et al., 2006), the latter refers to one's positive self-evaluation (Semmer, Jacobshagen et al., 2007) and represents a high personal goal for most individuals (Leary, 1999; Semmer, Jacobshagen et al., 2007). Consequently, in this study, we likewise draw on the concepts of work engagement and self-esteem to examine the challenging and hindering potentials of time pressure.

Prototypical Challenge and Hindrance Demands

Researchers have identified time pressure (i.e., “the extent to which employees feel they have insufficient time to finish their work tasks”; Ohly & Fritz, 2010, p. 544), complexity (i.e., a condition that requires novel approaches to problems and the employee to use a set of high-level skills; Chung-Yan, 2010; Giebe & Rigotti, 2022), and responsibility (i.e., increased visibility and the opportunity to make an impact; McCauley et al., 1994) as prototypical challenge demands. In contrast, role conflict (i.e., pressures that occur in one role are incompatible with pressures arising in another role; Greenhaus & Beutell, 1985), daily hassles (i.e., events that make individuals aware of the situation that their goals will be more difficult or impossible to achieve; O'Connor et al., 2008), and red tape (i.e., unnecessary rules or procedures that relate to problems of compliance; Bozeman, 1993) have been identified as prototypical hindrance demands (Cavanaugh et al., 2000; Crawford et al., 2010; J. A. LePine et al., 2004).

Empirical evidence supports the classification of complexity and responsibility as challenge demands. Next to reporting positive relationships with employee strain (e.g., Kunzelmann & Rigotti, 2021), studies also found positive relationships with work engagement (e.g., Christian et al., 2011; Karatepe et al., 2014), self-esteem (e.g., Kim & Beehr, 2020), thriving (e.g., Kunzelmann & Rigotti, 2021; Prem et al., 2017), or resilience (e.g., Kunzelmann & Rigotti, 2021). In contrast, as outlined earlier, time pressure’s classification as a challenge demand has been controversially discussed, considering that researchers consistently report a straining effect (e.g., Crawford et al., 2010; Prem et al., 2018); however, relationship patterns with outcomes such as work engagement (e.g., Baethge et al., 2018; Schaufeli et al., 2008) or self-esteem (e.g., Kim & Beehr, 2020; Widmer et al., 2012) are diverse and may be positive, non-significant, or negative.

Regarding identified hindrance demands, empirical evidence provides much support for their classification and outlines their straining potential (Crawford et al., 2010; Podsakoff et al., 2007) as well as their negative relationships with work engagement (e.g., Breevaart & Bakker, 2018; Crawford et al., 2010), self-esteem (e.g., Kern et al., 2021), resilience (e.g., Crane & Searle, 2016), performance (e.g., J. A. LePine et al., 2005), or job satisfaction (e.g., Podsakoff et al., 2007).

Quantitative and Qualitative Demands Within the Challenge-Hindrance Framework

One aspect, which is not accounted for within the challenge-hindrance framework, is that there also exists the distinction between quantitative and qualitative demands (e.g., van Veldhoven, 2014; van Yperen & Hagedoorn, 2003; Zapf

et al., 2014). While the former constitute those elements of the work that concern the amount and speed of work (e.g., time pressure), the latter pertain to the type of skill and/or effort needed to perform work tasks (e.g., van Veldhoven, 2014; Zapf et al., 2014). Specifically, qualitative demands refer to conditions that consist of complexity, responsibility, or ambiguity as well as conditions which are characterized by emotional demands (Drach-Zahavy & Freund, 2007; Kinnunen et al., 2017; Zapf et al., 2014).

Researchers commonly report positive correlations between quantitative and qualitative demands at the day- and the person-level, indicating that these demands co-exist (e.g., Giebe & Rigotti, 2022; Kunzelmann & Rigotti, 2021). This seems evident considering that quantitative demands only hold information on the amount of work; however, any amount of work is characterized by different qualitative components (i.e., qualitative demands). Fittingly, Zapf et al. (2014) state that quantitative and qualitative demands are difficult to separate and van Veldhoven et al. (2005) suggest that quantitative demands should be contrasted with qualitative ways in which a job may require effort.

When revisiting the prototypical challenge and hindrance demands introduced earlier, it becomes evident that only time pressure classifies as a quantitative demand, whereas the other demands (i.e., complexity, responsibility, role conflict, daily hassles, and red tape) represent qualitative demands (e.g., Drach-Zahavy & Freund, 2007; van Yperen & Hagedoorn, 2003). Accordingly, henceforth, we refer to these demands as qualitative challenge and qualitative hindrance demands, whereby complexity and responsibility conjointly represent qualitative challenge demands and role conflict, daily hassles, and red tape are combined to indicate qualitative hindrance demands (for a similar approach see e.g., Crane & Searle, 2016; Rodell & Judge, 2009). Taking into account that quantitative and qualitative demands are interrelated and difficult to separate (e.g., Kim & Beehr, 2020; Zapf et al., 2014), we suggest that considering the role of qualitative demands in the experience of time pressure (i.e., a quantitative job demand) is essential to comprehend time pressure’s challenging and hindering potential.

Time Pressure: a Challenge or a Hindrance Demand?

As a quantitative demand, time pressure contains information on the amount of work (Ohly & Fritz, 2010; van Veldhoven et al., 2014). The absence of time pressure may relate to a lack of work tasks and feelings of boredom (e.g., A. Schmitt et al., 2015), whereas the presence of time pressure may not only be straining but potentially also activate employees and trigger challenge-related experiences (i.e., mastery, engagement, success, and personal growth, e.g.,

J. A. LePine et al., 2005; van Yperen & Hagedoorn, 2003; Widmer et al., 2012).

We argue that whether time pressure unfolds a challenging potential is contingent upon its qualitative sources (i.e., qualitative demands). Consider the following example: On a given workday, Emma, a research associate, must conduct complex statistical analyses as part of a research paper. Analyses need to be conducted timely given that the submission deadline for the paper is fast approaching. First, Emma attempts to comprehend the principles behind the analytic procedures (i.e., complexity). Throughout this process, she finds out that she needs a specific statistics software to conduct the analyses which she has not yet installed on her computer. To gain access to the software, Emma needs her supervisor's approval and must hand in a form to the finance department such that they can purchase the program for her. Going through this process, Emma has hassles and red tape to overcome: Her supervisor has a tight schedule, so it takes multiple attempts to get hold of her. Further, when handing in her request to the finance department, Emma finds out that she needs to check with the IT department first to make sure that installing the statistics program is nonhazardous. So, Emma needs longer than expected to obtain all the relevant information before she can finalize her request and obtain access to the program. At the end of the workday, Emma takes part in our survey and indicates that she experienced time pressure. Will Emma's time pressure have a challenging or hindering effect?

Considering that both qualitative challenge (i.e., complexity) and hindrance demands (i.e., daily hassles and red tape) were the sources of Emma's time pressure, we would expect only a weak relationship between time pressure and work engagement as well as self-esteem. This is due to the premise that challenging and hindering experiences operate in opposite directions regarding engagement and self-esteem (e.g., Crawford et al., 2010; Kern et al., 2021). However, we propose that time pressure exhibits clear and significant challenging or hindering effects when either qualitative challenge or hindrance demands are controlled for. This indicates that we hypothesize qualitative job demands to act as suppressor variables, whereby a suppressor variable is one which strengthens the magnitude of the regression coefficient of another variable (MacKinnon et al., 2000; Spector, 2021). That is, we expect that controlling for qualitative challenge or hindrance demands will result in respectively negative and positive relationships between time pressure and work engagement/self-esteem and that these effects will be significantly stronger compared to those obtained from a model where qualitative demands are not included.

When controlling for qualitative challenge demands, the challenging sources of time pressure are suppressed, and qualitative hindrance demands represent a source of time pressure. Such qualitative hindrance demands are likely

associated with lower controllability (e.g., Emma cannot control whether she can get hold of her supervisor) and decrease the chances of goal attainment while increasing the risk of failure (e.g., being unable to submit the research paper on time; see e.g., Crawford et al., 2010). This may diminish employees' beliefs that an investment of resources will lead to desirable outcomes, resulting in passive coping styles (e.g., withdrawal or rationalization) and consequently decreased work engagement (Cavanaugh et al., 2000; Crawford et al., 2010). Moreover, according to the stress-as-offence-to-self perspective (SOS; Semmer et al., 2007a), the experience of success or failure in coping with job demands directly impacts employees' levels of self-esteem. Hindrance demands represent barriers to goal attainment, decrease chances of success, and thus increase the risk of failure (e.g., Cavanaugh et al., 2000; O'Connor et al., 2008). This may result in negative self-evaluations and thus lower levels of self-esteem (e.g., due to the hassles experienced, Emma may have been unable to make any significant progress toward her goal which may result in feelings of failure and frustration; Kern et al., 2021; Semmer et al., 2007a). Hence, when controlling for qualitative challenge demands, time pressure is expected to act as a hindrance demand indicated by negative relationships with work engagement and self-esteem.

In contrast, when controlling for qualitative hindrance demands, qualitative challenge demands remain and represent a source of time pressure. The presence of these qualitative challenge demands likely relates to the experience of mastery and success (e.g., Emma understands a complex statistical procedure; Cavanaugh et al., 2000; Crawford et al., 2010) and personal gains (e.g., obtaining knowledge which may be helpful in future situations; Kunzelmann & Rigotti, 2021; Prem et al., 2017). Given the possibility for and anticipation of such desirable outcomes, employees will more likely adopt active, problem-focused coping styles and as a result experience increased work engagement (e.g., Crawford et al., 2010; Macey & Schneider, 2008). Additionally, in case of Emma, gaining knowledge and understanding a complex analytic procedure under time pressure may be a source of pride, should positively relate to the experience of success as well as positive self-evaluations, and thus — according to SOS — likely enhances self-esteem (Kern et al., 2021; Semmer et al., 2007a; Widmer et al., 2012). Hence, we derive the following hypotheses:

H1: Qualitative challenge demands act as a suppressor variable regarding the relationship time pressure has with (a) work engagement and (b) self-esteem. When daily qualitative challenge demands are controlled for, daily time pressure will negatively relate to daily work engagement and daily self-esteem.

H2: Qualitative hindrance demands act as a suppressor variable regarding the relationship time pressure has with (a) work engagement and (b) self-esteem. When daily qualitative hindrance demands are controlled for, daily time pressure will positively relate to daily work engagement and daily self-esteem.

Irrespective of whether qualitative challenge or hindrance demands are the sources of time pressure, time pressure qualifies as a job demand. Job demands require sustained physical or mental effort (see also the job demands-resources model by Demerouti et al., 2001). As a result, they relate to energy depletion processes that are associated with psychophysiological costs which leaves employees feeling strained (Crawford et al., 2010; Demerouti et al., 2001). This depletion process is well established, and there is much empirical evidence to support the positive relationship between demands and strain outcomes (e.g., Demerouti et al., 2001; Guthrie et al., 2020; Prem et al., 2018). Returning to our example, to address time pressure, Emma may increase her work speed and/or working hours. These additional efforts likely deplete energy resources and — in case of prolonged working hours — may further inhibit recovery, leaving Emma to feel increasingly strained at the end of the day (see e.g., Baethge et al., 2019).

To operationalize strain, we draw on the concept of emotional exhaustion, that is, the experience of excessive emotional stress and a depletion of emotional resources (Maslach, 1993). Earlier research supports the proposed line of argumentation and illustrated that time pressure and emotional exhaustion are positively related at the day-level (e.g., Giebe & Rigotti, 2022; Prem et al., 2018). Hence, we derive the following hypothesis:

H3: On days when employees experience more time pressure, they report higher levels of emotional exhaustion.

Method

Procedure and Sample

Between January and April 2018, we invited 180 German organizations to participate in our study. In return for participation, we offered organizations parts of a psychological risk assessment which is a mandatory procedure in Germany. After consent from executive boards and the workers' council, 13 organizations agreed to participate. Acquisition of participants within the organizations took place through informative meetings, emails, and intranet posts. Participation was voluntary and employees had to work at least 20 h per week to be eligible for participation. Once registered, employees received a link to an initial questionnaire where

they provided information on sociodemographic variables. Following, employees participated in a daily diary over the course of one workweek. Participants were asked to fill out two daily questionnaires at the end of the workday and before going to bed.¹

Out of the 577 employees who registered for the study, 572 filled out the initial questionnaire. We excluded 176 individuals for either of the following reasons: participants reported to work less than 20 h per week (inclusion criterion), or participants failed to fill out at least two consecutive workdays (e.g., Monday and Tuesday) of the daily diary at the correct time. Obtaining data on consecutive workdays was essential given that to test day-level hypotheses, we controlled for outcome variables at the previous workday.

Thus, our final sample consisted of 396 employees who provided data on 1045 workdays. Approximately two-thirds of participants were female (66.5%), the average age was 41.36 years ($SD = 11.68$) and 78.7% of participants were either married or in a relationship. Moreover, 33.3% of participants held a university degree, 43.5% had completed an apprenticeship and 1.0% had no professional training. On average, participants worked for 40.02 h per week ($SD = 7.16$ h) and 27.7% held a leadership position. Our sample consisted of knowledge workers who mainly worked in the financial, the public (e.g., revenue office), and the service sector (e.g., an engineering company). Accordingly, job titles reported by participants included engineer, referee, administrator, accountant, civil servant, lawyer, or consultant.

Measures

We assessed all constructs daily and in German. Descriptive information are reported in Table 1; a list of all items is included in the supplemental material.

Constructs Assessed at the End of the Workday

Time Pressure We used two items developed by Rodell and Judge (2009) to measure time pressure. Items were “Today, I have experienced severe time pressures in my work” and “Today, it has been difficult to accomplish the volume of work in the allocated time.” We confirmed the validity of the scale with an additional cross-sectional data collection ($N = 105$ employees) which revealed that the two-item measure highly correlated ($r = 0.74$, $p < 0.001$) with the widely used and validated time pressure scale of the Instrument of

¹ Please note that this study was part of a larger research project. In the supplemental material, we have included further information on the project (page 10) as well as an anonymized data transparency table (page 11, Table S5).

Table 1 Descriptive information and zero-order correlations

	<i>M(SD)</i>	α_w	α_b	ICC(1)	1	2	3	4	5	6
1. Time pressure	2.65 (1.18)	.72	.95	.55		.37**	.31**	.21**	-.01	-.13**
2. Qualitative challenge demands	3.38 (0.93)	-	-	.59	.62**		.20**	-.03	.31**	.07
3. Qualitative hindrance demands	2.02 (0.73)	-	-	.62	.49**	.40**		.21**	-.12*	-.16**
4. Emotional exhaustion	2.19 (1.07)	.66	.88	.67	.34**	-.04	.35**		-.39**	-.25**
5. Work engagement	3.04 (0.83)	.87	.95	.61	.05	.43**	-.17*	-.55**		.38**
6. Self-esteem	4.48 (0.53)	.54	.82	.50	.06	.34**	-.16*	-.54**	.63**	

Correlations below the diagonal are between-person correlations; correlations above the diagonal are within-person correlations. ICC(1)=variance between persons/(variance between persons + variance within persons), α_w =Cronbach's alpha at within person level, α_b =Cronbach's alpha at between person level. As suggested by Eisinga et al. (2013), for the two-item scale of time pressure, the Spearman Brown coefficient is reported. We do not report reliability indicators for qualitative challenge and hindrance demands as the scales encompass distinct demands that do not necessarily occur within one workday. Thus, parameters such as Cronbach's alpha do not represent adequate reliability indicators (see N. Schmitt, 1996; Taber, 2018)

* $p < .05$. ** $p < .01$

Stress-related Task Analysis (ISTA; Semmer et al., 1999). Further, the two-item measure and the ISTA scale exhibited similar relationship patterns with relevant outcome variables.²

Qualitative Challenge Demands To measure qualitative challenge demands, we used the four items of the challenge demand scale developed by Rodell and Judge (2009) that assess qualitative job aspects (i.e., items that refer to the complexity and responsibility of the workday and not to the amount or speed of work). An example item was “Today, my job has required me to use a number of complex or high-level skills.”

Qualitative Hindrance Demands We used six of the eight qualitative hindrance demand items developed by Rodell and Judge (2009) to measure qualitative hindrance demands. Including all eight items resulted in an unsatisfactory model fit ($\chi^2(32) = 171.36$, $p < 0.001$; $CFI = 0.84$, $TLI = 0.73$, $AIC = 22,851.96$, $RMSEA = 0.07$). Excluding the items that measure role ambiguity — one of which needs to be recoded — significantly improved model fit and resulted in good fit indices ($\chi^2(12) = 39.00$, $p < 0.001$; $CFI = 0.95$, $TLI = 0.88$, $AIC = 17,088.14$, $RMSEA = 0.05$) (see also Crane & Searle, 2016 or Tuckey et al., 2015 who report similar procedures). Thus, for hypotheses testing, we included six items. An example item was “Today, I have had many hassles to go through to get projects/assignments done.”

For all demands, participants provided their answers on a scale from 1 (*disagree*) to 5 (*agree*). Please note that we do not report reliability indicators for qualitative challenge and hindrance demands. The scales encompass distinct demands that may not necessarily occur in conjunction within one workday (or a workweek). Thus, parameters such as Cronbach's alpha do not represent adequate reliability indicators (see N. Schmitt, 1996; Taber, 2018).

Finally, to examine if time pressure and qualitative challenge and hindrance demands represent separate factors, we performed multilevel confirmatory factor analysis (MCFA). A three-factor model consisting of time pressure, qualitative challenge, and qualitative hindrance demands ($\chi^2(102) = 418.32$, $p < 0.001$; $CFI = 0.92$, $TLI = 0.89$, $AIC = 51,729.70$, $RMSEA = 0.04$) fit our data significantly better than a two-factor model where time pressure and qualitative challenge demands constituted one and qualitative hindrance demands the second factor ($\chi^2(106) = 1019.95$, $p < 0.001$; $CFI = 0.76$, $TLI = 0.70$, $AIC = 52,330.15$, $RMSEA = 0.07$), a two-factor model where qualitative challenge demands constituted one and time pressure and qualitative hindrance demands constituted the second factor ($\chi^2(106) = 761.21$, $p < 0.001$; $CFI = 0.83$, $TLI = 0.78$, $AIC = 52,120.56$, $RMSEA = 0.06$) as well as a single-factor model ($\chi^2(108) = 1347.70$, $p < 0.001$; $CFI = 0.67$, $TLI = 0.60$, $AIC = 52,776.72$, $RMSEA = 0.08$).

Self-Esteem Given that we asked participants about their momentary self-esteem, we assessed self-esteem after work to ensure that it would be work-related experiences (and not for example family-related experiences) which affect self-evaluation. We used three items from the Rosenberg self-esteem scale (Eatough et al., 2016; Rosenberg, 1989). An example item was “At the moment, I feel I have a number of good qualities.” Answers were provided on a scale from 1 (*disagree*) to 5 (*agree*).

² The two-item measure (TP1; Rodell & Judge, 2009) and the five-item ISTA scale (TP2; Semmer et al., 1999) almost identically related to work engagement (TP1: $r = -.12$, $p = .251$; TP2: $r = -.10$, $p = .317$), self-esteem (TP1: $r = -.22$, $p = .024$; TP2: $r = -.25$, $p = .011$), and emotional exhaustion (TP1: $r = .53$, $p < .001$; TP2: $r = .52$, $p < .001$).

Constructs Assessed Before Participants Went to Sleep

Work Engagement We measured work engagement using the nine-item short version of the Utrecht Work Engagement Scale (Schaufeli et al., 2006). A sample item was “Today, I was immersed in my work”. Participants provided their answers on a scale from 1 (*disagree*) to 5 (*agree*).

Emotional Exhaustion We assessed emotional exhaustion using a three-item short version of the Maslach Burnout Inventory (Kinnunen et al., 2014; Maslach & Jackson, 1986). A sample item was “I feel burned out from my job.” Participants indicated their answers on a scale from 1 (*disagree*) to 5 (*agree*).

Analytic Procedure

Following, we elaborate our analytic procedure in two steps: First, we describe our use of multilevel structural equation modeling (MSEM). Second, we briefly outline the concept behind suppressor variables and how we tested the presence of suppression. We conducted all analyses using Mplus V8 (Muthén & Muthén, 2017).

Analytic Procedure for Hypothesis Testing

Given the nested data structure resulting from daily diary designs (i.e., days nested within individuals), we tested our hypotheses using MSEM while including autoregressive effects at the day-level (Hamaker & Grasman, 2014; Preacher et al., 2010, 2011; Zhang et al., 2009). MSEM decomposes the variance of variables into their within- and between-person components and allows researchers to simultaneously conduct analyses at both levels (Preacher et al., 2010, 2011; Zhang et al., 2009). Moreover, unlike other multilevel methods, MSEM does not assume that within- and between-person effects are equal (Preacher et al., 2010), a critical prerequisite to examine potential differences of effects at the different analytic levels which we did as part of our additional analyses. Further, MSEM corrects for the sampling error which results from aggregating within-person variables to form between-person constructs (Lüdtke et al., 2011; Marsh et al., 2009).

Suppressor Variables

A suppressor variable is one which increases the predictive validity of another variable by its inclusion in the regression equation (Conger, 1974), whereby predictive validity refers to the magnitude of the regression coefficient. Thus, in case of suppression, the magnitude of the relationship between the independent and dependent variable increases when the suppressor variable is added to the regression

equation (MacKinnon et al., 2000; Martinez Gutierrez & Cribbie, 2021). In our study, we expected qualitative challenge and hindrance demands to act as suppressor variables regarding the relationship between time pressure and work engagement as well as time pressure and self-esteem. To test these assumptions, we used an iterative approach where we included only time pressure to the regression equation (Model 1) and then added qualitative challenge (Model 2a) or hindrance demands (Model 2b) as predictor variables (see Widmer et al., 2012 for a similar approach). Hence, while in Model 1, the qualitative sources of time pressure are not accounted for, and in Model 2a, the challenge-related sources of time pressure are suppressed which should render time pressure into a demand that acts as a hindrance demand. In contrast, in Model 2b, the hindrance-related sources of time pressure are suppressed which should render time pressure into a demand that exhibits challenge-related relationship patterns. Following, drawing on Ludlow and Klein (2014, page 9, Eq. 7), we assessed if the absolute value of the estimate obtained from Model 2 (a/b) would be significantly larger than the absolute value obtained from Model 1. If this is the case, there exists significant suppression (see e.g., Ludlow & Klein, 2014; MacKinnon et al., 2000).

Results

Variance Composition and Preliminary Analyses

To analyze variance composition at the day- and person-level, we examined intraclass correlations (ICCs(1)). ICCs(1) ranged between 0.50 and 0.67 (see Table 1), indicating that between 33 and 50% of the included variables' variance was day-level variance. Means, standard deviation, and zero-order correlations at the day- and person-level are presented in Table 1. The positive correlations between qualitative challenge and hindrance demands as well as time pressure at the day- and the person-level provide first support for our assumption that qualitative and quantitative job demands coexist and that qualitative job demands may shape employees' experience of time pressure.

Hypotheses Testing

Table 2 depicts the relationship between time pressure and work engagement with and without the control of qualitative job demands. In Model 1, where only time pressure was included, time pressure was unrelated to work engagement at the day-level ($\beta = -0.01$, $SE = 0.04$, $p = 0.735$). When adding qualitative challenge demands (i.e., Table 2, Model 2a), the relationship between time pressure and work engagement at the day-level became negative and significant ($\beta = -0.15$, $SE = 0.04$, $p < 0.001$). Further, compared to Model 1, the

Table 2 Relationship between time pressure and work engagement with and without the control of qualitative challenge and hindrance demands

	Model 1			Model 2a			Model 2b		
	β (SE)	<i>B</i> (SE)	<i>p</i>	β (SE)	<i>B</i> (SE)	<i>p</i>	β (SE)	<i>B</i> (SE)	<i>p</i>
Day-level									
Time pressure	-.01 (.04)	-0.01 (.03)	.735	-.15 (.04)	-0.10 (.03)	<.001	.03 (.04)	0.02 (.03)	.567
Qualitative challenge demands				.36 (.04)	0.32(.04)	<.001			
Qualitative hindrance demands							-.12 (.05)	-0.14 (.06)	.018
Work engagement previous day	-.02 (.05)	-0.02 (.05)	.649	-.02 (.05)	-0.03 (.05)	.608	-.02 (.05)	-0.02 (.05)	.731
F^2	.00			.13			.01		
Semi-partial F^2 for time pressure				.02			.00		
Person-level									
Time pressure	.06 (.07)	0.04 (.06)	.444	-.35 (.09)	-0.26 (.07)	<.001	.18 (.03)	0.13 (.06)	.026
Qualitative challenge demands				.65 (.07)	0.59 (.07)	<.001			
Qualitative hindrance demands							-.26 (.08)	-0.29 (.09)	.001
F^2	.00			.36			.06		
Semi-partial F^2 for time pressure				.08			.04		

Standardized (β) and unstandardized (*B*) coefficients are reported. To interpret F^2 , Cohen (1988) suggested the following rule of thumb: $F^2 \geq 0.02$ = small effect size, $F^2 \geq 0.15$ = medium effect size, $F^2 \geq 0.35$ = large effect size

magnitude of the regression coefficient that indicates the relationship between time pressure and work engagement significantly increased in Model 2a at the day-level ($t(1043) = 7.96$, $p < 0.001$). Accordingly, qualitative challenge demands acted as a suppressor variable regarding the relationship between time pressure and work engagement in the hypothesized direction. Thus, we accept H1a. The effect that time pressure had on work engagement under the control of qualitative challenge demands should be considered as small (see Cohen, 1988; Orth et al., 2022). When adding qualitative hindrance demands to Model 1 (i.e., Table 2, Model 2b), the relationship between time pressure and work engagement at the day-level was positive, yet insignificant ($\beta = 0.03$, $SE = 0.04$, $p = 0.567$). Thus, we reject H2a.

Table 3 depicts the relationship between time pressure and self-esteem with and without the control of qualitative job demands. In Model 1, where only time pressure was included, time pressure negatively related to self-esteem at the day-level ($\beta = -0.13$, $SE = 0.04$, $p = 0.001$). When adding qualitative challenge demands (i.e., Table 3, Model 2a), the relationship between time pressure and self-esteem at the day-level was negative and significant ($\beta = -0.18$, $SE = 0.04$, $p < 0.001$). Given that the magnitude of the effect of time pressure significantly increased in the expected direction ($t(1043) = 2.65$, $p = 0.008$), we accept H1b. The effect that time pressure had on self-esteem under the control of qualitative challenge demands should be considered as small (see Cohen, 1988; Orth et al., 2022). When adding qualitative hindrance demands (i.e., Table 3, Model 2b), the relationship between time pressure and self-esteem at the day-level was negative ($\beta = -0.09$, $SE = 0.04$, $p = 0.040$). Hence, we reject H2b.

Table 4 depicts the relationship between time pressure and emotional exhaustion with and without the control of qualitative job demands. Supporting H3, there was a positive relationship between time pressure and emotional exhaustion at the day-level (Table 4, Model 1 — time pressure: $\beta = 0.22$, $SE = 0.04$, $p < 0.001$; Model 2a — time pressure and qualitative challenge demands: $\beta = 0.26$, $SE = 0.04$, $p < 0.001$; Model 2b — time pressure and qualitative hindrance demands: $\beta = 0.17$, $SE = 0.04$, $p < 0.001$). Moreover, controlling for qualitative challenge demands significantly increased the magnitude of the effect that time pressure had on emotional exhaustion at the day-level ($t(1043) = 2.65$, $p < 0.001$). Thus, qualitative challenge demands also acted as a suppressor variable regarding the relationship between time pressure and emotional exhaustion. Further, across all analyses, autoregressive effects at the day-level were not significant, indicating that day-specific demands are of greater predictive relevance to same-day work engagement, self-esteem, and emotional exhaustion than the outcomes' previous day level (see also Harris et al., 2003; Schacter & Margolin, 2019).

Additional Analyses

Detailed results of all additional analyses can be found in the supplemental materials. First, we tested the robustness of our findings by adding the job resources autonomy and social support as control variables to our model. Autonomy was measured via three items (e.g., “Looking at your workday, to what extent were you able to determine the sequence of work steps yourself?”; Semmer et al., 2007b); social support was measured via two items (e.g., “Today, I could count on my

Table 3 Relationship between time pressure and self-esteem with and without the control of qualitative challenge and hindrance demands

	Model 1			Model 2a			Model 2b		
	β (SE)	B(SE)	p	β (SE)	B(SE)	P	β (SE)	B(SE)	p
Day-level									
Time pressure	-.13 (.04)	-0.06 (.02)	.001	-.18 (.04)	-0.08 (.02)	<.001	-.09 (.04)	-0.04 (.02)	.040
Qualitative challenge demands				.13 (.05)	0.08 (.03)	.005			
Qualitative hindrance demands							-.13 (.05)	-0.11 (.04)	.006
Self-esteem previous day	-.05 (.06)	-0.05 (.06)	.382	-.05 (.06)	-0.05 (.06)	.374	-.05 (.06)	-0.04 (.05)	.421
F^2	.02			.03			.04		
Semi-partial F^2 for time pressure				.03			.00		
Person-level									
Time pressure	.07 (.06)	0.03 (.03)	.301	-.24 (.08)	-0.11 (.04)	.008	.19 (.08)	0.08 (.04)	.016
Qualitative challenge demands				.49 (.09)	0.27 (.06)	<.001			
Qualitative hindrance demands							-.25 (.09)	-0.17 (.06)	.004
F^2	.00			.18			.06		
Semi-partial F^2 for time pressure				.04			.03		

Standardized (β) and unstandardized (B) coefficients are reported. To interpret F^2 , Cohen (1988) suggested the following rule of thumb: $F^2 \geq 0.02$ = small effect size, $F^2 \geq 0.15$ = medium effect size, $F^2 \geq 0.35$ = large effect size

Table 4 Relationship between time pressure and emotional exhaustion with and without the control of qualitative challenge and hindrance demands

	Model 1			Model 2a			Model 2b		
	β (SE)	B(SE)	p	β (SE)	B(SE)	P	β (SE)	B(SE)	p
Day-level									
Time pressure	.22 (.04)	0.17 (.03)	<.001	.26 (.04)	0.20 (.03)	<.001	.17 (.04)	0.13 (.03)	<.001
Qualitative challenge demands				-.13 (.05)	-0.13 (.05)	.013			
Qualitative hindrance demands							.15 (.02)	0.21 (.07)	.002
Emotional exhaustion previous day	-.05 (.05)	-0.05 (.05)	.277	-.05 (.05)	-0.05 (.05)	.259	-.05 (.05)	-0.05 (.05)	.333
F^2	.05			.07			.074		
Semi-partial F^2 for time pressure				.06			.023		
Person-level									
Time pressure	.34 (.06)	0.34 (.07)	<.001	.59 (.08)	0.59 (.09)	<.001	.22 (.07)	0.22 (.08)	.004
Qualitative challenge demands				-.41 (.08)	-0.50 (.10)	<.001			
Qualitative hindrance demands							.24 (.07)	0.37 (.11)	.001
F^2	.13			.28			.19		
Semi-partial F^2 for time pressure				.28			.04		

Standardized (β) and unstandardized (B) coefficients are reported. To interpret F^2 , Cohen (1988) suggested the following rule of thumb: $F^2 \geq 0.02$ = small effect size, $F^2 \geq 0.15$ = medium effect size, $F^2 \geq 0.35$ = large effect size

colleagues"; Breevaart et al., 2014). Result patterns at the day-level remained consistent and thus supported the role of qualitative challenge demands as a suppressor variable regarding the effects of time pressure.

Second, to approach causality, we tested for reversed causation effects at the day-level, that is, whether engagement, self-esteem, and emotional exhaustion of the previous day would predict the perception of time pressure on the following day. Examination of such reversed effects seems particularly relevant given that Guthier et al. (2020) recently

showed that strain acted as an important predictor of stressor perception. In our sample, day-level findings showed that previous day levels of outcome variables did not predict following day perception of time pressure, supporting the hypothesized direction of effects.

Finally, we exploratively tested if qualitative demands also acted as suppressor variables at the person-level (results are depicted in Tables 2, 3 and 4). Without the control of qualitative demands, person level time pressure only related to emotional exhaustion ($\beta = 0.34$, $SE = 0.01$, $p < 0.001$).

When controlling for qualitative challenge demands, the relationship between person-level time pressure and work engagement ($\beta = -0.35$, $SE = 0.09$, $p < 0.001$) as well as person-level time pressure and self-esteem ($\beta = -0.24$, $SE = 0.08$, $p = 0.008$) became significant and negative. Suppression was also significant (time pressure–engagement: $t(394) = 6.87$, $p < 0.001$); time pressure–self-esteem: $t(394) = 5.64$, $p < 0.001$). Thus, qualitative challenge demands acted as a suppressor variable at the day- and the person-level, resulting in time pressure operating as a hindrance demand. Additionally, at the person-level, time pressure had a positive and significant effect on work engagement ($\beta = 0.18$, $SE = 0.03$, $p = 0.026$) and self-esteem ($\beta = 0.19$, $SE = 0.08$, $p = 0.016$) when qualitative hindrance demands were controlled for. Further, the magnitude of the regression coefficients significantly increased (time pressure–engagement: $t(394) = -2.96$, $p = 0.003$; time pressure–self-esteem: $t(394) = -2.48$, $p = 0.014$). Hence, other than at the day-level, at the person-level, qualitative hindrance demands operated as a suppressor variable, resulting in challenge-related relationship patterns associated with time pressure (i.e., a positive relationship with engagement, self-esteem, and exhaustion).

Discussion

This study aimed at advancing the understanding of the challenging and hindering potentials of time pressure by considering qualitative job demands as sources of time pressure. Findings revealed that qualitative challenge and hindrance demands operate as suppressor variables and determine whether time pressure itself acts as a challenge or hindrance demand. When qualitative challenge demands were controlled for, time pressure acted as a hindrance demand and thus, negatively related to work engagement and self-esteem, but positively related to exhaustion at the day-level. Additional analyses revealed that the same applied to the person-level. In contrast, when qualitative hindrance demands were controlled for, time pressure did not act as a challenge demand at the day-level. Yet, additional analyses illustrated that this was the case at the person-level where controlling for qualitative hindrance demands resulted in a positive relationship between time pressure and work engagement, self-esteem, and emotional exhaustion.

Theoretical Implications

With this study, we add to the literature in three important ways. First, we contribute to the ongoing discussion of when time pressure acts as a challenge or hindrance demand (e.g., Baethge et al., 2018; Prem et al., 2018; A. Schmitt et al., 2015). Our findings show that without considering

additional aspects, time pressure positively related to emotional exhaustion at the day- and the person-level but was unrelated to work engagement and self-esteem at both levels of analyses (see the negative relationship between time pressure and self-esteem at the day-level for an exception). Thus, a generic a priori classification of time pressure as challenge or hindrance demand seems debatable. These results align with previous findings which indicate that time pressure only related to desirable outcomes when additional conditions such as illegitimacy, job control, or strain were accounted for (Baethge et al., 2018; Kronenwett & Rigotti, 2019; Kühnel et al., 2012).

In this study, we proposed that time pressure (i.e., a quantitative demand that holds information only about the amount and speed of work) should not be seen as an isolated demand, but rather as one that subsumes additional demands of varying quality. We hypothesized that disassembling time pressure — by controlling for either qualitative challenge or hindrance demands — would determine time pressure's challenging and hindering potential. Generally, result patterns supported our assumptions and remained robust when adding job resources as additional control variables: While time pressure always positively related to emotional exhaustion, when controlling for qualitative challenge demands, time pressure negatively related to work engagement and self-esteem at the day-level. Additional analyses further revealed that the same applied to the person-level. Accordingly, time pressure exhibited relationship patterns which are associated with hindrance demands when qualitative challenge demands were controlled for. In contrast, time pressure positively related to exhaustion, however remained unrelated and negatively related respectively to work engagement and self-esteem when controlling for qualitative hindrance demands at the day-level. Yet, additional analyses demonstrated that hypothesized effects were present at the person-level where time pressure positively related to emotional exhaustion, work engagement, and self-esteem when qualitative hindrance demands were controlled for. Hence, under control of qualitative hindrance demands, time pressure exhibited relationship patterns associated with challenge demands (e.g., Cavanaugh et al., 2000; Crawford et al., 2010) at the person-level. A possible explanation as to why time pressure did not exert challenge-related relationship patterns at the day-level when controlling for qualitative hindrance demands may be due to the large variety of hindrance-related job characteristics that employees may experience (see e.g., Zacher & Frese, 2018). While we focused on qualitative hindrance demands which were identified throughout the development of the challenge-hindrance framework (Cavanaugh et al., 2000), aspects such as illegitimacy (e.g., A. Schmitt et al., 2015) were not included. Yet, according to SOS (Semmer et al., 2007a), illegitimate tasks may threaten employees' professional identity and consequently may pose

a particularly severe risk for individuals' self-esteem. Hence, it seems possible that employees experienced other relevant qualitative hindrance demands on a specific day (e.g., illegitimacy) in which case a smaller proportion of hindrance demands that shaped the experience of time pressure were controlled for.

Taken together, qualitative demands that need to be accomplished within an insufficient timeline seem to play a vital role in determining time pressure's challenging and hindering potential. Assessing time pressure irrespective of qualitative demands likely results in lower predictive precision and may explain the large variety of relationship patterns reported regarding the link between time pressure and work engagement, self-esteem, or performance. Hence, there exists the pressing need to investigate more deeply the sources and related the qualitative demands that shape the experience of time pressure.

Second, our findings contribute to the refinement of the challenge-hindrance framework regarding theoretical considerations and common research practices. Scholars (e.g., Cavanaugh et al., 2000; Crawford et al., 2010; Rodell & Judge, 2009) stated that time pressure, complexity, and responsibility represent prototypical challenge demands, whereas daily hassles, red tape, and role conflict represent prototypical hindrance demands. Following, much research on the challenge-hindrance framework used conglomerate measures of the above listed demands to operationalize challenges and hindrances and to examine their effects on outcomes such as work engagement, job satisfaction, or positive work behaviors (Mazzola & Disselhorst, 2019; Podsakoff et al., 2007). With only a few exceptions (e.g., Kronenwett & Rigotti, 2019; A. Schmitt et al., 2015, who assessed the interaction between time pressure and task illegitimacy), studies tend not to assess how job demands are related and how their interrelatedness may affect outcome variables.

Our study indicates that there exist complex relationships between prototypical challenge and hindrance demands, but also amongst challenge demands. Specifically, we observed that controlling for the presence of qualitative challenge or hindrance demands may determine the effects of time pressure (i.e., a quantitative demand). Such interrelatedness may explain as to why a recently conducted meta-analysis did not find the expected relationship pattern between challenge demands (operationalized as a conglomerate measure) and outcomes such as work engagement, job satisfaction, or organizational citizenship behavior (Mazzola & Disselhorst, 2019). Hence, to advance the challenge-hindrance framework, we suggest distinguishing between qualitative and quantitative job demands while also considering the interrelatedness between the quality and the quantity of work. This seems essential given that qualitatively distinct demands may cancel out each other's effects (or result in smaller effects) and/or the presence of qualitative demands

may determine the effects of quantitative demands. These implications may also inform the development of other theoretical frameworks and research questions. For example, researchers drew on transactional stress theory (Lazarus & Folkman, 1984) and showed that the same job demand (e.g., time pressure) may be appraised as both challenging and hindering (e.g., Kronenwett & Rigotti, 2022; Webster et al., 2011). Yet, to date, there exists little insight as to why these differential appraisal patterns occur (see M. A. LePine, 2022). The co-occurrence and interrelatedness of demands may provide an important explanation: For example, time pressure may be appraised as challenging and hindering by the same individual on different days, depending on the qualitative sources of time pressure on a specific day.

Third, our study raises awareness for the presence and importance of suppressor variables which remain only scarcely accounted for in work and organizational psychology research (e.g., Maassen & Bakker, 2001; Spector, 2021). An exception is the work conducted by Widmer et al. (2012) who showed that the relationship between time pressure and a positive life attitude became significant and positive only when controlling for strain. Our study outlines that it is also variables that lie outside the individual (i.e., qualitative job demands) that may act as suppressor variables and determine time pressure's challenging and hindering potential. Moreover, without the explicit consideration of qualitative job demands as suppressor variables, we could have concluded that time pressure is unrelated, positively, or negatively related to engagement and self-esteem. This shows how drastically results and hence, conclusions may vary contingent upon other variables included in the research model. Accordingly, we encourage researchers to think of theoretically relevant suppressor variables when planning their study (see Ludlow & Klein, 2014; MacKinnon et al., 2000; Spector, 2021) and to transparently report how the inclusion of variables changes relationships between other predictors and outcomes.

Limitations and Directions for Future Research

Our study has various limitations which suggest directions for future research. First, as is the case with most field research, we can only approach causality. While additional analyses at the day-level indicated that the perception of time pressure was not affected by previous day outcome variables and hence provide initial support for the proposed direction of effects, we were unable to assess reversed causation in our additional analyses, at the person-level. Considering meta-analytic findings which outlined that strain predicted the perception of demands more strongly than demands predicted strain (Guthier et al., 2020), future research may examine if our results also persist when including cross-lagged effects at the person-level.

Second, in accordance with theoretical assumptions, we argued that dealing with qualitative challenge demands may be a chance for goal attainment and a source of pride and thus, likely enhances work engagement and self-esteem. However, this should only be the case if employees have the required ability to successfully address their tasks (see Kronenwett & Rigotti, 2020). If qualitative job demands exceed personal capabilities and employees are unable to accomplish a task, effects are likely reversed. Hence, we suggest that future research integrates the level of success in dealing with qualitative challenge demands as a potential boundary condition.

Practical Implications

This study provides practical implications for employers and for professionals who conduct psychological risk assessments. First, findings suggest that time pressure may exert its challenging potential when qualitative challenge demands shape its experience. As such, work should be designed in a way that it contains sufficient qualitative challenges such as complexity and responsibility (see also e.g., Zacher & Frese, 2018). However, it is important to keep in mind that qualitative challenge demands only benefit employees if they do not exceed their capabilities and overburden them. Accordingly, to facilitate coping with challenges adequate resources such as job control need to be available (e.g., Kühnel et al., 2012).

Second, results depict that when qualitative hindrance demands shape the experience of time pressure, time pressure exerts its hindering potential. As such, employers should aim at minimizing hindrances. This could be accomplished by optimizing work processes (e.g., reducing red tape) and by providing employees with sufficient job control such that they may structure their workday and address job demands according to their needs (Dust & Tims, 2020). Additionally, we would like to point out that time pressure positively related to emotional exhaustion irrespective of qualitative job demands. As such, to avoid overstraining employees, it is essential that time pressure does not become a chronic demand (e.g., Baethge et al., 2018) and that periods of time pressure are followed by periods of recovery (Sonnentag & Fritz, 2015). This seems particularly important when qualitative hindrance demands shape the experience of time pressure, considering that the relationship between time pressure and exhaustion was stronger, when qualitative challenge demands were controlled for.

Third, conducting psychological risk assessments of the work environment is a mandatory procedure not only in Germany but also in many other countries (Beck & Lenhardt, 2019). Professionals commonly evaluate to what extent a certain job demand exists and define cut-off values beyond which the demand needs to be reduced. Our findings suggest that when evaluating the psychological risks associated with time

pressure, it may not suffice to solely look at the level of time pressure. Instead, we recommend assessing possible sources of time pressure given that they may shape time pressure's experience. Should qualitative hindrance demands be the main source of time pressure, the risk for employee well-being and consequently the need for action are particularly high.

Conclusion

With this study, we outline that time pressure should not be seen as an isolated demand, but rather as one which subsumes additional demands of varying quality (i.e., qualitative challenge and hindrance demands). Qualitative demands acted as suppressor variables which determined time pressure's challenging and hindering potential. Generally, result patterns highlight the need to consider the interrelatedness between demands given that the presence of the one may shape and/or suppress the effects of the other. We hope that our study stimulates future research on the interrelatedness of qualitative and quantitative demands within the challenge-hindrance framework and further encourages researchers to consider the presence of theoretically relevant suppressor variables.

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Declarations

Conflict of Interest The authors declare no competing interests.

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References

- Baethge, A., Vahle-Hinz, T., Schulte-Braucks, J., & van Dick, R. (2018). A matter of time? Challenging and hindering effects of time pressure on work engagement. *Work & Stress*, 32(3), 228–247. <https://doi.org/10.1080/02678373.2017.1415998>

- Baethge, A., Deci, N., Dettmers, J., & Rigotti, T. (2019). “Some days won’t end ever”: Working faster and longer as a boundary condition for challenge versus hindrance effects of time pressure. *Journal of Occupational Health Psychology*, 24(3), 322–332. <https://doi.org/10.1037/ocp0000121>
- Beck, D., & Lenhardt, U. (2019). Consideration of psychosocial factors in workplace risk assessments: Findings from a company survey in Germany. *International Archives of Occupational and Environmental Health*, 92(3), 435–451. <https://doi.org/10.1007/s00420-019-01416-5>
- Bozeman, B. (1993). A theory of government “red tape.” *Journal of Public Administration Research and Theory*, 3(3), 273–304. <https://doi.org/10.1093/oxfordjournals.jpart.a037171>
- Breevaart, K., & Bakker, A. B. (2018). Daily job demands and employee work engagement: The role of daily transformational leadership behavior. *Journal of Occupational Health Psychology*, 23(3), 338–349. <https://doi.org/10.1037/ocp0000082>
- Breevaart, K., Bakker, A., Hetland, J., Demerouti, E., Olsen, O. K., & Espevik, R. (2014). Daily transactional and transformational leadership and daily employee engagement. *Journal of Occupational and Organizational Psychology*, 87(1), 138–157. <https://doi.org/10.1111/joop.12041>
- Carrol, J. (2008). *Time pressures, stress common for Americans*. <https://news.gallup.com/poll/103456/time-pressure-stress-common-americans.aspx>
- Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. Managers. *Journal of Applied Psychology*, 85(1), 65–74. <https://doi.org/10.1037/0021-9010.85.1.65>
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1), 89–136. <https://doi.org/10.1111/j.1744-6570.2010.01203.x>
- Chung-Yan, G. A. (2010). The nonlinear effects of job complexity and autonomy on job satisfaction, turnover, and psychological well-being. *Journal of Occupational Health Psychology*, 15(3), 237–251. <https://doi.org/10.1037/a0019823>
- Conger, A. J. (1974). A revised definition for suppressor variables: A guide to their identification and interpretation. *Educational and Psychological Measurement*, 34(1), 35–46. <https://doi.org/10.1177/001316447403400105>
- Crane, M. F., & Searle, B. J. (2016). Building resilience through exposure to stressors: The effects of challenges versus hindrances. *Journal of Occupational Health Psychology*, 21(4), 468–479. <https://doi.org/10.1037/a0040064>
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology*, 95(5), 834–848. <https://doi.org/10.1037/a0019364>
- David, E. M., & Holladay, C. L. (2015). Intervening mechanisms between personality and turnover: Mediator and suppressor effects. *Journal of Business and Psychology*, 30(1), 137–147. <https://doi.org/10.1007/s10869-013-9335-4>
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512. <https://doi.org/10.1037/0021-9010.86.3.499>
- Drach-Zahavy, A., & Freund, A. (2007). Team effectiveness under stress: A structural contingency approach. *Journal of Organizational Behavior*, 28(4), 423–450. <https://doi.org/10.1002/job.430>
- Dust, S. B., & Tims, M. (2020). Job crafting via decreasing hindrance demands: The motivating role of interdependence misfit and the facilitating role of autonomy. *Applied Psychology: An International Review*, 69(3), 881–912. <https://doi.org/10.1111/apps.12212>
- Eatough, E. M., Meier, L. L., Igic, I., Elfering, A., Spector, P. E., & Semmer, N. K. (2016). You want me to do what? Two daily diary studies of illegitimate tasks and employee well-being. *Journal of Organizational Behavior*, 37(1), 108–127. <https://doi.org/10.1002/job.2032>
- Eisinga, R., Grotenhuis, M., & t., & Pelzer, B. (2013). The reliability of a two-item scale: Pearson, Cronbach, or Spearman-Brown? *International Journal of Public Health*, 58(4), 637–642. <https://doi.org/10.1007/s00038-012-0416-3>
- Eurostat. (2019). *Employed persons by degree of working under time pressure*. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Employed_persons_by_degree_of_working_under_time_pressure_2019_\(%25\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Employed_persons_by_degree_of_working_under_time_pressure_2019_(%25).png)
- Giebe, C., & Rigotti, T. (2022). Tenets of self-determination theory as a mechanism behind challenge demands: A within-person study. *Journal of Managerial Psychology*, 37(5), 480–492. <https://doi.org/10.1108/JMP-11-2019-0648>
- Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *The Academy of Management Review*, 10(1), 76. <https://doi.org/10.2307/258214>
- Guthier, C., Dormann, C., & Voelkle, M. C. (2020). Reciprocal effects between job stressors and burnout: A continuous time meta-analysis of longitudinal studies. *Psychological Bulletin*, 146(12), 1146–1173. <https://doi.org/10.1037/bul0000304>
- Hamaker, E. L., & Grasman, R. P. P. P. (2014). To center or not to center? Investigating inertia with a multilevel autoregressive model. *Frontiers in Psychology*, 5, 1492. <https://doi.org/10.3389/fpsyg.2014.01492>
- Harris, C., Daniels, K., & Briner, R. B. (2003). A daily diary study of goals and affective well-being at work. *Journal of Occupational and Organizational Psychology*, 76(3), 401–410. <https://doi.org/10.1348/096317903769647256>
- Karatepe, O. M., Beirami, E., Bouzari, M., & Safavi, H. P. (2014). Does work engagement mediate the effects of challenge stressors on job outcomes? Evidence from the hotel industry. *International Journal of Hospitality Management*, 36, 14–22. <https://doi.org/10.1016/j.ijhm.2013.08.003>
- Kern, M., Heissler, C., & Zapf, D. (2021). Social job stressors can foster employee well-being: Introducing the concept of social challenge stressors. *Journal of Business and Psychology*, 36(5), 771–792. <https://doi.org/10.1007/s10869-020-09702-7>
- Kim, M., & Beehr, T. A. (2020). Thriving on demand: Challenging work results in employee flourishing through appraisals and resources. *International Journal of Stress Management*, 27(2), 111–125. <https://doi.org/10.1037/str0000135>
- Kinnunen, U., Mäkikangas, A., Mauno, S., de Cuyper, N., & de Witte, H. (2014). Development of perceived job insecurity across two years: Associations with antecedents and employee outcomes. *Journal of Occupational Health Psychology*, 19(2), 243–258. <https://doi.org/10.1037/a0035835>
- Kinnunen, U., Feldt, T., Sianoja, M., de Bloom, J., Korpela, K., & Geurts, S. (2017). Identifying long-term patterns of work-related rumination: Associations with job demands and well-being outcomes. *European Journal of Work and Organizational Psychology*, 26(4), 514–526. <https://doi.org/10.1080/1359432X.2017.1314265>
- Kronenwett, M., & Rigotti, T. (2019). When do you face a challenge? How unnecessary tasks block the challenging potential of time pressure and emotional demands. *Journal of Occupational Health Psychology*, 24(5), 512–526. <https://doi.org/10.1037/ocp0000149>
- Kronenwett, M., & Rigotti, T. (2022). All’s well that ends well!? Moderating effects of goal progress on the relation between challenge and hindrance appraisal and well-being. *Journal of Managerial Psychology*, 37(5), 444–466. <https://doi.org/10.1108/JMP-11-2019-0618>

- Kühnel, J., Sonnentag, S., & Bledow, R. (2012). Resources and time pressure as day-level antecedents of work engagement. *Journal of Occupational and Organizational Psychology*, 85(1), 181–198. <https://doi.org/10.1111/j.2044-8325.2011.02022.x>
- Kunzelmann, A., & Rigotti, T. (2021). Challenge demands and resilience: Strain and learning as different pathways. *Zeitschrift Für Arbeits- Und Organisationspsychologie*, Article 0932–4089/a000363. Advance online publication. <https://doi.org/10.1026/0932-4089/a000363>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Leary, M. R. (1999). Making sense of self-esteem. *Current Directions in Psychological Science*, 8(1), 32–35. <https://doi.org/10.1111/1467-8721.00008>
- LePine, M. A. (2022). The challenge-hindrance stressor framework: An integrative conceptual review and path forward. *Group & Organization Management*, 47(2), 223–254. <https://doi.org/10.1177/10596011221079970>
- LePine, J. A., LePine, M. A., & Jackson, C. L. (2004). Challenge and hindrance stress: Relationships with exhaustion, motivation to learn, and learning performance. *Journal of Applied Psychology*, 89(5), 883–891. <https://doi.org/10.1037/0021-9010.89.5.883>
- LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor–hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, 48(5), 764–775. <https://doi.org/10.5465/AMJ.2005.18803921>
- Liu, C., & Li, H. (2018). Stressors and stressor appraisals: The moderating effect of task efficacy. *Journal of Business and Psychology*, 33(1), 141–154. <https://doi.org/10.1007/s10869-016-9483-4>
- Ludlow, L., & Klein, K. (2014). Suppressor variables: The difference between ‘is’ versus ‘acting as’. *Journal of Statistics Education*, 22(2). <https://doi.org/10.1080/10691898.2014.11889703>
- Lüdtke, O., Marsh, H. W., Robitzsch, A., & Trautwein, U. (2011). A 2 × 2 taxonomy of multilevel latent contextual models: Accuracy-bias trade-offs in full and partial error correction models. *Psychological Methods*, 16(4), 444–467. <https://doi.org/10.1037/a0024376>
- Maassen, G. H., & Bakker, A. B. (2001). Suppressor variables in path models. *Sociological Methods & Research*, 30(2), 241–270. <https://doi.org/10.1177/0049124101030002004>
- Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology*, 1(1), 3–30. <https://doi.org/10.1111/j.1754-9434.2007.0002.x>
- MacKinnon, D. P., Krull, J. L., & Lockwood, C. M. (2000). Equivalence of the mediation, confounding and suppression effect. *Prevention Science*, 1(4), 173–181. <https://doi.org/10.1023/a:1026595011371>
- Marsh, H. W., Lüdtke, O., Robitzsch, A., Trautwein, U., Asparouhov, T., Muthén, B., & Nagengast, B. (2009). Doubly-latent models of school contextual effects: Integrating multilevel and structural equation approaches to control measurement and sampling error. *Multivariate Behavioral Research*, 44(6), 764–802. <https://doi.org/10.1080/00273170903333665>
- Martinez Gutierrez, N., & Cribbie, R. (2021). Incidence and interpretation of statistical suppression in psychological research. *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement*, 53(4), 480–488. <https://doi.org/10.1037/cbs0000267>
- Maslach, C. (1993). Burnout: A multidimensional perspective. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Series in applied psychology: Social issues and questions. Professional burnout: Recent developments in theory and research* (pp. 19–32). Taylor & Francis.
- Maslach, C., & Jackson, S. E. (1986). *Maslach burnout inventory manual* (2nd ed.). Consulting Psychology Press.
- Mazzola, J. J., & Disselhorst, R. (2019). Should we be “challenging” employees? A critical review and meta-analysis of the challenge-hindrance model of stress. *Journal of Organizational Behavior*, 40(8), 949–961. <https://doi.org/10.1002/job.2412>
- McCauley, C. D., Ruderman, M. N., Ohlott, P. J., & Morrow, J. E. (1994). Assessing the developmental components of managerial jobs. *Journal of Applied Psychology*, 79(4), 544–560. <https://doi.org/10.1037/0021-9010.79.4.544>
- Muthén, L. K., & Muthén, B. O. (2017). *Mplus user’s guide* (8th ed.). Muthén & Muthén.
- O’Connor, D. B., Jones, F., Conner, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology*, 27(1S), S20–31. <https://doi.org/10.1037/0278-6133.27.1.S20>
- Ohly, S., & Fritz, C. (2010). Work characteristics, challenge appraisal, creativity, and proactive behavior: A multi-level study. *Journal of Organizational Behavior*, 31(4), 543–565. <https://doi.org/10.1002/job.633>
- Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology*, 92(2), 438–454. <https://doi.org/10.1037/0021-9010.92.2.438>
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multi-level SEM framework for assessing multilevel mediation. *Psychological Methods*, 15(3), 209–233. <https://doi.org/10.1037/a0020141>
- Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2011). Alternative methods for assessing mediation in multilevel data: The advantages of multilevel SEM. *Structural Equation Modeling: A Multidisciplinary Journal*, 18(2), 161–182. <https://doi.org/10.1080/10705511.2011.557329>
- Prem, R., Ohly, S., Kubicek, B., & Korunka, C. (2017). Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work. *Journal of Organizational Behavior*, 38(1), 108–123. <https://doi.org/10.1002/job.2115>
- Prem, R., Paškvan, M., Kubicek, B., & Korunka, C. (2018). Exploring the ambivalence of time pressure in daily working life. *International Journal of Stress Management*, 25(1), 35–43. <https://doi.org/10.1037/str0000044>
- Rodell, J. B., & Judge, T. A. (2009). Can “good” stressors spark “bad” behaviors? The mediating role of emotions in links of challenge and hindrance stressors with citizenship and counterproductive behaviors. *Journal of Applied Psychology*, 94(6), 1438–1451. <https://doi.org/10.1037/a0016752>
- Rosenberg, M. (1989). *Society and the adolescent self-image* (rev. ed.). Wesleyan University Press.
- Schacter, H. L., & Margolin, G. (2019). When it feels good to give: Depressive symptoms, daily prosocial behavior, and adolescent mood. *Emotion (Washington, D.C.)*, 19(5), 923–927. <https://doi.org/10.1037/emo0000494>
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire. *Educational and Psychological Measurement*, 66(4), 701–716. <https://doi.org/10.1177/0013164405282471>
- Schaufeli, W. B., Taris, T. W., & van Rhenen, W. (2008). Workaholism, burnout, and work engagement: Three of a kind or three different kinds of employee well-being? *Applied Psychology*, 57(2), 173–203. <https://doi.org/10.1111/j.1464-0597.2007.00285.x>
- Schilbach, M., Baethge, A., & Rigotti, T. (2021). Do challenge and hindrance job demands prepare employees to demonstrate resilience? *Journal of Occupational Health Psychology*, 26(3), 155–174. <https://doi.org/10.1037/ocp0000282>
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8(4), 350–353. <https://doi.org/10.1037/1040-3590.8.4.350>

- Schmitt, A., Ohly, S., & Kleespies, N. (2015). Time pressure promotes work engagement. *Journal of Personnel Psychology*, 14(1), 28–36. <https://doi.org/10.1027/1866-5888/a000119>
- Semmer, N., Zapf, D., & Dunckel, H. (1999). Instrument zur Stressbezogenen Tätigkeitsanalyse (ISTA) [Instrument for stress-related task analysis (ISTA)]. In H. Dunckel (Ed.), *Handbuch psychologischer Arbeitsanalyseverfahren*. Zürich: vdf-Hochschulverlag.
- Semmer, N. K., Jacobshagen, N., Meier, L., & Elfering, A. (2007a). The “stress-as-offense-to-self” perspective. In J. Houdmont & S. McIntyre (Eds.), *Occupational health psychology: European perspectives on research, education and practice* (2nd ed., pp. 43–60). Ismai.
- Semmer, N., Zapf, D., & Dunckel, H. (2007b). ISTA—Instrument zur Stressbezogenen Arbeitsanalyse [ISTA—Instrument for stress-related task analysis] (6.1st ed.).
- Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, 36(S1), S72–S103. <https://doi.org/10.1002/job.1924>
- Spector, P. E. (2021). Mastering the use of control variables: The hierarchical iterative control (HIC) approach. *Journal of Business and Psychology*, 36(5), 737–750. <https://doi.org/10.1007/s10869-020-09709-0>
- Taber, K. S. (2018). The use of Cronbach’s Alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48, 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tuckey, M. R., Searle, B. J., Boyd, C. M., Winefield, A. H., & Winefield, H. R. (2015). Hindrances are not threats: Advancing the multidimensionality of work stress. *Journal of Occupational Health Psychology*, 20(2), 131–147. <https://doi.org/10.1037/a0038280>
- van Veldhoven, M. J. (2014). Quantitative job demands. In M. C. W. Peeters, J. de Jonge, & T. W. Taris (Eds.), *An introduction to contemporary work psychology* (pp. 117–143). Wiley.
- van Yperen, N. W., & Hagedoorn, M. (2003). Do high job demands increase intrinsic motivation or job strain or both? The role of job control and social support. *Academy of Management Journal*, 46(3), 339–348. <https://doi.org/10.2307/30040627>
- van Veldhoven, M., Taris, T. W., de Jonge, J., & Broersen, S. (2005). The relationship between work characteristics and employee health and well-being: How much complexity do we really need? *International Journal of Stress Management*, 12(1), 3–28. <https://doi.org/10.1037/1072-5245.12.1.3>
- Webster, J. R., Beehr, T. A., & Love, K. (2011). Extending the challenge-hindrance model of occupational stress: The role of appraisal. *Journal of Vocational Behavior*, 79(2), 505–516. <https://doi.org/10.1016/j.jvb.2011.02.001>
- Widmer, P. S., Semmer, N. K., Kälin, W., Jacobshagen, N., & Meier, L. (2012). The ambivalence of challenge stressors: Time pressure associated with both negative and positive well-being. *Journal of Vocational Behavior*, 80(2), 422–433. <https://doi.org/10.1016/j.jvb.2011.09.006>
- Zacher, H., & Frese, M., (2018). Action regulation theory: Foundations, current knowledge, and future directions. In N. Anderson, D. S., Ones, C. Viswesvaran, & H. K. Sinangil (Eds.), *Handbook of industrial, work, & organizational psychology* (2nd ed., pp. 122–144). Sage Publication Inc.
- Zapf, D., Semmer, N. K., & Johnson, S. (2014). Qualitative demands at work. In M. C. W. Peeters, J. de Jonge, & T. W. Taris (Eds.), *An introduction to contemporary work psychology* (pp. 144–168). Wiley.
- Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multi-level mediation using hierarchical linear models. *Organizational Research Methods*, 12(4), 695–719. <https://doi.org/10.1177/1094428108327450>

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