Organizational Behavior

Perfectionistic Cognitions as Antecedents of Work Engagement: Personal Resources, Personal Demands, or Both?

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Whereas personal resources have been established as a counterpart to external job resources in the Job Demands–Resources Theory, personal demands as a counterpart to job demands have been rather neglected. In this study, we propose that multidimensional perfectionism—in the form of daily perfectionistic cognitions—is a relevant personal characteristic for predicting daily work engagement in addition to and in its interplay with daily time pressure as a common job demand. 157 employees participated in a daily diary study for 15 workdays. As hypothesized, multilevel regression analyses yielded a positive unique effect of perfectionistic strivings cognitions and a negative unique effect of perfectionistic concerns cognitions on daily work engagement. Furthermore, we found that both unique perfectionistic strivings cognitions and perfectionistic concerns cognitions moderated a quadratic relationship between daily time pressure and daily work engagement. Building on the Job Demands–Resources Theory, we propose that the dimension of perfectionistic strivings constitutes a personal resource and the dimension of perfectionistic concerns constitutes a personal demand in the prediction of work engagement.

Personal characteristics such as self-efficacy and optimism (Xanthopoulou et al., 2007) are an established component of the Job Demands–Resources (JD–R) Theory (Bakker & Demerouti, 2017). Building on the Conservation of Resources Theory (Hobfoll et al., 2003), personal characteristics have been included in the model as personal resources. Personal resources reflect "aspects of the self that are generally linked to resiliency and refer to individuals' sense of their ability to control and impact upon their environment successfully" (Xanthopoulou et al., 2007, pp. 123–124). Just like job resources, personal resources have been proposed as predictors of work engagement. In addition, they are expected to interact with job demands and hence buffer the effect of job demands on strain (Bakker & Sanz-Vergel, 2013; Xanthopoulou et al., 2013). In contrast to conceptual and empirical work on personal resources as a personal counterpart to job resources, potentially negative, impairing personal characteristics have thus far tended to be neglected. Similar to personal resources, which "may play at least five different roles in the job characteristics–well-being nexus" (Schaufeli & Taris, 2014, p. 56)—including the roles of mediators, moderators, and antecedents of job characteristics—personal demands are likely to play many roles in the JD–R Model. For example, personal vulnerability factors may determine the perception of job characteristics, resulting in a more negative eval-

uation of the work environment (Spector & O'Connell, 1994). In addition, personal demands may hamper motivational processes, directly affect work-related well-being, or interact detrimentally with job demands.

Considering this theoretical gap, we introduce multidimensional perfectionism as a particularly appealing personal characteristic for the processes proposed in the JD–R Model framework. Due to its ambivalence, perfectionism could function as both a personal resource and a personal demand. "I am a perfectionist" is an answer that is strategically provided in selection interviews when candidates are asked about their biggest weakness (Harari et al., 2018). It is commonly assumed that although perfectionism might have some negative impact, its positive aspects will outweigh them, resulting in an overall beneficial effect on work-related outcomes (e.g., performance). Hence, perfectionism is a personal characteristic that is highly relevant in the work context (Stoeber & Stoeber, 2009). It reflects a personality style that is characterized by setting and striving for extremely high standards for one's own performance and comes with the tendency to engage in overly critical evaluations of one's behavior (Stoeber & Gaudreau, 2017). This multidimensional nature of perfectionism might be the reason for its paradoxical effects at work (Harari et al., 2018).

Here, on the basis of opposite associations with (mal)adaptive work-related outcomes (Harari et al., 2018),

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we argue that the dimension of perfectionistic concerns reflects a personal demand, whereas the dimension of perfectionistic strivings could be thought of as a personal resource regarding work engagement. In this study, we look at dynamic, within-person associations of daily perfectionistic cognitions with daily work engagement and how they interact with a typical job demand—time pressure—at the daily level. Moreover, we examine joint effects of perfectionism and both linear and curvilinear effects of time pressure on work engagement. With this approach, we address the complexity of how, and under which boundaries, employees' personal and job characteristics determine the development and maintenance of work-related well-being.

Job Characteristics as Predictors of Work Engagement

Work engagement constitutes a "positive, fulfilling, affective-motivational state of work-related well-being that is characterized by vigour, dedication, and absorption" (Bakker, Schaufeli, et al., 2008, p. 187). Over the last two decades, this construct has received widespread attention in work and organizational psychology due to its associations with positive outcomes such as job satisfaction (Karanika-Murray et al., 2015) and job performance (Bakker, Van Emmerik, et al., 2008; Christian et al., 2011; Hopstaken et al., 2015). Most research on antecedents of work engagement has referred to the JD–R Model, which was originally introduced to explain the development of burnout among employees in various work sectors (Bakker & Demerouti, 2007). The JD–R Model differentiates between two main categories of job characteristics: job demands and job resources. Job demands constitute "those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" (Demerouti et al., 2001, p. 501). Examples are shift work, physical workload, and time pressure (Bakker & Demerouti, 2007; Demerouti et al., 2001). Job resources are "those physical, psychological, social, or organizational aspects of the job that may . . . (a) be functional in achieving work goals, (b) reduce job demands and their associated physiological and psychological costs; [or] (c) stimulate personal growth and development" (Demerouti et al., 2001, p. 501). Examples are performance feedback, job control, and support from supervisors (Bakker & Demerouti, 2007; Demerouti et al., 2001). This broad but flexible classification of working conditions applies to most types of occupations. Job demands and job resources are assumed to be involved in two distinct psychological processes (dual process assumption; Bakker & Demerouti, 2007). Whereas job demands are assumed to be primarily involved in a health-impairment process that should result in job strain (Bakker & Demerouti, 2007), job resources are assumed to be primarily motivational and should thus foster work engagement (Bakker & Demerouti, 2008; Schaufeli & Bakker, 2004). Numerous cross-sectional (e.g., Hakanen et al., 2006; Schaufeli & Bakker, 2004) and longitudinal studies have supported the assumptions of a health-impairment process initiated by job demands and of a motivational process initiated by job resources (Mauno et al., 2007; Schaufeli, Bakker, & Van Rhenen, 2009). Besides these elaborated dual main effects of job resources and job demands, research based on the JD–R Theory has also reported that job demands may negatively affect motivational processes (e.g., work engagement; Bakker et al., 2007).

Empirical findings on the zero-order association between the job demand of time pressure and work engagement have been inconsistent at both the between-person and within-person levels. Some studies found a positive linear relationship (e.g., Baethge et al., 2019), whereas others found a negative (e.g., Sonnentag & Niessen, 2008) or even a null relationship (e.g., Kühnel et al., 2012; Kunzelmann & Rigotti, 2020). Furthermore, besides linear associations, curvilinear (i.e., inverted U-shaped) relationships have also been reported in the literature, such that the effect of time pressure is positive up to a certain limit and then turns into a negative relationship (e.g., Sheng et al., 2019). The diversity of the findings on the main effects of time pressure could have different reasons: a) The true association between time pressure and work engagement equals zero, and significant effects in some studies might be due to chance. b) The association between time pressure and work engagement is not linear. c) Findings of studies that investigated effects only at the between-person level represent a blurred mix of between-person and within-person associations (Hamaker et al., 2015). d) The effects are zero on average but substantial (and opposite) at specific levels of a moderator. In this study, we aimed to deal with the last three concerns by exploring curvilinear in addition to linear associations of time pressure and work engagement on the level of daily within-person associations and by investigating perfectionism as an additional day-level personal predictor and moderator. Due to the inconsistent findings of previous studies, we did not predict the specific form of the association between daily time pressure and daily work engagement (i.e., whether the association would be linear or non-linear and whether it would be linearly positive or negative) and included both linear and quadratic main and interaction effects in our analysis models, as did previous studies on the association between daily time pressure and daily work engagement (Reis et al., 2016; Sheng et al., 2019).

Personal Characteristics as Predictors of Work Engagement

Since its first publication (Demerouti et al., 2001), the JD–R Model has sparked an abundance of studies and matured into JD–R Theory (Bakker & Demerouti, 2014, 2017). One of the most consequential expansions of the JD–R Model refers to the inclusion of personal resources (Xanthopoulou et al., 2007). Several studies investigated personal characteristics such as self-efficacy, optimism, and resilience as drivers of work engagement (Xanthopoulou et al., 2007, 2013). The broad definition of resources according to the Conservation of Resources Theory as objects, states, conditions, and other things with individual value has been criticized because, according to this definition, "nearly anything good can be considered a resource" (Halbesleben et al., 2014, p. 1337). By contrast, research on personal resources in the JD–R Model has specifically identified personality traits and states as potential resources for work-re-

lated well-being and thus has the advantage of offering a clear distinction from job resources. The definition of personal resources proposed by Xanthopoulou et al. (2007) skips the controversial term "value" in the Conservation of Resources Theory, which implies a positive outcome and thus confounds resources and their outcomes in a manner comparable to Halbesleben et al. (2014), who generally defined resources as "anything perceived by the individual to help attain his or her goals" (Halbesleben et al., 2014, p. 1338). Nevertheless, personal resources have been considered only "a good thing." Studies have viewed personal resources as directly enhancing work-related well-being (e.g., Barbier et al., 2013) or buffering the detrimental effects of job demands on well-being (e.g., Xanthopoulou et al., 2013). The empirical evidence from these studies has so far suggested that, besides some null findings (e.g., Xanthopoulou et al., 2013), personal resources tend to directly and indirectly promote work-related well-being.

Considering the conceptual and empirical work on personal resources as a personal counterpart to job resources, personal demands as a counterpart to job demands have tended to be rather neglected so far. Rather, Bakker and Demerouti (2007) stated that investigating the role of personal demands represents a promising avenue for future research in JD–R Theory. In one of the few studies considering personal demands, Barbier et al. (2013) defined them as "the requirements that individuals set for their own performance and behavior that force them to invest effort in their work and are therefore associated with physical and psychological costs" (Barbier et al., 2013, p. 751). We suggest that this definition of personal demands, although generally paralleling the conceptualization of job demands, might not be able to encompass psychologically relevant and potentially demanding conditions/variables. For example, the definition above implies that personal demands represent entities that individuals intently act upon ("setting requirements"). In addition, we propose that personal demands do not necessarily force individuals to invest effort in their work, but—on the contrary—might even impair such investments. Hence, drawing on the general definition of resources proposed by Halbesleben et al. (2014), we define personal demands—in contrast to personal resources—as the requirements of the self that may impair individual goal attainment. More specifically, personal demands can be thought of as vulnerability factors that both potentially hamper the achievement of (work-related) goals and additionally amplify possible negative effects of job demands on (work-related) well-being. Therefore, we assume personal demands and personal resources to show opposite relationships with work engagement. To date, personal demands have been studied as performance expectations (Barbier et al., 2013) or as workaholism (Schaufeli, Bakker, van der Heijden, et al., 2009). Whereas workaholism has been associated with negative long-term outcomes (for a meta-analysis, see Clark et al., 2016) but partially positive outcomes in the short-term (e.g., work engagement; Di Stefano & Gaudiino, 2019), increases in performance expectations have been associated with increased work engagement (Barbier et al., 2013). Therefore, these few findings suggest that more research is needed to advance our understanding of whether, under what conditions, and how personal demands affect work-related well-being.

Perfectionism as a Personal Demand and a Personal Resource

One personal characteristic that has been suggested for consideration as a personal demand is perfectionism (Lorente Prieto et al., 2008). Diverse facets defining perfectionism can be summarized under two broader dimensions which are moderately to highly correlated (Stoeber & Gaudreau, 2017): Perfectionistic strivings comprise the inclination to set and strive for extremely high standards for oneself, whereas perfectionistic concerns refer to the tendency to overly criticize one's own behavior and to worry about the consequences of not fulfilling one's standards. Whereas perfectionistic concerns can be viewed as a generally maladaptive personality characteristic due to their links with multiple maladaptive outcomes, associations of perfectionistic strivings with psychological (mal)adjustment have been shown to be weaker than those of perfectionistic concerns or even reversed, especially when the overlap between perfectionistic strivings and concerns has been accounted for (see Stoeber & Gaudreau, 2017, for a review).

Specifically, the differential associations of perfectionistic strivings and concerns were also revealed in associations with work-related outcomes (for a meta-analysis, see Harari et al., 2018). Thus, it seems particularly appealing to investigate the roles of the two dimensions of perfectionism as personal characteristics in the JD–R Model framework. On the one hand, we propose that perfectionistic concerns fulfil the characteristics of a personal demand. Perfectionistic concerns have been consistently associated with impaired well-being across different domains (e.g., Rice et al., 2016; Stoeber, 2012) including work (Harari et al., 2018; Ocampo et al., 2020). They have also been associated with factors that generally impede goal-achievement (e.g., Ocampo et al., 2020) and reduce work engagement (e.g., Harari et al., 2018). By contrast, we argue that (unique) perfectionistic strivings rather reflect the characteristics of a personal resource. They are an aspect of the self that is often linked to less negative and more positive health and work-related outcomes (e.g., Harari et al., 2018; Stoeber & Gaudreau, 2017) and are also associated with factors that generally promote goal-achievement (Dunkley et al., 2000; Ocampo et al., 2020; Stoeber et al., 2008). Specifically, they were found to be associated with higher work engagement (Harari et al., 2018). According to the dual process model of perfectionism, perfectionistic strivings and concerns are involved in two distinct processes regarding goal attainment (Slade & Owens, 1998): Whereas (unique) perfectionistic strivings are characterized by an approach orientation which is guided by hope for success, perfectionistic concerns are characterized by an avoidance orientation which is guided by fear of failure. Thus, the opposite associations of perfectionistic strivings and concerns with work engagement can be explained by different motivation orientations, which suggests the categorization of perfectionistic strivings and concerns as a personal resource and a personal demand, respectively.

Going beyond the investigation of perfectionism as a personality trait, perfectionistic cognitions are defined as

automatic thoughts that involve "themes of perfection and imperfection" (Flett et al., 2007, p. 257) that result from an activated perfectionistic self-schema. They constitute a "state-like manifestation" of perfectionism (Hill & Appleton, 2011, p. 697). Analogous to dispositional perfectionism, it has been valuable to differentiate perfectionistic strivings cognitions (PSC) and perfectionistic concerns cognitions (PCC) which showed differential associations with affective well-being and goal-achievement (e.g., Prestele et al., 2020). As such, we aimed to investigate PSC and PCC as state-level personal demands and personal resources in the JD–R framework. More specifically, we hypothesized:

Hypothesis 1: High levels of unique PSC will be associated with higher levels of work engagement.

Hypothesis 2: High levels of unique PCC will be associated with lower levels of work engagement.

In addition to these main effects, we explored interactions of PSC and PCC with the job demand time pressure. Specifically, we investigated whether time pressure would have different associations with work engagement at different levels of PSC and PCC. Only one previous study investigated a possible moderating role of perfectionism in the association between time pressure and work engagement, but it was not explicitly hypothesized (Leinhos et al., 2018). The interaction between dispositional perfectionism and trait time pressure in this previous study was not significant. However, the authors did not differentiate between perfectionistic strivings and concerns. Possible opposite moderating effects of the two dimensions might have been washed out of the total perfectionism score. Furthermore, all variables were measured as traits, and the study could thus only capture (potentially obscured) between-person differences. Therefore, no valid conclusions could be drawn about whether the same employee might be more or less engaged at work on one day compared with another as a function of day-to-day fluctuations in time pressure and perfectionism. On the level of dispositional perfectionism, perfectionistic concerns have been found to amplify the negative effects of stressors on well-being (e.g., Békés et al., 2015; Chang & Rand, 2000; Enns et al., 2005). The results for perfectionistic strivings have been less consistent. Whereas some studies reported that perfectionistic strivings have the potential to buffer negative effects of stressors on well-being and enhance invested effort (e.g., Blankstein et al., 2007; Enns et al., 2005), others found that perfectionistic strivings do not act as a moderator (e.g., Békés et al., 2015; Chang & Rand, 2000), and some studies even reported that perfectionistic strivings might amplify the negative effects of specific stressors (e.g., Békés et al., 2015).

In differentiating between perfectionistic strivings and concerns on the level of daily perfectionistic cognitions, we assumed high unique PCC as a personal demand to negatively influence the relationship between daily time pressure and daily work engagement. Specifically, we hypothesized that more frequent unique PCC than usual should amplify a negative effect or hamper a positive effect of daily time pressure on daily work engagement as opposed to less

frequent unique PCC than usual. In case of an inverted U-shaped relation between daily time pressure and daily work engagement, the quadratic relationship between daily time pressure and daily work engagement should be less pronounced and resemble a negative linear relation on days with more frequent unique PCC.

By contrast, frequent unique PSC as a personal resource should positively influence the association of daily time pressure with daily work engagement. Specifically, we expected that frequent unique PSC should buffer a negative effect or even enhance a positive effect of daily time pressure on daily work engagement compared to less frequent PSC. In case of an inverted U-shaped relation between daily time pressure and daily work engagement, the quadratic relationship between daily time pressure and daily work engagement should be less pronounced and resemble a positive linear relation on days with more frequent unique PSC.

Hypothesis 3: Unique PSC will moderate the (linear and/or curvilinear) within-person effects of daily time pressure on daily work engagement.

Hypothesis 4: Unique PCC will moderate the (linear and/or curvilinear) within-person effects of daily time pressure on daily work engagement.

All our hypotheses were directed at concurrent (i.e., same-day) effects. However, we also explored lagged (i.e., from one workday to the next) effects, i.e., whether time pressure and employees' perfectionistic cognitions including their interactions on one workday predicted employees' work engagement on the following day.

Method
Recruitment and Procedure

This paper is part of a larger preregistered project conducted in Southwestern Germany at the end of 2018. A registered report that used a part of the collected data has been published before (Reis & Prestele, 2020); however, the overlap of the variables used in the present paper and those used in the registered report is only minimal. An overview of all the variables assessed in this study can be accessed via https://osf.io/g7zch. Participants were employees who were recruited through flyers, social media, and advertisements in local newspapers. To be accepted into the study, individuals had to work at least part time and not work shifts. Upon registration via mail, participants received an informed consent form and additional information about the study. After providing consent, they were asked to complete an online trait questionnaire and provide demographic information (e.g., age, gender, and professional experience), and they were given detailed information about the upcoming daily assessment procedure.

The daily assessment phase took place for three subsequent weeks. Each evening from Monday to Friday, the participants were prompted to complete a brief questionnaire of approximately eight minutes on their smartphones.[1] Thereby, participants indicated how much time pressure they had perceived, how engaged they had been at work,

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[1] During the daily assessment phase, participants were also prompted to complete further questionnaires, which took approximately three

and how frequently they had experienced perfectionistic cognitions during the workday.

For compensation, participants received € 30, or they were offered to participate in an online mindfulness training program if they had completed at least 50% of the daily assessments. Upon request, participants received individual feedback based on their responses. The study was approved by the local ethics committee.

Participants

N = 160 participants completed the preliminary trait questionnaire. Out of these 160 participants, N = 157 participants (67% women) participated in the daily assessment phase. These constituted the final sample.[2] On average, the participants were 41.55 years old (SD = 10.94, range: 18–64), had professional experience of 16.96 years (SD = 11.81, range: 0–44), had spent 8.68 years with their current employer (SD = 8.34, range: 0–44), and had a contract of 36.8 hours per week (SD = 6.46, range: 18–56). Almost three quarters (73%) of the participants had an unlimited contract, whereas 18% had a limited contract, 3% were self-employed, and 6% had other forms of employment (e.g., civil servants or freelancers). Compliance was good: The average frequency of daily assessments was 12.54 days per participant (SD = 2.92; Min = 2, n = 1; Max = 15, n = 51), resulting in N = 1,986 measurement occasions at Level 1. These constituted 83.57% of the maximum number of measurement occasions possible (15 * 157 = 2,355).

Measures

Daily Perfectionistic Cognitions.

PSC and PCC were assessed with three items each suggested by Prestele et al. (2020) for the measurement of daily perfectionistic cognitions. Prestele et al. (2020) developed items for PSC and PCC that reflected the central aspects of perfectionistic strivings and concerns in the form of current thoughts. In a daily diary study among university students, they demonstrated that the six items reliably captured differences in PSC and PCC both at the within-person and at the between-person level. For the present study, we adapted the items to assess employees' perfectionistic cognitions during the workday. Participants indicated how frequently they had experienced each of the thoughts from 1 (not at all) to 6 (almost the entire time). One example item for PSC was "I want to perform particularly well at work." One example item for PCC was "Bother! I made a mistake here."

Daily Time Pressure.

Daily time pressure was assessed with three items of a shortened and adapted version of a frequently used and validated German scale by Semmer, Zapf, and Dunckel (1999). Participants indicated how intensively they experienced time pressure during the workday (1 = not at all to 5 = very much). The three items used were "Today I was under time pressure at work", "Today a high working speed was required", and "Today I had to work faster than usual to get my work done."

Daily Work Engagement.

Daily work engagement was assessed with three items adapted and translated into German from the ultra-short version of the Utrecht Work Engagement Scale (UWES-3; Schaufeli et al., 2019). Schaufeli et al. (2019) developed and validated the UWES-3 in order to parsimoniously assess work engagement with three items only, each item capturing one of the three dimensions of work engagement. For the present study, we adapted the items in that participants retrospectively assessed the intensity of work engagement they had experienced during the workday. Response options ranged from 1 (not at all) to 5 (very much). The three items were "Today I felt bursting with energy at work" (reflecting vigor), "Today I was enthusiastic about my job" (reflecting dedication), and "Today I was immersed in my work" (reflecting absorption).

Statistical Analyses

Due to the repeated daily assessment procedure, the resulting data were represented in a hierarchical structure, with daily measurement occasions (Level 1) nested within individuals (Level 2). We used R (R Core Team, 2021) for data management and Mplus Version 8.5 (Muthén & Muthén, 2017) for statistical modelling and hypothesis testing.

Out of the 1,968 measurement occasions of the dataset, six measurement occasions had to be dropped as data for our dependent variable daily work engagement were missing in these. Before testing the hypotheses, we ran some preliminary analyses. First, we conducted a multilevel confirmatory factor analysis (MCFA; Dyer et al., 2005) on all day-level variables. The MCFA allowed us to examine the factor structure of the daily measures used in this study and to calculate the multilevel composite reliabilities (ω reliabilities) of the scale values (Geldhof et al., 2014) at both levels. Second, in order to estimate the extent to which the

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minutes each in the morning (Monday through Saturday; Reis & Prestele, 2020) and in the late evening. However, the variables assessed at those times were not part of this study.

2 The raw daily diary data consisted of 164 participants (four more than the previous online pretest). Four of those were latecomers for the daily diary assessment phase without having participated in the online pretest. In order to make sure that the sample of our study fit the necessary inclusion criteria (e.g., employees, no shift-work), which were assessed in the pretest, we excluded these four participants from the data. Of the 160 participants who took part in the online pretest, two did not subsequently take part in the daily diary assessment phase. One further participant participated in both the pretest and the daily diary assessment phase, but due to technical errors, no daily diary data could be recorded for him or her. Hence, our total sample consisted of 157 participants.

Table 1. Bivariate Correlations, Means, Standard Deviations, Reliability Estimates, and Intraclass Correlation Coefficients of Scales at the Within-Person and Between-Person Level

Variable	1	2	3	4	ω reliability	ICC
1. PSC		**.32** [.26; .39]	**.18** [.11; .25]	**.21** [.14; .27]	.70	.74
2. PCC	**.35** [.21; .50]		**.21** [.14; .27]	**−.20** [−.27; −.12]	.64	.67
3. Daily Time Pressure	**.23** [.05; .42]	**.32** [.16; 50]		−.01 [−.09; .07]	.93	.37
4. Daily Work Engagement	.13 [−.07; .32]	**−.26** [−.46; −.07]	−.09 [−.33; .15]		.88	.52
M	3.54	2.22	2.65	3.05		
SD	1.47	1.17	1.23	1.05		
ω reliability	.95	.92	.97	.98		

Note. PSC = perfectionistic strivings cognitions, PCC = perfectionistic concerns cognitions. Within-person statistics above the diagonal, between-person statistics below the diagonal. Correlations significantly different from zero at α = .05 are in bold. Values in squared brackets indicate 95% confidence intervals of correlation coefficients. $N_{Level\ 2}$ = 157; $N_{Level\ 1}$ = 1,962 for PSC, PCC, and daily work engagement; $N_{Level\ 1}$ = 1,968 for daily time pressure.

daily measures captured between-person differences as opposed to within-person fluctuations, we calculated intraclass correlation coefficients (ICCs) of the latent variables using the latent variance estimations of the MCFA (Hox, 2010). Third, we calculated bivariate correlations between all study variables at both levels.

To test our hypotheses, we conducted a multilevel regression analysis at the within-person level with daily work engagement as the criterion. The model contained a random effect for the intercept of daily work engagement and fixed effects for slopes across participants. All predictor variables (daily time pressure, PSC, and PCC) were centered on the person means (Enders & Tofighi, 2007). The model included the linear and quadratic terms of daily time pressure, unique PSC and PCC and the interaction effects of both the linear and quadratic term of daily time pressure with PSC and PCC (i.e., linear and quadratic-by-linear interactions). We also tested for lagged effects (i.e., from day to day) besides concurrent effects by also including lagged variables (at $t - 1$) in the model. We set the values of the lagged variables referring to Fridays to NA in order to only specify pure day-to-day lagged effects of the variables on daily work engagement (i.e., lagged effects from previous Fridays to Mondays were removed). In order to avoid listwise deletion of all the data rows that contained missing values (among them all Monday data), we included the variances and covariances of all independent variables as model parameters. However, this approach led to estimation problems when robust Maximum Likelihood estimation was applied (i.e., standard errors of some parameters were not trustworthy). Therefore, we applied Bayes estimation with 100,000 iterations and non-informative priors in Mplus for our final model. In order to safeguard the validity of our results, we checked the stability of the Markov chains by inspecting the trace plots, scrutinized the smoothness of the histograms of all parameters, and inspected whether the model still converged after doubling the number of itera-

tions to 200,000. Our hypotheses would be supported if the 95% highest posterior density intervals (HPDs) of the corresponding regression parameters did not contain zero. We further scrutinized linear and quadratic-by-linear interaction effects between daily time pressure and daily perfectionistic cognitions by applying the Johnson-Neyman technique (Miller et al., 2013). Specifically, we determined the critical range of daily time pressure for which the simple slopes of daily time pressure on daily work engagement were significantly different from zero (i.e., where the 95% confidence intervals of the simple slope did not include zero).

Results

Preliminary Analyses

The MCFA of the daily variables provided a good model fit, $\chi^2(96)$ = 245.58, $p < .001$; CFI = .98; RMSEA = .03; SRMR (within) = .03, SRMR (between) = .05. Thus, the assumption of four different scales for the daily measures at both levels of analysis was well-represented by the data. Table 1 presents means, standard deviations, ω reliabilities, ICCs, and zero-order correlations for all scale scores in this study. The ICCs indicated a substantial percentage of intraindividual variation in the frequency of all study variables.

Hypothesis Tests

To test our hypotheses, we specified the full regression model with daily work engagement as the criterion as described above. R^2 of the model was .14, which indicated that 14% of the within-person variance of daily work engagement was explained by the predictors. The intercept had a variance of 0.54 across participants (M = 3.03). Table 2 summarizes the estimates of the regression parameters.

As regards concurrent effects, neither the linear nor the quadratic term of daily time pressure was a significant pre-

Table 2. Results of Multilevel Regression Analysis Predicting Daily Work Engagement

Predictor	B	95% HPD	β
DTP linear	–0.01	[–0.05; 0.03]	–0.01
DTP quadratic	0.01	[–0.01; 0.04]	0.03
PSC	0.21	[0.15; 0.27]*	0.20
PCC	–0.25	[–0.31; –0.19]*	–0.24
DTP linear x PSC	–0.02	[–0.07; 0.02]	–0.03
DTP linear x PCC	–0.06	[–0.11; –0.01]*	–0.06
DTP quadratic x PSC	0.06	[0.04; 0.09]*	0.14
DTP quadratic x PCC	–0.03	[–0.06; –0.00]*	–0.07
DTP linear *lagged*	–0.01	[–0.06; 0.04]	–0.01
DTP quadratic *lagged*	–0.00	[–0.04; 0.03]	–0.00
PSC *lagged*	–0.00	[–0.08; 0.07]	–0.00
PCC *lagged*	0.00	[–0.07; 0.08]	0.00
DTP linear x PSC *lagged*	0.04	[–0.02; 0.10]	0.04
DTP linear x PCC *lagged*	0.02	[–0.05; 0.08]	0.01
DTP quadratic x PSC *lagged*	–0.00	[–0.04; 0.04]	–0.00
DTP quadratic x PCC *lagged*	0.02	[–0.03; 0.06]	0.03
DWE *lagged*	0.09	[0.03; 0.15]*	0.08

Note. B = unstandardized regression coefficient, HPD = highest density interval, β = standardized regression coefficient, DTP = daily time pressure, PSC = perfectionistic strivings cognitions, PCC = perfectionistic concerns cognitions, DWE = daily work engagement; * HPD excluding zero.

dictor of daily work engagement. Hence, on workdays when perfectionistic cognitions were average, the level of work engagement was not affected by the level of time pressure. As opposed to daily time pressure, the two main effects of PSC and PCC were both significant and in the hypothesized directions. On days when participants experienced more frequent PSC than usual (and when PCC were held constant and time pressure was average), they were generally more engaged at work. By contrast, on days when they experienced more frequent PCC than usual (and when PSC were held constant and time pressure was average), they were generally less engaged at work. Hence, Hypotheses 1 and 2 could be supported for concurrent associations.

Concerning the concurrent interaction between daily time pressure and unique PSC, the linear interaction term was non-significant, whereas the quadratic-by-linear interaction term turned out to be significant. Figure 1A depicts the regression curves of daily work engagement predicted by daily time pressure for low (*M* – 1 *SD*), medium (*M*), and high (*M* + 1 *SD*) PSC (with PCC and the lagged variables held constant). For low unique PSC, the curve represents a slightly inverted U-shaped (i.e., concave) relation between daily time pressure and daily work engagement. Surprisingly, for high unique PSC, the curve is U-shaped (i.e., convex). Applying the Johnson-Neyman technique (Miller et al., 2013), we plotted the simple slope effects of daily time pressure on daily work engagement as a function of daily time pressure for fixed values of PSC (low, medium, and high) in Figure 2. We found that the simple slope of daily time pressure did not reach statistical significance for any level of daily time pressure at both low (Figure 2A) and medium (Figure 2B) levels of unique PSC. Hence, changes in time pressure did not seem to have a significant impact

on work engagement on days when employees experienced less frequent PSC or average PSC (with PCC held constant). However, at high levels of unique PSC (Figure 2C), there was a significant negative relationship between daily time pressure and daily work engagement for lower levels of daily time pressure than usual (up to about 0.30 units below the person means) and a significant positive relationship between daily time pressure and daily work engagement for higher levels of daily time pressure than usual (from about 0.71 units up above the person means). In other words, on days when employees experienced more frequent PSC than usual (with PCC held constant), an increase in time pressure was significantly negatively associated with daily work engagement for time pressure levels lower than the mean level. Also, on these days, an increase in time pressure was significantly positively associated with daily work engagement when time pressure was higher than the mean level. Although we found a significant interaction effect between daily time pressure and unique PSC, Hypothesis 3 concerning this interaction could not be supported as we rather expected a less pronounced inverted U-shaped relation between daily time pressure and daily work engagement than a U-shaped relation for high unique PSC in case of a nonlinear relation.

Regarding the concurrent interaction between daily time pressure and unique PCC, both the linear and the quadratic-by-linear interaction terms were significant. Figure 1B depicts the regression curves of daily work engagement predicted by daily time pressure for low (*M* – 1 *SD*), medium (*M*), and high (*M* + 1 *SD*) PCC (with PSC and the lagged variables held constant). For low unique PCC, the curve is slightly U-shaped (i.e., convex), similar to the curve for high unique PSC. For high unique PCC, however, a quadratic as-

sociation is less discernible, and the curve resembles a negative regression line. Johnson-Neyman plots of the slope effects of daily time pressure on daily work engagement as a function of daily time pressure for fixed values of PCC (low, medium, and high) are depicted in Figure 3. At low levels of unique PCC (Figure 3A), there was a significant positive relationship between daily time pressure and daily work engagement when daily time pressure was higher than the mean level (i.e., from about 0.24 units above the person means). Below this critical value of 0.24, the simple slope was not significant. This means that on workdays when employees experienced less frequent PCC than usual (and PSC held constant), an increase in time pressure went along with significantly higher work engagement levels than usual when time pressure was higher than usual, but an increase in time pressure had no significant effect for lower time pressure values. In contrast, at medium (i.e., average) levels of unique PCC (Figure 3B), the simple slope of daily time pressure did not reach significance for any level of daily time pressure. In other words, changes in daily time pressure did not have a significant impact on daily work engagement on days when employees experienced average levels of PCC (with PSC held constant). At high levels of unique PCC (Figure 3C), the simple slope of daily time pressure was mostly non-significant, apart from a small range of daily time pressure from about 0.14 to 0.91 above the mean level. In this range, the simple slope was significantly negative. All in all, Hypothesis 4, in which we expected that high unique PCC would either buffer a positive relation or enhance a negative relation between daily time pressure and daily work engagement compared to lower levels of unique PCC, was supported.

Apart from the autoregressive effect of daily work engagement, all of the lagged effects including main effects and linear and quadratic-by-linear interaction effects were non-significant. In other words, we did not find evidence that the frequency of perfectionistic cognitions or the level of time pressure on one workday affected the level of work engagement on the following workday.

Discussion

Building on the JD–R Theory, the present daily diary study investigated state manifestations of multidimensional perfectionism (i.e., daily perfectionistic cognitions) as personal demands and resources with respect to daily work engagement in addition to and in the interplay with daily time pressure as a common job demand. Applying multilevel regression analysis with daily work engagement as the dependent variable, we allowed for both linear and quadratic main effects of daily time pressure and linear and quadratic-by-linear interaction effects of daily time pressure with unique PSC and PCC as previous studies suggested that the relationship between time pressure and work engagement is non-linear (e.g., Schmitt et al., 2015; Sheng et al., 2019). Our hypotheses were directed at concurrent effects. However, our model also contained lagged variables as we also wanted to explore whether our hypothesized effects pertaining to the same workday were also present from one workday to the next.

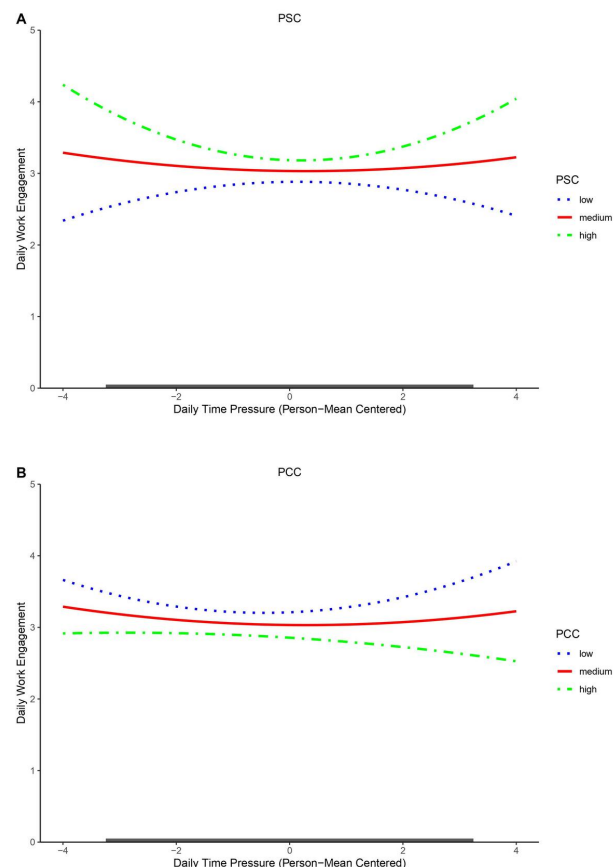As regards the main effects of daily perfectionistic cog-

Figure 1. Plot of the predicted values of daily work engagement as a function of daily time pressure at low (*M* – 1 *SD*), medium (*M*), and high (*M* + 1 *SD*) values of (A) perfectionistic strivings cognitions (PSC) and (B) perfectionistic concerns cognitions (PCC).

The gray bar on the x axis represents the range of person-mean centered daily time pressure in the data.

nitions, we expected that PSC as a personal resource should foster, whereas PCC as a personal demand should impede daily work engagement while daily time pressure was controlled for. In addition, we hypothesized that both unique PSC and PCC would moderate the (quadratic and/or linear) relationship between daily time pressure and daily work engagement in opposite directions. All in all, three of our four hypotheses were supported.

Opposite unique associations of PSC vs. PCC with daily work engagement

With regard to concurrent main effects of unique PSC and PCC on daily work engagement, we found opposite main effects of PSC and PCC, as hypothesized. More specifically, work engagement was higher on days with more frequent PSC and less frequent PCC. This is generally in line with results from cross-sectional studies showing that perfectionistic concerns constitute a personal characteristic associated with impaired goal achievement (e.g., Dunkley et al., 2014; Ocampo et al., 2020) and specifically with reduced work engagement (Harari et al., 2018). By contrast, perfectionistic strivings are an aspect of the self that is of-

ten linked to less negative and more positive health- and work-related outcomes (e.g., Harari et al., 2018; Stoeber & Gaudreau, 2017) and are also associated with factors that generally promote goal-achievement (e.g., Dunkley et al., 2000; Ocampo et al., 2020) and specifically higher work engagement (Harari et al., 2018). Extending the evidence from the level of between-person differences, our analyses revealed that comparable results could be found on the level of within-person variations. In other words, not only do dispositional levels of perfectionism predict between-person differences in work-related well-being, but daily variations in perfectionistic cognitions also go along with daily variations in work engagement.

Non-linear Relation between Daily Time Pressure and Daily Work Engagement Unfolded for Varying Levels of Daily Perfectionistic Cognitions

Besides the concurrent main effects of PSC and PCC, unique PSC and PCC turned out to be significant moderators in the concurrent quadratic relationship between daily time pressure and daily work engagement. Furthermore, unique PCC also moderated the effect of the linear term of daily time pressure on daily work engagement. Whereas daily time pressure appeared not to be related to daily work engagement on average, our results clearly showed that this association was affected by varying levels of unique PSC and PCC. Concerning the moderating role of unique PSC, a pronounced U-shaped relationship between daily time pressure and daily work engagement unfolded at high levels of unique PSC, indicated by changes in the direction of the simple slope of daily time pressure depending on the value of daily time pressure. Specifically, on days when employees experienced more PSC than usual (and PCC remained constant), an increase in time pressure went along with a significant decrease in work engagement at lower levels of time pressure, but it was associated with a significant increase in work engagement at higher levels of time pressure.

This U-shaped association at high levels of unique PSC was quite surprising for us. To our knowledge, a U-shaped association between daily time pressure and daily work engagement has not previously been reported in the literature, neither for an overall nor for a moderated association. Previous studies that reported a quadratic relationship between daily time pressure and daily work engagement exclusively found an *inverted* U-shaped relationship (e.g., Reis et al., 2016, for daily vigor; Sheng et al., 2019, for a total score of daily work engagement). Instead of a U-shaped relationship in case of a quadratic relationship between daily time pressure and daily work engagement, we rather expected a less pronounced inverted U-shaped relationship for high unique PSC (compared to low unique PSC) such that the regression curve should rather resemble a positive line in which the disengaging effect of high daily time pressure was buffered (e.g., Sheng et al., 2019). In addition, the assumption that PSC should buffer a detrimental effect of daily time pressure and daily work engagement, but should not negatively affect this association, might not (ultimately) hold in our results: At high unique PSC, an increase in daily time pressure was associated with a de-
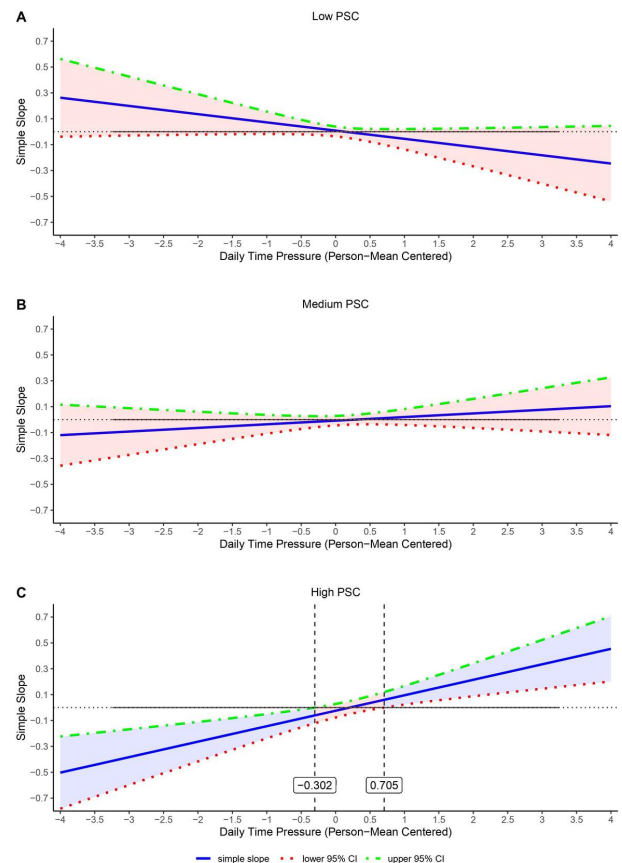

Figure 2. Johnson-Neyman plots of the simple slopes of daily time pressure predicting daily work engagement at (A) low (*M − 1 SD*), (B) medium (*M*), and (C) high (*M + 1 SD*) levels of unique perfectionistic strivings cognitions (PSC).

Blue shaded areas indicate 95% confidence intervals not including zero, red shaded areas indicate 95% confidence intervals including zero. Vertical dashed lines indicate critical person-mean centered values of daily time pressure at which simple slopes exceed significance level. Gray horizontal line on x axis represents the range of person-mean centered values of daily time pressure in the data.

crease in daily work engagement for lower levels of daily time pressure. In contrast, for medium and moderate levels of unique PSC, the simple slopes of daily time pressure on daily work engagement remained non-significant for all values of daily time pressure, indicating that the disengaging effect of increasing time pressure at lower values of time pressure might only be present for higher unique PSC. However, when time pressure exceeded its average level, it apparently boosted employees' work engagement levels when they were in a state of high perfectionistic strivings (and when PCC remained constant) such that work engagement regained its previous high level. Therefore, due to this unexpected finding, our hypothesis that high unique PSC enhance a positive association or buffer a negative association between daily time pressure and daily work engagement could not be supported. This seemingly paradox finding for high unique PSC is difficult to explain: Possibly, when employees are in a state of high perfectionistic strivings (i.e., they experience frequent PSC on a workday) and work under low time pressure, they might experience a lot of freedom to fully unfold at work, and they can put all their focus on the

perfect completion of the task they are currently working on (De Spiegelaere et al., 2016; Stoeber et al., 2010). With increasing time pressure, this freedom is less and less given to these employees, which might be responsible for the relatively low level of work engagement on days with moderate time pressure. By contrast, they might again increase their engagement under high time pressure instead of giving up their self-worth-relevant goals (Eddington, 2014), as only by increasing their efforts might they successfully finalize their tasks.

As regards the concurrent interaction effects of unique PCC, our hypothesis that high unique PCC as a personal demand might enhance a negative association or buffer a positive association between daily time pressure and daily work engagement as opposed to lower levels of unique PCC could be supported: Whereas at lower levels of unique PCC, an increase in daily time pressure was significantly related to an increase in daily work engagement at higher than average levels of daily time pressure, an increase in daily time pressure was unrelated to changes in daily work engagement at medium levels of unique PCC and even significantly associated with a slight decrease in daily work engagement for a small interval of moderately high daily time pressure at high levels of unique PCC. In a state of low perfectionistic concerns, employees might be less worried about bad consequences that could arise from making a mistake while working on their tasks (Slade & Owens, 1998). Therefore, higher time pressure might motivate them to even increase their effort to successfully finalize their tasks in such a state, whereas in a state of higher perfectionistic concerns, employees may decide to not increase or even decrease their effort under high time pressure as working faster might lead to making more momentous mistakes.

Strengths and Limitations of our Study and Suggestions for Future Research

Overall, the consideration of additive effects of job demands, personal demands, and personal resources along with their interplay in the motivational process offers a promising avenue for theoretically extending the JD–R Theory (Bakker & Demerouti, 2017). However, whereas research has begun to explore the role of (mostly trait-level) personal resources in addition to and in an interplay with job demands and job resources (e.g., Xanthopoulou et al., 2007), the investigation of personal demands is lagging far behind. We applied and theoretically derived definitions of personal demands and personal resources and deduced how perfectionistic strivings and concerns might be classified according to these definitions. It turned out that perfectionistic cognitions as state-like manifestations of trait perfectionism offer two dimensions that might be thought of as personal resources and personal demands with opposing effects on work engagement. Thereby, we turned away from the investigation of personal characteristics on the between-person level and explored the role that intraindividually varying state manifestations of a personal demand or personal resource might play in the daily motivational process.

By including a quadratic effect of daily time pressure in its interaction with daily perfectionistic cognitions we il-
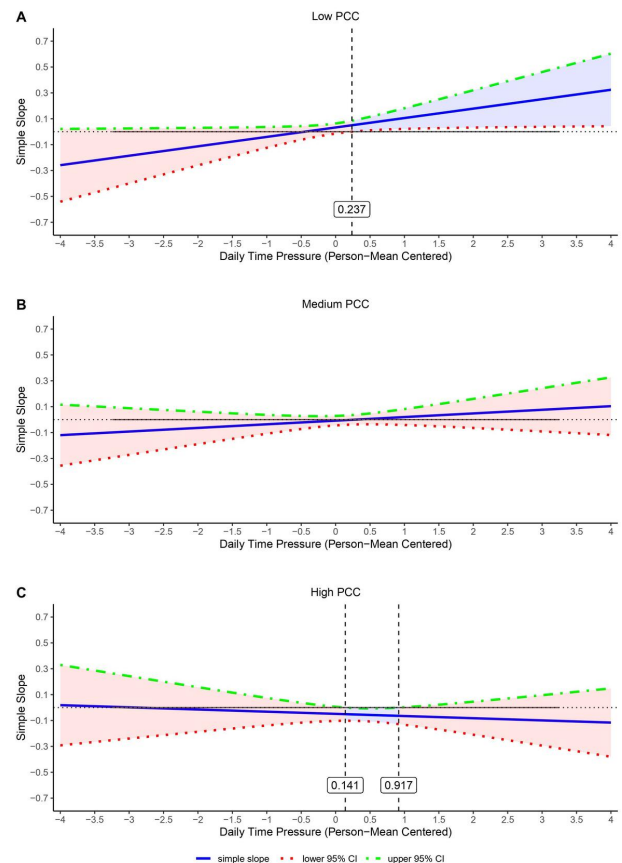

Figure 3. Johnson-Neyman plots of the simple slopes of daily time pressure predicting daily work engagement at (A) low (*M* − 1 *SD*), (B) medium (*M*), and (C) high (*M* + 1 *SD*) levels of unique perfectionistic concerns cognitions (PCC).

Blue shaded areas indicate 95% confidence intervals not including zero, red shaded areas indicate 95% confidence intervals including zero. Vertical dashed lines indicate critical person-mean centered values of daily time pressure at which simple slopes exceed significance level. Gray horizontal line on x axis represents the range of person-mean centered values of daily time pressure in the data.

lustratively demonstrated that the interplay between time pressure and personal characteristics in predicting work engagement might be much more complex than linear terms can account for. Positive effects of time pressure on work engagement sometimes only show up when suppressor variables are controlled for (e.g., Cavanaugh et al., 2000) or when other boundary conditions (e.g., appraisal processes and trait-level personal resources) are accounted for (e.g., Kunzelmann & Rigotti, 2020; Mazzola & Disselhorst, 2019). In our case, an inverted U-shaped association between daily time pressure and daily work engagement that appeared to be moderated in form but not in direction in prior studies (Reis et al., 2016; Sheng et al., 2019) could not be detected, whereas the U-shaped association we found for high levels of unique PSC was novel and unexpected. Future studies should use our findings to systematically investigate boundary conditions for the form and direction of quadratic and linear time pressure–work engagement effects. In general, given our findings, we suggest that researchers include quadratic interaction effects in associations between time pressure and work-related well-being even when the main

effect of the quadratic term of time pressure is not significant.

Although our daily diary design had the strength that we investigated pure within-person associations, one limitation is that we assessed daily perfectionistic cognitions, daily time pressure, and daily work engagement only retrospectively at the end of the workday. Therefore, the found effects of perfectionistic cognitions and time pressure on work engagement pertaining to the same workday can only be interpreted correlatively, but not causally. As such, we cannot rule out the possibility that daily work engagement might in turn or additionally have affected daily perfectionistic cognitions or daily time pressure. Our analysis model also contained lagged variables pertaining to the previous workday. This allowed us to exploratorily test for possible lagged effects of perfectionistic cognitions and time pressure of one workday on work engagement of the next workday. However, none of the main effects of daily time pressure and daily perfectionistic cognitions and none of the linear and quadratic-by-linear interaction effects between daily time pressure and daily perfectionistic cognitions turned out to be significant. The reason for these null lagged effects may be that the time lag of one day might be too large (Mitchell & James, 2001). Possibly, perfectionistic cognitions and time pressure only affect work engagement on the very same workday, but do not have any sustained effect on the next day. Arguably, these effects may dissipate after the end of the workday when recovery processes due to leisure time activities and sleep take place (Sonnentag et al., 2012). Future studies should therefore test the causal mechanism of our found results by assessing perfectionistic cognitions, time pressure, and work engagement at multiple time points during the workday. In this way, associations between these variables over a shorter time interval can be investigated and a causal interpretation of the results may be warranted.

Furthermore, our study did not differentiate between the three dimensions of work engagement (i.e., vigor, dedication, absorption). The use of an overall measure of work engagement reflects the presumption that all three dimensions are experienced at the same time (Reis et al., 2016; Sonnentag et al., 2010). Despite high interrelations of the three dimensions at the daily level (Breevaart et al., 2012), a moderate score on daily work engagement on a certain day does not necessarily indicate that an employee experienced moderate levels in each of the three dimensions. Rather, it could also indicate that an employee experienced a high level of vigor, a moderate level of dedication, and a low level of absorption on that specific day. Furthermore, previous studies partially reported differential relationships between predictors of work engagement and the three dimensions of work engagement (e.g., daily time pressure with daily vigor vs. daily absorption; Reis et al., 2016). As such, it is conceivable that daily perfectionistic cognitions might be differentially associated with the three dimensions of work engagement. On top of this, the investigations of whether daily perfectionistic cognitions moderate the relation between daily time pressure and daily work engagement might be too "rough" and unspecific, and it might be more fruitful to investigate such a moderating effect for the dimensions of work engagement separately. Future studies could explore the effects of daily perfectionistic cognitions for each dimension of daily work engagement separately in order to explore potential differential processes in the associations (see Reis et al., 2016).

Practical Implications

Because work engagement is predominantly related to positive outcomes at work such as job satisfaction (Karanika-Murray et al., 2015) or high job performance (Christian et al., 2011), employers should be interested in providing a work atmosphere that fosters work engagement. On the basis of the results of this study, this should be an atmosphere in which employees experience frequent PSC and do not experience frequent PCC.

In general, providing a rewarding atmosphere at work should foster an approach orientation among employees. Such an approach condition has been found to result in a state of high perfectionistic strivings and thus to trigger PSC (Kobori & Tanno, 2005). For example, employers could provide the prospect of bonuses or other material benefits as compensation for extraordinary engagement on important tasks. A less expensive yet very powerful "instrument" that supervisors could use involves praising employees or giving them positive feedback on their work (Kluger & DeNisi, 1996). However, prior to full-heartedly recommending the promotion of PSC, long-term effects that PSC might have on strain processes under stressful working conditions should be explored. By contrast, in order for employees to be in a state of low perfectionistic concerns (and thus to perceive less frequent PCC), they must not fear negative consequences or punishments when they fail. One essential aspect of perfectionistic concerns is the fear of making mistakes (Frost et al., 1990). A "mistake-tolerant" working atmosphere may prevent employees from developing a fear of failure and thereby help them remain engaged in their work.

Generally, high levels of perfectionistic concerns constitute a serious risk factor for negative outcomes concerning work (Harari et al., 2018) and health (e.g., Limburg et al., 2017). Therefore, in order to establish a healthy and successful work environment, organizations should look after perfectionistic employees and support them. Training and coaching programs that implement elements of evidence-based perfectionism intervention methods (Egan & Shafran, 2017) could be suitable measures to this end. These programs could help employees identify dysfunctional cognitions (e.g., PCC) and re-evaluate the performance-related situations in which these cognitions occur.

Conclusion

This is the first study to systematically investigate multidimensional daily perfectionistic cognitions predicting daily work engagement in addition to and in an interplay with daily time pressure as a common job demand. Unique PSC and PCC showed opposite associations with daily work engagement, thus highlighting the ambiguity of perfectionism with respect to psychological adjustment. Building on the JD–R Theory, our results support the complexity of the time-pressure–work engagement association and highlight how feeling the pressure of having personal demands versus feeling that one has personal resources at hand might add

to and moderate these associations.

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Contributions

Contributed to conception and design: EP, DR
Contributed to acquisition of data: EP, DR
Contributed to analysis and interpretation of data: MCS
Drafted and/or revised the article: MCS, EP, DR
Approved the submitted version for publication: MCS, EP, DR

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Competing Interests

The authors report no conflict of interest.

Data Accessibility Statement

Data and analysis scripts for this research can be accessed via https://osf.io/g7zch/.

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