

The ambivalence of challenge stressors: Time pressure associated with both negative and positive well-being [☆]

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ABSTRACT

According to the challenge–hindrance model, challenge stressors contain both stressful and challenging aspects, hindrance stressors only stressful aspects. Typically, negative outcomes of challenge stressors refer to well-being (strain), positive outcomes to so-called work outcomes (e.g., productivity, intention to quit). As both effects occur simultaneously, the positive outcomes often emerge only when controlling for the negative effects. We suggest that the negative *and* the positive effects of challenge stressors may refer to well-being. Specifically, we propose challenge to indicate competence, thus fostering organization-based self-esteem (OBSE), which, in turn, should enhance more general indicators of positive well-being. We explored the effect of time pressure (a prototypical challenge stressor) on a general well-being variable (positive attitude towards life; PAL). We postulated challenge stressors to be associated with PAL positively via OBSE and negatively via strain. These processes should (a) result in a non-significant bivariate association, which should (b) become significant once strain is controlled (suppression), but (c) become insignificant again once OBSE is controlled (mediation). Using structural equation modeling, we could confirm our hypotheses in a cross-sectional study. Results confirm the inherently ambivalent nature of time pressure, containing both positive and negative variance. In line with our theoretical position, results suggest that the negative and the positive outcomes may be conceived in terms of different aspects of well-being, in addition to “work outcomes” that do not refer to well-being. This concept of challenge stressors may help to explain why many people do not reduce challenge stressors even when they could: Feeling good about themselves and their lives may, at least temporarily, outweigh the strain.

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For a long time, research on work stress has concentrated mainly on the negative consequences of occupational stressors on physical and psychological health (e.g., Semmer, McGrath, & Beehr, 2005; Sonnentag & Frese, 2003). Recently, however, the challenge–hindrance framework postulated that some stressors – called challenge stressors – may have negative and positive consequences simultaneously (e.g., Cavanaugh, Boswell, Roehling, & Boudreau, 2000; LePine, Podsakoff, & LePine, 2005). Results of two meta-analyses provide support for this framework by demonstrating the postulated divergent relationships with several important work criteria (LePine et al., 2005; Podsakoff, LePine, & LePine, 2007). The challenge–hindrance model has yielded a number of important new insights. At the same time, however, some of the mechanisms involved in the process underlying the positive effects of challenge stressors are not very clear yet. Specifically, the distinction between “work outcomes” and “health outcomes” (i.e., strain) – as proposed by the challenge hindrance framework (e.g., Cavanaugh et al., 2000; LePine et al., 2005) – neglects the fact that some work outcomes are health outcomes as well, and that positive and negative health outcomes are not simply opposites, implying that both may result simultaneously from challenge stressors. The present study’s main goal was to

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examine the associations of challenge stressors with positive well-being and the simultaneously occurring costs in terms of negative well-being.

Based on the transactional stress model (Lazarus & Folkman, 1984) it has often been postulated that experiencing challenge can evoke positive emotions (e.g., Cavanaugh et al., 2000; LePine et al., 2005; Rodell & Judge, 2009). We propose that the positive emotions associated with challenge stressors particularly refer to appraisals regarding one's self. Thus, we assume that challenge stressors trigger a positive self-evaluation and, consequently, foster self-esteem. This boost in self-esteem, in turn, affects positive subjective well-being in a wider sense. This proposition has a number of implications, which will be tested in the present study. The first implication is that self-esteem should mediate positive effects of challenge stressors. The second implication refers to the kind of well-being-related variables that might be affected by challenge stressors. Indicators of negative well-being have dominated challenge–hindrance research so far. We propose that positive well-being variables should be considered as well, and that both may result from challenge stressors simultaneously. Furthermore, we assume that the positive effects of challenge stressors go beyond work-related variables, affecting more general aspects of well-being.

1. The concept of challenge versus hindrance stressors

Trying to explain inconsistencies regarding associations between stressors and some kinds of outcomes (e.g., job search), the LePine group makes a twofold distinction between (a) different kind of stressors and (b) different kinds of outcome variables. More specifically, they have distinguished between challenge and hindrance stressors, and between strain and what they call “work-related outcomes”. They postulate that all stressors are positively related to strain, but that challenge stressors are also positively related to work outcomes. However, since strain is often associated with poorer work outcomes (e.g., Beehr, Jex, Stacy, & Murray, 2000), the positive association between challenge stressors and work outcomes may be masked by the simultaneous association with strain and therefore may become apparent only when the strain-related variance is controlled (i.e. suppressor effect).

1.1. Distinction between stressors

Cavanaugh et al. (2000) define challenge stressors as “work-related demands or circumstances that, although potentially stressful, have associated potential gains for individuals”; by contrast, hindrance stressors do not involve such gains but “tend to constrain or interfere with an individual's work achievement and ... do not tend to be associated with potential gains for the individual” (p. 68). Typical challenge stressors refer to demands such as high workload, job scope, and responsibility; examples of hindrance stressors include organizational politics, red tape, or job and task insecurity. Cavanaugh et al. (2000) proposed that “work outcomes” such as job satisfaction, job search, and voluntary turnover should relate differentially to challenge stressors, as compared to hindrance stressors. Hindrance stressors should show the associations typically associated with stress (i.e., negative with job satisfaction, positive with job search and turnover), whereas challenge stressors should show exactly the opposite associations with these “work outcomes”. Results were as expected; however, the associations between challenge stressors and “work outcomes” only emerged when their negative variance was suppressed, which has repeatedly been done by controlling for hindrance stressors. Boswell, Olson-Buchanan, and LePine (2004) essentially replicated these results for similar work outcomes (loyalty, intention to quit, job search, and withdrawal behavior). Again, the positive effects of challenge stressors appeared only when hindrance stressors were controlled. Podsakoff et al. (2007) confirmed these results meta-analytically. Similarly, LePine, LePine, and Jackson (2004) found positive associations between challenge stressors and learning motivation as well as learning performance for students; in contrast to the previous studies, these associations were apparent even without controlling for hindrance stressors, although they were higher in the model that did include hindrance stressors. LePine et al. (2005) confirmed this pattern for the association between stressors and performance meta-analytically. All studies (except Cavanaugh et al., 2000, who did not measure strain) found challenge (just like hindrance) stressors to be positively associated with strain, confirming the divergent association with different outcome measures for challenge stressors. More recent studies have confirmed the basic tenet of the challenge–hindrance framework (Rodell & Judge, 2009; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). Two possible mechanisms have been discussed to explain the positive effects of challenge stressors; one is motivational, the other one affective.

With regard to *motivation*, LePine et al. (2004) argue that people see challenge stressors as “positive and changeable [therefore] they will likely cope with their stress ... by allocating more of their effort to learning”, indicating “increased motivation to learn” (p. 885). LePine et al. (2005) offer a similar explanation: Referring to Vroom's (1964) expectancy-value model, they emphasize expectations concerning the chances that one's work behavior and effort should entail positive results (expectancy) and the consequences of these results (instrumentality). Empirical support for the motivational path was provided by LePine et al. (2004) who found a significant indirect effect of challenge stressors on learning performance through motivation to learn. Webster, Beehr, and Christiansen (2010) found a positive association between challenge stressors and the motivational construct of self-efficacy (although they could not establish self-efficacy as a mediator between challenge stressors and performance). LePine et al. (2005) demonstrated the mediating effect of motivation between challenge stressors and performance meta-analytically. Clearly, the motivational path has received more attention than the affective one, with the majority of publications from the LePine group referring to such aspects as performance, or retention.

With regard to *affect*, authors emphasize “the potential for growth, mastery, or gain” associated with challenge stressors (Boswell et al., 2004, p. 169); as a consequence, challenge stressors should “trigger positive emotions” (LePine et al., 2005, p. 765). Podsakoff et al. (2007) emphasize that challenge stressors “evoke positive affective responses that should more than offset the negative effects

that occur through strain” (p. 441). Referring to *Selye (1978)*, they postulate that people might thrive in the face of challenging job demands, and express “enjoyment and even euphoria” (p. 441). Supporting these assumptions, *Boswell et al. (2004)* found that “feelings of challenge” mediated the relation between challenge-related stress and work outcomes. *Rodell and Judge (2009)* found a positive path from daily challenge stressors to daily performance via attentiveness.

Altogether, there is quite some support for the basic distinction between challenge and hindrance stressors, and for their potentially divergent associations with different outcomes. Furthermore, there are some indications about the processes being involved. Nevertheless, these processes are far from being well understood, and several authors have emphasized the need for clarifying them (e.g., *Rodell & Judge, 2009; Webster et al., 2010*). The present research aims at advancing our understanding of the links between challenge stressors and outcomes. Specifically, we suggest reconsidering the distinction between different kinds of outcomes that is usually made in the challenge–hindrance framework.

1.2. Distinction between outcomes

Typically, authors in the domain of challenge–hindrance stress postulate two kinds of outcomes: (1) well-being, and (2) “work outcomes”. Well-being typically refers to negative well-being, or strain, including variables such as anxiety, emotional exhaustion, frustration, or health complaints (*LePine, LePine, & Saul, 2007*). “Work outcomes” typically refer to (a) behaviors in terms of performance (e.g., *LePine et al., 2004; LePine et al., 2005*), withdrawal (e.g., *Boswell et al., 2004; Podsakoff et al., 2007*), or to intentions for such behaviors (*Boswell et al., 2004; Cavanaugh et al., 2000*); (b) to work-related attitudes, most often job satisfaction (e.g., *Cavanaugh et al., 2000*).

We have three concerns with respect to this distinction; the first one refers to the conceptualization of well-being, the second one to the issue of work-relatedness, and the third one to the role of job satisfaction.

First, as mentioned above, well-being is typically assessed in terms of negative well-being, or strain, in challenge–hindrance research (cf. *LePine et al., 2005*). Strain represents a negative evaluation, often combined with high arousal (e.g., anxiety), sometimes also with low arousal (e.g., depression). Positive well-being, however, is hardly considered as an outcome variable of challenge stressors, although many authors do refer to positive affective states as being associated with challenge stressors (see below). Considering only negative well-being would suffice if negative and positive well-being could simply be considered the opposite of one another, so that a high value on negative well-being would automatically imply a low value on positive well-being, and vice versa. However, positive and negative well-being may well co-occur (*Birdi, Warr, & Oswald, 1995*; as least as long as they are not assessed with reference to the very same moment; *Diener, Oishi, & Lucas, 2003*). Thus, a very demanding job can concurrently be associated with high anxiety, because of the pressure induced, and with less depression (cf. *Warr, 2005*). From this point of view, positive well-being deserves attention in its own right. Indeed, many authors mention positive affective states to be associated with challenge stressors (e.g., feelings of fulfillment; *Boswell et al., 2004*; positive feelings; *LePine et al., 2005*; enjoyment and euphoria; *Podsakoff et al., 2007*). These assumptions seem very plausible; however, if positive well-being is an outcome in its own right, they imply that challenge stressors may foster positive well-being and negative well-being simultaneously. Apart from “feelings of challenge”, these positive states have so far not been investigated empirically.

Second, the distinction between work outcomes and well-being outcomes is clear as long as behaviors (such as performance, or remaining in an organization), and attitudes (such as intention to quit) are compared to strain variables such as anxiety. However, some well-being variables may be work-related (e.g., ruminating about problems at work; *Grebnier, Semmer, & Elfering, 2005*), or self-esteem with regard to one’s organization (organization-based self-esteem; *Pierce, Gardner, Cummings, & Dunham, 1989*). *Warr (2007)* therefore distinguishes work-related and general well-being. As a result, work outcomes may refer to well-being, and well-being may refer to work, blurring the distinction between work outcomes and well-being.

Third, job satisfaction is especially difficult to classify. In the challenge–hindrance literature, job satisfaction is usually grouped together with other “work outcomes”, and set apart from well-being variables. In comparison to many strain variables (e.g., anxiety), which are strongly affective, job satisfaction is an attitude, the essence of which is an evaluative judgment that is strongly characterized by cognitive elements (*Weiss, 2002*). It is therefore plausible to regard job satisfaction as a “non strain” variable (*Webster et al., 2010*). Nevertheless, job satisfaction implies a positive evaluation of one’s job, which can be considered an aspect of well-being. In line with this argument, *Warr (2007)* considers job satisfaction an element of (work-related) well-being. Satisfaction also is one of three elements in *Diener et al. (2003)* concept of well-being (the other ones being negative and positive affect). Thus, job satisfaction, which is regarded as an important “work-related” outcome in challenge–hindrance research, can well be considered an indicator of well-being, again blurring the distinction between the two basic concepts.

By conceptualizing well-being in terms of the well-known model of subjective well-being, which contains positive affect, negative affect, and satisfaction (*Diener et al., 2003*; cf. *Warr, 2007*), we anchor our concept in well established theory and research, and we try to avoid possible ambiguities inherent in the term well-being.

1.3. Challenge stressors and positive well-being

As a result of the considerations outlined above, we suggest to reconsider the dichotomy between work outcomes and well-being outcomes by focusing more strongly on positive versus negative aspects of well-being. Focusing on positive well-being may deepen our understanding of the processes involved, especially by clarifying the nature of the gains. Authors have so far mainly argued that the positive effects of challenge stressors have costs “with respect to personal well-being” (*LePine et al., 2004*, p. 889); to the extent

that our approach proves valuable, there may, in addition to these costs, also be gains in terms of well-being, albeit with regard to other aspects of well-being than those traditionally covered.

Specifically, we propose that positive well-being in terms of self-affirmation may be a central mechanism responsible for the positive effects of challenge stressors on well-being. After all, the challenge involved refers to achievements, which imply a chance to confirm one's self-worth. Mastering challenges is indicative of competence (e.g., goal attainment; Grebner, Elfering, & Semmer, 2010); it demonstrates one's knowledge and skills and can be a source of pride. Mastering challenges therefore satisfies the motive of a positive self-image, which is seen as a basic human motive by many authors (e.g., Epstein, 1998; Semmer, Jacobshagen, Meier, & Elfering, 2007). Confirming one's self-esteem should, therefore, be an important aspect of the "gains" that challenge stressors offer (Lazarus, 1991; Rodell & Judge, 2009). It follows that self-esteem could be regarded as an outcome variable that reflects the meaning of challenge especially well (see Rodell & Judge, 2009, for a similar position). Because self-esteem is an important part of one's overall well-being (Warr, 2007), it should, in turn, be associated with other, more general, indicators of well-being. As work-related experiences can spill over into private life (cf. Amstad & Semmer, 2009; Demerouti & Geurts, 2004), such indicators need not be confined to work-related well-being. Constructs that represent a positive attitude towards life in general would, therefore, be especially suited to demonstrate that the positive outcomes resulting from challenge stressors may be seen in general positive well-being, rather than only in "work-related outcomes".

Note that we do not mean to imply that the distinction between work outcomes and well-being should be abandoned. Outcomes such as intention to quit, performance, or creativity, are important work-related outcomes that are to be distinguished from well-being (although they may well be related to well-being).

2. Summary and hypotheses

In sum, we argue that challenge stressors may result in both positive and negative indicators of well-being. As these are not simply opposites, they may well coexist, and they may well stem from the same source, that is, from challenge stressors. We further argue that challenge is likely to affirm the self (see Rodell & Judge, 2009), which implies that variables relating to the self (e.g., esteem) are likely to mediate the positive effects. Finally, we argue that positive well-being indicators as outcome variables need not be confined to work but also entail more general indicators of positive well-being.

The current study therefore investigated the associations of a challenge stressor with a more general indicator of positive well-being, namely positive attitude towards life. We further investigated the mediating effect of self-esteem, and the suppressor effect of strain. We focused on time pressure as a predictor. Time pressure is clearly a challenge stressor and arguably the most prototypical one. Furthermore, time pressure (or similar constructs such as workload) is a central component of many models of occupational stress (Siegrist, 2002; Sonnentag & Frese, 2003; Theorell & Karasek, 1996) and represent one of the most frequently investigated stressors in occupational health psychology.

It has been repeatedly stated that the positive relation between challenge stressors and desirable outcomes will not likely be identified unless the negative variance common to all stressors, i.e. strain, is controlled for (e.g., Boswell et al., 2004; Cavanaugh et al., 2000). This pattern is consistent with statistical suppression (e.g., MacKinnon, Krull, & Lockwood, 2000). Other studies have accounted for this peculiarity of challenge stressors by combining both challenge and hindrance stressors as predictors. However, the current study is the first to specifically test the hypothesis that suppression exists. We expect that strain will act as a suppressor between time pressure and positive attitude towards life. Consequently, we propose:

Hypothesis 1. Strain will act as a suppressor between time pressure and positive attitude towards life (PAL) implying that time pressure will be positively associated with PAL, but only (or more strongly) if strain is controlled.

Central to the current study is the explanation of the positive effect of challenge stressors in terms of self-affirmation. As our study is in the context of work, the most appropriate measure reflecting such experiences relates to organization-based self-esteem, which develops from social messages from the occupational environment concerning one's ability and competence (Pierce & Gardner, 2004). We expected organization-based self-esteem to mediate the relationship between time pressure and positive attitude towards life.

Hypothesis 2. Organization-based self-esteem (OBSE) mediates the relationship between time pressure and positive attitude towards life (PAL).

3. Method

3.1. Sample

The sample consisted of 163 individuals (61% male) of two different organizations: a Swiss government department (48% of participants) and a large Swiss technological company (52% of participants). The age of participants ranged from 16 to 62 years, with an average of 40.44 ($SD = 11.65$). All participants were white collar workers with various backgrounds. The majority of participants (75%) worked full time (i.e., 42 working hours per week). The present analyses are part of a comprehensive study on stress at work; it was presented to potential participants at several meetings, some of which were held specifically for this study. Participation was voluntary and rewarded by a small financial incentive. After the study was completed, participants were

provided with an online-feedback including benchmark data of several key variables of common interest concerning stress and well-being. Response rate was approximately 29% and 33% of all employees, respectively.

3.2. Measures

As the study was carried out in the German-speaking part of Switzerland, questionnaires were in German. Measures were generally “chronic” measures, that is, they referred to participants' work situation, feelings, etc. *in general*. Some of the questions also referred to frequency, as will be explicitly stated below.

3.2.1. Time pressure

Time pressure was measured by self-report, using a 4-item subscale of the Instrument for Stress Oriented Task Analysis (ISTA; Semmer, Zapf, & Dunckel, 1995), a well-established instrument in German-speaking countries (cf. Sonnentag, Binnewies, & Mojza, 2010). Items included questions like “How often do you have to work faster than normal in order to complete your work?” or “How often does it happen that you go home late because of too much work?”. They have a 5-point Likert format reflecting frequency (ranging from “very seldom/never” to “very often/always”). Coefficient alpha for this scale was .85.

3.2.2. Strain

To assess subjectively perceived strain, we used a subscale of Mohr's irritation scale (“cognitive irritation”; Mohr, Müller, Rigotti, Aycan, & Tschan, 2006). It consists of three items that assess a tendency to ruminate about work (e.g. “Even at home, I often think of my problems at work”), using a seven-point Likert scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*). The scale yielded a reliability of $\alpha = .85$.

3.2.3. Organization-based self-esteem

Organization-based self-esteem (OBSE) was measured with the German version of Pierce et al.'s (1989) OBSE scale (Kanning & Schnitker, 2004). It consists of ten items reflecting an individual's belief in his or her capability and worth within the organization (Pierce & Gardner, 2004). A sample item is “I count around here.” Response options range from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha coefficient for the OBSE scale was .92.

3.2.4. Positive attitude towards life

A 5-item subscale of the Berne Questionnaire of Subjective Well-Being (Grob, Lüthi, Kaiser, & Flammer, 1991) was used to assess positive attitude towards life (PAL). PAL describes a generally positive frame of mind and the conviction that one's life is meaningful and worth living (Grob, 1995). Exemplary items are “My future looks good.” or “I cope well with the things in my life that can't be changed.” Response options range from 1 (*strongly disagree*) to 6 (*strongly agree*). Of the original eight items we selected five, which yielded an alpha of .82.

3.3. Procedure for analysis

3.3.1. Structural modeling

The analyses were conducted with structural equation modeling, using AMOS 16 (Arbuckle, 2007). As compared to conventional methods such as listwise or pairwise deletion, multiple imputation leads to results being more reliable and less biased (e.g., Olinsky, Chen, & Harlow, 2003). We therefore imputed the 5% missing data via multiple imputation. All variables were modeled as latent variables with items or parcels as indicators. Item parcels favorably reduce the variable-to-sample-size ratio and produce more reliable latent variables than individual items (Little, Cunningham, Shahar, & Widaman, 2002). The items were combined to parcels based on factor analytic results according to the single-factor method (Landis, Beal, & Tesluk, 2000): First, we combined the items with the highest and lowest loadings for each measure, followed by the items with the second highest and lowest loadings, until all items were assigned. With this procedure, the 10 items of the OBSE scale were combined to 3 parcels, two of which containing 3, and one parcel containing 4 items. Following the recommendation by Hau and Marsh (2004) to use parcels only if there are sufficient items to construct three or four parcels, we did not parcel the items of time pressure, strain, and PAL. Support for suppression and mediation was evaluated using the Bootstrap method, which is widely recommended because it is more accurate than traditional methods such as the Sobel test, and because it does not require as many assumptions (MacKinnon, Fairchild, & Fritz, 2007; Shrout & Bolger, 2002). Following Hu and Bentler (1999), model fit was assessed by the Comparative Fit Index (CFI) and the Standardized Root Mean Square Residual (SRMR). Hu and Bentler (1999) recommend values close to .95 for CFI, and values close to .08 for SRMR. Additionally, we report chi-square statistics. Furthermore, to ensure comparability with other studies using SEM, we report the Root Mean Square Error of Approximation (RMSEA) and its confidence intervals, although this index tends to overreject models with a sample size like ours (Hu & Bentler, 1999). According to Hu and Bentler (1999), RMSEA indicates adequate fit at values close to .06. Schermelleh-Engel, Moosbrugger, and Müller (2003) suggest limits for an adequate fit at .10 for SRMR and at .08 for RMSEA.

3.3.2. Testing suppression

A suppressor variable is “a variable which increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation” (Conger, 1974, p. 36–37; as cited in MacKinnon et al., 2000, p. 3). The phenomenon can also be described as “inconsistent mediation”, i.e. a mediation model in which the direct (c') and the mediated effect ($a \times b$) have opposite signs

(MacKinnon et al., 2000; Zhao, Lynch, & Chen, 2010). Whereas the first criterion for determining mediation – although currently disputed (Shrout & Bolger, 2002) – requires a significant relationship between the independent and the dependent variable, this is not the case for a suppressor situation: Because the direct and indirect effect are of opposite sign, they might entirely cancel each other out, resulting in a overall null-relationship (MacKinnon et al., 2000; Rucker, Preacher, Tormala, & Petty, 2011). The analytic methods for testing suppression are the same as for mediation (Cheung & Lau, 2008; MacKinnon et al., 2000; Rucker et al., 2011), that is, the test of significance of an indirect effect ($a \times b$). As suppression effects are usually not foreseen (Maassen & Bakker, 2001), the study of challenge stressors demonstrates a peculiar case in which a suppressor effect is hypothesized as such. It follows that failing to include a suppressor into an equation will also undermine the possibility to detect a mediation effect (MacKinnon et al., 2000). Provided that our suppressor hypothesis is correct, it follows that the postulated mediation between time pressure and positive attitude towards life by OBSE can only be detected after the suppressor (strain) has been added to the model. We will present these analyses in a stepwise fashion to make the underlying processes as clearly visible as possible.

4. Results

4.1. Descriptives and correlations

Means, standard deviations, and zero order correlations are displayed in Table 1. Time pressure was positively related to both strain ($r = .37, p < .01$) and OBSE ($r = .23, p < .01$), but not to PAL. Thus, our expectation that time pressure would not be associated with positive well-being unless strain was controlled (suppressor effect) was confirmed with regard to PAL but not with regard to OBSE. Furthermore, there was a negative correlation between PAL and strain ($r = -.17, p < .05$) and a positive correlation between PAL and OBSE ($r = .41, p < .01$). Strain and OBSE were not correlated.

4.2. Structural models

The first model includes time pressure as an exogenous and PAL as an endogenous variable (Model 1a; Fig. 1a). Although positive in value, the relationship between time pressure and PAL was not significant ($\beta = .13, p = .19$), as expected. After adding strain as a suppressor, the path from time pressure to PAL became considerably higher and statistically significant ($\beta = .24, p < .05$; Model 1b, Fig. 1b). Also, the suppression, i.e., the indirect effect was significant ($-.11$, BC CI (95%): $-.02, -.23$). In the final model (Model 1c; Fig. 1c), which includes OBSE as a mediator, the direct effect from time pressure to PAL became non-significant again ($\beta = .10, p = .33$). Furthermore, the indirect effect via OBSE was highly significant ($.10$, BC CI (95%): $.03, .20$) indicating that OBSE fully mediated the positive effect of time pressure on PAL (note that AMOS does not allow testing for significance of specific indirect effects in multiple mediation models. To calculate the indirect effect via OBSE, we therefore constructed a model in which we replaced the direct effect from time pressure on strain with a correlation. As our study is cross-sectional, this did not result in different results than our final model). Fit indices showed satisfactory to good model fit for our final model (see Table 2).

4.3. Additional analysis

The present study focused on the effects of challenge stressors, neglecting possibly synchronous effects of hindrance stressors. The reason for this is our focus on the ambivalence inherent in challenge stressors, that is, their simultaneous negative and positive effects on well-being, rather than a comprehensive investigation of the challenge–hindrance framework. Also, we assumed that the negative effects of hindrance stressors on positive as well as negative indicators of well-being were quite well established and did not require further empirical support. Nevertheless, readers might wonder what would happen if a hindrance stressor was included, and an anonymous reviewer alerted us to this issue. We therefore conducted an additional analysis including a hindrance stressor. Specifically, we used the uncertainty scale from ISTA (Semmer et al., 1995); it contains items (a) on role ambiguity, which has long been regarded as a prototypical hindrance stressor (e.g., LePine et al., 2005), and (b) on role conflict, which has been shown by Webster, Beehr, and Love (2011) to represent a hindrance stressor even more clearly. Two items assess role ambiguity (e.g., “How often to you get unclear instructions?”), and two items assess role conflict (e.g., “How often do you get conflicting instructions from

Table 1
Means, standard deviations and correlations among all variables.

Variables	<i>M</i>	<i>SD</i>	1	2	3
1. Time pressure	3.13	0.82	–		
2. Strain	3.23	1.39	.37**	–	
3. OBSE	3.99	0.62	.23**	–.11	–
4. PAL	4.82	.61	.12	–.17**	.41**

Note. $N = 163$. OBSE = Organization-based self-esteem. PAL = Positive attitude towards life.

* $p < .05$.

** $p < .01$.

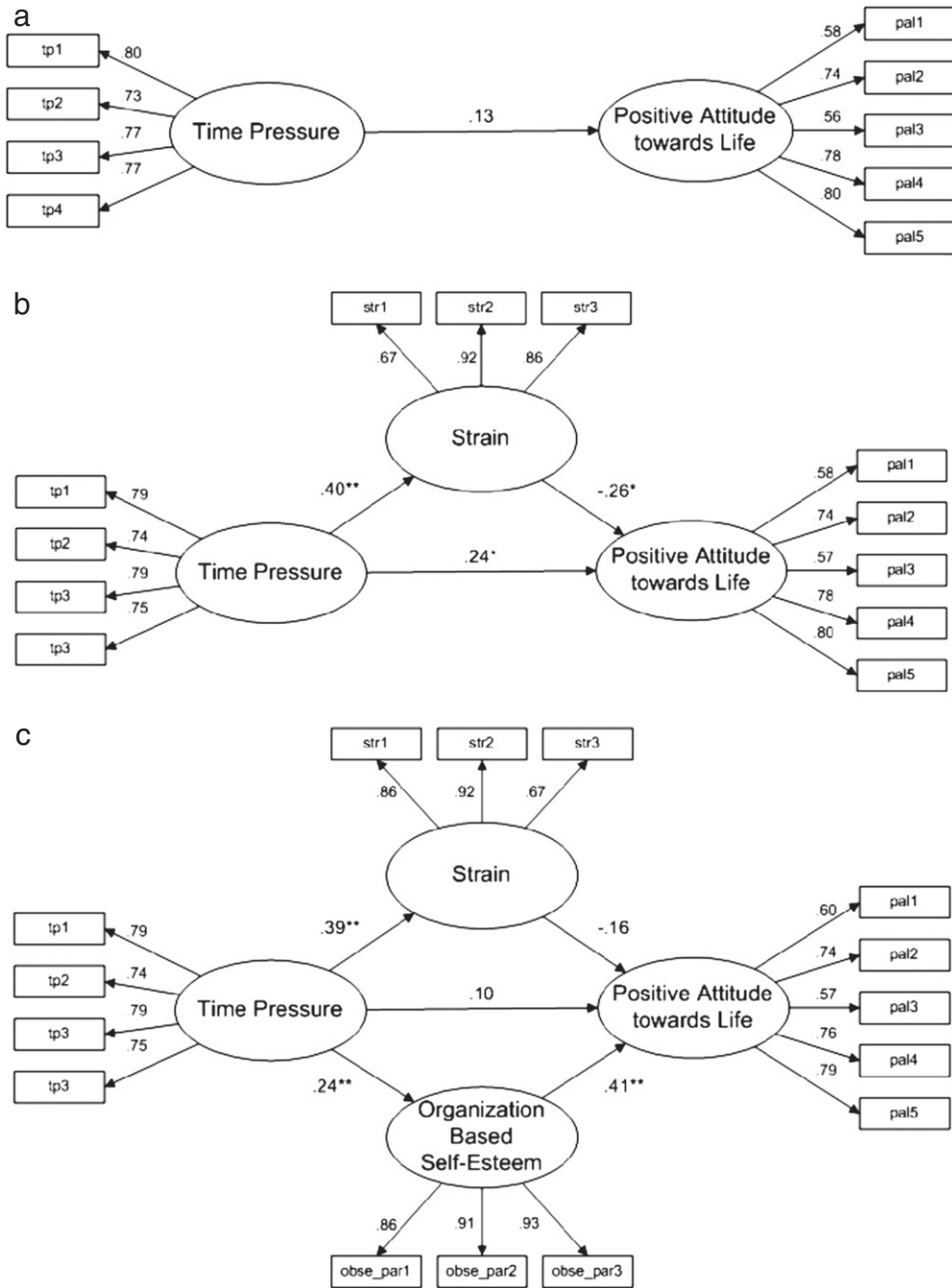


Fig. 1. Structural equation models examining the hypothesized association between time pressure and positive attitude towards life, including no other variables (Model 1a, Fig. 1a), strain as a suppressor (Model 1b, Fig. 1b), and, additionally, OBSE (Model 1c, Fig. 1c). Path coefficients are standardized. * $p < .05$; ** $p < .01$.

different supervisors?”). Items had a 5-point Likert format, ranging from 1 (*very seldom/never*) to 5 (*very often*); internal consistency was .74. The resulting model is shown in Fig. 2. As can be expected by the basic assumption of the challenge–hindrance framework, uncertainty showed a positive relationship with strain ($\beta = .23, p < .01$) and a negative relationship with OBSE ($\beta = -.28, p < .01$). The direct path from uncertainty to PAL was not significant, suggesting mediation effects. The relationships between time pressure and strain, OBSE, and PAL remained almost unchanged in comparison with the model in Fig. 1c, suggesting that the negative and positive effects of time pressure on well-being are the same when a hindrance stressor is in the model as well. Fit indices showed good model fit ($\chi^2(142) = 208.13; p < .01; \chi^2/df = 1.47; CFI = .96; RMSEA = .054$ (CI: .037–069); SRMR = .053).

Table 2
Fit Indices of the models tested.

Model	χ^2	df	χ^2/df	CFI	RMSEA (CI)	SRMR
1a	71.509***	26	2.75	.92	.104 (.076–.133)	.057
1b	103.925***	51	2.04	.94	.080 (.058–.102)	.054
1c	144.516***	85	1.70	.95	.066 (.047–.084)	.073

Note. N = 163. χ^2 = chi-square discrepancy; df = degrees of freedom; χ^2/df = relative chi-square; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; CI = confidence interval; SRMR = Standardized Root Mean Square Residual.

*** p < .001.

5. Discussion

The main goal of the present study was to test a new way to conceive the positive effect of challenge stressors. We assumed that, under control of strain, time pressure – the most prominent challenge stressor – would be associated with an indicator of general well-being, that is, positive attitude towards life, and that this relationship would be mediated by organization-based self-esteem. Our results generally support these expectations: In line with the challenge–hindrance framework (LePine et al., 2005) as well as with more traditional research on stress at work (Sonnetag & Frese, 2003), we found that time pressure was associated with strain. Simultaneously, however, we found a positive association between time pressure and positive attitude towards life when strain was partialled out. This positive effect was mediated by organization-based self-esteem. Our results contribute to the study of the challenge–hindrance framework in two respects, concerning (a) the well-being outcomes of challenge stressors and the mechanisms involved, and (b) the conceptualization of “work-related outcomes”.

5.1. Well-being outcomes of challenge stressors

With regard to well-being we see four contributions of our research, referring to the distinction between positive and negative well-being, the role of work-related vs. general well-being, the importance of self-esteem, and the role of suppression.

5.1.1. Positive and negative well-being

With regard to well-being outcomes, the challenge–hindrance framework focuses on negative well-being, that is, strain. We have proposed a modification to this conceptualization in terms of distinguishing between positive and negative indicators of well-being. Specifically, we have suggested that there may – simultaneously – be both negative and positive effects of challenge stressors. Our approach is in line with the well-being concept advanced by Diener and colleagues (e.g., Diener et al., 2003; Lucas, Diener, & Suh, 1996) who distinguish several components of well-being, that is negative affect, positive affect, and satisfaction (Diener et al., 2003). Warr (2007) advocates a similar concept, based on the well-known emotional circumplex; his three “axes” correspond with satisfaction (axis 1, from feeling bad to feeling good, with medium arousal), negative affect (axis 2, ranging

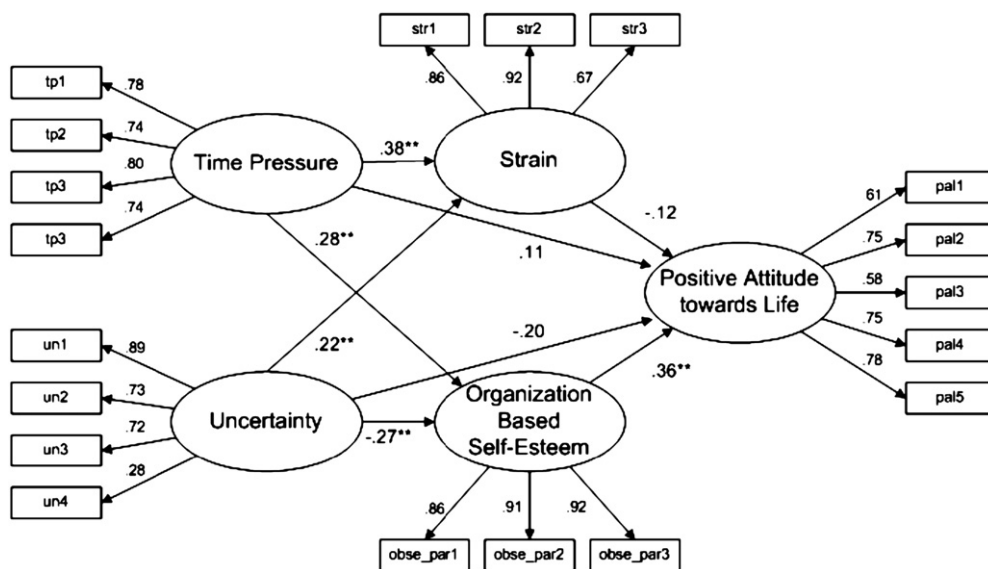


Fig. 2. Structural equation models examining the association between time pressure, uncertainty, strain, OBSE, and positive attitude towards life. Path coefficients are standardized. *p < .05; ** p < .01.

from anxiety to comfort), and positive affect (axis 3, ranging from depression to enthusiasm). Unless measured at the same point of time, these components show only a limited degree of overlap, and are discriminable from each other (Lucas et al., 1996). Therefore, it is possible that a variable simultaneously is associated with both negative indicators of well-being, that is, strain, and positive indicators of well-being, such as self-esteem. By conceptualizing outcomes in this way, and by finding evidence supporting this conceptualization, our study contributes to existing theory and research. Specifically, it highlights the possibility that positive effects of challenge stressors may not be limited to benefits for the organization (e.g., in terms of performance); rather, there may be benefits for the individual, in terms of positive well-being, which may occur simultaneously with negative effects, in terms of strain.

5.1.2. Work-related and general well-being

A further implication of our approach is that outcomes of challenge stressors may refer to work-related well-being but are not restricted to it. Rather, both negative and positive work-related well-being may spill over into the private domain (cf. Amstad & Semmer, 2009; LePine et al., 2007), and work-related well-being has been shown to relate to more general well-being (Warr, 2007). In line with this, we postulated that time pressure is associated with work-related strain (i.e. rumination about work-related problems) and with work-related self-esteem (OBSE), but that the positive effects extend beyond the work domain to a positive attitude towards life in general. Our results support this hypothesis, demonstrating that such a broader concept of outcomes is feasible. Such a relationship has been hypothesized by authors working in the challenge–hindrance tradition (LePine et al., 2007), but has not been empirically tested so far.

There is some evidence pointing into the same direction from research not explicitly linked to the challenge–hindrance tradition. For example, Simmons and Nelson (2001) found that eustress in nurses was positively related to subjectively perceived health; Britt, Adler, and Bartone (2001) found that U.S. soldiers who were engaged in meaningful work found peacekeeping a positive experience and reported deriving benefits long after it ended, despite the stress associated with it. However, our study is the first one working explicitly within the challenge–hindrance framework and showing that the findings concerning positive impacts of challenge stressors can be applied to well-being and generalized beyond the work-domain.

5.1.3. The role of self-esteem

An important contribution of the current study concerns the mechanisms underlying the positive effects of challenge stressors. Previous studies have addressed this issue to some degree (Boswell et al., 2004; LePine et al., 2004), but the core dynamics that explain positive effects, especially on more distal and more general outcomes, have remained open (Cavanaugh et al., 2000; LePine et al., 2005). We postulated, and found, that people who experience a lot of time pressure score higher on organization-based self-esteem (OBSE), and that OBSE mediates the association between time pressure and PAL. As emphasized in the literature (e.g., LePine et al., 2007), challenge stressors, such as time pressure, provide opportunities to demonstrate one's competence and motivation to learn and to achieve success. Put more generally, by indicating success and competence, mastering challenge stressors implies a favorable evaluation of the person, which is the essence of self-esteem (Brown & Marshall, 2001; cf. Rodell & Judge, 2009). In line with this, LePine et al. (2007) state that the emotional responses to encountering challenge stressors include not only general positive emotions, such as happiness and joy, but also pride, which is an emotion that is specifically related to achievement and involves an appraisal of one's worth as a person (Ellsworth & Scherer, 2003). Thus, our argument that challenge stressors should have implications for self-esteem is absolutely compatible with the challenge–hindrance framework (cf. Rodell & Judge, 2009). Up to now, however, this aspect has not been emphasized very strongly in this framework; most importantly, the implications of regarding self-esteem as a possible important outcome of experiencing challenge stressors have not been incorporated into research designs.

5.1.4. Suppression

The positive effects of challenge stressors often occur only when the negative aspect is controlled for (LePine et al., 2007). Typically, investigators control for hindrance stressors in order to remove the strain-related variance from challenge stressors (LePine et al., 2005; Podsakoff et al., 2007; Webster et al., 2010). We chose to use a measure of work-related strain as the potential suppressor variable; doing so is conceptually equivalent to controlling for hindrance stressors. Our study is the first to hypothesize, and test, this suppressor effect. At the same time it has to be noted that suppression occurred only with regard to PAL, but not with regard to OBSE, as shown by the significant bivariate correlation between time pressure and OBSE (Table 1). Evidently, the amount of positive variance contained in time pressure is strong enough to lead to an association with work-related well-being by itself, but not strong enough to lead to an association with positive well-being in general unless the suppressor (strain) is controlled. This issue deserves further investigation.

5.2. Work-related outcomes of challenge stressors

Our study suggests that the term “work-related outcomes”, as used in many studies within the challenge–hindrance framework, may profit from being defined more precisely, and less inclusive. Specifically, we suggest limiting “work-related outcomes” to outcomes that are not indicators of well-being. Doing so avoids confounds between work-related outcomes and well-being. Thus, many well-being indicators (including two indicators we used in this study) refer to the work setting. Using the term work-related outcomes without any restriction blurs the distinction between the two groups of outcomes. Furthermore, we maintain, in line with many others (e.g., Diener et al., 2003; Warr, 2007), that job satisfaction may well be regarded as component of well-being, its attitudinal character notwithstanding. Distinguishing work related outcomes that do *not* represent well-being

on the one hand, and well-being outcomes (including work-related well-being) on the other hand, yields a clear, theoretically sound, and empirically supported categorization.

5.3. Strengths and limitations

We feel that a strength of our research lies in conceptualizing both positive effects and negative effects of challenge stressors in terms of well-being, thus focusing on the outcomes for the individual, avoiding the somewhat misleading dichotomy between “strain” and “work outcomes”. The way we assessed the challenge stressor can be seen as a strength or a limitation. Rather than using a composite measure of challenge stressors, which has been used by other authors (e.g., [Cavanaugh et al., 2000](#)), we chose to focus on a specific stressor, that is, time pressure. The strength lies in the fact that time pressure can be regarded as a prototypical challenge stressor, and measuring one single stressor avoids the problem that the existing measure of challenge stressors “is not a comprehensive measure of all the various work experiences that could be ‘challenging’ ([Boswell et al., 2004](#), p. 178)”. The drawback lies in the fact that our study does not contribute to clarifying the issue of exactly which stressors can be regarded as challenge stressors. Further research should explore the association of challenge stressors with well-being more extensively, using different challenge stressors as well as different indicators of well-being.

A methodological strength of our study lies in hypothesizing and testing the suppressor effect of strain on the relationship between time pressure and PAL. The suppression inherent in the relationship between challenge stressors and positive outcomes has been discussed repeatedly (e.g., [Boswell et al., 2004](#); [Cavanaugh et al., 2000](#)). However, this is the first study to specifically hypothesize and statistically test the suppressor effect of strain on the association between time pressure and a positive indicator of well-being (PAL).

A number of methodological limitations have to be noted as well. First, the cross-sectional design of the study limits our ability to draw conclusions regarding causality. The causal ordering was based on theoretical reasoning. Replications and extensions of our findings using longitudinal designs are needed to further clarify the associations found. Second, all our measures are self-report measures. Although it has been shown that common method bias typically does not fatally invalidate research findings ([Doty & Glick, 1998](#)), it does cause concern, and future research should employ alternative measures in addition to self-report. Third, we did not include outcome variables that represent work outcomes in terms of performance, intention to quit, or the like. While this is justified given our emphasis on challenge stressors and well-being, further research on this issue might investigate if variables such as OBSE mediate the association between challenge stressors and these outcome variables.

5.4. Implications

Our approach and the confirming findings suggest several implications for occupational stress research as well as for stress management in practice. With regard to theory, it seems that the dimensions of outcomes of challenge stressors should be reconsidered. Specifically, we propose to consider not only strain but also positive well-being when focusing on the individual, as challenge stressors may have different effects on positive and negative indicators of well-being. With regard to positive well-being, self-related aspects, such as (organization-based) self-esteem, seem to be especially pertinent, as they are intimately tied to the issue of achievement implied by the challenge concept (cf. [LePine et al., 2007](#); [Rodell & Judge, 2009](#)).

What remains open at this time is how to integrate the performance and retention-related variables that have dominated investigations of the positive effects of challenge stressors so far. It is conceivable that well-being (both positive and negative) constitutes a mediator between challenge stressors and these positive work outcomes, as has been demonstrated using affect-related variables by [Rodell and Judge \(2009\)](#), and using job satisfaction by [Webster et al. \(2010\)](#). This is not to suggest that a path through well-being is the only one leading to work outcomes as defined here. The motivational path postulated by [LePine et al. \(2004, 2005\)](#) may well work independently of well-being.

We have focused on positive and negative effects of challenge stressors on well-being that can exist simultaneously. A recent study by [Webster et al. \(2011\)](#) adds an intriguing aspect by suggesting, and demonstrating, that a stressor may be appraised as both challenge and hindrance simultaneously, rather than as one or the other, although one of these appraisals may be dominant (e.g., hindrance in the case of role conflict). Thus, the ambivalence inherent in challenge stressors seems to be consciously represented at the antecedent level (i.e., appraisal), implying a chain from ambivalent appraisals to ambivalent outcomes in terms of well-being (and, possibly, further on to “work-related outcomes”). Further research should explore these issues.

A further issue that should be explored concerns the time-frame and saliency of positive and negative consequences. It seems possible that for some people positive effects in terms of self-esteem are more important than the negative ones in terms of strain, at least as long as the strain-symptoms are not (yet) drastic. This dynamic may also be supported by the time course involved. Whereas some negative consequences may occur very quickly, such as impaired sleep during a difficult phase of a project, such effects tend to disappear quickly as well, once the difficult period is over (cf. [Sonnentag & Frese, 2003](#)). Pride and self-esteem induced by successful mastery may then take over, and these might be more persistent, but for many also more salient and more important than the worries they went through. Persistent negative effects (e.g., enduring sleep problems) and physical consequences (e.g. cardiovascular issues) may take much longer to develop ([Landsbergis, Schnall, & Dobson, 2009](#)). Immediate strain reactions that disappear quickly, effects on self-esteem that are more persistent, and more serious impairments of well-being and health that seem far-away – such a mixture may well contribute to the characterizations of challenge stressors as “rewarding work experiences well worth the discomfort that was involved” ([Cavanaugh et al., 2000](#), p. 66). Given that serious and persistent problems of health and well-being may take a very long time to develop, it is conceivable, however,

that the positive effects of challenge stressors may induce some people to develop an “over-commitment” (Siegrist, 2002), ignoring or downplaying the long-term risks involved, leading to possible negative health effect in the (very) long run. Such issues require long-term longitudinal research.

With regard to practical implications, the basic message implied by the challenge–hindrance framework remains essentially the same; however, our approach implies some changes in nuances. So far, the message to organizations and employees has mainly been: For organizations, challenge stressors have both positive and negative effects on productivity and turnover; these may cancel each other out, resulting in a null, or weak effect overall. By contrast, effects on employees are negative, that is, the positive effects for the organization may come at a price for employees “with respect to personal well-being” (LePine et al., 2004, p. 889). Our results imply that, just as for organizations, there are positive and negative effects on employees as well; these refer to different aspects of well-being. In other words, challenge stressors may induce strain as well as self-esteem and positive feelings about one's life in general. As discussed above, this “paradoxical” effect on well-being may explain why people often do not reduce stressors even if they could. People with high amounts of autonomy (e.g., entrepreneurs, politicians, scientists) often take on so many projects and duties that they become overburdened. It seems that the confirmation of the self associated with these challenge stressors induces people to disregard or accept the strain-related consequences of overburdening themselves. Such considerations should be taken into account (a) for job design and task assignment, which should aim at moderate challenges, while trying to reduce hindrance stressors – or reduce the strain related to challenge stressors – and (b) for stress management training, which should try to reduce potential negative stress reactions but also raise awareness for the dilemmas and trade-offs involved.

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