Unifying the Challenge-Hindrance and Sociocognitive Models of Stress

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We put forth a theoretical unification of 2 of the more popular theories of job stress: challenge-hindrance and the sociocognitive models of stress, to explain the process by which stress impacts performance. In Study 1, we manipulated challenge (n = 98) and hindrance stress (n = 96) and measured its effect on perceived stress, on-task effort, negative affective thoughts, and decision-making performance. The relationship between perceived stress and performance was fully mediated by on-task effort and negative affective thoughts. In Study 2, we manipulated stressor strength by randomly assigning participants to a pervasive time pressure (n = 48) or no time pressure (n = 47) condition. Compared with the no time pressure condition, the pervasive time pressure significantly reduced performance and increased perceived stress. Across the 2 studies, we identified a boundary condition of the
challenge-hindrance model in that the severity of the stressor influenced the extent to which people perceive a stressor as a challenge or a hindrance and relationships with performance. Furthermore, individual differences in perceived stress had a stronger impact on performance than the actual stressors in the weaker situation (no time pressure). Our results demonstrate the advantage of unifying the sociocognitive model of stress with its emphasis on individual differences in stress perceptions with the challenge-hindrance model and its distinction between positive and negative stressors.

**Keywords:** job stress, challenge stress, hindrance stress, decision making, performance

Historically, the predominant models of job stress collapsed multiple stressors into a single category and emphasized the negative consequences of stress. However, research based on this approach to job stress revealed a tenuous and inconsistent relationship between stressors and work-related outcomes (e.g., Daniels & Guppy, 1994; Leong, Furnham, & Cooper, 1996). An early review of the job stress literature led Beehr and Newman (1978) to suggest that the observed inconsistent and weak relationships might result from differential effects of stressors on performance. For example, they highlighted the possibility that certain types of job stressors could inspire workers to make positive changes in their lives (e.g., improving their diet, increasing physical activity, and getting sufficient rest at night), which in turn can improve work-related outcomes. Subsequent studies supported the view that some stressors have beneficial consequences for workers (e.g., Boswell, Olson-Buchanan, & LePine, 2004; Cavanaugh, Boswell, Roehling, & Boudreau, 2000). Hence, considering all stressors as the same and emphasizing their negative consequences obscures the potential positive effects.

Because stressors can result in both beneficial and detrimental consequences, Cavanaugh, Boswell, Roehling, and Boudreau (2000) decomposed stressors into a challenge-hindrance model that builds upon prior research (e.g., Beehr & Newman, 1978; Lazarus, 1981; Selye, 1982). The challenge-hindrance model asserts that in addition to harmful stressors (i.e., hindrance), there are stressors that may improve performance and potentially promote achievements and gains (i.e., challenge; LePine, LePine, & Jackson, 2004). The challenge-hindrance model was an improvement over traditional conceptualizations of stress because distinguishing between the two types of stressors revealed more consistent relationships. Challenge stressors positively related to work outcomes (e.g., overall job performance, $\rho = .12$) and hindrance stressors negatively related to work outcomes (e.g., overall job performance: $\rho = -.20$; Boswell et al., 2004; LePine, Podsakoff, & LePine, 2005). Notwithstanding, these effects were weaker than theory and prevailing logic would predict. The Handbook of Industrial/Organizational Psychology noted that the challenge-hindrance model “is inconsistent with a substantial body of research that has emphasized the moderating effect of personality,
and other individual-difference variables, on how individuals appraise stressors” (Griffin & Clarke, 2010, p. 363). Thus, we posit that a critical missing link for the challenge-hindrance model is lack of direct linkage with the sociocognitive model of stress and its emphasis on individual differences in perceptions and coping.

The sociocognitive model of job stress focuses on the interaction between person and environment and places greater emphasis on appraisal processes (Lazarus, 1991; Lazarus & Folkman, 1984; Smith & Lazarus, 1993). This model posits that environmental stressors (e.g., work demands) directly lead to perceptions of stress (e.g., degree of felt stress) and stress appraisals, which leads to several potential strains (i.e., emotional, behavioral, physical, and psychological reactions). Accordingly, individual differences in perceived stress and subsequent coping strategies serve as the theoretical explanatory mechanism for the relationship between stressors and outcomes. Consistent with the sociocognitive model of stress, we make the distinction among stressors (environmental), perceptions of stress (appraisals), and strains (cognitive, behavioral, and physical outcomes).

The sociocognitive theory can improve the usefulness of the challenge-hindrance model to provide more consistent and informative results in job stress research. Specifically, we delineate how environmental stressors impact performance via perceived stress, on-task effort, and negative affective thoughts and demonstrate how the strength of the stressor (or situation) places boundary conditions on the challenge-hindrance model. As such, we provide evidence regarding when environmental stressors versus perceived stress are most important in influencing outcomes, and how and why challenge and hindrance stress differentially affect performance.

**INTEGRATION OF THEORIES**

An advantage of the sociocognitive model of stress is the emphasis on individual differences in stress perceptions (as distinct from environmental stressors) whereas the primary advantage of the challenge-hindrance model is the distinction between positive and negative stressors. Alone, both models have been beneficial in describing some stressor-outcome relationships; however, a unification of these two related theories would be beneficial for better predicting how and when stressors affect performance. We propose that there are three limitations of the challenge-hindrance model that can be addressed by incorporating this model with the sociocognitive model of stress.

First, the sociocognitive model of job stress acknowledges that both environmental stressors and perceived stress are more distal to performance
than the challenge-hindrance model implies. Specifically, the extent to which stressors will influence performance depends on behavioral, affective, and cognitive reactions to stressors. Therefore, stronger support for the challenge-hindrance stress framework would be obtained by investigating the role of explanatory variables. The sociocognitive model provides these explanatory links between stressors and performance. Specifically, individuals may perceive environmental stressors as challenges when they anticipate that they have the ability to overcome the stressor. This perception is more likely to lead to adaptive coping strategies (e.g., on-task effort), which can yield positive outcomes. Conversely, when environmental stressors are perceived as hindrances, individuals may choose maladaptive coping strategies (e.g., negative affective response), which are more likely to result in negative outcomes (e.g., Spector, 1998). In Study 1, we examine the extent to which on-task effort and negative affective thoughts mediate the relationships between challenge and hindrance stressors and performance.

Second, categorizing different stressors a priori as challenges or hindrances might confound environmental stressors with perceptions of those stressors. Items on Cavanaugh et al.’s (2000) scale categorize stressors as a challenge, for example, “the number of projects or assignments I have” and “the amount of time I spend at work,” or a hindrance, for example, “the inability to clearly understand what is expected of me on the job” and “the amount of red tape I need to go through to get my job done.” Rating each item on its predetermined categorization as challenge or hindrance stressor and then creating composite scores to represent each category confounds the influence of stressors and stress perceptions. The same measurement confound is also present in meta-analyses (e.g., LePine et al., 2004, 2005) of the challenge-hindrance stress literature because researchers coded effect sizes from primary studies into the a priori dimensions of challenge and hindrance. Cavanaugh et al. (2000) acknowledged that perceptions were the primary mechanism that influenced performance and the measurement of perceptions is vital to understanding the stressor-performance relationship. Ironically, the use of Cavanaugh et al.’s measure or categorization scheme makes it impossible to disentangle stressors and perceptions of said stressors to evaluate the extent to which environmental stressors or perceived stress influence performance. Distinguishing between environmental stressors and stress perceptions would allow for a unification of the two theories, provide a strong test of the extent to which environmental stressors versus perceived stress are related to performance, and explain how and why each are related to performance. To tease apart the differential effects of environmental stressors and perceived stress requires the manipulation of one and holding the other constant across conditions or respondents. Therefore, in both Study 1 and Study 2, we compared the relative impact of environmental stressors versus perceived stress on performance.
Third, the current instantiation of the challenge-hindrance model in research does not allow for the possibility that a given stressor (e.g., role ambiguity or time pressure) may be perceived as a challenge or hindrance depending on characteristics of the stressor (e.g., severity) or characteristics of the individual experiencing the stressor. The initial categorization of stressors as hindrances (e.g., role ambiguity) or challenges (e.g., time pressure) was developed by having raters categorize items from existing measures of job stress followed by a confirmatory factor analysis and correlating these dimensions with additional measures of job outcomes and satisfaction (see Cavanaugh et al., 2000). Thus, stressors were deemed challenge or hindrance because a majority of the respondents classified them as such and/or because of their specified relationships with relevant outcomes. The rationale for predefined categories of challenge and hindrance stressors is that work contexts have a fairly consistent meaning for individuals (cf. Brief & George, 1995) such that individuals should interpret and react to environmental stressors in largely the same way (i.e., as a challenge or a hindrance; LePine et al., 2005). However, not all stressors are interpreted in the same manner, and the perception coupled with subsequent cognitions and behaviors determine the stress response (i.e., Spector, 1998). We argue that individuals will perceive the stressor in the same manner (i.e., as a challenge or hindrance) only in strong situations where the categorization of a stressor and perceived stress are closely aligned and there is little room for interpretation of said stressor. We tested this hypothesis in Study 2 by comparing weak and strong situations.

CURRENT STUDIES

In Study 1, we held the environmental stressor constant (performance pressure) and manipulated features that would influence participants’ stress perceptions (challenge vs. hindrance condition). In Study 2, we manipulated an environmental stressor (time pressure) and participants’ stress perceptions (challenge vs. hindrance condition). In both studies, we measured participants’ stress perceptions and performance to determine whether environmental stressors or perceived stress are likely to have the largest impact on decision-making performance. There are several critical features of the present study that allow us to test our hypotheses. First, we implement an experimental design where the environmental stressor was held constant across conditions, but we manipulate perceptions of stress in challenge and hindrance conditions. The use of our experimental design to generate the challenge and hindrance conditions addresses the limitations of previous research, which compared self-report perceptions across very different types
of stressors (e.g., time pressure vs. role conflict). An experimental design, suitable for interpretations of causality, has not been used to examine the processes through which challenge and hindrance stressors affect reactions and performance (e.g., Perrewé & Zellars, 1999; Webster, Beehr, & Christiansen, 2010).

In Study 1, we also examined the mediating effects of both on-task effort and negative affective thoughts to explain the differential effects of challenge and hindrance stressors on performance and demonstrate why perceived stress might be more influential on performance than the actual environmental stressor. In Study 2, we used a strong stressor (i.e., time pressure as a pervasive environmental stressor) to demonstrate how perceptions and performance are affected in strong situations relative to a milder environmental stressor (i.e., performance pressure) where individual differences in stress perceptions play a more significant role.

According to the sociocognitive model of stress, environmental stressors directly impact perceived stress, which in turn influences strains and other outcomes (Spector, 1998). Stressors perceived as a challenge positively relate to performance because they are appraised as having the potential for personal growth, and may lead to increased effort. Conversely, stressors perceived as a hindrance negatively relate to performance because they are appraised as potentially harming personal gain, and may trigger negative emotions and/or a withdrawal coping style (LePine et al., 2005; Spector, 1998). Models of stress would predict that any type of stressor would lead to elevated levels of strain. However, perceptions of stress should be higher when stressors are perceived as a hindrance compared with when they are perceived as a challenge. Therefore, we hypothesize:

**Hypothesis 1:** Perceived stress will be higher in the hindrance condition than in the challenge condition.

**MEDIATING EFFECTS OF ON-TASK EFFORT AND NEGATIVE AFFECTIVE THOUGHTS**

The sociocognitive model of job stress acknowledges that both environmental stressors and perceived stress are more distal to performance than the challenge-hindrance model implies (Spector, 1998). The degree to which stressors influence performance depends on the behavioral, affective, and cognitive reactions related to those stressors. A crucial piece of missing information with regard to testing the challenge-hindrance model is evidence for why challenge stressors positively relate to performance and why hindrance stressors negatively relate to performance. Therefore, we examine the
extent to which on-task effort and negative affective thoughts mediate the relationships between perceived stress and performance.

LePine, Podsakoff, and LePine (2005) suggested that expectancy theory (Vroom, 1964) could explain the underlying process of how challenge and hindrance stress elicits motivation and effort. Stressors perceived as a challenge would be positively related to effort. Higher perceived likelihood of success leads to a higher valuation of the task outcome and effort would be construed as worth the energy exerted. Thus, individuals would believe that effort can help them overcome the stressor to achieve their goals. Alternatively, effort expended to overcome stressors perceived as a hindrance would not be worthwhile because they are perceived as insurmountable obstacles and no amount of effort will lead to goal achievement. We empirically test whether challenge and hindrance stressors differentially relate to performance because they elicit different levels of effort. Consequently, we expect that the level of on-task effort expended would differ across conditions such that effort would be higher in the challenge stressor condition than the hindrance stressor condition.

Hypothesis 2: On-task effort will be higher in the challenge condition than in the hindrance condition.

The sociocognitive model suggests that the appraisal process triggers specific emotional or affective reactions and coping strategies (e.g., Duhachek & Iacobucci, 2005; Lazarus & Folkman, 1984; Spector, 1998). Pearsall, Ellis, and Stein (2009) found support for the role of problem-solving and avoidant coping as an explanation for the differential relationships between challenge and hindrance stressors and team-based performance. An interpretation of a situation as a job stressor may have an affective response that leads to strains (Spector, 1998). When individuals perceive stressors as a hindrance, affective avoidant responses are more likely because nothing constructive can be done to overcome the situation. Consequently, we expected that negative affective thoughts would differ across conditions such that negative affective thoughts would be higher in the hindrance stressor condition than the challenge stressor condition.

Hypothesis 3: Negative affective thoughts will be higher in the hindrance condition than in the challenge condition.

Hindrances should lead to negative affect characterized by feelings of threat, anxiety, and apprehension which lead to more avoidant coping strategies (e.g., withdrawal, distraction). Stressors perceived as challenges should evoke more positive appraisals (e.g., feelings of eagerness, confidence) leading to an active coping style. Perceiving stressors as a challenge can
enable individuals to manage their affective response to prevent strains and engage in adaptive coping strategies such as on-task effort to dampen the negative affective response. Thus, stressors perceived as challenges should promote greater effort to obtain gains whereas stressors perceived as hindrances should decrease effort, ultimately hampering performance. Furthermore, prior research demonstrates that effort and affective thoughts are related to task performance (Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994). Therefore, we propose that on-task effort and negative affective thoughts will explain the relationship between perceived stress and performance.

**Hypothesis 4:** (a) On-task effort and (b) negative affective thoughts will mediate the relationship between perceived stress and performance. Perceived stress will positively relate to negative affective thoughts and on-task effort. In turn, on-task effort will positively relate to performance and negative affective thoughts will negatively relate to performance.

**STUDY 1**

**Method**

*Participants, Design, and Procedure*

Undergraduate students \( N = 244 \), recruited through the psychology department subject pool at a large U.S. state university, participated in the study in exchange for extra credit. Participants were randomly assigned to one of three between-subjects conditions \( n = 98 \): challenge; \( n = 96 \): hindrance; and \( n = 50 \): control. Although our hypotheses were focused on the challenge and hindrance conditions, we included a control condition to provide further empirical support for the effectiveness of our manipulation. We omitted one participant because this person consistently responded to the decision task in less than 500 ms which is evidence that they did not take the decision task seriously.

*Decision Task*

Participants viewed a total of eight cityscape pictures that represented U.S. cities. Each picture measured 350 pixels \( \times \) 289 pixels. We purposely selected eight cities that were populous (e.g., Dallas, Philadelphia, etc.), but whose cityscape was not recognizable to most students (confirmed by pilot
data) so prior experience could not influence the effects of the stressor on
strain and performance. Participants were presented with two pictures side by
side on a computer monitor and they were asked to decide which picture
represented the city with a larger population. To familiarize the participants
with the task, they completed approximately half of the possible combina-
tions of cityscape picture pairs. Feedback was provided after each decision:
the word CORRECT was presented for accurate choices and the word
INCORRECT for inaccurate choices. In the performance portion of the task
everyone completed all possible cityscape pairings for a total of 56. All
participants, regardless of condition received the same cityscape pairs; how-
ever, the pairings were presented in a random order for each participant.

Our decision-making task was designed to hold constant the environ-
mental stressor (performance pressure to do well on the task and earn money;
see Beilock & Carr, 2005; Beilock & DeCaro, 2007) across our perceived
stress manipulations (challenge and hindrance stress conditions). Participants
were informed that the decision task involved real money and they could earn
up to $3 based on their performance on the task. Participants made decisions
between two pictures depicting U.S. cities. The decision task requires mem-
ory for learned information acquired through feedback. In many real-world
decisions, people must learn information (e.g., on-the-job training using a
subsample of all possibilities) and then use this information to make deci-
sions to a larger sample where accurate performance is vital (e.g., radiologist
screening x-rays, a factory worker responsible for product quality and safety).
The task was constructed to model decisions based on newly acquired
information where participants are responsible for task performance.

Perceived Stress Manipulation

A pay-off matrix design was used to frame performance on the decision
task as either hindering (hindrance) or enabling (challenge) performance by
experimentally manipulating perceived stress (i.e., participants’ interpreta-
tion of the environmental stressor). In the challenge condition, participants
gained 5 cents for every correct choice and lost 1 cent for every incorrect
choice, enabling participants the ability to overcome the stressor with posi-
tive net gain for accurate performance. Conversely, in the hindrance condi-
tion, participants gained 1 cent for every correct choice and lost 5 cents for
every incorrect choice which impeded participants’ ability to overcome the
stressor with a larger negative consequence for inaccurate performance. In
the control condition, correct choices resulted in a gain of 3 cents and
incorrect choices with a loss of 3 cents. Thus, the control condition used the
same task as the challenge and hindrance conditions; however, the pay-off
matrix did not favor a challenge or hindrance stress interpretation. During the actual task, all participants started with 25 cents and received real-time feedback indicating the amount won or lost and the cumulative total in the bank so that participants were aware of their performance. The pay-off manipulation created the challenge and hindrance conditions; however, all participants received $3 upon study completion. Participants were unaware of the different pay-off matrices; hence, we can attribute any observed differences to the manipulation of a challenge or hindrance interpretation because the task was held constant between participants. Performance was operationally defined as the number of correct responses and not the amount of money won. The amount of money won or lost was used for the sole purpose of creating the challenge and hindrance stress conditions.

**Performance**

Task performance was measured by mean proportion of trials answered correctly \(1 = \text{correct choice}; 0 = \text{incorrect choice}\) and scores ranged from .44 to .98 (mean of .77).

**Perceived Stress**

Participants rated experienced stress using three items: “pressure to perform well on the task,” “the reward system for correct and incorrect answers,” and “overall stress from the task” using a 5-point scale \(1 = \text{no stress}; 5 = \text{very much stress}\). Participants were instructed: “You will now be asked to indicate the extent to which each of the following statements produced stress with regard to the task you just completed.” Thus, consistent with Jex, Beehr, and Roberts (1992), our perceived stress measure would be considered a response measure. Higher mean scores are indicative of a higher level of perceived stress. Internal consistency reliability was .82.

**On-Task Effort**

We used Kanfer, Ackerman, Murtha, Dugdale, and Nelson’s (1994) 6-item Task Focus Scale to assess focused effort and attention on the task (e.g., “I thought about new strategies for improving my performance”) using a 5-point scale \(1 = \text{strongly disagree}; 5 = \text{strongly agree}\). High mean score scores indicated higher levels of on-task effort. Internal consistency reliability was .74.
Negative Affective Thoughts

A 4-item scale from Kanfer et al. (1994) measured negative affective thoughts during the task (e.g., “I became frustrated with my inability to improve my performance”) using a 5-point scale (1 = strongly disagree; 5 = strongly agree). A high mean score indicated a higher level of negative affective evaluations. Internal consistency reliability was .83.

Results

Manipulation Check

The manipulation reflected the different pay-off matrices across the three conditions designed to elicit differences in perceptions of the task as a challenge or a hindrance. To determine whether they perceived their respective conditions as an obstacle (hindrance) or as enabling (challenge) performance we asked the following: “My reward reflected the effort I put into each decision,” “The money earned in the task was justified, given my performance,” “I was satisfied with the amount of money I made on the decision task.” Participants responded on a 5-point rating scale (1 = strongly disagree; 5 = strongly agree). Mean scores were significantly higher in the challenge (M = 3.77, SD = 0.72) than the hindrance condition (M = 2.62, SD = 0.67), d = 1.64, t(96) = 8.12, p < .05. Participants in the hindrance condition clearly perceived a disconnect between the money earned and the amount of effort expended which aligns with the contention that perceiving a stressor as an obstacle to performance is a defining characteristic of hindrance stress. We also checked differences in perceptions of variables that define the difference between challenge and hindrance: perceived control over the task (challenge: M = 4.12, SD = 0.85; hindrance: M = 2.71, SD = 1.17; d = 1.37, t(94) = 6.74, p < .05), extent to which the task presented an insurmountable obstacle (challenge: M = 4.02, SD = 0.77; hindrance: M = 3.18, SD = 1.03; d = 0.93, t(94) = 4.49, p < .05), and self-efficacy (challenge: M = 3.63, SD = 0.87; hindrance: M = 2.79, SD = 1.02; d = 0.90, t(94) = 4.34, p < .05). Participants in the challenge condition indicated more control, ability to overcome the obstacle, and reported higher self-efficacy. Thus, participants perceived the challenge condition as a challenge and the hindrance condition as a hindrance. The effect sizes for our manipulation check items were quite large providing additional confidence that the manipulations were successful.

We randomly assigned 50 participants to a control condition which did not favor a challenge or a hindrance interpretation. Because the environmen-
tial stressor (performance pressure in the decision task) was the same, we expected that performance would not differ among the three conditions. Indeed there was no statistically significant difference in performance between the challenge and control condition, $d = 0.16; t(146) = 0.94; p = .31$, or between the hindrance and the control condition, $d = 0.20; t(144) = 1.19; p = .23$ (see Table 1). Similar performance across the three conditions is important to test the unified theory of stress connecting the challenge-hindrance with sociocognitive model of stress.

To ensure participants were aware of the pay-off information, we asked 98 participants ($n = 51$ challenge condition; $n = 47$ hindrance condition) to indicate how much money they gained and lost for correct and incorrect responses, respectively. Every participant answered with 100% accuracy affirming their attention to the pay-off information.

### Hypothesis Testing

Study variable means (standard deviations) per condition are presented in Table 1 and bivariate correlations in Table 2. Hypotheses 1, 2, and 3 predicted mean differences between the challenge and hindrance stress conditions for perceived stress (H1), on-task effort (H2), and negative affective thoughts (H3). Mean differences were observed for all three hypotheses (see Table 1). Negative affective thoughts, $d = -0.60, 90\% \text{ CI} [-0.84 \text{ to} -0.36]; t(192) = -4.18, p < .05$, and perceived stress $d = -0.37, 90\% \text{ CI} [-0.61 \text{ to} -0.13]; t(192) = -2.56, p < .05$, were significantly higher in the hindrance condition than the challenge condition, providing support for Hypotheses 1 and 3. On-task effort was statistically higher in the challenge

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1 Because of our directional hypotheses, we chose to interpret statistical significance using a one-tailed test and 90% CIs. However, our results were the same if we had used a two-tailed significance test.
condition than in the hindrance condition, $d = 0.32$, 90% CI [0.09 to 0.56]; $t(192) = 2.26$, $p < .05$, providing support for Hypothesis 2.

Hypothesis 4 predicted that (a) on-task effort and (b) negative affective thoughts would mediate the relationship between perceived stress and performance. We examined the mediation hypothesis by obtaining point estimates of the indirect effects and the bias corrected and accelerated 95% confidence intervals around the effects using a bootstrapping method (see Preacher & Hayes, 2006). We estimated the full structural equation model and estimated 5,000 bootstrap samples with perceived stress as the independent variable, on-task effort and negative affective thoughts as mediators, and performance scores as the dependent variable. The model provided a good fit to the data, $\chi^2(72) = 119.40$, $p < .05$, CFI = .95, TLI = .94, RMSEA = .05, 90% CI [.03, .07].

The direct relationship between perceived stress and performance was not statistically significant when both mediators were simultaneously modeled (unstandardized direct effect = 0.013, 90% CI [−0.012, 0.036]). The specific indirect effects through on-task effort (effect = 0.005, 90% CI [0.001, 0.012]) and negative affective thoughts (effect = −0.025, 90% CI [−0.041, −0.010]) were significantly different from zero. Finally, we compared the relative strength of the two mediators by estimating the difference in the magnitude of the specific, indirect effects. This difference was statistically significant (effect difference = 0.029, 90% CI [0.015, 0.046]. Thus, the indirect effect through negative affective thoughts was significantly stronger than the indirect effect through on-task effort. The results from our mediation analyses lend full support for Hypothesis 4. Our hypothesized model and the standardized estimates are presented in Figure 1.

**STUDY 2**

Recall that within the challenge-hindrance stress framework that challenge stressors are positively related to outcomes and hindrance stressors are negatively related to outcomes (Cavanaugh et al., 2000; LePine et al., 2004). We contended that individual differences in stress perceptions define a

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<tr>
<td>1. On-task effort</td>
<td>—</td>
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<tr>
<td>2. Negative affective thoughts</td>
<td>.12</td>
<td>—</td>
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<td>3. Perceived stress</td>
<td>.23*</td>
<td>.54*</td>
<td>—</td>
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<tr>
<td>4. Performance</td>
<td>.13*</td>
<td>−.19*</td>
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*Note. N = 244. *p < .05.
stressor as a challenge or hindrance; however, to test the boundaries of our proposition, we examined the role of situational strength as a moderator of the stress-outcome relationship. The challenge-hindrance stress model assumes that stressors can be reliably categorized as challenges or hindrances and employees interpret and react to environmental stressors in a similar manner (LePine et al., 2005). We posit that this holds only for strong situations where the unequivocal perception of that stressor is held by everyone. To provide a coherent framework for describing when environmental stressors or perceived stress will predict performance, we incorporate the “strong” and “weak” situation distinction (Ickes, 1982; Mischel, 1977). Situational strength refers to the degree to which the situation leads people to “construe the particular events the same way” (Mischel, 1973, p. 276). Hence, “strong” situations generate uniform responses because the situation clearly indicates which behaviors are expected and reinforced (Mischel, 1977). The appropriate behavior in “weak” situations is less clear, allowing the individual to construct his or her interpretation.

Situational strength, defined by the magnitude of the environmental stressor, determines whether an environmental stressor or the perception of an environmental stressor is most likely to impact performance (Meyer, Dalal, & Hermida, 2010). Environmental stressors will directly impact performance in stronger situations because the pervasive environmental stressor (e.g., acute time pressure) prevents individuals from performing effectively (i.e., making good decisions). Consequently, individual differences in perceptions will have less opportunity to impact performance. Mild environmental stressors allow individual differences to emerge (Snyder & Ickes, 1985) because the stressor is susceptible to interpretation. The environmental stressor used in Study 1 (performance pressure to earn money) can be construed as a mild stressor, and we observed very little impact on performance but significant differences in perceived stress. We believe that the “strong” and “weak” situation distinction can provide a better understanding of many workplace behaviors (e.g., Meyer et al., 2010) and can elucidate the

Figure 1. Study 1 standardized structural coefficients for hypothesized model. Coefficients in bold represent statistically significant effects, $p < .05$. $N = 244$. 

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<th>Variable</th>
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<td>Perceived Stress</td>
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<td>On-task effort</td>
<td>.16</td>
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<td>Negative affective</td>
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<td>Performance</td>
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We manipulated time pressure to examine the effect of a pervasive strong environmental stressor on perceived stress and performance. Cavanaugh et al. (2000) classified time pressure as a challenge stressor. However, this classification may not always be appropriate especially when faced with an imminent deadline where time restrictions make it difficult or impossible to complete the task while maintaining high performance levels. Some evidence supports improved performance when task difficulty and time pressure are present (Chajut & Algom, 2003), but several studies demonstrated that time pressure impairs decision quality (e.g., Kerstholt, 1994; Rothstein, 1986; Wallsten & Barton, 1982) and cognitive processes crucial for effective decision making (e.g., Kirschenbaum & Arruda, 1994). In general, reducing the time allotted to make decisions has been found to impact both processing and outcomes (see Svenson & Maule, 1993, for a review). Because we used strong time pressure, perceptions of stress should be higher during time pressure; however, time pressure should affect task performance more than perceptions of stress. The time pressure can be an insurmountable obstacle (hindrance) that overwhelms performance and will be interpreted as a hindrance stressor unambiguously such that perceptions matter less than the environmental stressor itself. In contrast, a weaker stressor (performance pressure with no time pressure—identical to Study 1) allows for individual differences in interpretation of that stressor.

**Hypothesis 5:** Performance will be lower in the time pressure condition than in the no time pressure condition.

**Hypothesis 6:** Perceived stress will be higher in the time pressure condition than in the no time pressure condition.

**Hypothesis 7:** The effect of time pressure manipulation will be stronger on performance than perceived stress. Specifically, the mean difference in performance between the time pressure and no time pressure conditions will be significantly larger than the mean difference in perceived stress.

**Method**

**Participants, Design, and Procedure**

Undergraduate students ($N = 95$) participated in the study in exchange for extra credit. We used a between-subjects design where participants were
randomly assigned to one of four conditions. Forty-eight participants completed the decision task while subjected to a pervasive time pressure \((n = 23: \text{challenge}; n = 25: \text{hindrance})\). The remaining 47 participants completed the decision task without the additional time pressure \((n = 26: \text{challenge}; n = 21: \text{hindrance})\). We omitted four participants (two each in the time pressure and no time pressure conditions) because they consistently responded to the decision task in less than 500 ms.

**Decision Task and Perceived Stress Manipulation**

The decision task and pay-off matrices for the challenge and hindrance conditions were identical to Study 1, except six pictures were used.

**Environmental Stressor Manipulation**

Participants had 800 ms or less to make their choice which was feasible to respond to the pairs (based on pilot data) while inducing a demanding environmental stressor consistently across the task.

**Measures**

Participants completed the perceived stress measure (internal consistency reliability was .77). The decision task was assessed with mean correct performance.

**Results**

Perceived stress and performance means (standard deviations) are presented in Table 3 for time pressure conditions and Table 4 for stress conditions. Hypotheses 5 and 6 predicted that performance would be lower (H5) and perceived stress would be higher (H6) in the time pressure condition than the no time pressure condition. The results supported H5 with large differences in performance between the two conditions, \(d = -1.70, 90\% \text{ CI } [-2.09 \text{ to } -1.30]; t(93) = -8.26, p < .05\). The pervasive environmental stressor had a direct impact on performance with poorer performance for time pressure participants than no time pressure participants. A significant difference in perceived stress between the time pressure conditions supported H6, \(d = 0.38, 90\% \text{ CI } [0.04 \text{ to } 0.72]; t(93) = 1.85, p < .05\). The lack of overlap
in the 90% CIs for the two effects provided support for H7 that a strong stressor (time pressure) influenced performance more strongly than perceived stress. Further, these results demonstrated that an environmental stressor that is traditionally classified as a challenge could impair performance when the stressor is sufficiently strong.

Notably, our results demonstrated that the stronger environmental stressor affected performance ($d = 1.70$) more than perceived stress ($d = 0.38$); however, the milder environmental stressor (performance pressure alone) affected perceived stress ($d = 0.86$) more than performance ($d = 0.23$). The pattern of results demonstrated that the relationship between environmental stressors and performance predicted by the challenge-hindrance model held only in a strong situation. However, individual differences in perceived stress played a larger role for the milder stress conditions in that differences in perceived stress were larger than differences in performance.

**GENERAL DISCUSSION**

The present study provides evidence regarding when environmental stressors or perceived stressors are most important in influencing outcomes, and how and why challenge and hindrance stress affects performance. Spe-

### Table 3. Means and Standard Deviations by Time Pressure Condition in Study 2 (Collapsed Across Stress Condition)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Time pressure condition</th>
<th>No time pressure condition</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Perceived stress</td>
<td>2.75</td>
<td>0.91</td>
<td>2.45</td>
</tr>
<tr>
<td>Performance</td>
<td>0.57</td>
<td>0.11</td>
<td>0.74</td>
</tr>
</tbody>
</table>

* $p < .05$.

### Table 4. Means and Standard Deviations by Stress Condition in Study 2 (Collapsed Across Time Pressure Condition)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Challenge condition</th>
<th>Hindrance condition</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Perceived stress</td>
<td>2.29</td>
<td>0.65</td>
<td>2.93</td>
</tr>
<tr>
<td>Performance</td>
<td>0.67</td>
<td>0.14</td>
<td>0.64</td>
</tr>
</tbody>
</table>

* $p < .05$.
cifically, environmental stressors are more important in influencing outcomes in stronger situations whereas perceived stressors are more important in influencing outcomes in milder situations. On-task effort was higher in the challenge than the hindrance stress condition and negative affective thoughts were higher in the hindrance than challenge condition. Finally, we demonstrated that the relationship between perceived stress and performance was explained by on-task effort and negative affective thoughts.

One objective of the present study was to unify the challenge-hindrance model with the sociocognitive model to explain the process through which challenge and hindrance stressors can impact performance via perceived stress, on-task effort, and negative affective thoughts. This objective was accomplished by using an experimental design which disentangled the environmental stressor (performance pressure) from the perception of the stressor as a challenge or hindrance (pay-off matrix manipulation). Study 2 results explicated a boundary condition for the challenge-hindrance model. Using the “strong” and “weak” situation distinction, we demonstrated that the severity of the environmental stressor matters. In a strong situation, the environmental stressor affected both perceived stress and performance outcomes with larger effects for performance than perceived stress. Conversely, in the presence of a milder stressor (i.e., performance pressure alone), the effects were stronger for perceived stress than performance (Study 1 and Study 2). Consistent with the challenge-hindrance model, stress perceptions were higher in the hindrance than challenge condition. Contrary to the challenge-hindrance model, a relatively small difference in performance occurred between the challenge and hindrance conditions. Consistent with the sociocognitive model of stress, stress perceptions were significantly related to performance via on-task effort and negative affective thoughts. The pattern of results across both studies can be explained by integrating the challenge-hindrance and sociocognitive models of stress with the strong versus weak situation distinction.

It is not always accurate to objectively sort or categorize stressors as either challenges or hindrances, and we demonstrated that time pressure—a stressor considered to be a challenge in the challenge-hindrance stress model—can be a hindrance in a strong situation and is appraised as stressful. Given that environmental stressors can be perceived as a challenge or hindrance, it is important to understand the role of stress perceptions within the context of the challenge-hindrance model. Researchers have discounted the role of individual differences in stress perceptions (LePine et al., 2005) arguing that work contexts have a consistent meaning for individuals resulting in the same appraisal and reaction to work stressors. However, we contend that many workplace stressors are susceptible to interpretation, especially when stressors are mild in nature, allowing individuals the opportunity to respond differently. Because the primary studies in LePine et al.’s (2005) meta-
analysis included a mix of strong and weak situations, the effects found between hindrance and challenge stress and performance might underestimate the true effect. Perceptions of stressors are integral to understanding the impact of stressors on performance in weaker situations.

Another major contribution is that categorical stressors will not necessarily lead to the differential outcomes. Instead, it is the perception of a given stressor and how individuals appraise and cope (i.e., effort and negative affective thoughts) with said stressors that yields the hypothesized differential relationships with performance. Previous studies investigating the links between challenge and hindrance stressors and performance failed to disentangle the effects of environmental stressors and perceived stress (e.g., Pearsall et al., 2009; Rodell & Judge, 2009; Webster et al., 2010), and some acknowledged this limitation (Webster et al., 2010). Our results showed that the challenge and hindrance conditions differentially affected perceived stress, on-task effort, and negative affective thoughts. Furthermore, on-task effort and negative affective thoughts were significant predictors of performance. We are not aware of any studies that have empirically examined on-task effort or negative affective thoughts as explanatory mechanisms linking challenge and hindrance stress to performance. This is a critical because a unification of the sociocognitive theory and challenge-hindrance model offers a comprehensive view that challenge and hindrance stress affects performance through effort (e.g., task focus, motivation, self-efficacy) and emotions (e.g., negative affect, withdrawal, anxiety).

**Implications and Future Research**

There are several implications for research using the challenge-hindrance model of stress. Researchers should be careful to emphasize and understand that stress perceptions and stress reactions (on-task effort and negative affective thoughts) are the more proximal antecedents to performance than the stressor itself, based on extant theory and empirical findings. Creating composite scores from ratings of a list of challenge and hindrance stressors may mask differences in perceptions of stressors as a challenge and hindrance; resulting in weaker effect sizes. In strong situations, employees should interpret the stressors in the same way; but, weak situations introduce more variability in perceptions. One suggestion is to ensure that stressors in self-report measures are indeed perceived as and operating as challenges or hindrances. Consistent with the extant literature, time pressure can be interpreted as both a challenge and a hindrance, depending on the situation. Another suggestion for obtaining stronger effects would be to use stress perceptions as the primary independent variable in theory testing.
Another implication for testing the challenge-hindrance model is that stronger effects can be obtained by also examining the cognitive and behavioral reactions to stress. We examined the mediating role of on-task effort and negative affective thoughts in explaining the stressor-performance relationship posited by theory; however, there are other potential intervening variables that may also explain the relationship between stressors and performance. For example, Pearsall, Ellis, and Stein (2009) found support for the role of problem-solving and avoidant coping as an explanation for the differential relationships between challenge and hindrance stressors and team-based performance. Although Webster, Beehr, and Christiansen (2010) found weak evidence that self-efficacy mediated the stressor-performance relationship, self-efficacy plays a prominent role in some theories of stress as an intervening variable (e.g., Spector, 1998). Indeed, one potential limitation of our Study 1 is that there may be omitted mediators that our experimental manipulation also affected that would have biased our indirect effect estimates of on-task effort and negative affective thoughts (e.g., Bullock, Green, & Ha, 2010). Despite the potential for biased estimates of mediation in favor of finding mediation due to missing variables, we investigated the role of two mediators most directly implicated in theories of stressor-performance relationships (e.g., Lazarus & Folkman, 1984; Motowidlo, Packard, & Manning, 1986; Spector, 1998). Second, we used an experimental research design, which is recommended to reduce bias in indirect effects (e.g., Spencer, Zanna, & Fong, 2005; Stone-Romero & Rosopa, 2008). Finally, we used bootstrapping procedures to obtain more accurate confidence intervals in which to evaluate our mediators. As such, we are confident that, although there may be other mediators of the stressor-performance relationship, we have provided compelling evidence that on-task effort and negative affective thoughts are important in understanding the stressor-performance relationship.

Human resource professionals may argue that the best strategy for improving relevant outcomes (e.g., satisfaction, performance) is to remove stressors; however, eliminating all stressors is not feasible, and some stressors may improve performance. We contend that strong situations that impose difficult constraints are infrequent in everyday work tasks and that mild-to-moderate strength situations are more common; albeit, some employees may think otherwise. Results of the present study clearly highlighted that performance is influenced more by the perceptions of stress than the actual stressors. Further, managing employee perceptions might be easier than changing the situation. Stress management could focus on interventions such as training individuals to reframe hindrances as challenges. Framing can have a profound effect on perceptions and behavior (Tversky & Kahneman, 1974), which can impact health, wellness, and happiness (see Thaler & Sunstein, 2008, for overview). Possible interventions could train individuals to learn
more adaptive strategies for controlling their emotional reactions, focusing their efforts on the task at hand, or dealing with specific stressors (e.g., integrating roles under role conflict similar to crew resource management). Stress management practices may also involve providing resources such as time management skills training and supervisor support to help employees overcome hindrance stressors. For example, high involvement management interventions can improve employee perceptions and morale regarding work tasks (Riordan, Vandenberg, & Richardson, 2005).

**Potential Limitations**

Some applied researchers may argue that our results would not generalize to other populations, settings, or stressors. Because our results were consistent with extant theory and past research in applied settings, we believe our results would generalize. The primary objectives of the present research were dependent on addressing threats to internal validity and addressing causality for theory testing. Achievement of these objectives required an experimental design in a carefully controlled laboratory study. Furthermore, almost all of the prior studies examining the relationship between stressors and performance used applied samples. Also, there is a near unanimous consensus that time pressure and performance pressure are considered stressors and that decision making is imperative in many jobs. The use of experimental designs in which stressors can be manipulated in applied settings is ethically and legally prohibitive which may be why no prior data exists addressing our study objectives.

Applied researchers may also express some concern with our manipulation that generated the perceptions of challenge and hindrance stress. To help mitigate this concern, we generated a pay-off matrix that shares the same features of a typical reward system whereby participants are rewarded with real money for correct decisions. We were careful to define the pay-off matrix consistent with the definitions of challenge and hindrance stressors and particularly how perceptions of those stressors are linked to the effort-reward relationship. That is, challenge stressors are defined as surmountable through effort. Thus, participants were rewarded with more money than they lost if they were incorrect in the challenge condition; expending more effort led to a greater reward. In contrast, the hindrance condition weakened the effort-reward relationship by punishing participants with a greater loss for incorrect answers than the gain for correct answers. Thus, in the hindrance condition, more effort could not overcome the insurmountable deficit for errors.

Another potential limitation is that the decision-making task is not representative of the types of decisions performed in jobs. Although it is
unlikely that individuals at work would encounter the exact task, employees often have to make decisions at work during the presence of some form of stressor. Much of the work on decision making has successfully relied on controlled laboratory experiments to infer how people make decisions in real-world situations (e.g., heuristics approach: Tversky & Kahneman, 1974; Gigerenzer & Goldstein, 1996).

CONCLUSION

Our goal was to identify the unique contributions from the challenge-hindrance model and the sociocognitive model of stress in understanding the stressor-performance relationship. Results indicate that it is important to consider both the severity of the environmental stressor, the type of the environmental stressor, and individual differences in perceived stress. Further, we contributed to the research on the challenge-hindrance model of stress by demonstrating that on-task effort and negative affective thoughts were significant mediators of the relationship between perceived stress and performance. Finally, using the strong-weak situation distinction as a conceptual paradigm, we demonstrated that individual differences in stress perceptions have the largest impact when a stressor is relatively mild.

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