ABSTRACT

OAKLEY, SONIA LAUREN. Cognitive Appraisals as Mediators of the Relationship between Job Demands and Work Engagement. (Under the direction of Dr. Samuel Pond, III.)

By integrating models of work-related well-being with stressor appraisal theory, this study investigated the psychological processes linking job demands to work engagement. Self-report survey data from 459 full-time employees revealed that employees tended to view job demands as both challenging and hindering simultaneously. Multiple mediation analysis confirmed that hindrance appraisal mediated a negative relationship between job demands and work engagement. Challenge appraisal mediated a positive relationship between two job demands (quantitative workload and interpersonal conflict) and work engagement. However, challenge appraisals of cognitive demands and role conflict were unrelated to work engagement. Finally, general self-efficacy did not moderate the relationships between job demands and cognitive appraisals. These results suggest that, rather than classifying certain demands as challenges and others as hindrances as done in past research, researchers should measure individual perceptions of challenge and hindrance for all job demands. Future research should identify individual and environmental characteristics that can strengthen challenge appraisals and weaken hindrance appraisals of common job demands. These findings could help organizations support employee well-being by facilitating adaptive perceptions of the work environment.

Cognitive Appraisals as Mediators of the Relationship between Job Demands and Work Engagement

by
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A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the degree of
Master of Science

Psychology

Raleigh, North Carolina

2014

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Cognitive Appraisals as Mediators of the Relationship between Job Demands and Work Engagement

As a positive facet of work-related well-being, work engagement holds long-term advantages for both individuals and organizations (Bakker & Demerouti, 2008). Research has established work engagement as a unique concept that predicts job performance even after accounting for job satisfaction, organizational commitment, and job involvement (Christian, Garza, & Slaughter, 2011). Compared to their non-engaged counterparts, engaged employees are more likely to expend extra effort and experience positive emotions at work, resulting in increased in-role and extra-role performance (Bakker, 2011; Christian et al., 2011; Rich, LePine, & Crawford, 2010). In addition, longitudinal studies show that engagement improves life satisfaction and reduces depressive symptoms (Hakanen & Schaufeli, 2012) and sick leave frequency (Schaufeli, Bakker, & Van Rhenen, 2009). Benefits persist as work engagement fosters the mobilization of resources that promote further engagement, resulting in a positive gain spiral (Schaufeli et al., 2009).

Given the clear link between work engagement and positive outcomes, it is valuable to understand how organizations can cultivate employee engagement. According to the Job Demands-Resources (JD-R) model, job demands, or work aspects that place physical or psychological pressure on employees, are unrelated to work engagement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). However, research drawing from the challenge-hindrance model (Cavanaugh, Boswell, Roehling, & Boudreau, 2000), contradicts this claim. Specifically, researchers have demonstrated that job demands perceived as challenges, or

opportunities for learning and growth, promote work engagement; conversely, job demands perceived as hindrances, or barriers to learning and growth, diminish work engagement (Crawford, LePine, & Rich, 2010; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). These findings suggest that job demands play an important but complex role in shaping worker well-being.

Although the challenge-hindrance model has refined the study of work well-being, it also has limitations. Namely, studies have classified demands as either challenges or hindrances without measuring employee appraisal (e.g., Cavanaugh et al., 2000; Crawford et al., 2010; LePine, Podsakoff, & LePine, 2005). Because the difference between challenges and hindrances lies in how employees perceive them, this method fails to capture the psychological process linking demands to outcomes (Webster, Beehr, & Love, 2011). In addition, this practice treats each job demand as either a universal challenge or a universal hindrance, ignoring individual differences in appraisal. Thus, there is a need for research that examines individual demand appraisal and factors accounting for appraisal differences.

The purpose of this study is to explore the relationship between job demands and work engagement by testing the model shown in Figure 1. First, I will examine cognitive appraisals as mediators of the relationship between demands and engagement. Next, I will examine general self-efficacy as a moderator of the relationship between job demands and cognitive appraisals. In doing so, I will integrate the Job Demands-Resources model, the challenge-hindrance model, and demand appraisal research to construct a more complete framework of work engagement.

Work Engagement and the Job Demands-Resources Model

Work engagement is "a positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). *Vigor* reflects high levels of energy and activation at work, and thus represents an active, motivational component of engagement (Bakker, 2011; Mauno, Kinnunen, & Ruokolainen, 2007). *Dedication* reflects belief in the significance of one's work, and is characterized by feelings of enthusiasm and pride. Finally, *absorption*, or immersion in one's work, adds a cognitive element to work engagement (Bakker, 2011). In short, engaged individuals experience well-being because of a commitment to work on multiple levels.

The dominant framework for understanding work engagement is the Job Demands-Resources (JD-R) model (Demerouti et al., 2001). Its central proposition is that characteristics of any work environment fall into one of two categories: *job demands*, or aspects of the job that harm health and well-being due to the effort required to deal with them; and *job resources*, or aspects of the job that facilitate work goals and personal growth. According to the JD-R model, resources and demands activate two distinct psychological processes. Job resources activate a motivational process that strengthens individuals' engagement with their jobs (Schaufeli & Bakker, 2004). In contrast, job demands activate a health-impairment process in which the effort expended to deal with demands leads to burnout. This dual-process model implies that job demands neither facilitate nor impair work engagement; instead, they contribute to other, more negatively framed well-being outcomes.

The Challenge-Hindrance Model of Work Stress

Although the JD-R model asserts that job demands do not affect work engagement, Crawford and colleagues (2010) observed that studies conducted within the JD-R framework contradict this assumption. Namely, research has found positive relationships between work engagement and time pressure (Bakker, van Emmerik, & Euwema, 2006; Schaufeli, Taris, & Van Rhenen, 2008), workload (Bakker, Demerouti, & Schaufeli, 2005; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007), and cognitive demands (Bakker et al., 2005). In contrast, research has linked role conflict, organizational politics, and emotional conflict to decreased work engagement (Crawford et al., 2010). These findings suggest that the JD-R model does not capture the true relationship between demands and engagement.

The challenge-hindrance model of occupational stress reconciles the seemingly conflicting findings by stating that two types of stressors contribute to work outcomes (Cavanaugh et al., 2000). *Challenges* include stressors that employees view as difficult to deal with, but also as opportunities for growth and personal gain. In contrast, *hindrances* include stressors that employees perceive as obstacles to achievement and as carrying no potential for gain. When applied to the JD-R model, this framework suggests that job demands can act either as challenges, which promote work engagement, or as hindrances, which reduce work engagement. Recent research suggests that this distinction effectively clarifies the relationship between demands and engagement. For instance, in a meta-analytic study, Crawford and colleagues (2010) differentiated challenge and hindrance demands based on Cavanaugh and colleagues' (2000) framework. They found that challenge demands

(e.g., responsibility and workload) positively predicted engagement, while hindrance demands (e.g., emotional conflict and role conflict) negatively predicted engagement. Similarly, in two samples of call center agents and police officers, Van den Broeck and colleagues (2010) found that workload and cognitive demands positively predicted the vigor component of work engagement, whereas work-home interference and emotional demands negatively predicted vigor. Thus, contrary to the assumption of the JD-R model, job demands shape work engagement when researchers differentiate challenges and hindrances.

The first goal of this study is to replicate research showing differential relationships of challenge and hindrance demands with work engagement. To build on previous literature reflecting the JD-R and challenge-hindrance perspectives, I chose job demands that are: a) well-researched within the JD-R framework; b) clearly classified as either challenges or hindrances within the challenge-hindrance framework; and c) relevant to a variety of organizational settings. Based on these criteria, I propose the following hypotheses:

Hypothesis 1a: Challenge demands (i.e., quantitative workload and cognitive demands) will positively relate to work engagement.

Hypothesis 1b: Hindrance demands (i.e., role conflict and interpersonal conflict) will negatively relate to work engagement.

The Importance of Demand Appraisal

While the challenge-hindrance model extends the understanding of job demands as shapers of work outcomes, research conducted within this framework has largely failed to test its conceptual underpinnings. Proponents of the challenge-hindrance model (e.g., LePine

et al., 2005) have grounded it in the transactional theory of stress (Lazarus & Folkman, 1984), which explains how stressors lead to individual outcomes. According to this theory, individuals confronting a stressful situation engage in a primary appraisal process through which they label the stressor as potentially threatening (a hindrance) and/or potentially beneficial (a challenge). Challenge appraisals generate positive emotions, active coping, and high expectancy; thus, they lead to increased motivation and performance (LePine et al., 2005). In contrast, hindrance appraisals trigger negative emotions, avoidance, and beliefs that effort will not lead to valued outcomes; thus, hindrances reduce performance and motivation.

Because the challenge-hindrance model is rooted in the transactional theory of stress, appraisal is a central component. In other words, challenges and hindrances exhibit different relationships with work outcomes because individuals tend to perceive them differently. However, Webster and colleagues (2011) noted that challenge-hindrance research does not reflect the underlying theory's focus on appraisal. Cavanaugh and colleagues (2000) made the original distinction by classifying each of 11 demands as either a challenge or a hindrance based on formal definitions. Subsequent studies (e.g., Boswell, Olson-Buchanan, & LePine, 2004; Crawford et al., 2010; Podsakoff, LePine, & LePine, 2007) used this two-dimensional framework as a guideline for classifying demands as challenges or hindrances. Thus, rather than basing the challenge-hindrance distinction on the appraisal process outlined by the transactional theory of stress, researchers established the distinction based on their own judgment. Failure to include appraisal ratings from employee participants poses several problems, which I present in the following sections.

Individual appraisals of job demands. By disregarding demand appraisal, researchers have assumed that individuals perceive each type of job demand as either fully challenging or fully hindering. However, the transactional theory of stress (Lazarus & Folkman, 1984) suggests that challenge and hindrance appraisals are not mutually exclusive. In other words, a single job demand may evoke hindrance appraisals with resulting negative outcomes, yet at the same time evoke challenge appraisals with resulting positive outcomes (Gilboa, Shirom, Fried, & Cooper, 2008; Staufenbiel & König, 2010). Indeed, Webster and colleagues (2011) confirmed this idea by examining university employees' appraisals of job demands. Workload, role conflict, and role ambiguity positively predicted both challenge and hindrance appraisal, demonstrating that individuals appraise job demands as challenges and hindrances simultaneously. Based on their results, Webster and colleagues (2011) suggested that the two-dimensional classification system oversimplifies the cognitive appraisal process.

Although a job demand may simultaneously evoke challenge and hindrance appraisals, Cavanaugh and colleagues' (2000) categorization system implies that individuals consistently perceive a single type of job demand as either more challenging than hindering or vice versa. Presumably, the difference between demands originally defined as challenges and those originally defined as hindrances lies in the relative strength of the two appraisals that each demand evokes. The second aim of this study is to test this assumption by examining how individuals appraise both typical challenge demands and typical hindrance demands. Drawing from the challenge-hindrance framework (Cavanaugh et al., 2000) and Webster and colleagues' (2011) appraisal research, I propose the following hypotheses:

Hypotheses 2a-d: (a) Quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict challenge appraisal.

Hypotheses 3a-d: (a) Quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict hindrance appraisal.

Hypotheses 4a-b: (a) Quantitative workload and (b) cognitive demands will relate more strongly to challenge appraisal than to hindrance appraisal.

Hypotheses 5a-b: (a) Role conflict and (b) interpersonal conflict will relate more strongly to hindrance appraisal than to challenge appraisal.

The relationship between appraisals and work engagement. In addition to overlooking individual perceptions of job demands, disregarding demand appraisal fails to capture the most proximal source of demand-related outcomes. According to the transactional theory of stress (Lazarus & Folkman, 1984), it is not the demand itself, but an individual's perception of the demand, that determines outcomes. Several studies have explored the relationship between demand appraisals and work outcomes. In their survey study, Gardner and Fletcher (2009) asked 659 veterinarians to recall their most stressful recent work experience. Individuals who appraised these stressful situations as more challenging experienced greater task-focused coping, positive affect, and job satisfaction. In contrast, individuals who appraised these situations as more hindering experienced greater avoidance, more negative affect, and lower job satisfaction. Similarly, in a study of within-day beliefs about job demands, employees experienced more positive affect and less anxious affect when they appraised problem-solving demands as more beneficial for their work

performance (Daniels, Wimalasiri, Beesley, & Cheyne, 2012). Finally, Webster and colleagues (2011) found positive relationships between hindrance appraisal and four outcomes: psychological strain, physical strain, job dissatisfaction, and turnover intentions. However, challenge appraisals were largely unrelated to these outcomes.

The lack of relationship between challenge appraisal and work outcomes in Webster and colleagues' (2011) study signals the need to examine positively framed outcomes such as work engagement. Because hindrance appraisals are uniformly negative, their negative effects should be consistent across work outcomes; however, because challenge appraisals involve perceptions of both stress and potential benefit, their positive effects may become evident only when predicting more active, motivational outcomes. Indeed, a study of 750 Spanish and Polish social service workers found that challenge appraisals of workload, personal accountability, and relationships positively predicted work engagement (Kozusznik, Rodriguez, & Peiro, 2012). Although this study suggests that challenge appraisal may promote work engagement, the authors did not examine appraisals for any work demands traditionally classified as hindrances. The third aim of my study is to extend research on demand appraisal by exploring the relationship between appraisals for both types of demands and the positive outcome of work engagement. Thus, I propose the following hypotheses:

> *Hypotheses 6a-d:* Challenge appraisals for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict work engagement.

Hypotheses 7a-d: Hindrance appraisals for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will negatively predict work engagement.

The mediating role of demand appraisal. Another benefit of measuring cognitive appraisal is the ability to examine it as a psychological process linking demands to outcomes (Lazarus & Folkman, 1984). While previous research has linked cognitive appraisals to work outcomes, many of these studies (e.g., Gardner & Fletcher, 2009; Kozusznik et al., 2012) did not include levels of the associated job demands as antecedents of demand appraisals. Consequently, less research has examined appraisal as a mediator. In the first study to directly test this relationship for specific job demands, Webster et al. (2011) found that cognitive appraisal mediated the relationship between job demands and outcomes such as exhaustion and job dissatisfaction. Two other studies identified challenge appraisal of work in general as a mediator of the relationship between demands and turnover intentions, work withdrawal, loyalty (Boswell et al., 2004), creativity, and proactive behavior (Ohly & Fritz, 2009). The fourth goal of my study is to expand upon previous research examining the mediating role of appraisal. Thus, I hypothesize the following:

Hypotheses 8a-d: Challenge appraisal for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will mediate the relationship between its corresponding job demand and work engagement.

Hypotheses 9a-d: Hindrance appraisal for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will mediate the relationship between its corresponding job demand and work engagement.

General Self-efficacy as a Moderator of the Demand-Appraisal Relationship

Challenge-hindrance research has shown that different job demands exert different effects on work engagement. Additionally, appraisal research suggests that perceptions of demands, not demands themselves, directly affect engagement. Given these assumptions, the next step in clarifying the relationship between demands and engagement is determining factors that influence the extent to which demands evoke particular appraisals. Thus, my fifth goal is to identify moderators of the relationships between job demands and appraisals.

According to Lazarus and Folkman (1984), individuals are more likely to see a difficult situation as a challenge, and less likely to see it as a hindrance, when they feel they can control either the situation itself or their own reactions to it. This suggests that factors reflecting perceived ability to handle work demands moderate the relationship between demands and appraisals. I propose that one such individual factor is general self-efficacy, a trait-like concept reflecting individuals' general beliefs that they can succeed in the face of difficulties (Chen, Gully, & Eden, 2001). According to social-cognitive theory, self-efficacy influences expectations of future performance (Bandura, 2009). Specifically, individuals with higher self-efficacy are more likely to anticipate positive outcomes and focus on opportunities rather than obstacles during difficult situations. These perceptions mirror those outlined by the transactional theory of stress: a focus on opportunities reflects challenge

appraisal, whereas a focus on obstacles reflects hindrance appraisal. Thus, compared to individuals with low self-efficacy, individuals with high self-efficacy should form stronger challenge appraisals and weaker hindrance appraisals of job demands.

The JD-R model classifies self-efficacy as a personal resource that buffers the impact of job demands on strain (Xanthopoulou et al., 2007). In a six month longitudinal study of Malaysian technical workers, Panatik, O'Driscoll, and Anderson (2011) found that job demands produced strain for individuals with low self-efficacy, but not for individuals with high self-efficacy. Similarly, a study of bank employees found that general self-efficacy buffered the negative effect of demands on psychological health (Van Yperen & Snijders, 2000). Finally, in a sample of employees in Hong Kong and Beijing, Siu, Lu, and Spector (2007) found that demands exhibited stronger negative relationships with well-being for individuals with low self-efficacy. The authors proposed that self-efficacy buffers the effects of demands by leading employees to perceive them as less hindering and more challenging.

Although research has established self-efficacy as a moderator of the stressor-strain relationship, little research has examined work engagement as an outcome. However, one cross-sectional study of 143 Italian teachers found that work-family conflict was less detrimental to work engagement for individuals with high self-efficacy (Simbula, Mazzetti, & Guglielmi, 2011). Interpreted within the framework of social-cognitive theory and the transactional theory of stress, these results suggest that self-efficacy influences the relationship between job demands and engagement by influencing the extent to which demands evoke cognitive appraisals.

It is important to note that research has explored self-efficacy as a moderator of the demand-outcome relationship, not of the demand-appraisal relationship. Furthermore, findings are mixed, as studies have failed to establish self-efficacy as a moderator of the relationship between demands and exhaustion (Xanthopoulou et al., 2007), job dissatisfaction, and anxiety (Jex & Gudanowski, 1992). Jex, Bliese, Buzzell, and Primeau (2001) explained the inconsistency by suggesting that although self-efficacy facilitates positive stressor appraisal, factors such as coping may affect the link between these appraisals and outcomes, thus weakening the moderating effect of self-efficacy on the demand-outcome relationship. By assessing the proximal outcome of appraisal in addition to the distal outcome of work engagement, I aim to refine the examination of self-efficacy as a moderator. Thus, I propose the following hypotheses:

Hypotheses 10a-d: General self-efficacy will moderate the relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and its corresponding challenge appraisal, such that the relationship between the job demand and its challenge appraisal will be stronger for individuals with high self-efficacy than for individuals with low self-efficacy.

Hypothesis 11a-d: General self-efficacy will moderate the relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and its corresponding hindrance appraisal, such that the relationship between the job demand and its hindrance appraisal will be weaker for individuals with high self-efficacy than for individuals with low self-efficacy.

Conditional Indirect Effects of Job Demands on Work Engagement

Hypotheses 8 and 9 propose that challenge and hindrance appraisals mediate the relationships between demands and engagement. Hypotheses 10 and 11 propose that general self-efficacy moderates the relationships between demands and appraisals. Together, these hypotheses imply that general self-efficacy moderates the indirect effects of job demands on work engagement (Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007). In other words, because self-efficacy influences the extent to which demands evoke challenge and hindrance appraisals, the mediating role of these appraisals should vary as a function of individuals' levels of general self-efficacy. Thus, I propose the following hypotheses:

Hypotheses 12a-d: General self-efficacy will moderate the indirect relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and work engagement through challenge appraisal, such that the positive indirect relationship between each demand and engagement through challenge appraisal will be stronger for those with high self-efficacy than for those with low self-efficacy.

Hypotheses 13a-d: General self-efficacy will moderate the indirect relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and work engagement through hindrance appraisal, such that the negative indirect relationship between each demand and engagement through hindrance appraisal will be weaker for those with high self-efficacy than for those with low self-efficacy.

Method

Participants and Procedure

To increase variability in job characteristics, previous researchers (e.g., Demerouti, 2006; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008) recruited heterogeneous samples. Therefore, I recruited individuals from a range of occupations and organizations using a snowball sampling technique similar to that employed in previous research (e.g., Stoner & Gallagher, 2010; Treadway et al., 2005). Namely, as part of a research requirement for an introductory psychology course, undergraduates at a university in the Southeastern United States assisted with recruitment. I provided students with the link to an online survey, which they emailed to two individuals employed full time in any occupation. Of the 1080 individuals who received the survey, 572 submitted responses, for a response rate of 53%. The final sample consisted of 459 full-time employees who completed the entire survey. Half of the respondents were female, and the mean age was 46 years (*SD* = 9.9 years). Seventy eight percent of respondents had earned a Bachelor's degree or higher, and the most common occupations were education (15%), sales (12%), management (12%), and business (10%).

Measures

The online survey contained the scales described below, plus demographic items.

Work engagement. I measured work engagement with the nine-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006). Three items each measure vigor (e.g., "At my work, I feel bursting with energy"), dedication (e.g., "I am proud of the work that I do"), and absorption, (e.g., "I get carried away when I am

working”). Participants rated how often they experienced the conditions described by each statement on a seven-point Likert-type scale (1 = *Never*, 7 = *Always*). The coefficient alpha reliability estimate for this scale was .93.

Job demands. I measured four job demands with the four scales described below. Participants rated demand items on a five-point Likert-type scale (1 = *Never*, 5 = *Very often).*

Quantitative workload. The Quantitative Workload Inventory (QWI; Spector & Jex, 1998) contains five items assessing workload (e.g., “How often do you have to do more work than you can do well?”) and the time pressure associated with work activities (e.g., “How often does your job require you to work very fast?”). Coefficient alpha for this scale was .81.

Cognitive demands. I measured cognitive demands using seven items from the Questionnaire on the Experience and Assessment of Work (QEAW; van Veldhoven, Meijman, Broersen, & Fortuin, 1997). Items assess the level of mental effort required to carry out work tasks. To maintain consistency across job demand scales, I revised the items to reflect the frequency with which individuals experience mental demands on the job. For example, the item “Does your work demand a lot of concentration?” became “How often does your work demand a lot of concentration?” Coefficient alpha for this scale was .86.

Role conflict. Researchers traditionally define role conflict as encompassing multiple dimensions reflecting incompatibility among the expectations associated with fulfilling a work role (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Rizzo, House, & Lirtzman, 1970). I examined the dimension of intersender conflict, which occurs when individuals face incompatible requests or expectations at work (Bishop & Scott, 2000). I measured

intersender conflict with three items adapted from Rizzo, House, and Lirtzman's (1970) measure of role conflict, which Bishop and Scott (2000) identified as reflecting intersender conflict. To maintain consistency with the other job demand scales, I changed these items from first-person statements (e.g., "I often receive incompatible requests from two or more people") to second-person questions (e.g., "How often do you receive incompatible requests from two or more people?"). Coefficient alpha for this scale was .82.

Interpersonal conflict. I measured interpersonal conflict with Jehn's (1995) relationship conflict scale. This scale includes four items assessing tension and incompatibility among members of a work unit. I revised the items to fit the frequency-based wording of the other job demand items. For instance, the item "How much friction is there among members in your work unit?" became "How often is there friction among members in your work unit?" Coefficient alpha for this scale was .92.

Demand appraisals. I measured challenge and hindrance appraisals using methods consistent with previous cognitive appraisal research (i.e., Kozusznik et al., 2012; Webster et al., 2011). First, participants viewed a definition of a challenge or a hindrance, which I constructed based on definitions from previous research (i.e., Cavanaugh et al., 2000; Kozusznik et al., 2012; LePine et al., 2005; Webster et al., 2011; Table 1). Participants then viewed a list of items corresponding to the job demand items they had previously rated. For each item, participants rated the extent to which they viewed each condition as a challenge and a hindrance on a 7-point Likert-type scale (for challenge appraisal, 1 = *Not at all a challenge*, 7 = *Very much a challenge*; for hindrance appraisal, 1 = *Not at all a hindrance*, 7

= *Very much a hindrance*). Thus, participants made separate challenge and hindrance appraisals for each of the four job demands, for a total of eight appraisal scales. Participants made the challenge and hindrance appraisal ratings separately, and I counterbalanced their presentation to prevent order effects. The coefficient alpha reliability estimates for challenge appraisal of quantitative workload, cognitive demands, role conflict, and interpersonal conflict were .91, .96, .90, and .95, respectively. The coefficient alpha reliability estimates for hindrance appraisal of quantitative workload, cognitive demands, role conflict, and interpersonal conflict were .93, .96, .91, and .95, respectively.

General self-efficacy. Chen, Gully, and Eden's (2001) General Self-Efficacy Scale includes eight items assessing individuals' perceived capability of meeting goals and demands across contexts (i.e., "When facing difficult tasks, I am certain that I will accomplish them"). To avoid misinterpretation based on the previous definition of a challenge, I changed the item "I will be able to successfully overcome many challenges" to "I will be able to successfully overcome many difficulties." Participants rated their agreement with each statement on a five-point Likert-type scale (1 = *Strongly disagree*, 5 = *Strongly agree)*. Coefficient alpha for this scale was .90.

Results

Measurement Model Fit

I first assessed the fit of the four measurement models using confirmatory factor analysis (CFA). Each model contained item-level indicators for five factors: one of the four job demands, its corresponding challenge and hindrance appraisals, work engagement, and

general self-efficacy. Because the challenge and hindrance appraisal items contained stems drawn from their corresponding job demand scales, items across the job demand, challenge appraisal, and hindrance appraisal constructs had identical wording. Because similar wording can cause items to relate in ways that the focal factors do not account for (Reeve et al., 2007), I allowed the error terms for items with identical wording to covary.

I judged model fit using five fit indices: χ^2 difference test, the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). Table 2 displays the fit indices for the measurement models. The χ^2 values for all four models were significant, and the fit indices for the quantitative workload model indicated mediocre fit according to Hu & Bentler's (1999) criteria (RMSEA = .08, SRMR = .07, CFI = .89, TLI = .88). The fit indices for the other three models approached, but still fell largely outside, the accepted cutoffs for good fit: although all SRMR values fell within the cutoff of .08, the RMSEA values were all above .06, and the CFI and TLI values were all under .95.

Examination of the modification indices revealed that the fit of all four models would improve if I allowed the errors for two engagement items ("At my work, I feel bursting with energy" and "At my job, I feel strong and vigorous") to covary. In addition to having similar structure and wording, these items contain phrasing that may sound strange to respondents from the United States. This is unsurprising given that the developers of the Utrecht Work Engagement Scale (Schaufeli et al., 2006) used samples from primarily European countries, and did not validate the scale on respondents from the U.S. Because the error correlation was

not likely due to chance characteristics of the data (MacCallum, Roznowski, & Necowitz, 1992), I allowed the error terms for these two items to covary in a modified five-factor model. These modified models fit the data reasonably well according to Hu and Bentler's (1999) criteria. All RMSEA values fell within or just outside the cutoff of .06 (values ranged from .054 to .066), and all SRMR values were under.08. Similarly, all CFI and TLI values approached.95, with a CFI range of .92-.96, and a TLI range of .90-.96. Finally, all items loaded significantly onto their corresponding factors, with standardized loadings >.50.

To provide evidence for the distinction between challenge and hindrance appraisal, I compared the modified five-factor model to an alternative four-factor model in which all challenge and hindrance appraisal items loaded onto a single factor. Again, I allowed errors for identically-worded job demand and appraisal items to covary, and allowed the errors for the two previously identified work engagement items to covary. For all four job demands, significant differences in $\Delta\chi^2$ showed that each modified five-factor model fit the data better than its corresponding four-factor model: for quantitative workload, $\Delta\chi^2(4) = 1006.13$, $p < .001$; for cognitive demands, $\Delta\chi^2(4) = 2746.26$, $p < .001$; for role conflict, $\Delta\chi^2(4) = 404.01$, $p < .001$; for interpersonal conflict, $\Delta\chi^2(4) = 881.09$, $p < .001$. This supports the idea that challenge and hindrance appraisals represent two distinct constructs.

Descriptive Statistics and Correlations

Table 3 displays the means, standard deviations, and zero-order correlations for all study variables. I tested Hypothesis 1 by examining the correlations between the four job demands and work engagement. Hypothesis 1a stated that job demands traditionally

classified as challenges would positively predict work engagement. In full support of this hypothesis, work engagement was positively correlated with quantitative workload ($r = .15$, $p < .001$) and cognitive demands ($r = .21$, $p < .001$). Hypothesis 1b stated that traditional hindrance demands would negatively predict work engagement. The correlation between role conflict and work engagement was in the predicted direction, but was nonsignificant ($r = -.06$, $p > .05$). However, as expected, interpersonal conflict negatively predicted work engagement ($r = -.13$, $p < .01$). Thus, I found partial support for Hypothesis 1b.

Hypotheses 2a-d stated that all four job demands would positively predict their corresponding challenge appraisals. As expected, job demands positively predicted challenge appraisals for quantitative workload ($r = .43$, $p < .001$), cognitive demands ($r = .23$, $p < .001$), role conflict, ($r = .62$, $p < .001$), and interpersonal conflict ($r = .68$, $p < .001$). Hypotheses 3a-d stated that all four job demands would positively relate to their corresponding hindrance appraisals. As expected, job demands positively predicted hindrance appraisals for quantitative workload ($r = .48$, $p < .001$), cognitive demands ($r = .10$, $p < .05$), role conflict ($r = .60$, $p < .001$), and interpersonal conflict ($r = .69$, $p < .001$). These results provided full support for Hypotheses 2 and 3.

To compare the strength of the relationships between job demands and the two types of cognitive appraisal, I used Williams' T2 statistic, which tests the significance of the difference between two dependent correlations involving a common variable (Steiger, 1980). I predicted that quantitative workload (Hypothesis 4a) and cognitive demands (Hypothesis 4b) would relate more strongly to challenge appraisal than to hindrance appraisal.

Quantitative workload predicted both challenge and hindrance appraisal with equal strength, $t(456) = -1.35$, $p = .18$. Thus, Hypothesis 4a was not supported. Cognitive demands correlated more strongly with challenge appraisal than with hindrance appraisal, $t(456) = 2.74$, $p < .01$). Thus, Hypothesis 4b was supported. Hypotheses 5a and 5b stated that role conflict and interpersonal conflict would relate more strongly to hindrance appraisal than to challenge appraisal. I found no support for this hypothesis, as both job demands predicted challenge and hindrance appraisal with equal strength (role conflict: $t(456) = .79$, $p = .43$; interpersonal conflict: $t(456) = -.49$, $p = .63$).

Multiple Mediation

I conducted the mediation analyses using the PROCESS computational tool, which uses a path analysis framework to test for mediation, moderation, and conditional indirect effects (Hayes, 2013). The previous tests of Hypotheses 2 and 3 established that job demands predicted challenge and hindrance appraisals. As the next step in the mediation analyses, I examined whether challenge and hindrance appraisals, in turn, predicted work engagement. Hypotheses 6a-d stated that challenge appraisals for all four job demands would positively predict work engagement, while Hypotheses 7a-d stated that hindrance appraisals for all four job demands would negatively predict work engagement. To test these hypotheses, I regressed work engagement on the focal job demand, its corresponding challenge appraisal, and its corresponding hindrance appraisal (Table 4). This resulted in path coefficients for cognitive appraisals predicting work engagement, controlling for the focal job demand. In support of Hypotheses 6a and 6d, challenge appraisal positively predicted work engagement

for quantitative workload (*ß* = .12, *SE* = .05, *p* < .05) and interpersonal conflict (*ß* = .19, *SE* = .07, *p* < .05). However, challenge appraisals for cognitive demands and role conflict did not predict work engagement; thus, I found no support for Hypotheses 6b and 6c. In contrast, I found full support for Hypothesis 7, as hindrance appraisals for all four job demands negatively predicted work engagement after controlling for the focal job demand and its challenge appraisal (quantitative workload: *ß* = -.45, *SE* = .05, *p* < .001; cognitive demands: *ß* = -.28, *SE* = .05, *p* < .001; role conflict: *ß* = -.34, *SE* = .06, *p* < .001; interpersonal conflict: *ß* = -.37, *SE* = .07, *p* < .001).

As the last step in the mediation analyses, I estimated the indirect effect of each job demand on work engagement through challenge and hindrance appraisal. Because my model includes two mediators that exert opposite effects on work engagement, it is possible for mediation to exist without a total effect of the job demand on work engagement. Indeed, researchers have suggested that an overall relationship between the predictor and the outcome is not required to test for mediation (Shrout & Bolger, 2002). Additionally, it is not necessary to demonstrate significance for the individual paths in a mediation model before testing for mediation (Hayes, 2009). Therefore, I tested the mediation hypotheses for all four job demands, even though my previous analyses showed that role conflict, challenge appraisal for cognitive demands, and challenge appraisal for role conflict did not predict work engagement.

Using PROCESS, I computed the indirect effects of each job demand on work engagement as the products of the unstandardized component path coefficients. For instance,

the indirect effect estimate for quantitative workload on work engagement through challenge appraisal was the product of: 1) the unstandardized path coefficient for quantitative workload predicting challenge appraisal; and 2) the unstandardized path coefficient for challenge appraisal predicting work engagement, controlling for quantitative workload and hindrance appraisal. I used 95% bias-corrected bootstrapped confidence intervals based on 5000 samples to test the significance of these indirect effects (Preacher & Hayes, 2008). Bootstrapping uses repeated sampling with replacement from the original sample to estimate the sampling distribution of the indirect effect; confidence intervals for the indirect effect are constructed based on this sampling distribution. Preacher and Hayes (2008) recommend this method over other mediation tests, including the Sobel test, because it does not assume normality of the sampling distribution of the indirect effect.

Table 5 presents the results of the significance tests for the indirect effects. Hypotheses 8a-d stated that challenge appraisals would mediate a positive relationship between each job demand and work engagement. In support of Hypothesis 8a, the indirect effect of quantitative workload on work engagement through challenge appraisal was positive (*indirect effect* = .07, *SE* = .03). The 95% bias-corrected confidence interval did not contain zero, demonstrating that the positive indirect effect was significant. Similarly, in support of Hypothesis 8d, the indirect effect of interpersonal conflict on work engagement through challenge appraisal was positive and significant (*indirect effect* = .15, *SE* = .07). Hypotheses 8b and 8c were not supported; although the estimates for the indirect effects through challenge appraisal were positive for cognitive demands (*indirect effect* = .01, *SE* =

.02) and role conflict (*indirect effect* = .06, *SE* = .05), the 95% bias-corrected confidence intervals contained zero. Therefore, these indirect effects were not significant. Overall, these results provided partial support for Hypothesis 8.

Hypotheses 9a-d stated that hindrance appraisals would mediate a negative relationship between each job demand and engagement. As expected, the indirect effect of the focal demand on engagement through hindrance appraisal was negative for quantitative workload (*indirect effect* = -.30, *SE* = .05), cognitive demands *(indirect effect* = -.05, *SE* = .02), role conflict (*indirect effect* = -.23, *SE* = .06), and interpersonal conflict (*indirect effect* = -.30, *SE* = .07). None of the 95% bias-corrected confidence intervals contained zero, demonstrating that all four indirect effects were significant. Thus, I found full support for Hypothesis 9. However, the direct effects of quantitative workload and cognitive demands were still significant after accounting for challenge and hindrance appraisal; this indicates that, for these two job demands, appraisals acted as partial rather than full mediators.

Moderation and Moderated Mediation

To test whether general self-efficacy moderated the relationship between job demands and appraisals (Hypotheses 10 and 11), I conducted eight hierarchical regression analyses with challenge and hindrance appraisal for each of the four job demands as the dependent variables. In the first step, I entered the focal job demand and general self-efficacy as predictors; in the second step, I added the job demand by general self-efficacy interaction term. To aid in interpretability, I mean-centered the focal job demand and general self-efficacy in all moderation analyses. Contrary to Hypothesis 10, none of the job demand by

general self-efficacy interaction terms explained additional variance in challenge appraisals (quantitative workload: $\Delta R^2 = .00$, $p = .60$; cognitive demands: $\Delta R^2 = .001$, $p = .58$; role conflict: $\Delta R^2 = .00$, $p = .80$; interpersonal conflict: $\Delta R^2 = .002$, $p = .20$). Similarly, contrary to Hypothesis 11, none of the interaction terms explained additional variance in hindrance appraisals (quantitative workload: $\Delta R^2 = .00$, $p = .76$; cognitive demands: $\Delta R^2 = .00$, $p = .92$; role conflict: $\Delta R^2 = .00$, $p = .98$; interpersonal conflict: $\Delta R^2 = .003$, $p = .12$).

For moderated mediation to exist, a variable must significantly moderate one of the paths in the mediation model. Because general self-efficacy did not moderate the relationships between job demands and cognitive appraisals, I did not test for moderated mediation. Thus, I found no support for Hypotheses 12 and 13.

Discussion

The purpose of this study was to integrate the Job Demands-Resources model (Demerouti et al., 2001), the challenge-hindrance model (Cavanaugh et al., 2000), and the transactional theory of stress (Lazarus & Folkman, 1984) to examine the role of cognitive appraisals in linking job demands to work engagement. The first goal was to replicate findings that traditional challenge demands positively predict work engagement, while traditional hindrance demands negatively predict work engagement. As expected, quantitative workload and cognitive demands positively predicted work engagement, while interpersonal conflict negatively predicted work engagement. These findings are consistent with the challenge-hindrance model, and contest the JD-R model's assertion that job demands play no role in shaping work engagement (Schaufeli & Bakker, 2004). However, in

contradiction with previous meta-analytic research (Crawford et al., 2010), role conflict did not predict work engagement. This could be because I only examined intersender conflict, which reflects incompatible work requests and expectations (Rizzo et al., 1970). It is possible that other types of role conflict, including work tasks that violate personal values or exceed available resources, better predict engagement. Future research could confirm whether different dimensions of role conflict display different relationships with work outcomes.

The second goal of this study was to examine how job demands evoke particular cognitive appraisals. By directly measuring cognitive appraisals, I was able to examine the extent to which individuals perceived various job demands as challenges and hindrances. As expected, job demands consistently predicted cognitive appraisal, such that individuals who reported higher job demands also tended to report stronger perceptions of that demand as both a challenge and a hindrance. Furthermore, with the exception of cognitive demands, which more strongly predicted challenge appraisal than hindrance appraisal, job demands predicted both types of appraisal with equal strength. This is consistent with Webster, Beehr, and Love's (2011) findings, and supports their claim that job demands are not *either* challenges *or* hindrances, but can act as both simultaneously. At the same time, these results largely contradict the challenge-hindrance model, which assumes that individuals see certain job demands as more challenging than hindering, and vice versa (Cavanaugh et al., 2000). My findings underscore the importance of considering both the challenging and hindering aspects of each job demand, rather than sharply dividing job demands according to a two-dimensional framework.

Although the challenge-hindrance model of stress assumes that cognitive appraisals account for the relationships between job demands and well-being, few studies have actually tested this assumption. By directly measuring individual perceptions of challenge and hindrance, my study accomplished the goal of providing preliminary evidence that cognitive appraisals link job demands to work engagement. Hindrance appraisals consistently negatively predicted work engagement, and mediated a negative relationship between job demands and work engagement. These findings confirm previous suggestions that certain job demands decrease work engagement because individuals tend to perceive them negatively (Crawford et al., 2010; Van den Broeck et al., 2010). At the same time, my study extends previous research by demonstrating that this negative appraisal process can occur even with job demands traditionally classified as challenges. Thus, considering the underlying appraisal process blurs the line between challenge and hindrance demands.

In contrast to hindrance appraisal, challenge appraisal for quantitative workload and interpersonal conflict positively predicted work engagement, and mediated a positive relationship between job demands and work engagement. These findings emphasize the value of examining measures of well-being that frame success in terms of the presence of positive functioning, rather than just the absence of dysfunction. While appraising job demands positively may not prevent strain and negative job attitudes (Webster et al., 2011), its benefits may appear when examining actively positive work-related states. However, it is also important to acknowledge that the results for challenge appraisal were inconsistent: challenge appraisals for cognitive demands and role conflict were unrelated to work engagement.

Further research is needed to clarify the relationship between challenge appraisal and well-being. It is possible that individuals did not correctly interpret the given definition of a challenge across all job demands; if this is the case, then the inconsistent findings are due to measurement issues rather than true differences in the relationship between challenge appraisal and work engagement across job demands. Alternatively, compared to hindrance appraisals, challenge appraisals may have weaker and less consistent effects on work-related well-being. Although challenge appraisal is a largely positive perception, it still involves acknowledging an environmental characteristic as a potential stressor; thus, it is plausible that it has complex relationships with well-being outcomes.

Despite varying results for challenge appraisal, the present study still supports the idea that challenge and hindrance appraisals represent two distinct psychological processes. Although the two types of appraisal were positively correlated, models with separate challenge and hindrance factors fit the data better than models with a single cognitive appraisal factor. Furthermore, the two forms of appraisal had different implications for well-being: while hindrance appraisal was associated with lower work-related well-being, challenge appraisal was neutral or even beneficial. These findings lend empirical support to the challenge-hindrance model's basis in the transactional theory of stress, and suggest that individuals who form different appraisals of the same job demand may experience different well-being outcomes.

The final goal of my study was to explore individual differences that modify the appraisal process. Contrary to my hypotheses, general self-efficacy did not moderate the

relationships between job demands and cognitive appraisals. This may be because general self-efficacy is domain-general, while the other study variables were work-specific. According to Bandura (2013), self-efficacy is domain-specific, meaning measures of perceived ability should always target a particular task or domain. Therefore, it is possible that general self-efficacy has little relevance to the cognitive appraisals that individuals form about their work environments. Alternatively, lack of variance in general self-efficacy may account for its failure to moderate the relationships between demands and appraisals. My sample was uniformly high in general self-efficacy, with a mean rating of 4.26 on a five-point scale (*SD* = .52). In more heterogeneous samples, general self-efficacy may act as a moderator.

Limitations and Future Directions

Although this study makes unique contributions to the study of individual well-being at work, its findings should be interpreted with caution. Because the study employed a cross-sectional self-report design, I cannot conclude that differences in cognitive appraisals actually caused differences in work engagement. Instead, the causal path may be reversed: work engagement may lead individuals to construct more positive perceptions of their work environments. Alternatively, a third variable such as positive or negative affectivity may lead individuals to report uniformly positive or negative perceptions of their work, producing a non-causal relationship between demand appraisals and work engagement. Future research should examine job demands, appraisals, and work engagement over time to establish causation. A longitudinal design would also allow researchers to test for feedback effects of

work engagement. Previous research has determined that job resources promote work engagement, which subsequently leads individuals to engage in resource-mobilization behaviors. This reciprocal relationship perpetuates a positive cycle of well-being gains (Schaufeli et al., 2009). Similarly, it is possible that adaptive appraisals facilitate work engagement, which leads individuals to perceive their job demands more positively, further strengthening challenge appraisals and weakening hindrance appraisals.

Another limitation of this study is its use of challenge and hindrance appraisal scales that have not yet been validated fully. Although the measures were consistent with previous research (i.e., Kozusznik et al., 2012; Webster et al., 2011), there is no evidence that they adequately capture the construct domains of challenge and hindrance appraisal. Indeed, there were several indications that the challenge appraisal scale was inadequate. First, the relationship between challenge appraisal and engagement was inconsistent across demands. The fact that challenge appraisals of cognitive demands and role conflict were unrelated to engagement, while challenge appraisals of quantitative workload and interpersonal conflict positively predicted engagement, suggests that respondents possibly misunderstood the intended meaning of a challenge. Specifically, they may have formed overly negative interpretations of the provided definition of a challenge. Because challenge appraisal involves simultaneous acknowledgement of the potential stress and the potential rewards associated with a demand, it is more difficult to accurately convey the definition to respondents. This is particularly true because in everyday language, the word “challenge” has negative implications.

In addition, the direct effects of quantitative workload and cognitive demands on work engagement were positive even after accounting for cognitive appraisals. This provides further evidence that the challenge appraisal scale did not fully capture respondents' positive perceptions of these job demands, leading to underestimation of the indirect effect of job demands on work engagement through challenge appraisal. For the study of demand appraisal to advance, researchers must construct valid measures of challenge and hindrance appraisal that can apply to a variety of job demands. Rather than relying on direct definitions of a challenge and a hindrance, such a scale might ask participants to reflect on several aspects of the focal job demand separately, including its potential to promote or harm personal growth, and its potential to facilitate or impede the accomplishment of work goals.

A third limitation of this study lies in the nature of the sample. Although diverse in occupation, respondents tended to be well-educated, highly engaged, and high in general self-efficacy. Future research should attempt to replicate and extend the current findings with individuals from more diverse backgrounds, and who hold a broader range of work-related perceptions and self-views.

Finally, given that general self-efficacy did not moderate the relationships between job demands and cognitive appraisal, future research should examine whether work-related variables shape the extent to which job demands evoke challenge and hindrance appraisals. Individual differences such as self-regulatory self-efficacy, which reflects perceived ability to mobilize resources and execute desired behaviors (Bandura, 2013), may moderate the demand-appraisal relationship. Additionally, work-specific environmental factors may act as

moderators. Previous research suggests that resources such as autonomy and social support buffer the relationship between job demands and work well-being (Bakker, Demerouti, & Euwema, 2005; Xanthopoulou et al., 2007). This overall moderating effect may exist because job resources facilitate the formation of stronger challenge appraisals and weaker hindrance appraisals in the face of job demands. It may be particularly valuable to understand how environmental factors shape the demand-appraisal relationship, because these findings can provide organizations with specific strategies to help employees form adaptive appraisals.

Conclusions

According to the challenge-hindrance model, some job demands are beneficial while others are harmful to well-being. However, the present study suggests that a single job demand can both facilitate and hinder work-related well-being as individuals appraise them as challenges and hindrances simultaneously. This perspective has important implications for employee well-being, because many job demands are inescapably bound to the work context or the work itself. For instance, public accountants must deal with drastic increases in workload during the busy season (Sweeney & Summers, 2002), and individuals in human service fields such as nursing and social work face high emotional demands (Maslach & Jackson, 1981). While organizations should ensure that employees do not face unnecessary obstacles at work, they should also facilitate positive perceptions of the demands they cannot eliminate. Although further research is needed to identify factors that facilitate the formation of challenge appraisals, supporting employees in viewing job demands as opportunities rather than obstacles may help them remain engaged with their work.

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Table 1
Definitions of Challenge and Hindrance

Challenge	Hindrance
"The following statements describe aspects of your current job. Please rate how much of a **challenge** each aspect of your current job is for you. A **challenge** is something that, although stressful, you view as an opportunity for achievement. Challenges can make your work difficult, but they also motivate you to develop new skills and attain personal growth. Because challenges can be rewarding to deal with, you feel they are typically worth the discomfort. Challenges can make your job interesting."	"The following statements describe aspects of your current job. Please rate how much of a **hindrance** each aspect of your current job is for you. A **hindrance** is something that interferes with your work and stands in the way of your personal growth. Because dealing with hindrances is stressful and unfulfilling, you view them as typically unnecessary sources of discomfort. Hindrances can make your job tedious."

Table 2
Goodness of Fit Statistics for the Measurement Models

Model	$\chi^2(df)$	RMSEA	SRMR	CFI	TLI
5-Factor Models					
Quantitative workload	1543.33 (439)	.075	.07	.89	.88
Cognitive demands	1774.17 (634)	.063	.05	.92	.91
Role conflict	927.34 (280)	.071	.05	.92	.91
Interpersonal conflict	1058.25 (355)	.066	.05	.94	.93
Modified 5-Factor Models					
Quantitative workload	1306.09 (438)	.066	.07	.92	.90
Cognitive demands	1535.61 (633)	.056	.05	.94	.93
Role conflict	688.67 (279)	.057	.05	.95	.94
Interpersonal conflict	820.01 (354)	.054	.05	.96	.96
4-Factor Models					
Quantitative workload	2312.22 (442)	.097	.09	.82	.79
Cognitive demands	4281.87 (637)	.11	.09	.74	.72
Role conflict	1092.68 (283)	.079	.05	.90	.89
Interpersonal conflict	1701.10 (358)	.091	.05	.89	.87

Table 3
Descriptive Statistics and Correlations (N = 459)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Quantitative workload	3.72	.68	(.81)													
2. Challenge appraisal QW	2.98	1.06	.43*	(.91)												
3. Hindrance appraisal QW	2.41	1.03	.48*	.58*	(.93)											
4. Cognitive demands	4.23	.55	.52*	.21*	.15*	(.86)										
5. Challenge appraisal CD	2.86	1.12	.22*	.78*	.43*	.23*	(.96)									
6. Hindrance appraisal CD	2.10	.94	.33*	.47*	.80*	.10*	.46*	(.96)								
7. Role conflict	2.98	.85	.31*	.14*	.23*	.13*	.06	.15*	(.82)							
8. Challenge appraisal RC	2.29	1.12	.23*	.44*	.38*	.04	.39*	.35*	.62*	(.90)						
9. Hindrance appraisal RC	2.09	1.02	.20*	.29*	.48*	-.02	.25*	.44*	.60*	.75*	(.91)					
10. Interpersonal conflict	2.63	.82	.30*	.11*	.31*	.11*	.07	.27*	.57*	.46*	.49*	(.92)				
11. Challenge appraisal IC	1.97	1.08	.24*	.33*	.35*	.07	.28*	.32*	.44*	.69*	.57*	.68*	(.95)			
12. Hindrance appraisal IC	1.87	1.03	.20*	.19*	.39*	.001	.16*	.35*	.43*	.54*	.68*	.69*	.80*	(.95)		
13. Work engagement	5.10	.95	.15*	-.003	-.23*	.21*	-.05	-.25*	-.06	-.11*	-.22*	-.13*	-.11*	-.22*	(.93)	
14. Self-efficacy	4.26	.52	.02	-.03	-.17*	.18*	-.02	-.17*	-.08	-.10*	-.15*	-.09*	-.19*	-.23*	.37*	(.90)

Note. Coefficient alpha reliability estimates are on the diagonal.
*p < .05
QW = Quantitative workload. CD = Cognitive demands. RC = Role conflict. IC = Interpersonal conflict.

Table 4
Regression of Work Engagement on Cognitive Appraisals

Predictor	*ß*	*B*	*SE*	R^2
Quantitative Workload				.15***
Quantitative workload	.32***	.44***	.07	
Challenge appraisal	.12*	.11*	.05	
Hindrance appraisal	-.45***	-.42***	.05	
Cognitive Demands				.12***
Cognitive demands	.23**	.40***	.08	
Challenge appraisal	.03	.02	.04	
Hindrance appraisal	-.28***	-.29***	.05	
Role Conflict				.06***
Role conflict	.09	.10	.07	
Challenge appraisal	.09	.08	.06	
Hindrance appraisal	-.34***	-.31***	.06	
Interpersonal Conflict				.06***
Interpersonal conflict	-.001	-.001	.08	
Challenge appraisal	.19*	.16*	.07	
Hindrance appraisal	-.37***	-.34***	.07	

Note. N = 459.
*p < .05, ***p < .001.

Table 5
Indirect Effects of Job Demands on Work Engagement through Cognitive Appraisals

			95% BC CI	
Mediator	Indirect Effect	*SE*	Lower	Upper
Quantitative Workload				
Challenge appraisal	.07*	.03	.007	.142
Hindrance appraisal	-.30*	.05	-.406	-.216
Cognitive Demands				
Challenge appraisal	.01	.02	-.027	.055
Hindrance appraisal	-.05*	.02	-.100	-.009
Role Conflict				
Challenge appraisal	.06	.05	-.044	.164
Hindrance appraisal	-.23*	.06	-.341	-.111
Interpersonal Conflict				
Challenge appraisal	.15*	.07	.015	.276
Hindrance appraisal	-.30*	.07	-.446	-.152

Note. BC CI = bias-corrected bootstrapped confidence intervals.
Bootstrap sample size = 5,000.
*significant indirect effect.

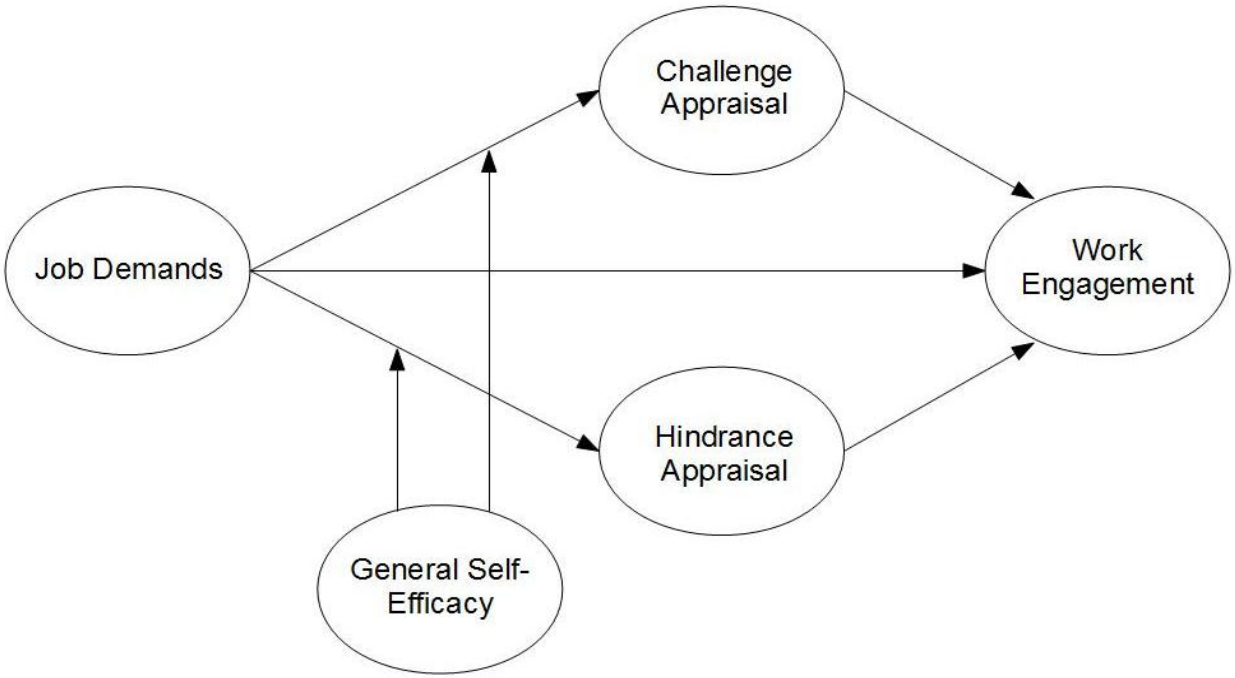

Figure 1. Hypothesized conceptual model of the effects of job demands on work engagement.

Appendix

Cognitive Appraisals as Mediators of the Relationship between Job Demands and Work Engagement

by
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A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the degree of
Master of Science

Industrial/Organizational Psychology

Raleigh, North Carolina

2013

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Cognitive Appraisals as Mediators of the Relationship between Job Demands and Work Engagement

Statement of the Problem

As a positive facet of well-being characterized by energy, dedication, and immersion in one's work, work engagement has substantial implications for the workplace (Bakker & Demerouti, 2008). Research has established work engagement as a unique concept that predicts job performance even after accounting for the related concepts of job satisfaction, organizational commitment, and job involvement (Christian, Garza, & Slaughter, 2011). Compared to their non-engaged counterparts, engaged employees are more likely to expend extra effort and experience positive emotions at work, resulting in increased in-role and extra-role performance (Bakker, 2011; Christian et al., 2011; Rich, LePine, & Crawford, 2010). In addition, longitudinal studies suggest that engagement strengthens organizational commitment (Hakanen, Schaufeli, & Ahola, 2008) and life satisfaction (Hakanen & Schaufeli, 2012), as well as reduces depressive symptoms (Hakanen & Schaufeli, 2012) and sick leave frequency (Schaufeli, Bakker, & Van Rhenen, 2009). Benefits are likely to persist over time as engagement fosters mobilization of resources that further promote engagement, resulting in a positive gain spiral (Schaufeli et al., 2009). In short, engagement holds long-term advantages for individuals and organizations.

Given the clear link between work engagement and positive outcomes, it is valuable to understand how organizations can cultivate employee engagement. The Job Demands-Resources (JD-R) model identifies job resources, or aspects of the job that help individuals

achieve work goals and personal growth, as the primary drivers of engagement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). According to the JD-R model, job demands, or features of the job that place physical or psychological pressure on employees, are unrelated to work engagement. However, recent research has challenged the JD-R model by demonstrating that job demands do predict work engagement. Drawing from the challenge-hindrance model of work stress (Cavanaugh, Boswell, Roehling, & Boudreau, 2000), two groups of researchers (Crawford, LePine, & Rich, 2010; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010) demonstrated that job demands perceived as challenges, or opportunities for learning and growth, promote work engagement; conversely, job demands perceived as hindrances, or barriers to learning and growth, diminish work engagement. Their findings suggest that job demands play an important but complex role in shaping worker well-being.

While the challenge-hindrance distinction has helped refine the model of worker well-being, it also holds several limitations. First, most studies have classified demands as either challenges or hindrances without measuring employees' actual appraisals of these demands (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Crawford et al., 2010; LePine, Podsakoff, & LePine, 2005). Because the difference between challenge and hindrance demands lies in how employees perceive them, this method fails to capture the psychological process that links demands to outcomes (Webster, Beehr, & Love, 2011). Additionally, this method treats a single type of job demand as either a universal challenge or a universal hindrance, when in reality individual differences may cause individuals to perceive the same

job demand in different ways (Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). Thus, there is a need for research that examines demand appraisal as well as individual factors accounting for differences in appraisal.

The purpose of this study is to explore the nature of the relationship between job demands and work engagement. First, I will examine challenge and hindrance appraisals as mediators of the relationship between job demands and work engagement. Next, I will examine self-efficacy as a potential moderator of the relationship between job demands and appraisals, and thus as a moderator of the indirect relationship between job demands and work engagement. In doing so, I will integrate the Job Demands-Resources model, the challenge-hindrance model, and demand appraisal research to construct a more complete framework of work engagement.

Defining Work Engagement

Researchers have typically defined work engagement as "a positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). *Vigor* reflects high levels of energy and activation in regards to work. Because employees who experience vigor are likely to exhibit high levels of effort and persistence at work, researchers consider this element an active, motivational component of engagement (Bakker, 2011; Mauno, Kinnunen, & Ruokolainen, 2007). *Dedication* reflects employees' belief in the significance of their work, characterized by feelings of enthusiasm and pride. Dedication relates to job involvement, which similarly reflects a psychological connection to work (Mauno et al., 2007). Finally,

absorption, characterized by complete immersion in one's work, adds a cognitive element to the concept of work engagement (Bakker, 2011). In short, engaged individuals experience positive well-being because of their commitment to work on multiple levels.

Together, the three elements of work engagement form a positive, stable state of well-being encompassing cognition, affect, and motivation. Its multidimensional nature distinguishes it from related concepts such as job satisfaction or job involvement alone (Bakker, 2011). Although engagement contains three distinct elements, these elements are highly intercorrelated. For this reason, the scale developers (Schaufeli, Bakker, & Salanova, 2006) suggest that researchers examine work engagement as a whole. Therefore, overall engagement will be the outcome of interest in this study.

The Job Demands-Resources Model

The dominant framework for understanding the antecedents of work engagement is the Job Demands-Resources (JD-R) model, introduced by Demerouti and her colleagues in 2001. The central proposition of the JD-R model is that one can divide characteristics of any work environment into two categories: job demands and job resources. *Job resources* are "physical, psychological, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands and the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti et al., 2001, p. 501). In other words, the JD-R model views job resources as directly beneficial to individuals both at work and on a personal level.

Commonly studied job resources include performance feedback, job control, autonomy, and supervisory support (Bakker & Demerouti, 2008).

Job demands are "physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" (Demerouti et al., 2001, p. 501). Job demands place strain on individuals at work, and have the potential to evoke negative physical and psychological outcomes when individuals do not have the resources necessary to address them. Commonly studied job demands include workload, emotional demands, interpersonal conflict, role conflict, role ambiguity, and cognitive demands (Bakker & Leiter, 2010; Hu, Schaufeli, & Taris, 2011).

A second core assumption of the JD-R model is that job resources and demands activate two distinct psychological processes. Job resources activate a motivational process that strengthens individuals' engagement with their jobs (Schaufeli & Bakker, 2004). In contrast, job demands activate a health-impairment process, such that the effort expended to deal with demands leads to burnout. This dual-process model implies that job demands do not play a direct role in shaping work engagement and other positive conceptions of well-being; instead, demands contribute to negative health and well-being outcomes that are distinct from the concept of engagement.

The Challenge-Hindrance Model of Work Stress

Although the JD-R model provides a simple and comprehensive explanation for the link between job characteristics and worker well-being, the relationship between job

demands and engagement requires clarification. As previously noted, the JD-R model assumes that job demands do not play a role in shaping work engagement. However, Crawford and colleagues (2010) observed that studies conducted within the JD-R framework do not fully support this assumption. Research has consistently linked demands such as role conflict, organizational politics, and emotional conflict to decreased work engagement (Crawford et al., 2010). In contrast, research has found positive relationships between work engagement and time pressure (Bakker, van Emmerik, & Euwema, 2006; Schaufeli, Taris, & Van Rhenen, 2008), workload (Bakker, Demerouti, & Schaufeli, 2005; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007), and cognitive demands (Bakker et al., 2005). These examples suggest that the JD-R model may not accurately capture the true relationship between job demands and work engagement.

By offering an alternative view of the role of demands in shaping work outcomes, the challenge-hindrance model of occupational stress integrates the seemingly conflicting findings on the demand-engagement relationship. Most broadly, the challenge-hindrance model states that two types of stressors contribute to work outcomes (Cavanaugh et al., 2000; LePine et al., 2005; Podsakoff, LePine, & LePine, 2007). *Challenges* include stressors that employees view as difficult to deal with, but also as opportunities for learning, growth, and personal gain. In contrast, *hindrances* include stressors that employees perceive as obstacles to achievement and as carrying no potential for individual gain. Cavanaugh and colleagues (2000) established this two-factor structure and demonstrated that challenge and hindrance stressors display differential relationships with work outcomes. Specifically, challenge

stressors such as workload, time pressure, and responsibility positively related to job satisfaction and negatively related to job search. In contrast, hindrance stressors such as organizational politics, role ambiguity, and job insecurity negatively related to job satisfaction and positively related to job search. Subsequent studies have replicated these findings with motivation and performance (LePine et al., 2005) and organizational commitment (Podsakoff et al., 2007), confirming that challenge stressors tend to associate with positive work-related outcomes, whereas hindrances tend to associate with outcomes that are harmful to individuals and organizations.

When applied to the JD-R model, the challenge-hindrance model suggests that there are two types of job demands: challenges, which promote work engagement, and hindrances, which reduce work engagement. Recent research suggests that this distinction effectively clarifies the relationship between job demands and engagement. For instance, Crawford, LePine, and Rich (2010) conducted a meta-analysis of JD-R research from the perspective of the challenge-hindrance model. While job demands as a whole exhibited a very weak negative relationship with engagement ($\rho = -.07$, $p < .05$), meaningful relationships appeared after differentiating challenge and hindrance demands based on Cavanaugh and colleagues' (2000) framework. Specifically, challenge demands (i.e., responsibility, workload, and time urgency) positively predicted engagement ($\rho = .16$, $p < .05$), while hindrance demands (i.e., administrative hassles, emotional conflict, organizational politics, resource inadequacies, role conflict and role overload) negatively predicted engagement ($\rho = -.19$, $p < .05$).

As an additional test of the challenge-hindrance model, Van den Broeck and colleagues (2010) assessed the relationship between job demands and the vigor component of work engagement in call center agents and police officers. Structural equation modeling supported their hypotheses that workload and cognitive demands (characterized as challenges) positively relate to engagement, while work-home interference and emotional demands (characterized as hindrances) negatively relate to engagement. These studies show that, contrary to the assumption of the JD-R model, job demands do shape work engagement when researchers differentiate challenge and hindrance demands.

The first goal of this study is to replicate previous research demonstrating differential relationships of challenge and hindrance demands with work engagement. To effectively build upon previous literature reflecting both the JD-R and challenge-hindrance perspectives, I chose job demands that: a) are well-researched within the JD-R framework; b) are clearly classified as either challenges or hindrances according to the challenge-hindrance framework; and c) apply to a variety of occupations and organizational settings. Given these criteria, quantitative workload and cognitive demands will serve as the two challenge demands in this study; role conflict and interpersonal conflict will serve as the two hindrances. Based on the challenge-hindrance model literature, I propose the following hypotheses:

Hypothesis 1a: Challenge demands (i.e., quantitative workload and cognitive demands) will positively relate to work engagement.

Hypothesis 1b: Hindrance demands (i.e., role conflict and interpersonal conflict) will negatively relate to work engagement.

The Importance of Demand Appraisal

While the challenge-hindrance model extends the understanding of job demands as shapers of work outcomes, research conducted within this framework has largely failed to test its conceptual underpinnings. Proponents of the challenge-hindrance model (e.g., LePine et al., 2005) have grounded it in the transactional theory of stress (Lazarus and Folkman, 1984), which explains how stressors lead to individual outcomes. According to this theory, individuals confronting a stressful situation engage in a primary appraisal process through which they label the stressor as potentially threatening (a hindrance) and/or potentially beneficial (a challenge). These two appraisal types activate different emotions, coping styles, and expectancies, which lead to different work outcomes. Specifically, challenge appraisals generate positive emotions that motivate individuals to actively cope with the stressor, and thus lead to better performance. Additionally, individuals are likely to see their efforts to meet challenges as resulting in successful coping, as well as valued outcomes; thus, challenges stimulate work motivation (LePine et al., 2005). In contrast, hindrance appraisals trigger negative emotions, avoidance, and beliefs that effort will not lead to successful performance or valued outcomes; thus, hindrances are more likely to reduce work performance and motivation.

Because the challenge-hindrance distinction is rooted in the transactional theory of stress, appraisal is a central component of the model. In other words, challenge and hindrance demands exhibit different relationships with work outcomes because individuals tend to perceive them differently. However, Webster and colleagues (2011) noted that most

challenge-hindrance model research does not reflect the underlying theory's focus on individual appraisal. Instead, researchers have categorized job demands as either challenges or hindrances based on judgments of how individuals are most likely to appraise them. Cavanaugh and colleagues (2000) made the original distinction between the two types of demands by jointly classifying each of 11 demands as either a challenge or a hindrance. Four independent evaluators then confirmed these classifications based on formal definitions of a challenge and a hindrance. Subsequent studies (e.g., Boswell et al., 2004; Crawford et al., 2010; Podsakoff et al., 2007) have used this two-dimensional framework as a guideline for determining whether specific demands qualify as challenges or hindrances. Thus, rather than basing the distinction between challenge and hindrance demands on the primary appraisal process outlined by the transactional theory of stress (Lazarus & Folkman, 1984), researchers established the distinction based on their own judgment.

Researchers have validated the resulting categorization framework using confirmatory factor analysis (Cavanaugh et al., 2000; Boswell et al., 2004) and appraisal ratings from small student samples (LePine, LePine, & Jackson, 2004; LePine et al., 2005). However, the main body of research on the challenge-hindrance model lacks a focus on actual appraisal ratings from employee participants. This failure to consider demand appraisal poses several problems, which I present in the following sections.

Individual appraisals of job demands. By disregarding demand appraisal, researchers have assumed that individuals perceive each type of job demand as either fully challenging or fully hindering. However, the transactional theory of stress (Lazarus &

Folkman, 1984) suggests that challenge and hindrance appraisals are not mutually exclusive. In other words, it should be possible for a single job demand to relate to hindrance appraisals with resulting negative outcomes, yet at the same time relate to challenge appraisals with resulting positive outcomes (Gilboa, Shirom, Fried, & Cooper, 2008; Staufenbiel & König, 2010).

Webster and colleagues (2011) were the first to explore this possibility by examining 479 university employees' ratings of four job demands: workload, responsibility, role conflict, and role ambiguity. Participants rated the presence of each job demand in their own work, their perception of each demand as a challenge, and their perception of each demand as a hindrance. Three of the demands (workload, role conflict, and role ambiguity) positively related to both challenge appraisal and hindrance appraisal. By demonstrating that individuals may appraise a job demand as both a challenge and a hindrance simultaneously, Webster and colleagues (2011) suggested that the original two-dimensional classification system oversimplifies the cognitive appraisals underlying the experience of job demands.

Although a job demand may simultaneously evoke challenge and hindrance appraisals, Cavanaugh and colleagues' (2000) categorization system implies that individuals consistently tend to perceive a single type of job demand as either more challenging than hindering or vice versa. Presumably, the difference between demands traditionally defined as challenges and those traditionally defined as hindrances lies in the relative strength of the two appraisals that each demand evokes. The second aim of this study is to test this assumption by examining how individuals tend to appraise both typical challenge demands and typical

hindrance demands. Drawing from the original challenge-hindrance framework (Cavanaugh et al., 2000) and Webster and colleagues' (2011) research on demand appraisal, I propose the following hypotheses:

Hypotheses 2a-d: (a) Quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict challenge appraisal.

Hypotheses 3a-d: (a) Quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict hindrance appraisal.

Hypotheses 4a-b: (a) Quantitative workload and (b) cognitive demands (i.e., job demands traditionally classified as challenges) will relate more strongly to challenge appraisal than to hindrance appraisal.

Hypotheses 5a-b: (a) Role conflict and (b) interpersonal conflict (i.e., job demands traditionally classified as hindrances) will relate more strongly to hindrance appraisal than to challenge appraisal.

The relationship between appraisals and work engagement. In addition to oversimplifying individual perceptions of job demands, disregarding demand appraisal fails to capture the true source of demand-related outcomes. As previously noted, the challenge-hindrance model is grounded in the transactional theory of stress (Lazarus & Folkman, 1984), which states that stressors evoke primary appraisals that determine stress outcomes. According to this framework, it is not the demand itself, but an individual's perception of the demand, that determines outcomes.

Several studies have explored the relationship between demand appraisals and work outcomes. In their survey study, Gardner and Fletcher (2009) asked 659 veterinarians to recall the most stressful situation they had recently experienced at work. The participants then provided challenge and hindrance appraisal ratings for the situation and reported outcomes such as coping strategies, affect, and job satisfaction. The researchers found that individuals who appraised stressful work situations as more challenging experienced greater task-focused coping, positive affect, and job satisfaction. In contrast, individuals who appraised these situations as more hindering experienced greater avoidance, more negative affect, and lower job satisfaction. Similarly, in a study of within-day beliefs about job demands, 68 workers reported job-related demands, cognitions, and emotions four times a day for a week (Daniels, Wimalasiri, Beesley, & Cheyne, 2012). When participants appraised problem-solving demands as more beneficial for their work performance, they tended to experience more positive affect and less anxious affect. Finally, Webster and colleagues (2011) found positive relationships between hindrance appraisal and four outcomes: psychological strain, physical strain, job dissatisfaction, and turnover intentions. However, challenge appraisals were unrelated to psychological strain, job dissatisfaction, and turnover intentions.

The lack of relationship between challenge appraisal and work outcomes in Webster and colleagues' (2011) study may signal the need for examining work demands in relation to positive outcomes such as work engagement. Because hindrance appraisals are uniformly negative, their negative effects should be consistent across work outcomes; however, because

challenge appraisals involve perceptions of both stress and potential benefit, their positive effects may become evident only when predicting outcomes that tap into more active, motivational processes. Indeed, a subsequent study of 750 Spanish and Polish social service workers found that challenge appraisals of workload, personal accountability, and relationships positively predicted work engagement (Kozusznik, Rodriguez, & Peiro, 2012). Although this study suggests that challenge appraisals relate to increased work engagement, the authors did not examine appraisals for any work demands traditionally classified as hindrances. The third aim of my study is to extend previous research on demand appraisal by exploring the relationship between appraisals for both types of demands and the positive outcome of work engagement. Thus, I hypothesize the following:

Hypotheses 6a-d: Challenge appraisals for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will positively predict work engagement.

Hypotheses 7a-d: Hindrance appraisals for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will negatively predict work engagement.

The mediating role of demand appraisal. An additional improvement associated with measuring demand appraisal is the ability to examine appraisal as a psychological process that links job demands to outcomes, as proposed by the transactional theory of stress (Lazarus & Folkman, 1984). While previous research has linked challenge and hindrance appraisals of job demands to work outcomes, many of these studies (e.g. Gardner & Fletcher,

2009; Kozusznik et al., 2012) did not include levels of the associated job demands as antecedents of demand appraisals. As a result, less research has explored appraisal as a mediator of the relationship between work demands and outcomes. In the first study to directly test this relationship, Webster et al. (2011) found that demand-specific challenge and hindrance appraisals mediated the relationship between job demands (workload, responsibility, role conflict, and ambiguity) and outcomes (exhaustion, physical symptoms, job dissatisfaction, and turnover). Two studies have also identified challenge appraisal as a mediator of the relationship between work demands and outcomes such as turnover intentions, work withdrawal, loyalty (Boswell et al., 2004), creativity, and proactive behavior (Ohly & Fritz, 2009). However, both of these studies examined challenge appraisals of work in general rather than of specific job demands. The fourth goal of the current study is to address this gap by examining the role of demand appraisal in linking job demands to work engagement. Thus, I hypothesize the following:

Hypotheses 8a-d: Challenge appraisal for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will mediate the relationship between its corresponding job demand and work engagement.

Hypotheses 9a-d: Hindrance appraisal for (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict will mediate the relationship between its corresponding job demand and work engagement.

Moderation of the Demand-Appraisal Relationship

Research on the challenge-hindrance model has established that job demands are important shapers of work engagement, with different types of demands exerting different effects on engagement. Additionally, research on demand appraisal has suggested that it is not demands themselves, but individual perceptions of demands, that directly influence work engagement. Given these assumptions, the next step in clarifying the relationship between demands and engagement is determining the factors that influence the extent to which work demands evoke certain appraisals. Thus, the fifth goal of this study is to explore potential moderation of the relationship between job demands and both challenge and hindrance appraisals.

According to Lazarus and Folkman (1984), individual differences influence the mediating effect of cognitive appraisal on the stressor-outcome link. In the face of a difficult situation, individuals are more likely to form challenge appraisals, and less likely to form hindrance appraisals, when they feel they can control either the situation itself or their own reactions to it. This suggests that individual factors that influence individuals' perceived ability to handle work demands will moderate the relationship between job demands and appraisals. In the following section, I discuss self-efficacy as one such factor.

Self-efficacy as a moderator of the demand-appraisal relationship. General *self-efficacy* is defined as "individuals' perceptions of their ability to meet demands in a broad array of contexts" (Chen, Gully, & Eden, 2001). In other words, it is a trait-like concept that reflects individuals' general beliefs that they can succeed in the face of difficulties.

According to social-cognitive theory, self-efficacy influences the expectations that individuals form about their future performance (Bandura, 2009). Specifically, individuals with higher self-efficacy are more likely to anticipate positive outcomes in the face of difficult circumstances and to focus on opportunities rather than obstacles. These perceptions mirror those outlined by the transactional theory of stress (Lazarus & Folkman, 1984): a focus on opportunities implies the formation of a challenge appraisal, whereas a focus on obstacles suggests the presence of a hindrance appraisal. Thus, as Ohly and Fritz (2009) suggested, it is likely that self-efficacy influences the extent to which demanding work evokes specific cognitive appraisals. Compared to individuals with low self-efficacy, individuals with high self-efficacy should form stronger challenge appraisals in the face of increasing demands. Similarly, compared to individuals with high self-efficacy, individuals with low self-efficacy should have stronger negative reactions (i.e., hindrance appraisals) when confronting increasingly demanding work.

The JD-R model classifies self-efficacy as part of the larger category of personal resources that buffer the negative impact of job demands on work-related well-being (Xanthopoulou et al., 2007). In line with this proposition, there is evidence that job demands are particularly detrimental to psychological health among individuals low in self-efficacy. For instance, Panatik, O'Driscoll, and Anderson (2011) examined the psychological health and job characteristics of 245 Malaysian technical workers in a six-month longitudinal study. They found that job demands (quantitative demands, attention demands, problem-solving demands, and responsibility) positively predicted subsequent psychological strain for

individuals low in self-efficacy, but not for individuals high in self-efficacy. Similarly, a study of 260 bank employees found that general self-efficacy buffered the negative relationship between quantitative job demands and psychological health (Van Yperen & Snijders, 2000). Finally, Siu, Lu, and Spector (2007) found that general self-efficacy moderated the relationship between demands (e.g., role conflict and social work relationships) and mental well-being in a heterogeneous sample of employees in Hong Kong and Beijing. Specifically, job demands exhibited stronger negative relationships with mental well-being for those with low self-efficacy than for those with high-self-efficacy. The researchers suggested that general self-efficacy buffered the negative effects of job demands by leading individuals to perceive job demands as less hindering and more challenging.

Although research has established self-efficacy as a moderator of the stressor-strain relationship, very little research has examined work engagement as an outcome of the interaction between stressors and self-efficacy. However, one cross-sectional study of 143 Italian teachers did find that work-family conflict was less detrimental to the vigor component of work engagement when self-efficacy was high (Simbula, Mazzetti, & Guglielmi, 2011). Interpreted within the framework of social-cognitive theory and the transactional theory of stress, these results suggest that self-efficacy influences the relationship between job demands and work engagement by influencing the extent to which job demands evoke challenge and hindrance appraisals.

It is important to note that studies have explored self-efficacy as a moderator only of the overall demand-outcome relationship, not of the demand-appraisal relationship.

Furthermore, findings are mixed, as studies have failed to consistently establish self-efficacy as a moderator of the relationship between demands and outcomes such as exhaustion (Xanthopoulou et al., 2007), job dissatisfaction, anxiety, frustration, or turnover intent (Jex & Gudanowski, 1992). Jex, Bliese, Buzzell, and Primeau (2001) explained such inconsistent results by suggesting that self-efficacy makes positive appraisals of stressors more likely; however, factors such as coping may influence the link between these appraisals and outcomes, and therefore weaken any overall moderating effect of self-efficacy on the demand-outcome relationship. By examining the proximal cognitive outcome of demand appraisal in addition to the distal outcome of work engagement, I refine the examination of self-efficacy as a potential moderator. Thus, I propose the following hypotheses:

Hypotheses 10a-d: Self-efficacy will moderate the relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and its corresponding challenge appraisal, such that the relationship between the job demand and its challenge appraisal will be stronger for individuals with high self-efficacy than for individuals with low self-efficacy.

Hypothesis 11a-d: Self-efficacy will moderate the relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and its corresponding hindrance appraisal, such that the relationship between the job demand and its hindrance appraisal will be weaker for individuals with high self-efficacy than for individuals with low self-efficacy.

Conditional Indirect Effects of Job Demands on Work Engagement

Hypotheses 8 and 9 propose that challenge and hindrance appraisals mediate the relationships between job demands and work engagement. Hypotheses 10 and 11 propose that self-efficacy moderates the relationships between each job demand and its corresponding challenge and hindrance appraisals. Together, these hypotheses imply that self-efficacy moderates the indirect effects of job demands on work engagement. In other words, because self-efficacy influences the extent to which job demands evoke challenge and hindrance appraisals, the mediating role of challenge and hindrance appraisals should vary as a function of individuals' levels of self-efficacy. For instance, individuals high in self-efficacy are likely to view an increased workload as more of an opportunity for learning and growth; thus, challenge appraisal is likely to mediate a positive, indirect relationship between workload and work engagement for individuals high in self-efficacy. In contrast, challenge appraisal is less likely to mediate the relationship between workload and engagement for those low in self-efficacy, as an increased workload is less likely to evoke challenge appraisals for these individuals. Extending this example to both challenge and hindrance appraisals for all four job demands, I propose the following hypotheses for the conditional indirect relationships between job demands and work engagement:

Hypotheses 12a-d: Self-efficacy will moderate the indirect relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and work engagement through challenge appraisal, such that the positive indirect relationship between each job demand and work engagement through

challenge appraisal will be stronger for those with high self-efficacy than for those with low self-efficacy.

Hypotheses 13a-d: Self-efficacy will moderate the indirect relationship between (a) quantitative workload, (b) cognitive demands, (c) role conflict, and (d) interpersonal conflict and work engagement through hindrance appraisal, such that the negative indirect relationship between each job demand and work engagement through hindrance appraisal will be weaker for those with high self-efficacy than for those with low self-efficacy.

Figure 1 displays the full conceptual model that I will test in the current study. In short, it illustrates that the relationship between job demands and work engagement is mediated by both challenge appraisal and hindrance appraisal; additionally, it illustrates that self-efficacy (a personal resource) moderates the relationships between job demands and appraisals.

Method

Participants and procedure

To increase the variability in reported job characteristics, previous researchers examining the relationship between job characteristics and outcomes (e.g., Demerouti, 2006; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008) have included heterogeneous samples. Thus, to ensure my sample captures varying levels of the four job demands, I will recruit individuals from a wide range of occupations and organizations. As part of a research participation requirement for an introductory psychology course, undergraduate students at a

university in the Southeastern United States will assist with the recruitment process. I will provide the students with the link to an online survey, which they will email to at least two individuals currently employed full time in any occupation. Students will receive research credit regardless of whether the contacted individuals actually complete the survey.

Measures

The online survey will contain the seven scales described below, plus demographic items.

Work engagement. I will measure work engagement with the nine-item version of the Utretcht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006). Three items each measure vigor (e.g., "At my work, I feel bursting with energy"), dedication (e.g., "I am proud of the work that I do"), and absorption, (e.g., "I get carried away when I am working"). The median Cronbach's alpha from samples across 10 countries is .92 (Schaufeli et al., 2006). Participants will rate how often they experience the conditions described by each statement on a seven-point Likert-type scale, with response options ranging from *Never* to *Always*. Appendix A contains all UWES items.

Job demands. I will measure the four job demands with four separate scales, which are described in detail below. Participants will rate all job demand items on a five-point Likert-type scale ranging from *Never* to *Very often*. Appendix B contains all items for the four job demand scales.

Quantitative workload. The Quantitative Workload Inventory (QWI; Spector & Jex, 1998) contains five items. Some items assess workload (e.g., "How often do you have to do

more work than you can do well?”), and some items assess the time pressure associated with work activities (e.g., “How often does your job require you to work very fast?”). The scale displayed an average Cronbach’s alpha of .82 across 15 studies (Spector & Jex, 1998).

Cognitive demands. I will measure cognitive demands using seven items from the Questionnaire on the Experience and Assessment of Work (QEAW; van Veldhoven, Meijman, Broersen, & Fortuin, 1997). Items assess the level of mental effort required to carry out work tasks. To maintain consistency across job demand scales, I revised the items to reflect the frequency with which individuals experience mental demands on the job. For example, the original item “Does your work demand a lot of concentration?” became “How often does your work demand a lot of concentration?” Peeters, Montgomery, Bakker, and Schaufeli (2005) reported a Cronbach’s alpha of .89 for this scale.

Role conflict. Researchers traditionally define role conflict as encompassing several different dimensions reflecting incompatibility among the expectations associated with fulfilling a work role (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Rizzo, House, & Lirtzman, 1970). I will examine the dimension of intersender conflict, which occurs when individuals face incompatible requests or expectations at work (Bishop & Scott, 2000). I will measure intersender conflict with three items adapted from Rizzo, House, and Lirtzman’s (1970) measure of role conflict. Bishop and Scott (2000) identified these items as reflecting intersender conflict, and reported a Cronbach’s alpha of .83 for a six-item scale including these three items. To maintain consistency with the other job demand scales, I changed these items from first-person statements (e.g., “I often receive incompatible requests from two or

more people") to second-person questions (e.g., "How often do you receive incompatible requests from two or more people?").

Interpersonal conflict. I will measure interpersonal conflict with The Interpersonal Conflict at Work Scale (ICAWS; Spector & Jex, 2008), which assesses the extent to which individuals experience disagreements and mistreatment at work. The four items (for example, "How often are people rude to you at work?") displayed an internal reliability value of .74 across 13 studies (Spector & Jex, 2008). Additionally, I will measure interpersonal conflict with Jehn's (1995) relationship conflict scale. This scale includes four items assessing tension and incompatibility among members of a work unit. I revised the items to fit the frequency-based wording and response scale of the other job demand items. For instance, the item "How much friction is there among members in your work unit?" became "How often is there friction among members in your work unit?" Jehn, Northcraft, and Neale (1999) reported a coefficient alpha of .90 for this scale.

Demand appraisals. First, participants will provide a challenge appraisal rating for each job demand scale item. To ensure that participants understand the meaning of a challenge, I will provide a formal explanation based on definitions that researchers have created for validation and data collection purposes (i.e., Cavanaugh et al., 2000; Kozusznik et al., 2012; LePine et al., 2005; Webster et al., 2011). Participants will then view a set of 23 items describing their work conditions, which correspond to the job demand scale items previously shown. For example, one quantitative workload appraisal item will be "The fact that you [never/rarely/sometimes/often/very often] have to work very fast." The survey

system will automatically fill in one of the five frequency descriptors to correspond to the actual job demand rating that the participant previously made. For instance, an individual who previously indicated that their job sometimes requires them to work very fast will see the appraisal item "The fact that you sometimes have to work very fast." For each item, participants will rate the extent to which they view the aspect of their current job as a challenge. Responses will range from *1* (Not at all a challenge) to *5* (Very much a challenge). Next, participants will view a definition of hindrance based on previous literature (i.e., Cavanaugh et al., 2000; Kozusznik et al., 2012; LePine et al., 2005; Webster et al., 2011). They will then make hindrance appraisal ratings for the same items shown for the challenge appraisal ratings. Responses will range from *1* (Not at all a hindrance) to *5* (Very much a hindrance). See Appendix C for the challenge and hindrance definitions and Appendix D for a full list of demand appraisal items.

Self-efficacy. Chen, Gully, and Eden's (2001) General Self-Efficacy Scale includes eight items assessing individuals' perceived capability of meeting goals and demands across contexts. Item examples include "When facing difficult tasks, I am certain that I will accomplish them" and "Even when things are tough, I can perform quite well." To avoid misinterpretation based on the previous definition of a challenge, I changed the item "I will be able to successfully overcome many challenges" to "I will be able to successfully overcome many difficulties." Chen et al. (2001) reported alpha coefficients ranging from .85 to .90 for this scale. Participants will rate their agreement with each statement on a five-point

Likert-type scale ranging from *Strongly disagree* to *Strongly agree*. Appendix E displays all self-efficacy items.

Proposed Analyses

First, I will calculate means and standard deviations for all of the study variables. Additionally, I will calculate correlations among the study variables. Correlations between each job demand and work engagement will serve as tests of Hypotheses 1a and 1b.

I will test the remaining hypotheses using the PROCESS computational tool for SPSS (Hayes, 2012), which allows the use of ordinary least squares regression to estimate conditional indirect effects containing multiple mediators and moderators. I will conduct analyses separately for each job demand and its associated challenge and hindrance appraisals, for a total of four separate sets of analyses. As an example, Figure 2 displays the entire model to be tested for role conflict. My ultimate goal is to examine how the indirect effects of job demands on work engagement, mediated through challenge and hindrance appraisals, vary according to levels of self-efficacy. Thus, my model is one of moderated mediation (Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007).

First, I will conduct mediation analysis to estimate the indirect relationship between each job demand and work engagement through challenge appraisal and hindrance appraisal (Hypotheses 2-9). I will regress each challenge appraisal measure on its corresponding job demand to test Hypotheses 2a-d. Similarly, to test Hypotheses 3a-d, I will regress each hindrance appraisal measure on its corresponding job demand. I will use the Hotelling-Williams test (Steiger, 1980) to determine whether each demand is more strongly correlated

with challenge appraisal or hindrance appraisal (Hypotheses 4a-b and 5a-b). I will then regress work engagement on challenge appraisal (Hypotheses 6a-d) and hindrance appraisal (Hypotheses 7a-d) to determine the direct relationship between each appraisal type and engagement. Finally, I will test the overall multiple mediation model (Hypotheses 8a-d and 9a-d) by regressing work engagement on the focal job demand, challenge appraisal, and hindrance appraisal. Bootstrap confidence intervals will test the significance of the two indirect effects of each job demand on engagement through challenge appraisal and hindrance appraisal (Preacher & Hayes, 2008). This method uses repeated sampling with replacement from the original sample to estimate the sampling distribution of the indirect effect; confidence intervals for the indirect effect are constructed based on this sampling distribution. Preacher and Hayes (2008) recommend this method over other mediation tests, including the Sobel test, because it does not assume normality of the sampling distribution of the indirect effect.

Next, I will conduct moderation analysis to examine self-efficacy as a moderator of the relationship between each job demand and challenge appraisal (Hypotheses 10a-d). Specifically, I will regress challenge appraisal on each job demand, self-efficacy, and the interaction of job demand and self-efficacy. I will use the same procedure to examine self-efficacy as a moderator of the relationship between each job demand and hindrance appraisal (Hypotheses 11a-d), using hindrance appraisal as the outcome. For both sets of hypotheses, I will illustrate significant interactions by graphing the relationship between each job demand and appraisal at low, moderate, and high levels of self-efficacy.

Finally, using the PROCESS computational tool (Hayes, 2012), I will estimate the conditional indirect relationship between each job demand and work engagement through challenge appraisal (Hypotheses 12a-d) and hindrance appraisal (Hypotheses 13a-d) simultaneously. Bootstrap confidence intervals will test the significance of the indirect effects of each job demand on work engagement through challenge appraisal and hindrance appraisal at low, moderate, and high levels of self-efficacy (Hayes, 2012).

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Items measuring work engagement (Schaufeli, Bakker, & Salanova, 2006)

Vigor:

At my work, I feel bursting with energy.

At my job, I feel strong and vigorous.

When I get up in the morning, I feel like going to work.

Dedication:

I am enthusiastic about my job.

My job inspires me.

I am proud of the work that I do.

Absorption:

I feel happy when I am working intensely.

I am immersed in my work.

I get carried away when I am working.

0 = Never, 1 = Almost never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very often, 6 = Always

Items measuring job demands

1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often

Quantitative workload (Spector & Jex, 1998)

How often does your job require you to work very fast?
How often does your job require you to work very hard?
How often does your job leave you with little time to get things done?
How often is there a great deal to be done?
How often do you have to do more work than you can do well?

Cognitive demands (adapted from van Veldhoven et al., 1997)

How often does your work demand a lot of concentration?
How often do you have to work with a lot of precision?
How often do you have to be attentive to many things at the same time?
How often does your work require continual thought?
How often do you have to give continuous attention to your work?
How often do you have to remember many things in your work?
How often does your work require a great deal of carefulness?

Role conflict (adapted from Rizzo et al., 1970)

How often do you work with two or more people who want to do things quite differently?
How often do you receive incompatible requests from two or more people at work?
How often do you do things at work that are likely to be accepted by one person and not accepted by others?

Interpersonal conflict (Spector & Jex, 1998)

How often do you get into arguments with others at work?
How often do other people yell at you at work?
How often are people rude to you at work?
How often do other people do nasty things to you at work?

Interpersonal conflict (adapted from Jehn, 1995)

How often is there friction among members in your work unit?
How often are personality conflicts evident in your work unit?
How often is there tension among members in your work unit?
How often is there emotional conflict among members in your work unit?

Note. I revised the wording of the van Veldhoven et al. (1997), Rizzo et al. (1970) and Jehn (1995) items to fit a frequency-based response scale.

Demand appraisal instructions (adapted from Webster et al., 2011; Kozusznik et al., 2012)

For challenge appraisal ratings: "The following statements describe aspects of your current job. Please rate how much of a **challenge** each aspect of your current job is for you.
A **challenge** is something that, although stressful, you view as an opportunity for achievement. Challenges can make your work difficult, but they also motivate you to develop new skills and attain personal growth. Because challenges can be rewarding to deal with, you feel they are typically worth the discomfort. Challenges can make your job interesting."

For hindrance appraisal ratings: "The following statements describe aspects of your current job. Please rate how much of a **hindrance** each aspect of your current job is for you.
A **hindrance** is something that interferes with your work and stands in the way of your personal growth. Because dealing with hindrances is stressful and unfulfilling, you view them as typically unnecessary sources of discomfort. Hindrances can make your job tedious."

Demand appraisal items

Items presented for both challenge and hindrance appraisal ratings.

In the survey, an item's wording will reflect the actual rating that the participant previously gave for the corresponding job demand item (1 = Never, 2 = Sometimes, 3 = Rarely, 4 = Often, 5 = Very often). Items displayed below assume that the participant previously gave a response of *4* (Often) for all job demand ratings.

Quantitative workload

The fact that you often have to work very fast
The fact that you often have to work very hard
The fact that there is often a great deal to be done
The fact that you often have to do more work than you can do well
The fact that your job often leaves you with little time to get things done

Cognitive demands

The fact that your work often demands a lot of concentration
The fact that you often have to work with a lot of precision
The fact that you often have to be attentive to many things at the same time
The fact that your work often requires continual thought
The fact that you often have to give continuous attention to your work
The fact that you often have to remember many things in your work
The fact that your work often requires a great deal of carefulness

Role conflict

The fact that you often work with two or more people who want to do things quite differently
The fact that you often receive incompatible requests from two or more people at work
The fact that you often do things at work that are likely to be accepted by one person and not accepted by others

Interpersonal conflict

The fact that you often get into arguments with others at work
The fact that other people often yell at you at work
The fact that people are often rude to you at work
The fact that other people often do nasty things to you at work
The fact that there is often friction among members in your work unit
The fact that there are often personality conflicts evident in your work unit
The fact that there is often tension among members in your work unit
The fact that there is often emotional conflict among members in your work unit

1 = Not at all a [challenge/hindrance] 5 = Very much a [challenge/hindrance]

Items measuring self-efficacy

General Self-Efficacy Scale (Chen et al., 2001)

I will be able to achieve most of the goals that I have set for myself.

When facing difficult tasks, I am certain that I will accomplish them.

In general, I think that I can obtain outcomes that are important to me.

I believe I can succeed at most any endeavor to which I set my mind.

I will be able to successfully overcome many difficulties.

I am confident that I can perform effectively on many different tasks.

Compared to other people, I can do most tasks very well.

Even when things are tough, I can perform quite well.

1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

Note. I revised the original item ("I will be able to successfully overcome many challenges") to read "I will be able to successfully overcome many difficulties."

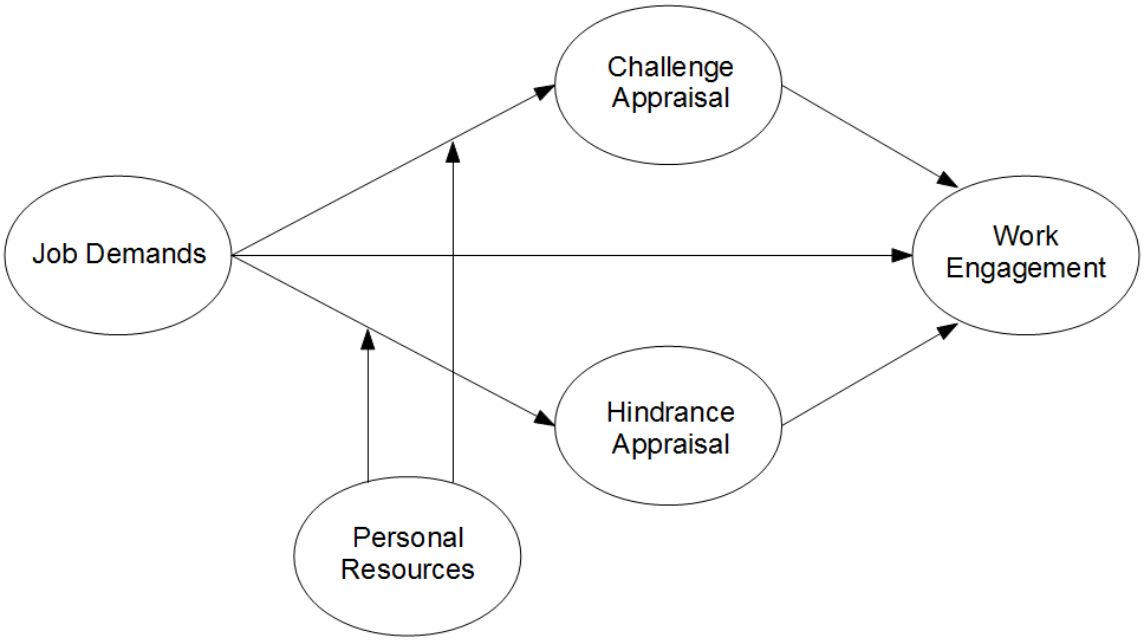

Figure 1. Hypothesized conceptual model for the current study.

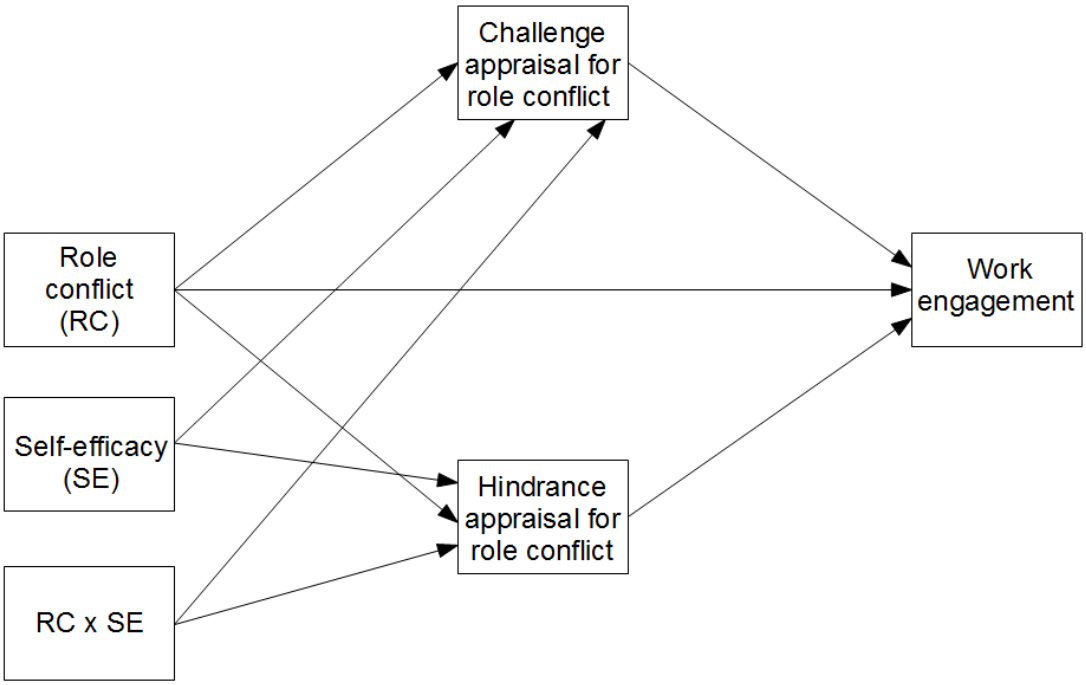

Figure 2. Hypothesized statistical model for the current study with role conflict as the focal job demand.