



Too much may be a bad thing: the difference between challenge and hindrance job demands

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Abstract

Job demands and employee motivations are studied through a challenging-disruptive needs framework. However, studies on challenging demands show mixed results due to the difference in the level of demand and effect of moderating variables. In this study, based on the Yerkes-Dodson law and conservation of resources theory, the non-linear relationship between challenging demand and work engagement, linear relationship between hindrance demand and work engagement, and moderating effect of stress were verified. A total of 3914 people were surveyed. The results showed that hindrance demand had a negative linear relationship with work engagement. Moreover, challenging demand had a positive effect on work engagement till a certain level, but had an inverted-U relationship with a negative influence thereafter. Stress mindset moderated these relationships and the negative effects of challenging and hindrance demands weakened for a stress-enhancing-mindset. Based on these results, theoretical and practical implications and future research directions were proposed.

Keywords Employee motivation · Job demand · Job stress · Work engagement · Stress mindset

Introduction

Nowadays, organizations are experiencing rapid changes in the business environment than ever before. In addition to technological advancement and intensifying competition, the economic situation and working environment have significantly changed due to COVID-19. Consequently, an organization's adaptation to the environment is considered an important competency for its survival. In this evolving environment, it is more important than ever for employees to take initiatives based on job motives. However, the increase in uncertainty and volatility in the labor market act as factors hindering employee motivation (Shin & Hur, 2021).

Additionally, the demand for adaptation to these changes in the work environment besides daily work increases the work burden on employees, which lowers job motivation and causes stress (Ervasti et al., 2022). Excessive challenges and demands experienced by employees due to these social changes are recognized as important problems in private and public organizations (Guidetti et al., 2022). As a result, it can be said that many organizations are going through difficult times in which they have to maintain their employees' motivation to work in an environment with high workload and stress. Considering this, studies related to job demand, job motivation, and job stress have increased in the organizational context after the recent COVID-19 pandemic (Hal-dorai et al., 2022).

Work engagement is a concept that reflects employee motivation and is an outcome that has been studied along with job characteristics. Work engagement is defined as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002). In previous studies, the relationship between job demand and work engagement was mainly explained through the challenge-hindrance framework. Cavanaugh et al. (2000) divided job demand into challenge and hindrance demands based on the transactional theory of stress (Lazarus

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& Folkman, 1984), and suggested that coping and outcome of the demand vary depending on the type of demand. Challenge demand is a stressful situation, but if it is overcome, it is helpful for personal growth and development. On the other hand, hindrance demand obstructs work achievement and impedes personal growth and development. Since then, many studies have been conducted using the frame of challenge and hindrance demands and the challenge demand was found to have a positive effect on both work motivation and stress. For example, in Lepine et al. (2005) and Podsakoff et al. (2007) meta-analysis, challenge demands were positively associated with both motivation and burnout, whereas hindrance demands were negatively associated with motivation and positively associated with burnout. Lepine et al. (2005) explained this as a difference in motivation due to expectations. They suggested that a challenge demand evokes the expectation that it will be achieved through effort and will help accomplish the goals, and this expectation can have a positive effect on an individual's work engagement. However, despite this assumption, job demands classified as challenge demand show mixed results in several studies (O'Brien & Beehr, 2019). For example, Sheng et al. (2019) suggested that excessive time pressure can induce stress and avoidance behavior, and Mazzola and Disselhorst (2019) found that challenge demand, unlike expectations based on challenge and hindrance model, showed weak or non-significant associations with positive outcomes. Considering these points, O'Brien and Beehr (2019) and Horan et al. (2020) suggested the need for reexamination or modification in the challenge-hindrance demand model. In their studies, first, they suggested the need to consider the nonlinear relationship (inverted U) between the challenge demand and job-related outcome. According to the Yerkes-Dodson law, which explains the relationship between psychological arousal level and job performance, arousal to an optimal level has a positive effect on performance, while excessive arousal can have a negative effect on performance (Yerkes & Dodson, 1908). Similarly, if challenging needs are too high despite their contribution to personal growth, individuals may not enjoy the positive benefits of challenging demands. According to the biopsychosocial (BPS) model, the evaluation of resources and demands determines psychological state. When resources meet or exceed demands, people experience challenges, a positive psychological state, whereas when demands exceed resources, people experience threat, a negative psychological state (Seery, 2011). Thus, even though challenge demands have positive attributes that contribute to personal growth and development, excessive challenge demands beyond personal resources can act as a threat rather than a challenge. Cavanaugh et al. (2000) also suggested the possibility of a curvilinear relationship between job demand and outcome

variables, although, many studies assumed a linear relationship between these two (Horan et al., 2020). Second, individual differences can also have a significant impact on the response of challenge demand as a moderating variable (O'Brien & Beehr, 2019). According to the transactional theory of stress (Lazarus & Folkman, 1984), which is the basis of the challenge-hindrance demand model, appraisal of a stressor has an important influence in determining its effect. However, even in an objective situation, there is a difference in how individuals interpret it and therefore, the appraisal of stressors may also vary according to individual differences (Horan et al., 2020). Therefore, if individual differences affect how they appraise job demands, we need to identify the moderating effects of individual differences on the relationship between challenge demand and outcome. Also, identifying these individual differences could provide opportunities for intervention within the workplace.

Considering these points, the purpose of this study was to investigate the nonlinear relationship between job demand and work engagement and the moderating effect of individual differences on this relationship. Challenge demand can be helpful for individual growth and development, but excessive challenge demand that one cannot cope with can be perceived as a threat to employees, similar to a hindrance demand. Additionally, as job demand evaluation may vary depending on individual differences, a study was needed that comprehensively considers the type and level of job demand and individual differences affecting its evaluation (O'Brien & Beehr, 2019). We believe that this study will not only contribute to the research on job demand, but also to the development of interventions or policies for employees who experience unprecedented changes and maintain high job motivation to survive.

Nonlinear relationship between challenge demand and work engagement

Cavanaugh et al. (2000) divided stressors into challenge stressor and hindrance stressor according to the way they were evaluated to explain the ambiguous result between work stress and outcome. According to this classification, challenge stressor causes strain as a job demand, but at the same time is perceived as an opportunity to achieve performance, and overcoming it may help achieve individual goals and get a sense of achievement (Cavanaugh et al., 2000; Webster et al., 2011). Subsequently, job demand, which is a stressor in organizations, has been studied by dividing it into challenge and hindrance demands, and many studies have been carried out by integrating with the job demands-resources (JD-R) model (Van den Broeck et al., 2010). According to these studies, challenge demands cause stress in employees, but at the same time they are perceived

as high expectations for job achievement and opportunities for growth. Therefore, challenge demand has two functions of “energy-depleting and stimulating”, and despite being a demand, it appears to have a positive effect on work engagement similar to job resources (Van den Broeck et al., 2010). However, according to various theories related to stress, it may be difficult to assume a simple relationship between challenge demand and work engagement. First, according to the Yerkes-Dodson law (1908), the effect of stress can vary depending on the stimulus level. Similarly, Scott (1966) argued that the motivation and behavior of employees differed according to the level of activation. People need a certain level of activation to be motivated. However, activation above a certain level can be dysfunctional due to excessive stress and the negative behavior caused by a high level of activation is called “impact-decrease behavior” (Scott, 1966; Haldorai et al., 2022). Second, the negative effect of excessive demand can also be explained by coping ability. According to Lazarus and Folkman (1984), the degree of having resources to cope with stress has a significant influence on the appraisal of stress. Therefore, if the stressor is excessive and there are fewer resources to cope with it, the stressor may be appraised negatively. Similar to Lazarus and Folkman’s transactional model (1984), the BPS model also explains that evaluation of demand and resource have a significant impact on people’s psychological processes and physiological responses. According to this model, the evaluation of resources and demands determines the psychological state experienced in challenge versus threat. The challenge indicates that people have a positive psychological state when the resources of a resource meet or exceed the demand, whereas the threat state indicates a negative state when the demand exceeds the resource. Therefore, excessively challenge demands that exceed resources may be perceived by employees as a threat rather than a challenge although classified as challenging job demands by Cavanaugh et al. (2000), which in turn ultimately decrease in motivation and negative health consequences such as low cardiac output and release of cortisol (Seery, 2011).

Moreover, according to the conservation of resources (COR) theory (Hobfoll, 2001), stress occurs when there is a loss of resource and an expectation of resource loss. People actively invest their resources to cope with stress, and the results of stress vary according to the loss or gain compared to the resources invested. In this case, the challenge demand can help one’s growth and development, but an excessive level of challenge demand can have a negative effect on work engagement as the probability of acquiring resources compared to the invested resources is lower (O’Brien & Beehr, 2019). For example, the relationship between work load that is classified as challenge demand and work engagement was found to have an inverted

U-shape (Zivnuska et al., 2002), and time pressure classified as challenge demands was shown to have a non-linear relationship (inverted U-shape) with creativity and excessive time pressure has been shown to limit creativity (Baer & Oldham, 2006). Therefore, the non-linear relationship (inverted U) between challenge demand and outcome was raised, but curvilinear relationships have not been explored extensively (Horan et al., 2020). In this study, considering these theories and previous studies, a non-linear relationship (inverted U) between challenge demand and work engagement was assumed and hypothesis 1 was formed as follows.

Hypothesis 1 Challenge demand and work engagement will have a non-linear relationship (inverted U), such that the relationship between challenge demand and work engagement will be positive at first, but will change into a negative one after reaching the appropriate level of challenge job demand.

Linear relationship between hindrance demand and work engagement

A hindrance demand hinders the achievement of an individual’s goal. The hindrance demand is not only difficult to overcome through individual effort, but even if it is overcome, it does not help in personal growth and development (Cavanaugh et al., 2000; Webster et al., 2011). Therefore, unlike an appropriate level of challenge demand that can be overcome with individual resources and has a positive effect on work engagement because of expectations of growth and achievement, hindrance demand can have a negative effect on work engagement regardless of the level. According to Crawford et al. (2010), when an individual deals with hindrance demand, resources are continuously consumed and when resources are invested, it is difficult to expect acquisition of additional resources. Conservation of resources (COR) theory explains this as a loss process, which can impair employee motivation and cause stress (Hobfoll, 2001). In other words, hindrance demand has a low expectation of achievement of one’s goal through individual effort due to its intrinsic nature, and thus, it has a negative effect on the employee’s work engagement regardless of the level (Lepine et al., 2005). In empirical studies, it was reported that hindrance demand was consistently positively related to burnout, strain, and withdrawal behavior, and negatively related to work engagement and positive affect (Podsakoff et al., 2007; Crawford et al., 2010; Mazzola & Disselhorst, 2019). Therefore, considering these theories and previous studies, a negative linear relationship between hindrance demand and work engagement was assumed, and hypothesis 2 was formed as follows.

Hypothesis 2 hindrance demand and work engagement will have a negative linear relationship.

Stress mindset as a moderator

As the job resources expanded, individual differences were also recognized as important job resources (Xanthopoulou et al., 2007). Considering this, the boundary condition of individual differences in the relationship between stressful events and outcomes was also considered as an important research topic (O'Brien & Beehr, 2019; Horan et al., 2020).

A stress mindset is a belief in stress. It is divided into a stress-is-enhancing mindset that considers stress will have opportunities for positive outcomes such as performance and growth and a stress-is-debilitating mindset that considers stress will have detrimental consequences for such outcomes (Crum et al., 2017). As described above, the appraisal of a stressor has an important influence in determining its effect. However, the same situation can be interpreted differently by people, and therefore the appraisal of stressors may vary depending on individual differences. According to the BPS model, evaluation of resources and demands affects physiological responses as well as psychological processes. However, although the evaluation of demands and resources is important in determining psychological and physiological responses through response to a challenge or threat, the same situation may be perceived differently by different individuals. For example, people may perceive the same stimulus differently as a challenge versus a threat depending on the framing in which they interpret it (Seery et al., 2009). Thus, even for the same stressor, a stress-is-enhancing mindset, which perceives stress as an opportunity for a positive outcome, may perceive it as more challenging, whereas a stress-is-debilitating mindset, which perceives stress as a negative one, may perceive it as more threatening.

Individuals with a stress-is-enhancing mindset are more likely to evaluate a stressful event as a challenge rather than a threat than those with a stress-is-debilitating mindset. Therefore, they perceive higher expectations of goal achievement and growth in a stressful situation. According to Vroom's expectancy theory (1964), the expectation of achieving a goal has a significant effect on improving individual motivation. A stress-is-enhancing mindset recognizes stress as an opportunity and focuses on the positive outcomes that can be achieved by overcoming stress (Huebschmann & Sheets, 2020). Therefore, when faced with a stressor, individuals with a stress-is-enhancing mindset expect high successful management expectations and positive results from their efforts and may show higher job motivation than those with a stress-is-debilitating mindset. Furthermore, stress mindset was found to have a particularly important effect on the

outcome of stress and individuals with a stress-is-enhancing mindset were found to be more adaptive not only in behavioral but also in emotional and hormonal responses in stressful situations (Crum et al., 2013; Crum et al., 2017).

This stress mindset is a metacognitive belief of an individual's stressors and is characterized as not context-specific (Crum et al., 2017; Horan et al., 2020; Huebschmann & Sheets, 2020). For example, individuals with a stress-is-debilitating mindset have the expectation that stress will have a negative effect on them regardless of the type of stressor. Therefore, they perceive that it is undesirable to put cognitive resources and effort into a stress-inducing situation for both challenge and hindrance demands (Crum et al., 2013). In addition, the effect of this stress mindset appears to play a more important role when the stressful situation becomes adverse. For example, Park et al. (2018) found that the moderating effect of stress mindset was insignificant in low-adversity situations, in which those with stress-is-debilitating mindset showed lower stress-depressing symptoms than they showed in high-adversity situations.

Combining these theories and previous studies, it can be said that the stress mindset can act as a moderator in both challenge and hindrance demands, and its positive effect can be stronger when the intensity of the stressor is high in both challenge and hindrance demands. In other words, in the nonlinear relationship between challenge demand and work engagement, people with a stress-is-enhancing mindset can perceive the same challenge demand as more challenging than those with a stress-is-debilitating mindset do. Therefore, an optimal level at which a challenging demand can positively affect work engagement may be higher in stress-is-enhancing mindset than in stress-is-debilitating mindset and the negative effect of a challenging demand after an optimal level may be weaker in stress-is-enhancing mindset than in stress-is-debilitating mindset. Likewise, in the negative linear relationship between hindrance demand and work engagement, people with a stress-is-enhancing mindset will have a weaker negative effect of hindrance demand on work engagement than those with a stress-is-debilitating mindset. In addition, the stronger the challenge and hindrance demands, the stronger the positive effect on the stress-is-enhancing mindset. Therefore, hypotheses 3 and 4 were formed as follows.

Hypothesis 3 A stress mindset will moderate the nonlinear relationship between challenge demand and work engagement, such that a stress-is-debilitating mindset will have a lower level of inflection point compared to a stress-is-enhancing mindset and after the inflection point, the negative relationship between challenge demand and work

engagement will be stronger in this mindset than in stress-is-enhancing mindset.

Hypothesis 4 A stress mindset will moderate the linear relationship between hindrance demand and work engagement, such that stress-is-debilitating mindset will have a stronger negative relationship between hindrance demand and work engagement than a stress-is-enhancing mindset.

Materials and methods

Participants and procedure

For this study, A survey was conducted to employees working at government agencies, including the regional office in South Korea. They were informed that the study was on perceptions and attitudes toward jobs. It was explained that their responses would be anonymized, and only those who voluntarily agreed to participate were surveyed. The survey was conducted online and a link to the survey was sent by e-mail. A total of 3914 people participated in the survey. The online questionnaire was set up so that all questions should be answered before proceeding to the next questionnaire and there were no missing values. Therefore, the data of all participants were analyzed. Participants included 2291 men (58.5%) and 1623 women (41.5%). Regarding age, 9.1%, 34.7%, 39.8% and 16.4% were in the age groups of 20s, 30s, 40s, and 50s, respectively. Regarding tenure, 26.4%, 16.3%, 33.5%, 21.7%, 2.1% were in tenure groups of less than 5 years, 6–10 years, 11–19 years, 20–29 years, and 30–39 years, respectively.

Measures

Items were rated on a 5-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5). All items were used after being translated into Korean. Two bilinguals who majored in psychology translated the items from English to Korean and a bilingual researcher with a doctorate in psychology in the United States finally reviewed the questionnaire.

Challenge demand. The items used by Podsakoff (2007) were used to measure the challenge demand which consisted of workload, job responsibility, job complexity, and work pace. Each sub-factor was measured with one item for a total of four items. Items included: for workload, “I have to complete a great deal of work on this job”; for job responsibility, “My job requires me to be accountable for my work and the work of others”; for job complexity, “Tasks on my job use a variety of different skills and abilities”; and for

work pace, “To complete my work on time, I must work quickly.” Cronbach’s α for this measure was 0.83.

Hindrance demand. The items used by Podsakoff (2007) were used to measure the hindrance demand which consisted of administrative hassles, interpersonal conflict, role conflict, and role ambiguity. Items included: for administrative hassles, “This job requires the completion of unnecessary paperwork or computer work.”, “There are many overly restrictive rules and regulations in this job.”; for interpersonal conflict, “I have conflicts with other coworkers regarding political views, personality, and/or interpersonal style”, “I have arguments with people at my workplace about personal issues.”; for role conflict, “I often receive conflicting requests from a supervisor (or supervisors)”; and for role ambiguity, “I am often given conflicting assignments.” Cronbach’s α was 0.78.

Stress mindset. The Stress Mindset Measure (SMM) developed by Crum et al. (2013) was used to measure stress mindset. It consists of two items each for enhancing and debilitating mindset with a total of four items. Items included: for enhancing, “Experiencing stress enhances my performance and productivity” and for debilitating, “The effects of stress are negative and should be avoided.” Cronbach’s α was 0.78.

Work engagement. The Utrecht Work Engagement Scale-9 (UWES-9) developed by Schaufeli et al. (2006) was used. It consists of three items each for vigor, dedication, and absorption with a total of nine items. Example items included: for vigor, “At my work, I feel bursting with energy”; for dedication, “I am enthusiastic about my job”; and for absorption, “I feel happy when I am working intense.” Cronbach’s α was 0.92.

Data analyses

For hypothesis testing, hierarchical polynomial regression analysis was used and standardized values of the independent variables were used in the regression models (Aiken et al., 1991; Le et al., 2011). First, to identify the relationship between challenge demand and work engagement and the moderating effect of the stress mindset in this relationship, challenge demand was entered in the first step. The quadratic term of the square of the challenge demand was entered in the second step to represent the hypothesized curvilinear effect. In the third step, the stress mindset was entered as a moderator, and in the fourth step, the interaction term between the challenge demand and stress mindset and the quadratic term of challenge demand and stress mindset were entered. Next, to identify the relationship between hindrance demand and work engagement, hindrance demand was entered in the first step. In the second step, the quadratic term of the square of the hindrance demand was entered. To

Table 1 Descriptive statistics and correlations between variables

	1	2	3	4	5	6	7
1.Sex							
2.Age	-0.20***						
3.Tenure	-0.07***	0.77***					
4.CD	0.03*	-0.08***	-0.07***				
5.HD	0.05**	-0.16***	-0.14***	0.51***			
6.SM	-0.07***	0.08***	0.05***	-0.29***	-0.27***		
7.WE	-0.04*	0.19***	0.16***	-0.19***	-0.31***	0.44***	

N=3914. CD=challenge demand; HD=hindrance demand; SM=stress mindset; WE=work engagement. * $P < .05$, ** $P < .01$, *** $P < .001$

Table 2 Relationships between challenge demand and work engagement moderated by stress mindset

	Model 1			Model 2			Model 3			Model 4		
	B	β	SE	B	β	SE	B	B	SE	B	β	SE
Intercept	2.92***			2.97***			2.96***			2.96***		
Challenge demand	-0.13***	-0.19	0.10	-0.13***	-0.20	0.10	-0.05***	-0.08	0.10	-0.05***	-0.07	0.01
Challenge demand ²				-0.05***	-0.11	0.01	-0.03***	-0.08	0.01	-0.02**	-0.05	0.01
Stress mindset							0.27***	0.41	0.01	0.25***	0.38	0.01
CD X SM										0.06***	0.09	0.01
CD ² X SM										0.01	0.02	0.01
R ²	0.036			0.047			0.203			0.209		
ΔR^2				0.011***			0.155***			0.006***		

N=3914. CD=challenge demand; SM=stress mindset. * $P < .05$, ** $P < .01$, *** $P < .001$

Table 3 Relationship between hindrance demand and work engagement

	Model 1			Model 2		
	B	β	SE	B	β	SE
Intercept	2.92***			2.93***		
Hindrance demand	-0.21***	-0.31	0.10	-0.21***	-0.31	0.10
Hindrance demand ²				-0.003	-0.005	0.006
R ²	0.099			0.099		
ΔR^2				0.000		

N=3914. * $P < .05$, ** $P < .01$, *** $P < .001$

identify the moderating effect of stress mindset in the linear relationship between hindrance demand and work engagement, multiple regression analysis was performed. For this, the hindrance demand in the first step, stress mindset as a moderator in the second step, and finally interaction term between hindrance demand and stress mindset in the third step were entered. SPSS 26.0 was used for the statistical analyses.

Results

First, to confirm the absence of common method variance, we used Harman’s single-factor method (Podsakoff et al., 2003). The underlying assumption of this technique is that if there is a significant amount of common method variance, either (a) a single factor emerges from the factor analysis or (b) one common factor account for the majority of the covariance among the measures (Podsakoff et al., 2003). As

a result of the analysis, four factors with an eigenvalue of 1 or more were derived. The total variance of the four factors was 70.0%, and the explanation amount of the principal factor was 34.9%.

Table 1 presents the correlations between the variables examined in this study.

The nonlinear relationship between challenge demand and work engagement (Hypothesis 1) is represented in Table 2. In Model 2 of Table 2, the quadratic term of the challenge demand was significant ($B = -0.05$, $p < .001$). Thus, the relationship between challenge demand and work engagement was found to have a non-linear relationship. The linear relationship between hindrance demand and work engagement (Hypothesis 2) is represented in Table 3. In Model 1 of Table 3, the effect of hindrance demand on work engagement was significant. However, the quadratic term of hindrance demand was non-significant. Therefore, hindrance demand and work engagement appeared to have a

Table 4 Moderating effect of stress mindset on the relationship between challenge demand and work engagement

	Regression coefficients (<i>B</i>)			
	Intercept(<i>B</i> 0)	Linear(<i>B</i> 1)	Quadratic(<i>B</i> 2)	Z inflection = $-B1/2B2$
Challenge demand - work engagement				
Stress-is-debilitating mindset (-1SD)	2.927	-0.137	-0.056	-1.22
Stress-is-enhancing mindset (+1SD)	3.396	-0.011	0.023	0.24

negative linear relationship. Thus, hypotheses 1 and 2 were supported.

The moderating effect of stress mindset in the non-linear relationship between challenge demand and work engagement is represented in Tables 2 and 4, and Fig. 1 (Hypothesis 3). In Model 4 of Table 2, the interaction between challenge demand and stress mindset was significant ($B=0.07$, $p<.001$). This means that the threshold at which the positive relationship between challenge and work engagement disappears depends on the level of stress mindset. For a detailed understanding, we divided the stress-is-enhancing mindset (+1SD) and the stress-is-debilitating mindset (-1SD) and compared the relationship between challenge demand (in standardized score) and work engagement. Table 4 indicates regression coefficients and inflection points for stress-is-enhancing (+1SD) and stress-is-debilitating (-1SD) mindsets. As shown in Table 4, inflection point for stress-is-enhancing mindset is much higher than that for stress-is-debilitating mindset. This difference can also be confirmed in Fig. 1; it was found that the inflection point of the stress-is-debilitating mindset is much lower and the slope that decreases after the inflection point is steeper than

that for stress-is-enhancing mindset. Therefore, Hypothesis 3 was supported.

Finally, the moderating effect of stress mindset in the linear relationship between hindrance demand and work engagement is presented in Table 5; Fig. 2 (Hypothesis 4). As shown in Model 2 of Table 5, the interaction between hindrance demand and stress mindset was significant ($B=0.09$, $p<.001$). To interpret this finding, a simple slope test was conducted by dividing the stress-is-enhancing mindset (+1SD) and stress-is-debilitating mindset (-1SD). The results showed that the relationship between hindrance demand and work engagement in stress-is-debilitating mindset was significant ($b= -0.19$, $t= -5.90$, $p<.001$), whereas in the stress-is-debilitating mindset it was not significant ($b= -0.07$, $t= -1.36$, $p=.17$). Therefore, Hypothesis 4 was supported.

Discussion

Since the distinction between challenge and hindrance demands in the workplace was demonstrated, their discriminatory effects have been established in many studies.

Fig. 1 Moderating effect of stress mindset on the relationship between challenge demand (z-score) and work engagement

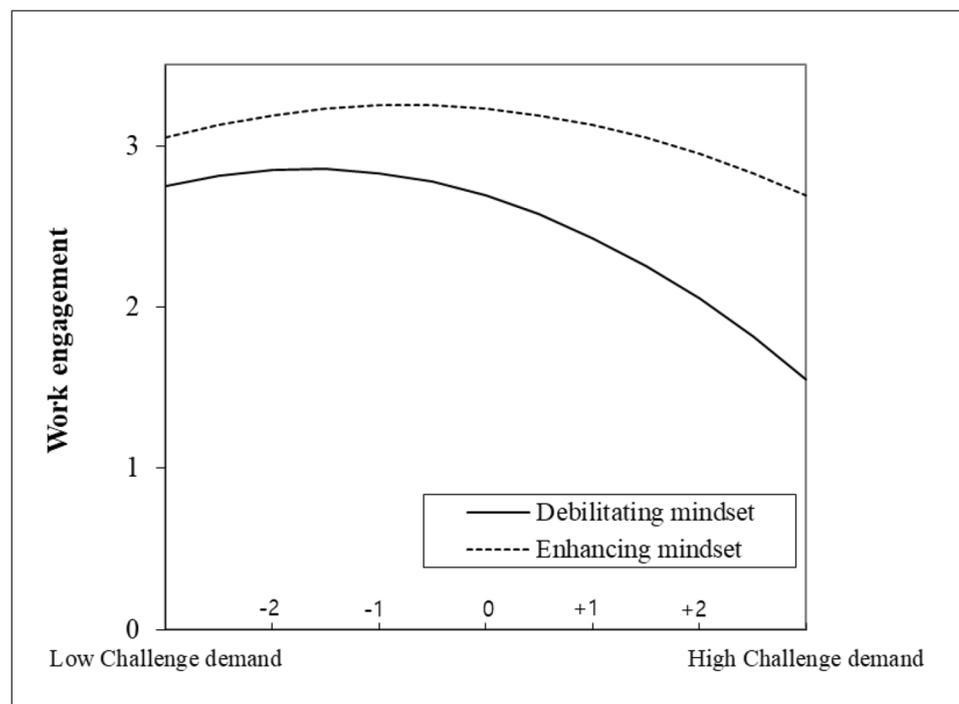


Table 5 Moderating effect of stress mindset on the relationship between hindrance demand and work engagement

	Model 1			Model 2		
	<i>B</i>	β	<i>SE</i>	<i>B</i>	β	<i>SE</i>
Intercept	1.97***			2.01***		
Hindrance demand	-0.14***	-0.21	0.01	-0.36***	-0.54	0.03
Stress mindset	0.37***	0.38	0.01	0.37***	0.37	0.01
HD X SM				0.09***	0.34	0.01
<i>R</i> ²	0.234			0.246		
ΔR^2				0.011***		

N = 3914. HD = hindrance demand; SM = stress mindset

P* < .05, *P* < .01, ****P* < .001

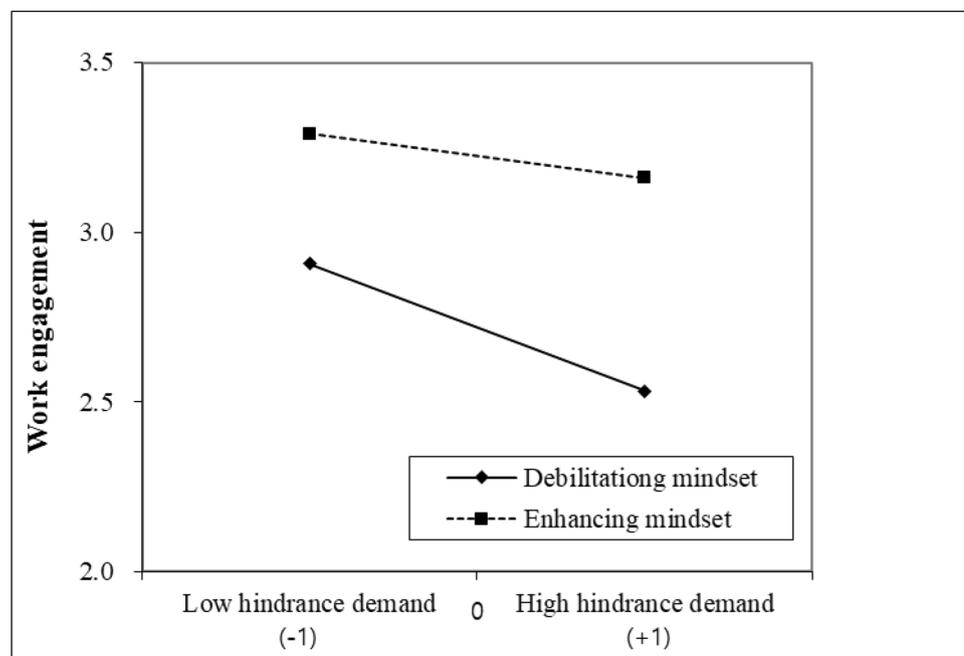
However, little is known about the nonlinear and linear relationships and the moderating effects of individual differences in these relationships (O’Brien & Beehr, 2019; Horan et al., 2020). Studies on challenge-hindrance demand and work engagement based on the JD-R model assume a linear relationship between job demand and work engagement regardless of the type of job demand. However, excessive challenge demands can act as a burden or threat to employees, and therefore, challenge demands that exceed the optimal level can have the same negative impact on employees as hindrance demands. In addition, since the interpretation of job demands may vary from person to person, this optimal level may be affected by individual differences. Consistent with these assumptions, in this study, challenge demands showed a non-linear relationship (inverted U shape) with work engagement, whereas hindrance demands showed a negative linear relationship with work engagement. In other words, challenge demand and hindrance demand differ not simply in their impact on the outcome variable, but in the relationship shapes, such as linear and inverted-U shape.

In addition, it was found that the stress mindset moderates this relationship, and the stress-is-enhancing mindset has a weaker negative effect than the stress-is-debilitating mindset. In other words, the optimal level at which challenge demand began to have negative impact on the work engagement higher than that for stress-is-debilitating mindset. However, after the inflection point, the negative impact of challenge demand on work engagement was stronger for the stress-is-debilitating mindset than the stress-is-enhancing mindset. The theoretical and practical implications of this study are as follows.

Theoretical implication

First, this study can contribute to a better understanding of challenge demand by explaining the mixed results of challenging demands and outcomes. Since Cavanaugh et al. (2000)’s suggestion to distinguish between challenge and hindrance demand, many studies explored the differences between them. However, somewhat mixed results existed

Fig. 2 Moderating effect of stress mindset on the relationship between hindrance demand (z-score) and work engagement



on the effect of challenge demand (O'Brien & Beehr, 2019). According to the results of this study, the relationship between challenge demand and work engagement is non-linear and the effect of challenge demand on work engagement can vary depending on the level of challenge demand. Challenge-hindrance demand model has been validated in many studies. Recently, however, there has been an issue of inconsistent results in challenge demands, thus raising the need for reexamination in the challenge-hindrance demand model (O'Brien & Beehr, 2019; Horan et al., 2020). In this study, we explained that excessively challenge demands could be perceived as a threat like hindrance demands via the transactional model, BPS model, and COR, thus suggesting that it is appropriate to regard it as an inverted U shape relationship between challenge demand and work engagement. Based on the BPS model and the transactional model, we explained that demands that exceed the personal resources can be perceived as a threat. Challenge demands are no exception, and even though they are helpful for personal growth and development, challenge demands that exceed the appropriate level can negatively affect motivation. Also, according to COR, people may experience stress when resources are lost or expected to be lost. Thus, excessively challenging demands can have a negative impact on employees due to the low probability of acquiring resources compared to the invested resources. In other words, similar to what is suggested in the BPS model, excessively challenge job demands can be evaluated as a threat to employees due to the perception of excessive demands, while the acquired resources relative to the investment are low. As such, this study is meaningful in that it presented the negative effects of excessively challenging demands based on various theories.

Second, it is meaningful in that we explained the difference in effect through individual differences as a moderator between challenge-hindrance demand and outcome. According to previous studies, the difference in effect of challenge demands can be explained not only by the non-linear relationship with outcome, but also by the moderators. We considered individual differences in stress mindset as a moderating variable in this study and we found that the effect of job demands varied depending on the individual differences in stress mindset; in the case of a debilitating mindset, challenge-hindrance demand has a more negative effect on work engagement. A debilitating mindset focuses more on the negative aspects of stress, whereas an enhancing mindset focuses more on the positive aspects of stress. Therefore, through expectancy theory, we explained that people with an enhancing mindset can be positive in both challenge and hindrance demands in the workplace. Thus, this study can contribute to a comprehensive understanding of job demand in that it described the relationship between

job demand and outcome, including non-linear relationships and moderating effects.

Third, the positive effect of stress mindset was more pronounced when the demand level was high in both challenge-hindrance job demands and, these results can be explained by the trait activation theory (TAT). TAT stress interaction theory between people and the environment, which considers personality traits as "latent potentials to behave" in response to trait-relevant situations (Tett et al., 2021). The environment provides opportunities for personality traits to be expressed. Therefore, the relationship between personality and environment is important for the expression of personality (Tett & Burnett, 2003). In this study, the effect of stress mindset was effective when the demand level was high. Specifically, the inflection point that determined the influence of challenge demand was different depending on the stress mindset. This means that individual differences related to stress may become more important in a stress-causing environment as emphasized in the TAT. Job resources have been gradually expanded, and individual differences are also considered as important job resources. Moreover, the response to stress can vary depending on the individual's evaluation. Therefore, individual difference is an important resource for the stress response. Accordingly, it is necessary to conduct a study of variables considering the trait activation theory and explain the research results regarding work stress.

Finally, this study can contribute to a better understanding of the difference between challenge and hindrance demands. Few studies have been conducted on the non-linear relationship between a specific job stressor classified as challenge demand and the outcomes. However, no single study has been conducted to explain the difference between the non-linear and linear relationships in this context. We included both challenge and hindrance demand in this study. Thus, it contributes to the understanding of job demands by explaining that challenge and hindrance demands have different non-linear and linear relationships, respectively, with work engagement.

Practical implication

Organizations spend a significant amount of money every year to manage the causes of job stress and improve employee motivation (Abbas & Raja, 2019). These efforts of organizations further aggravate due to the recent rapid changes. This study is meaningful in that it can suggest an intervention direction for stress management and motivation maintenance of employees.

Stress mindset is an individual difference, but it can be easily manipulated. Previous studies have shown that stress mindset can be easily manipulated through video

intervention and short articles (Crum et al., 2013, 2017; Walton, 2014). As such, stress mindset has the advantage of being used as education at work as it can be manipulated with a short intervention. In fact, in a longitudinal field study, employees who watched a video about enhancing the nature of stress had improved performance and those who participated in a stress mindset training improved their well-being (Jamieson et al., 2018). In particular, mindset interventions can be more effective when they target leaders as well as employees. For example, a mindset intervention study by Yeager et al. (2022) suggests that it is important to provide people with a context for experiencing growth mindset. According to their mindset-plus-supportive-context hypothesis, teachers' growth mindset can also influence the students' growth mindset. Applying this to the work context, the leader's mindset acts as an affordance that can draw out a follower's mindset. Therefore, leaders who have a growth mindset can help shape the mindset of their employees if they communicate that stress can act as an opportunity for growth, and back up this view with reward such as recognition. Considering these studies, stress mindset education in workplace can be reasonable with some advantages. First, according to the study on the effect of stress mindset, it was found that stress mindset not only evaluated the stressor, but also showed adaptive behavior and cognitive flexibility (Crum et al., 2017). Coping with stress can be divided into problem-focused and emotion-focused coping and the former has been proposed as a constructive coping method (Cheng et al., 2014). However, recent studies on stress coping strategies suggest that it is important to use an appropriate coping strategy suitable for the situation rather than using one specific coping strategy and to do this, cognitive flexibility is important (Bakker & de Vries, 2021). Therefore, if education on stress mindset at work is provided, employees can evaluate their stress more effectively which will help them cope constructively in future stressful situations by improving their cognitive flexibility.

Second, stress mindset is a general cognitive belief, and thus, is effective in stress response regardless of the type of stress (Crum et al., 2017). Organizations are composed of different jobs and job levels. Individuals may experience different stressors according to these differences. There is a belief that stress mindset is not situation-specific (Crum et al., 2017), and therefore, has an advantage in terms of educational efficiency as it can be applied to all employees regardless of job or job level. As the required competencies or skills may vary depending on the specific job or job level, it is necessary for the organization to implement education that reflects these differences. However, along with this, if a stress mindset that can be generally applied to all employees is implemented as a basic or common education, it will help

them deal with stress in a constructive way and improve their motivation.

Third, a stress mindset can be synergistic with a growth mindset, which is the belief that abilities are not fixed and can be developed through effort. According to Yeager et al. (2022), stress and growth mindsets are not separate ideas; they share the belief that one can develop and achieve through one's own efforts. Indeed, an intervention study of their synergistic effects have shown that synergistic mindset interventions targeting both mindsets in routine and challenging demanding situations are effective on cognitive appraisal as well as physiological responses. What makes these findings valuable is that these effects were replicated in a 30-minute online intervention. Therefore, we believe that using mindset interventions as a way to effectively respond to everyday demands will further benefit people's well-being and performance.

Limitation and future research

This study has some limitations. First, Since Cavanaugh et al. (2000) distinguished challenge-hindrane stressors in organizations, many studies have suggested the existence of stressors that are perceived as challenge or hindrance. However, an individual's perception of challenge-hindrane stressor can be different depending on their organization or job. For example, in a study on nurses, work pressure was perceived as a hindrance, whereas emotional demand was perceived as a challenge, unlike the general occupational group (Bakker & Sanz-Vergel, 2013). In this study, factors validated as challenge-hindrane demand in previous studies were used. However, in future research, it is necessary to consider factors that reflect how actual employees perceive specific job demands as challenge or hindrance.

Second, as this is a cross-sectional study, confirming a causal relationship between variables is difficult. A longitudinal design has the advantage that it can explain the causal relationship between variables and exclude other alternative explanations. However, Spector (2019) explained that cross-sectional studies are not just an easy choice, rather can be a correct choice depending on the purpose of the study. Specifically, Spector (2019) suggested that the cross-sectional design can be a desirable research method when the predictor and outcome variable have already occurred or the duration for which the predictor will affect the outcome variable is unknown. In this study, since the duration of the effect of challenge and hindrance job demands on work engagement was unclear (Shin & Hur, 2021), a cross-sectional design might be desirable. However, the perception of the stressor, response to it, and outcomes are premised on the passage of time. Therefore, for a detailed understanding of the temporal impact of job demand, it is necessary

to check the causal relationship between these variables by varying the measurement time point in future research. Third, this study has limitations in that it relied only on subjective measurement. This study conducted a questionnaire study, and did not include objective indicators. According to the BPS model, evaluation of challenge versus threat can influence psychological processes as well as subsequent physiological responses, in particular, hypothalamic-pituitary-adrenal axis (HPA) activation that related to release of cortisol. Therefore, it is thought that it will be more helpful to understand the effect of excessively challenge demands if research using these objective indicators is conducted through field experiments in the future. However, despite proposal optimal theory of arousal, there are some mixed results about biological or behavioral measurements and the resulting nonlinear (inverted U-shaped curve). There is a line of classic research in psychophysiology that highlights how approach-oriented, challenge type responses characterized by increased catecholamine production do not exhibit inverse U-shaped curves with performance (e.g., Dienstbier, 1989). Therefore, studies to reveal these differences through biological measurements with experimental methods will help provide a greater understanding of stress response and performance.

Fourth, although this study confirmed the difference in the relationship between challenge and hindrance demands and work engagement and the moderating effect of stress mindset on this relationship, the mechanism of these effects was not disclosed. Crum et al. (2017) showed that stress mindset affects an individual's emotional, cognitive, and physiological responses to a stressful situation. Therefore, it is necessary to consider this in future research and expand on the differential effect of stress mindset in workplace on challenge-hindrance demand. Finally, this study was conducted with a large sample size ($N=3914$). Of course, larger sample sizes typically are more representative of the population. However, a larger sample of a homogenous population cannot guarantee accuracy, and may provide data that describe associations or relationships that are due merely to chance (Fowler & Lapp, 2019). Although this study targeted a single organization, it included all branches located nationwide, and it was found that the level of education and tenure were relatively diverse. Therefore, we use larger sample for a more representative of the population. However, in order to generalize the results of this study, it is necessary to conduct a repeat study on heterogeneous populations, such as various occupational groups.

Conclusion

Stress is an unavoidable phenomenon in an individual's life and it is more common in a time, such as this, when many changes that have not been experienced before are underway. Work occupies an important part in one's life, therefore, managing stress at work can play a crucial role in personal happiness. Stress can have different effects depending on how one manages it, and consequently, can also lead to positive results such as personal growth and development. Indeed, there are stressors that harmfully impact individuals due to their intrinsic characteristics, but this is also an inevitable part of most peoples' lives. Therefore, strategies to manage stress can be an important topic. According to this study, excessive stress, no matter how good, can have a negative effect on an individual. Additionally, even if the stressor is perceived as a hindrance by the individual, its result may vary depending on of the individual's mindset. The results of this study may be helpful in preparing a stress management plan for employees and conducting detailed studies on job stress.

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Data availability Data is available on request for corresponding author.

Declarations

Declaration of interest None.

Ethics statement The Authors declare that there are no ethical issues.

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