The Moderating Effect of Sensory Processing Sensitivity on the Relationship Between Problem-Solving Demands and Vitality

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Abstract

Research has shown that people differ in how much their well-being is affected by their work characteristics. Therefore, it is important to deepen the knowledge of how work characteristics influence employee well-being and what interindividual differences affect this relationship. This study aims to detangle mixed research results on the relationship between problem-solving demands at work (PSD) and employee vitality. Furthermore, based on the person-environment fit model it was expected that the personality trait sensory processing sensitivity (SPS) moderates this relationship. SPS is a multidimensional concept that captures interindividual differences in the perception, processing, and responsiveness of sensory information. It was hypothesized that SPS can be directly related to vitality, due to its relationship with other personality traits and heightened behavioural inhibition and activation systems. The three dimensions of SPS are expected to have varying relationships with vitality and to differently moderate the relationship between PSD and vitality, in such a way that the dimensions influence the appraisal and reaction to PSD differently and therefore the relationship. In order to test the hypotheses a daily diary study was conducted among 38 employees. The results obtained with hierarchical multiple regression, showed no support for the hypotheses. The findings indicate that there is no relationship between PSD and vitality, no moderation effect by SPS and no relationship between SPS and vitality. Overall, the study offers an intriguing starting point for further research on how SPS is related to well-being indicators.

Keywords: problem-solving demands, vitality, sensory processing sensitivity, person-environment fit model

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Solving Demands and Vitality

Organisations are getting more and more aware of the relevance of their employees' health and well-being (Kundi et al. 2021; Nielsen et al., 2017). Employee health and well-being have been found to be critical factors for organisational performance and success (Bakker et al., 2019; Turban & Yan., 2016). Next to beneficial effects at the organisation level, employee well-being also contributes to employee engagement and organisational citizenship behaviour (Mousa et al., 2020; Tisu et al., 2020). Several studies have shown that work design is a key antecedent in influencing employee well-being (Morgeson & Humphrey, 2006; Parker et al., 2017). Research has also shown that people differ in how much of their well-being is affected by their work design (Parker et al., 2017). For example, research has shown that people who score low on extraversion suffer more from conflict than people who score high on extraversion, other research shows that people who score high on negative affect are more likely to become emotionally exhausted by workload than people who score low on negative affect (Dijkstra et al., 2005; Houkes et al., 2003). It is important to deepen existing knowledge of why the relationship between work design and well-being differs among employees so that future interventions can be specifically altered to increase well-being (El Khawli et al., 2022).

The first objective of this study is to investigate how work design influences employee well-being and which individual differences influence this relationship. Employee well-being is seen as a broad concept entailing different aspects, such as job satisfaction, energy, involvement and efficacy (Grant et al., 2007; Schaufeli & Bakker, 2001). Instead of focusing on negative aspects of well-being, this paper will examine one specific dynamic indicator of well-being, namely vitality (Ryan & Frederick, 1997; Schmitt et al., 2017). Vitality is a positive phenomenon that describes how energised, awake, and engaged one feels (Porath et al., 2011). Employees' vitality can be influenced by work characteristics in such a way that it impacts the employees' need for recovery, which is negatively related to well-being (Parker et al., 2017; Sonnentag & Zijlstra, 2006). Work design is often used as a broad term to cover many job aspects (Parker et al., 2017). Parker (2014, p. 662) defines

work design as "the content and organisation of one's work tasks, activities, relationships, and responsibilities." One particularly interesting aspect of work design is job demands (Parker, 2014). Job demands are features of any job that require a certain amount of effort from the employee to fulfil the different tasks of the job.

A specific job demand is problem-solving demands (PSD) (Morgeson & Humphrey, 2006). PSD is a psychological job demand that has become an integral part of employees' work tasks, which makes it a valuable variable to research (Ackerman & Kanfer, 2020; Hirschi, 2018). PSD refers to the extent to which an employee is expected to come up with new ideas and solutions for occurring problems (Wall et al., 1990).

A second objective of this study is to research if personality traits can account for some of the interindividual variations in employee reactions on work design and the effect on well-being as suggested by Wohlers and colleagues (2017). Based on the person-environment fit model (P-E fit model), positive and negative health outcomes are expected depending on the match between individual personality traits and the environment (i.e. work design) (Schaufeli & Bakker, 2013). To further explain the interindividual differences in how employees react to PSD regarding their vitality, this study investigates the personality trait sensory processing sensitivity (SPS). SPS is a personality trait that describes variation in how individuals perceive, process, and react to sensory information, both internally and externally (Aron & Aron, 1997; Schmitt, 2022). There is a broad social interest in the concept of SPS, but there is a lack of research on the application of SPS in a work environment. At the moment of writing this paper, not many papers can easily be found on the topic SPS at work (Andresen et al., 2017; Schmitt., 2022; Vander Elst et al., 2019). Schmitt (2022) mentions that, SPS can make individuals more susceptible to stress in negative environments, but also allows the individual to experience greater benefit from positive and supportive environments. This makes it a relevant personality trait to investigate further.

Lastly, another objective of this study is to investigate if SPS has a direct effect on vitality. It is important to investigate factors that directly influence positive indicators of employee well-being, so

that employers can help the employee flourish instead of focusing on battling negative well-being indicators like stress (Meyer & Hünefeld, 2018; Schaufeli & Bakker, 2001). In a nutshell, the overall goal of this study is to contribute to the discussion of inconsistent findings about work design and vitality. In addition, it aims to gain insight into SPS as a predictor of employees' vitality. The conceptual model as described in the paragraphs above is illustrated in Figure 1.

Problem-solving Demands and Vitality

Parker and colleagues (2017) have established that work design plays an important role in influencing employee well-being. As mentioned before one aspect of work design is job demands (Parker, 2014). Employees may experience physical, psychological, social, physiological, and organisational job demands. Examples are time pressure, emotion regulation, role conflict, and work overload. Job demands are requested from the employee, which does not automatically mean that they are met (Edwards & Cooper, 1990). The overall labour market has a fast cycle of change with more flexibility and unpredictability (Hirschi, 2018). Therefore, it has become increasingly important that employees can keep up with new situations that require innovative solutions. Aspects of these requirements come back in PSD, which is the reason this paper focuses on PSD (Morgeson & Humphrey, 2006).

The job characteristics model by Hackman and Oldham (1975) is a frequently used theoretical model for research on work design. This model states that five core job characteristics (skill variety, task identity, task significance, autonomy, and feedback) influence five different personal and work-related outcomes, such as absenteeism and turnover. With the idea that high levels of these five job characteristics will enrich the job and increase work motivation and job satisfaction. Morgeson and Humphrey (2006) decided to build further on the job characteristics model by adding additional job demands and researching their relationship with other work-related outcomes. One of these job demands is PSD, which is a part of the knowledge characteristics cluster (Morgeson & Humphrey, 2006). In order to meet PSD, the employee actively needs to make use of their knowledge and skills to determine and solve the problems that occur on the day-today level

(Wall et al., 1990). This calls on the more active cognitive process of the employee (Morgeson & Humphrey, 2006). Increased knowledge requirements (i.e. PSD) are thought to increase intrinsic motivation and positive affective outcomes (Humphrey et al., 2007). For jobs with high PSD specifically, it can be argued that employees receive the opportunity to show and strengthen their competence by handling challenging and new problems (Deci & Ryan, 2000). These can positively influence one's vitality, by experiencing more positive affect (Deniz & Satici, 2017). It is therefore expected that when a job scores high on PSD it has a positive effect on the employees' vitality.

Hypothesis 1: Problem-solving demands are positively related to vitality.

However, there is some evidence that knowledge characteristics demand a certain amount of cognitive effort which could deplete the employees' vitality (Humphrey et al., 2007). Coming up with new solutions or ideas for occurring problems requires full attention from the employee, which can lead to cognitive overload for some employees (Humphrey et al., 2007; Schmitt, 2022). This other way of viewing knowledge demands can explain the mixed results in prior research regarding the relationship between PSD and employee well-being (Huo & Boxall, 2018). Schmitt and colleagues (2012) have found a positive relationship between PSD and employees' fatigue level (i.e. a component of vitality) and Campion and McClelland (1993) even found that challenging job demands, like PSD, make the employee stretch out their skills in order to fulfil the challenging demands (Porath et al., 2011). This can lead to more fatigue, strain, effort and overload (i.e. lower vitality). On the contrary, Holman (2002) has found no significant relationship between PSD and job satisfaction, strain, anxiety and depression (i.e. lower vitality).

The mixed results could indicate that there are individual differences at play that influence the effect of PSD on vitality (Deniz & Satici, 2017). These incoherent results plead for future exploration of which individual differences influence the perception of problem-solving in order to predict vitality better. The inconsistent relationship could be explained through the person-environment fit model (P-E fit model). According to this model, negative stress reactions and health-related complaints can arise if employees experience a mismatch between their personality traits

and job demands (Van Vianen, 2018). The P-E fit model does not categorise personality traits as good or bad, but depending on the environment the personality trait will lead to positive or negative health outcomes. Based on the P-E fit model, it can be argued that the relationship between PSD and vitality differs depending on the employees' SPS level.

The P-E fit is a multidimensional approach that explains the match between the employee and their work environment (Oh et al., 2014). In this case, it would mean that employees who score high on SPS differ in their appraisal and reaction to PSD, as compared to employees who score low on SPS. The extent to which the employees' characteristics meet the environment's requirements (P-E fit) influences the employees' motivation, behaviour, and well-being (Kristof-Brown et al., 2005; Schmitt, 2022; Schmitt et al., 2015). Based on this, it is argued that the relationship between PSD and employees' vitality is depending on the fit with their personality characteristics.

SPS consists of three dimensions. It is expected that they influence the appraisal and reaction to PSD differently, and therefore also the relationship between PSD and vitality (Smolewska et al., 2006). The first dimension, ease of excitation (EOE), refers to an individual's tendency of being quickly mentally overwhelmed by internal or external demands (e.g. performing worse when being observed during a task) (Lionetti et al., 2019). The second dimension, low sensory threshold (LST), refers to the amount of unpleasant sensory excitement by external stimuli (e.g. negatively responding to loud noises and bright light) (Lionetti et al., 2019; Schmitt, 2022). The final dimension, aesthetic sensitivity (AES), refers to the amount of aesthetic awareness (e.g. noticing and being open to positive aspects of the surroundings) (Schmitt, 2022).

EOE and LST as Moderators

Employees who score high on EOE and LST are more quickly (mentally) overwhelmed, extra responsive to external stimuli, and have a more active behavioural inhibition system (BIS) (Smolewska et al., 2006). The BIS is responsible for the individuals' response to anxiety-relevant cues in the environment. It may be the case that the over-arousal from the BIS inhibits the individual to use their cognitive resources in an effective way (Schmitt, 2022; Smolewska et al., 2006; Sobocko &

Zelenski, 2015). They have fewer cognitive resources left to deal with high PSD, which leaves them with lower vitality. This means that employees with lower levels of EOE and LST have more cognitive resources to spare, due to a less active BIS (Smolewska et al., 2006). For this group, I argue that high PSD is perceived as a challenge that gives them the opportunity to grow and become motivated in such a way their vitality increases (Smolewska et al., 2006). Therefore, it is expected that employees with high EOE and LST may respond less positively than those with low EOE and LST regarding their vitality.

Hypothesis 2a: EOE and LST moderate the relationship between problem-solving demands and vitality. Specifically, the positive relationship is stronger for employees who score lower on EOE and LST and is less strong or negative for employees who score high on EOE and LST.

AES as Moderator

Employees who score high on AES are more open and appreciative of positive experiences from their surroundings, have a rich imagination, and are able to make fine distinctions (Lionetti et al., 2019; Schmitt, 2022). They are more likely to think outside the box and imagine unique solutions or ideas when presented with high PSD, compared to employees who score low on AES. It costs employees who score low on AES much more energy to come up with new ideas or solutions, which depletes their energy levels and lowers their vitality (Da Costa et al., 2015). Indirect evidence for this is found in the meta-analysis from Da Costa and colleagues (2015). It was found that openness to experience is positively related to creativity and innovation. Additionally, people who score high on AES are more appreciative of positive experiences, which in turn enhances their creative thinking and problem-solving skills (Hirt et al., 1997; Shalley et al., 2004). AES also has a positive relationship with increased responsiveness of the behavioural activation system (BAS) (Sobocko & Zelenski, 2015). BAS is responsible for engaging in action and positive emotions. It is, activated when individuals think there is a positive outcome when they perform a certain action. In this case, it could mean that individuals with high AES and increased BAS are more likely to engage in problem-solving as they could perceive it as a challenging opportunity. Together, this perspective suggests that employees

that score high on AES will experience high PSD as motivational, which positively affects their vitality (Deniz & Satici, 2017; Ryan & Frederick, 1997). Accordingly, it will strengthen the relationship between PSD and vitality.

 Hypothesis 2b: AES moderates the relationship between problem-solving demands and vitality. Specifically, the positive relationship is stronger for employees who score high on AES, and it is less strong for employees who score low on AES

SPS and Vitality

 Research has shown that personality traits are related to vitality and can explain individual differences in vitality (Deniz & Satici, 2017; Ryan & Frederick, 1997). In their study among university students Deniz and Satici (2017) have shown that extraversion, agreeableness, and openness to experience were positively related to vitality while neuroticism was negatively related to vitality. They have based their study on Ryan and Frederick (1997), who researched vitality in six different studies with different variables. One study was about the association with the Big Five personality traits. Ryan and Frederick (1997) showed that extraversion and conscientiousness were positively associated with vitality in their sample. Furthermore, neuroticism was found to be negatively related to vitality, in line with the research of Deniz and Statici (2017). Both studies collected data from a student population, so it remains unclear whether these results can be generalised to the workforce with a more diverse population.

 The personality trait SPS describes an individual's tendency to perceive and process sensory information more deeply than others (Aron & Aron, 1997; Greven et al., 2019). This makes those individuals more susceptible to influences from their environment. Within SPS there is no distinction between positive and negative influences. In other words, individuals who score high on SPS tend to show a higher sensitivity to both negative and positive stimuli (Acevedo et al., 2014). Practically, this means that people who score high on SPS are more affected by negative environments, like certain stressors. Moreover, they also benefit more from positive environments, like positive social stimuli. When diving further into the different dimensions of SPS, the differential between positive and

negative effects can be explained (Smolewska et al., 2006). The negative response to the environment can, for instance, be found in health problems (Benham., 2006; Listou Grimen & Diseth, 2016). Research by Liss and colleagues (2008) showed that SPS, specifically EOE and LST, is positively associated with health complaints. Another study by Evers and colleagues (2008) showed that EOE and LST are positively related to the amount of work stress, work displeasure, need for recovery, and negative affect. EOE and LST work mostly through the BIS (Smolewska et al., 2006). When the BIS is activated, the individual becomes more alert and focuses their attention on the signal. The BIS was found to have a negative effect on the individuals' energy levels (Adil et al., 2021).

According to these perspectives, it is expected that employees with high levels of EOE and LST, who are easily overwhelmed by demands and stimuli (both internal and external), show an active BIS which depletes their vitality (Adil et al., 2021). The positive relationship between neuroticism and EOE and LST seconds this indirectly (Benham, 2006; Greven et al., 2019; Lionetti et al., 2019).

Hypothesis 3a: EOE and LST are negatively related to employees' vitality.

The positive reaction to the environment can be attributed to the AES dimension. AES was found to be positively related to self-efficacy and feelings of meaningfulness (Benham, 2006; Lionetti et al., 2019). Additionally, AES has a positive relationship with openness to experience, which is positively related to vitality (Deniz & Satici, 2017; Lionetti et al., 2019). Individuals who score high on openness to experience are more open to new experiences, imaginative, and are receptive to new viewing points and ideas (George & Zhou, 2001). Since AES also shares some aspects with openness to experience and has a moderate to strong relationship with it, it is expected that employees who score higher on AES have higher levels of vitality (Deniz & Satici, 2017; Lionetti et al., 2019). Both constructs make the individual more receptive to positive stimuli in their environments, which in turn makes for a positive affect that influences vitality (Deci & Ryan, 2000; Ryan & Frederick, 1997).

Hypothesis 3b: AES is positively related to employees' vitality.

Method

The data for this study was gathered as part of a larger project. Therefore, more constructs were measured than described in this paper. The current study and data collection have been approved by the ethics committee of the Department of Psychology at the University of Groningen.

Procedure and Sample

The data was collected in June 2022 using a daily diary study among employees that work a minimum of 20 hours per week. The participants were selected through snowball sampling and the personal network of the student-researcher. No power analysis was conducted before starting the data collection. Participants were first asked to fill in the baseline survey and were then requested to fill out the daily survey, at the end of their workday, for ten days. Before the participants started with the baseline survey, they were presented with an informed consent form, which mentioned that there was an incentive with a raffle of 50 euros and a feedback report. In total, 43 participants filled in the baseline survey. Four of them did not fill in the daily survey. One participant failed the attention check question (i.e. instructed response item) and was therefore excluded from the sample. The final sample of participants that filled out the baseline survey and at least one of the daily surveys was 38.

In the final sample, the average age of the participants was 33.49 years (ranging from 21 to 61 years). Of the participants 63.20% identified as cisgender women, and 36.20% as cisgender men. The majority of the participants (92.10%) were born in the Netherlands, while the remaining participants (7.90%) were born in Germany, New Zealand, and Russia. 13.16% of the participants attained a secondary school degree, and 71.05% attained a university degree (no distinction is made between universities of Applied Sciences and other universities). The participants have been employed for an average of 11.46 years (ranging from 0 to 37 years) with different professional occupations, such as a psychologist, consultant, nurse, and personal trainer. Their average organizational tenure was 6.80 years (ranging from 0 to 34 years).

Measures

In the baseline survey participants were asked to fill in demographic information and their SPS was measured. In the daily survey, they answered questions to what extent they were required to show problem-solving skills during their workday, and answer questions that reflected their current vitality (i.e. end of their workday). Both surveys were distributed online through the program Qualtrics, and provided in English.

Sensory Processing Sensitivity

To measure the three dimensions of SPS, the Highly Sensitive Person-12 (HSP-12) scale by Pluess and colleagues (2021) was used. Participants were asked to indicate to what extent they agree with statements that represent different aspects of the three dimensions (EOE, LST, and AES). The responses were obtained with a seven-point Likert scale ranging from 1 (*not at all)* to 7 (*extremely)*, with a higher score indicating a higher SPS in that dimension (EOE, LST, and AES). In total, the scale consists of 12 items where five items were used to measure EOE (α = 0.825). An example item is, "Do changes in your life shake you up?" Three items were used to measure LST (α = 0.673). An example item is, "Do you make a point to avoid violent movies and TV shows?" The remaining four items were used to measure AES (α = 0.671). An example item is, ''Are you deeply moved by the arts or music?''.

Problem-solving Demands

Problem-solving demands were measured with four items from the subscale Problem Solving of the Work Design Questionnaire (WDQ) by Morgeson and Humphrey (2006). An example item is, "The job requires me to be creative." The responses were obtained with a five-point Likert scale ranging from 1 (*does not apply at all*) to 5 (*applies fully*). In the current study the Cronbach's alpha was 0.884.

Vitality

To measure employees' vitality the Vitality subscale in the Thriving at Work questionnaire was used (Porath et al., 2011). The Thriving at Work subscale consists of five items, of which three items were used, considering the daily survey length (Gabriel et al., 2018; Ohly et al., 2010). The following three items were used: "Today at work, I had energy and spirit", "Today at work, I felt alert

and awake", and "Today at work, I felt alive and vital" (Porath et al., 2011). The participants were asked to indicate to what extent they agree with the statements. The responses were obtained with a seven-point Likert scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree)*, with a higher score indicating higher vitality. In the current study the Cronbach's alpha was 0.973.

Control Variables

This study included age and gender as control variables in the analyses. Age has shown to be of influence on different aspects determining vitality (Baruch et al., 2014; Schaufeli & Bakker, 2013). For instance, when age increases, the deterioration of health and the number of chronic diseases increase (Schaufeli & Bakker, 2013). Interestingly, age could also positively affect vitality. Boundary management is known to increase over age, which contributes to a positive work-life balance, that in turn could positively affect vitality (Spieler et al., 2018). For some work characteristics, the impact is mediated by gender (Matthews et al., 1998; Schaufeli & Bakker, 2001). In the study by Herrero and colleagues (2012) women are found to have higher levels of stress when exposed to certain job demands. Therefore, it is possible that gender influences one's vitality.

Statistical Analysis

Hierarchical multiple regression was used to test all three hypotheses in SPSS. As this was a daily diary study, the data was aggregated first. For each participant, the data sets were combined based on an average score for the relevant variables (i.e. PSD and vitality). In order to test the main effects (Hypotheses 1 and 3) and create the interaction term (Hypothesis 2), the variables were mean-centred first before running the hierarchical multiple regression analyses. For testing Hypotheses 1 and 2, the first block included the mean-centred control variables age and gender with mean-centred vitality as the dependent variable. The second block included the mean-centred variables PSD, EOE, LST and AES (linear main effects). The third block included the linear interaction terms of the three mean-centred SPS dimensions with mean-centred PSD (Hypothesis 2). They were entered separately from each other. To measure the interaction effect of EOE, block three consisted of the linear interaction term between EOE and PSD. To measure the interaction effect of LST, block

three consisted of the linear interaction term between LST and PSD. Lastly, to measure the interaction effect of AES, block three consisted of the linear interaction term between AES and PSD. Hierarchical multiple regression analysis was also used to test Hypothesis 3. The first block included mean-centred age and gender, with mean-centred vitality as the dependent variable. The second block contained mean-centred EOE, LST and AES. The assumptions for hierarchical multiple regression were tested by means of a Q-Q plot, VIF-score, residuals and histograms.

Results

The descriptive statistics and bivariate correlations between the study variables can be found in Table 1. EOE and LST were positively and significantly related (r = .63, p ≤ .01). AES was positively and significantly related to EOE (r = .44, p ≤ .01) and LST (r = .41, p ≤ .05). Only the AES dimension was found to be significant and positively related to PSD (r = .48, p ≤ .05). Vitality was found to be significantly correlated with EOE, there was a negative correlation (r = -.46, p ≤ .01). There was no significant correlation found between PSD and vitality (r = .18, p > .05). Of the covariates, gender was positively and significantly related to LST (r = .35, p ≤ .05). Age was negatively and significantly related with EOE (r = -.46, p ≤ .01) and AES (r = -.43, p ≤ .01). Table 1 also shows that age is positively and significantly related to vitality (r = .44, p ≤ .01).

Hypothesis Testing

The assumptions of multiple hierarchal regression are met. The VIF value stayed below 3 with the highest value being 2.54 for the effect of EOE on vitality. The results of the hierarchical multiple regression for Hypotheses 1 and 2 can be found in Table 2. The table shows that PSD does not significantly predict employees' vitality (B = 0.27, SE = 0.19, p = .152). Thus, Hypothesis 1 that states that PSD is positively related with vitality is not supported by the data.

Hypothesis 2a states that the relationship between PSD and vitality is stronger for employees who score low on EOE and LST, and less strong or negative for employees who score high on EOE and LST. The results of the analyses for this hypothesis can also be found in Table 2. The table shows that the interaction terms were non-significant for EOE (B = 0.00, SE = 0.15, p = .995) and LST (B = -0.08,

SE = 0.20, *p* = .677). Thus, Hypothesis 2a is not supported by the data. Hypothesis 2b includes the

prediction that the relationship between PSD and vitality is stronger for employees who score high

on AES, and less strong for employees who score low on AES. The results of the analysis for this

hypothesis can also be found in Table 2. The table shows that the interaction term between PSD and

AES is not significant (*B* = 0.26, *SE* = 0.15, *p* = .091).

The results of the hierarchical multiple regression analysis for Hypothesis 3 can be found in

Table 3. Hypothesis 3a states that EOE and LST are negatively related to employees' vitality. Both EOE

and LST are not significant predictors for vitality (for EOE *B* = -0.22, *SE* = 0.17, *p* = .212 and *B* = -0.07,

SE = 0.16, *p* = .696 for LST). Thus, Hypothesis 3a was not supported by the data. Hypothesis 3b states

that AES is positively related to employees' vitality. The results in Table 3 show that AES does not

significantly predict employees' vitality (*B* = 0.09, *SE* = 0.17, *p* = .587). Thus, Hypothesis 3b was not

supported by the data.

Additional Analyses

Overall, the results showed that the hypotheses were not supported (Tables 2 and 3).

However, the results show that age significantly predicts employees' vitality (*B* = 0.04, *SE* = 0.01, *p* =

.007) when only the control variables age and gender are used in the first block. Based on this result

and the correlation between the control variables, the SPS dimensions and vitality (see Table 1) it

would be interesting to see whether SPS could explain some of the variance in vitality without the

control variables included in block one. In order to investigate, additional analyses were performed.

The hypotheses were tested again with hierarchical multiple regression analyses, as described in the

method section, without the first block containing the control variables age and gender. This did not

lead to different conclusions, all the hypotheses remained unsupported by the data.

Discussion

Research shows that people differ in how much their well-being is affected by work

characteristics (Parker et al., 2017). To get a more nuanced perspective on how this relationship

works, this study aimed to investigate how PSD (i.e. a specific work characteristics) influences the

well-being of the employee and what interindividual differences affect this relationship. To do this, this study focused on the two possible roles of the personality trait SPS on employees' vitality. Firstly, I examined whether SPS acted as a boundary condition for the relationship between PSD and employees' vitality. Vitality is indirectly related to organisational performance and success, as it is a part of the well-being construct, which makes it a vital construct (Bakker et al., 2019; Turban & Yan., 2016). Secondly, I examined whether SPS, as a multidimensional characteristic, could act as a predictor of employees' vitality.

The present study showed no evidence of a relationship between PSD and vitality. The findings also suggest that the three dimensions of SPS cannot explain the interindividual differences in how employees react to PSD regarding their vitality. In addition, the study also did not provide evidence for the hypothesis that the three dimensions of SPS are directly related to employees' vitality. The absence of significant effects can be explained by the lack of statistical power in this study, since this limits the possibility to find the associated medium effect size, and increases the likelihood of false-negative findings (Cohen, 1992). It is now unclear whether there is actually no effect or whether it is absent due to the lack of statistical power.

The data showed no support for the main effect of a positive relationship between PSD and vitality. This is in line with the mixed results between PSD and employee well-being in prior research (Huo & Boxall, 2018). It seems there is no clear explanation why PSD sometimes positively affects employee well-being and sometimes negatively affects it. This knowledge gap also occurs with other psychological models, for example, the job demands-resources model (Schaufeli & Taris, 2013). This frequently used model explains the relationship between job demands and work outcomes. In this model, there is a distinction between job demands and job resources (Bakker et al., 2003; Demerouti et al., 2001). It is stated that high job demands lead to stress and depletion of energy, while job resources lead to higher motivation and productivity. At the first glance, it looks like a clear description, especially considering the addition by LePine and colleagues (2004). However, there are also some counterintuitive elements to it. LePine and colleagues (2004) made a distinction between

job demands that are either seen as barriers at work or as a challenge at work. Both produce a

certain amount of tension, but challenges lead to learning, development, and growth. On the

contrary, barriers get in the way of this. The meta-analysis by Crawford and colleagues (2010)

showed that both barriers, and challenges are positively related with burnout, and job challenges are

positively related with being passionate at work. The latter seems counterintuitive, since it was

argued by the job-demands resources model that job demands lead to stress and energy depletion

(Bakker et al., 2003; Demerouti et al., 2001). How is it possible that a job demand can also have a

positive effect? It is entirely possible that the negative valence of the job demand is overruled by the

thought that it is worth the trouble, since a learning possibility will eventually lead to positive

outcomes, which is a motivational effect (Schaufeli & Taris, 2013). Another explanation lies in the

appraisal made by the employee (Lazarus & Folkman, 1984). A job demand can be considered a

challenge or barrier based on the number of available resources to meet the job demands. This study

missed out on measuring the appraisal of job demands. It could be possible that the participants

consider PSD as a challenge with a motivational effect (Schaufeli & Taris, 2013). The findings of this

study and additional literature suggest that there is still a knowledge gap on the (individual) factors

that determine whether PSD has a negative or positive effect on employee well-being (i.e. vitality)

and how PSD is appraised by the employee (Crawford et al., 2010).

The rationale based on the P-E Fit model used in this study, where the so-called fit between

the employee and the environment determines the direction of the relationship, could still be valid

(Oh et al., 2014). Based on the P-E Fit model, it was argued that the employees that score high on

EOE and LST have fewer cognitive resources, since they have a more active BIS and are extra

responsive to external stimuli (Smolewska et al., 2006). It was further argued that the employee with

high self-reported EOE and LST would respond less positively to PSD, since they have less cognitive

resources to deal with PSD. This hypothesis could not be supported by the results. It therefore seems

that employees that score high on EOE and LST do not experience a misfit when being confronted

with PSD on the job resulting in lower vitality. Overall, the data does not support that EOE and LST

act as a boundary condition. It could be the case that the BIS is only activated under certain conditions and not when the employee is confronted with PSD (Aron et al., 2012; Serrano-Ibáñez et al., 2019). In this case, there is no increased BIS activity that inhibits the employee to use their cognitive resources in a less effective manner (Smolewska et al., 2006). The use of cognitive resources is not assessed in the current study.

For individuals who score high on AES, it was argued that they are more inclined to be creative and think outside the box. Consequently, AES would act as a boundary condition, since creativity helps to positively react to PSD. This assumption could not be supported by the data. It therefore seems that employees that score high on AES do not experience additional positive effects on their vitality when being confronted with PSD on the job, in comparison with employees with low levels of AES. It could be the case that employees with high levels of AES are indeed more prone for positive experiences and have elevated levels of BAS, but this does not translate into getting more motivated by PSD at work, which elevates their vitality.

A possible explanation for the absence of the interaction effect could be that another personality trait is better suited to explain the experienced P-E fit between PSD and employee vitality. For example, research has shown that conscientiousness and openness to experience are positively related to effective problem-solving skills, which could contribute to a positive attribution of PSD on the job, which in turn could lead to a positive affect that positively influences vitality (Deniz & Satici, 2017; D'Zurilla et al., 2011; Ryan & Frederick, 1997). Neuroticism can also be considered as a personality trait that can determine the P-E fit. Neuroticism was found to be a predictor of more dysfunctional problem-solving, which could contribute to a negative attribution of PSD on the job which in turn could lead to a negative effect on vitality (D'Zurilla et al., 2011; McMurran et al., 2001). Besides the Big Five personality traits other traits, can be considered, such as polychronicity (Wu et al., 2020). This personality trait describes the tendency to organise time in such a manner that the individual can cope with multiple tasks simultaneously in a short time frame. The research from Wu and colleagues (2020) showed that polychronicity has a positive effect on well-being. It could be

possible that employees with more time-structuring characteristics experience a better fit with a

work environment with more PSD, since they probably have more time in their work schedule. It can

also be argued the other way around. Employees that score high on polychronicity could be more

likely to experience a misfit with a work environment with more PSD, since PSD requires a certain

amount of flexibility when a new problem occurs (Morgeson & Humphrey, 2006). The fact that it can

be argued both ways shows that there is a knowledge gap on the influence of personality traits on

job demands. Overall, the results in this study do not support the hypothesis that the personality

trait SPS, can act as a boundary condition to explain the inconsistent findings on the relationship

between PSD and vitality.

In addition, this study also examined to what extent EOE and LST can predict vitality. The

study could not support the hypothesis that employees who score high on EOE and LST have lower

vitality, because of a more elevated BIS compared to those who score low on EOE and LST

(Smolewska et al., 2006). An explanation could be that the BIS is not elevated enough to translate

into a decrease in subjective vitality (Aron et al., 2012; Serrano-Ibáñez et al., 2019). The activation of

the BIS is not tested in this study.

There was also no evidence to support the hypothesis that employees who score high on AES

experience higher levels of vitality, because of heightened receptiveness to positive stimuli, in

comparison to those who score low on AES. It could be that the heightened receptiveness to positive

stimuli leads to an information overload. The positive stimuli could be seen as new opportunities

where the employee might feel that they have to exploit them all. It might be worth looking further

into the found relationship between heightened openness to experience and higher cardiovascular

stress responses, and higher cortisol stress responses (Bibbey et al., 2013). The same mechanisms

could also apply here, since AES shares similar aspects with openness to experience. Another

explanation could be that individuals who score high on AES also experience mixed emotions. "Mixed

emotions are concurrent experiences of positive and negative valence" (Larsen & McGraw, 2014,

p.263). In two studies it was found that simultaneous experience of positive and negative affect can

be positively predicted by openness to experience (Barford & Smillie, 2016; Kööts et al., 2012). It might be possible that the employee experiences mixed feelings during the workday resulting in the elimination of the positive effect on a positive affect, and subsequently their vitality. Overall, the findings in this study do not support the hypothesis that SPS is directly related to employees' vitality. Another explanation for the overall non-significant findings can be found in the methodology. For the hierarchical multiple regression analyses, the daily data was aggregated. If the daily data was analysed instead of the aggregated data, it could be possible that within-person effects would have been found (Gabriel et al., 2018; Ohly et al., 2010).

Limitations and Implications for Future Research

Although this study provides useful information and potential leads for future research on SPS and employee well-being, the study also has some limitations. The lack of statistical power is a big limitation and using a hierarchical multiple regression analysis instead of a multilevel analysis (Beal & Weiss, 2003; Cohen, 1992). A multilevel analysis would have done more justice to the longitudinal data (i.e. multiple entries by the same participants) (Beal & Weiss, 2003). However, the lack of statistical power remains. Therefore, it would be wise to pay more attention to recruiting participants and avoiding attrition. Attrition remains a thorny issue with longitudinal research (i.e. attrition bias), but diary methods are a useful design for studying PSD and vitality (Ohly et al., 2010). Diary methods are useful, because PSD and vitality are dynamic variables and tend to change throughout the day (Nix et al., 1999; Schmitt et al., 2012). Asking employees about their daily experiences captures their actual experiences better and allows for detecting fluctuations in the variables (Beal & Weiss, 2003; Bolger et al., 2003; Ohly et al., 2010). In the way the current study was designed, common method bias should also be taken into account (Ohly et al., 2010). This could be overcome in a replication study by doing an end-of-day survey on PSD, and briefly asking about vitality during the day or even measuring it, for instance, with a wearable. By collecting other inputs than just self-report measurements, attrition might be reduced and the vitality measurement gets more body. In this study, the construct vitality was assessed with a subscale that is focused on being

energetic, alert, and awake, with the premise that these are positive indicators (Porath et al.,2011). However, there are also subjective states where high levels of energy and alertness are not associated with a positive state, for example anxiety and anger (Ryan & Frederick, 1997). The same applies the other way around, a calm state does not necessarily mean a lack of vitality. It could also mean that an individual is at peace (Ryan & Frederick, 1997). By using another objective measure like a wearable, other control variables can also be taken into account, since an increase in activity also influences subjective vitality (Ryan & Frederick, 1997). It would be wise to look into different kinds of aspects that vitality can entail in further research (Ryan & Frederick, 1997). It is also possible that the results in this study are limited by measurement, because the vitality measurement does not discriminate enough. The standard deviation of vitality was 0.99 with an average of 4.83. This would reflect that most participants score high on vitality or that the scale does not give enough room for subtle differences in vitality. In addition, this survey was conducted in June. The overall mood and subjective feelings of vitality during spring and summer are generally higher, due to more daylight exposure despite interindividual differences in personality characteristics (Smolders et al., 2013).

The findings of this study have implications for further research in different ways. First of all, in this study it was assumed that SPS is a personality trait that explains above and beyond the already existing personality traits like the Big Five. Considering that the dimensions of SPS have a high correlation with other personality traits it would be wise to further investigate whether there is incremental validity for the SPS dimensions, above and beyond the Big Five traits, for the relationship between work design and employee well-being. Secondly, considering SPS as a boundary condition for explaining the mixed results regarding the relationship between PSD and vitality is an interesting starting point. The lack of significant results does not necessarily mean that personality traits cannot explain the mixed results, it just shows that SPS does not explain the underlying mechanisms in the nuanced relationship between PSD and vitality. Future research could study the boundary effect of SPS in a larger sample and also consider other personality traits.

Practical Implications and Conclusions

Considering the fact that this study did not find supporting data for the hypotheses the practical implications remain short. Also, taking into account that the statistical power of this study is lacking, these practical implications should not be overestimated.

Often SPS is discussed as a personality trait with negative connotations and with an increased risk for the development of mental health problems (Aron et al., 2012). By examining if AES could contribute to vitality in a positive way, this study tried to shed light on the positive aspects of SPS, in such a way that it is no longer considered as a "weak'' personality trait. Despite the fact that this study could not find support for this hypothesis, it could also not support the remaining hypotheses that are more focused on the negative connotations of SPS (Hypotheses 2a & 3a). The non-significant effects do not confirm the assumption held by previous research that SPS reduces well-being (Andresen et al., 2017; Benham, 2006; Evers et al., 2008; Vander Elst et al., 2019; Wu et al., 2021). Therefore, this study gives the HR-professional a positive counterview. Based on the non-significant results of this study, it seems that employees that score high on SPS are not more likely to suffer from lower well-being.

In summary, there was no relationship found between PSD and vitality, and SPS did not act as a boundary condition. Additionally, SPS did not explain any of the variance of the employees' vitality. More research is needed before any well-founded practical implications can be derived. However, the results did show that age is a significant predictor of vitality. This is not a surprising result, given that several studies have found that age is related to employee well-being (El Khawli et al., 2022; Ng & Feldman, 2012; Scheibe & Zacher, 2013). For now, the HR-professional can take this into consideration and keep an eye out for the well-being of younger workers. Often it is thought that older employees score lower on well-being, but this prejudice has been debunked (Ng & Feldman, 2012).

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Tables

Table 1

Means, Standard Deviations, and Pearson Correlations Coefficients Between Study Variables.

	M	*SD*	1	2	3	4	5	6	7
1 Age	33.49	11.64	-						
2 Gender	0.63	0.49	-.01	-					
3 EOE	3.82	1.26	-.46**	.19	-				
4 LST	3.30	1.34	-.19	.35*	.63**	-			
5 AES	4.66	1.08	-.43**	.16	.44**	.41*	-		
6 PSD	2.93	1.01	-.15	.01	-.08	.10	.48*	-	
7 Vitality	4.83	0.99	.44**	-.13	-.46**	-.30	-.22	0.18	-

Note. N = 38, M, means, SD, Standard Deviations, EOE, ease of excitation, LST, low sensory threshold, AES, aesthetic sensitivity; and PSD, problem-solving demands. Gender was coded 0 = male, 1 = female. **p ≤ .05; **p ≤ .01* (two-tailed).

Table 2

Results of the Hierarchical Multiple Regression Analysis With Vitality as Dependent Variable

(Hypotheses 1, 2a, 2b).

	EOE as moderator			LST as moderator			AES as moderator		
	B	SE	t	B	SE	t	B	SE	t
Step 1									
Age	0.04*	0.01	2.89	0.04*	0.01	2.89	0.04*	0.01	2.89
Gender	-0.25	0.31	-0.81	-0.25	0.31	-0.81	-0.25	0.31	-0.81
*R*2		.21			.21			.21	
Step 2									
Age	0.03	0.02	2.02	0.03	0.02	2.02	0.03	0.02	2.02
Gender	-0.06	0.33	-0.17	-0.06	0.33	-0.17	-0.06	0.33	-0.17
EOE	-0.11	0.19	-0.61	-0.11	0.19	-0.61	-0.11	0.19	-0.61
LST	-0.11	0.16	-0.67	-0.11	0.16	-0.67	-0.11	0.16	-0.67
AES	-0.05	0.19	-0.26	-0.05	0.19	-0.26	-0.05	0.19	-0.26
PSD	0.27	0.19	1.47	0.27	0.19	1.47	0.27	0.19	1.47
*R*2		.34			.34			.34	
Step 3									
Age	0.03	0.02	1.85	0.03	0.02	2.01	0.03	0.02	1.77
Gender	-0.18	0.33	-0.17	-0.18	0.33	-0.04	-0.18	0.33	-0.54
EOE	-0.09	0.18	-0.60	-0.09	0.18	-0.60	-0.09	0.18	-0.53
LST	-0.07	0.16	-0.66	-0.07	0.16	-0.71	-0.07	0.16	-0.46
AES	0.10	0.20	-0.25	0.10	0.20	-0.39	0.10	0.20	0.47
PSD	0.23	0.18	1.45	0.23	0.18	1.49	0.23	0.18	1.28
PSD * EOE	0.00	0.15	-0.01						

	EOE as moderator			LST as moderator			AES as moderator		
	B	*SE*	*t*	*B*	*SE*	*t*	*B*	*SE*	*t*
PSD * LST				-0.08	0.20	-0.42			
PSD * AES							0.26	0.15	1.75
*R*2		.34			.34			.40	

Note. N = 38. Gender was coded 0 = male, 1 = female. The predictors were mean-centered. *B*, unstandardized regression coefficient; SE, standard error and *t*, the *t* statistic. *R*2 = proportion of variance explained in the criterion. *p ≤ .05.

Table 3

Results of the Hierarchical Multiple Regression Analysis With Vitality as Dependent Variable

(Hypotheses 3a & 3b).

	B	*SE*	*t*	*B*	*SE*	*t*
Step 1						
Age	0.04*	0.01	2.89	0.03	0.02	1.86
Gender	-0.25	0.31	-0.81	-0.10	0.33	-0.31
Step 2						
EOE				-0.22	0.17	-1.28
LST				-0.07	0.16	-0.39
AES				0.09	0.17	0.55
*R*2		.21			.29	

Note. N = 38. Gender was coded 0 = male, 1 = female. The predictors were mean-centered. *B*, unstandardized regression coefficient SE, standard error and *t*, the *t* statistic. *R*2 = proportion of variance explained in the criterion. *$p \leq$ .05.

Figures

Figure 1

Conceptual Model.

Sensory processing sensitivity

Ease of excitation (EOE)
Low sensory threshold (LST)
Aesthetic sensitivity (AES)

Problem-solving demands

Vitality