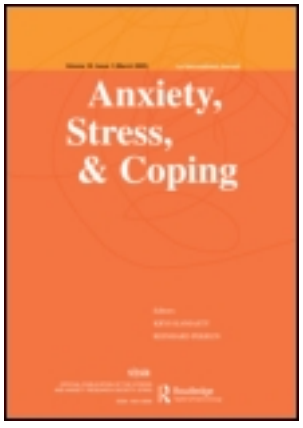

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In a general population sample of 2343 Australian workers from a wide ranging employment demographic, we extended research testing the buffering role of psychosocial safety climate (PSC) as a macro-level resource within the health impairment process of the Job Demands-Resources (JD-R) model. Moderated structural equation modeling was used to test PSC as a moderator between emotional and psychological job demands and worker depression compared with control and social support as alternative moderators. We also tested PSC as a moderator between depression and positive organizational behaviors (POB; engagement and job satisfaction) compared with control and social support as moderators. As expected we found PSC moderated the effects of job demands on depression and further moderated the effects of depression on POB with fit to the data that was as good as control and social support as moderators. This study has shown that PSC is a macro-level resource and safety signal for workers acting to reduce demand-induced depression. We conclude that organizations need to focus on the development of a robust PSC that will operate to buffer the effects of workplace psychosocial hazards and to build environments conducive to worker psychological health and positive organizational behaviors.

Keywords: psychosocial safety climate; depression; positive organizational behaviors

Introduction

Psychosocial hazards at work can be conceptualized as the "work design and the organization and management of work, and their social and environmental contexts, which have the potential for causing psychological, social or physical harm" (Cox et al., 2000, p. 14). Workplace psychosocial hazards can be explained by the Job Demands-Resources (JD-R) model that proposes – regardless of the occupation, when a worker experiences excessive *job demands* in combination with low *job resources* there are energy depleting conditions (i.e., psychosocial hazards) that undermine motivation and in turn increase the likelihood of ill health (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). *Job demands* are physical, psychological, and emotional aspects of work that require sustained effort. High job demands are not necessarily negative aspects of the job, but become

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stressors when they require high effort, eliciting responses such as anxiety, burnout, and depression (Schaufeli & Bakker, 2004). *Job resources* are aspects of work such as control and social support that aid in achieving work goals, reduce job demands, and stimulate personal growth and learning (Bakker, Demerouti, & Schaufeli, 2003; Demerouti et al., 2001).

The JD-R model is driven by a dual process: (1) a health impairment process wherein excessive job demands, such as psychological and emotional demands, can exhaust worker's mental resources contributing to problems such as anxiety, burnout, and depression; and (2) a motivational process, whereby job resources have motivational potential to promote high work engagement, low cynicism, and improved performance (Bakker & Demerouti, 2007). The model also emphasizes the role of specific job resources as main predictors of motivational and active learning organizational outcomes (Bakker, van Veldhoven, & Xanthopoulou, 2010). Furthermore, a central hypothesis in the JD-R model is that worker well-being is determined by many different combinations (interactions) of specific job demands and resources that can moderate (buffer) the effects of excessive demands on job strain such as burnout (Bakker & Demerouti, 2007; Bakker, Demerouti, & Euwema, 2005; Xanthopoulou et al., 2007). The buffering assumption is consistent with the demand-control model (DC model; Karasek, 1979, Karasek & Theorell, 1990) and the demand-control support model (DCS model; Johnson & Hall, 1988). However, the JD-R model expands on the DC and DCS models by proposing that numerous different resources can moderate (buffer) the negative effects of excessive job demands on worker health and organizational outcomes (Bakker & Demerouti, 2007). Importantly, in the JD-R model, apart from burnout, there are other worker health factors that are influenced by job strain such as depression that need to be tested (Schaufeli & Bakker, 2004).

Depression in the workplace

Depression compromises workers' quality of life and their physical, cognitive, and social functioning in the workplace (Elinson, Houck, Marcus, & Pincus, 2004; Lerner, & Henke, 2008). Depression impairs multiple dimensions of worker performance, such as concentration, decision making, interpersonal communication, and physical co-ordination and leads to mistakes, accidents and workplace injuries (Adler et al., 2006; Stewart, Ricci, Chee, Hahn, & Morganstein, 2003). Of greater importance, depression has been shown to be an independent risk factor for death due to cardiovascular disease and myocardial infarction in previously healthy people in two meta-analyses (Rugulies, 2002; Wuslin & Singal, 2003). In the USA between $30 and $44 billion are lost each year in medical, mortality and productivity costs as a result of worker depression (Elinson et al., 2004). In Europe, the World Health Organization claimed that 6% of the burden of all diseases was caused by depression in 2004 with a total cost estimated at Euro 118 billion (Sobocki, Jonsson, Angst & Rehnberg, 2006).

Psychosocial hazards present in the workplace can adversely affect workers' mental health leading to problems such as work-related depression (Clarke & Cooper, 2004; Stansfeld & Candy, 2006; van Veldhoven, de Jonge, Broersen, Kompier, & Meijman, 2002). Workplace psychosocial hazards have been linked with depression in a Danish 5-year cohort study (Rugulies, Bultman, Aust, & Burr,

2006) and in an Australian study of upper white-collar, lower white-collar, and blue collar groups (LaMontagne, Keegel, Vallance, Ostry, & Wolfe, 2008). In a recent study among direct support professionals within a US Midwestern State, depression was associated with work overload, and was especially dependent on the availability of organizational resources such as decision-making related to staff, material supplies, and overall funding (Grey-Stanley et al., 2010). Indeed, there is solid empirical evidence that confirms the links between psychosocial hazards and depression when workers are exposed to high job demands, low control and low social support (Andrea, Bültmann, Ludovic, van Amersfoort, & Kant, 2009; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Mausner-Dorsch & Eaton, 2000; Siegrist, 2008; van Vegchel, de Jonge, & Landsbergis, 2005; Ylipaavalniemi et al., 2005).

Given the indications that workplace psychosocial hazards are predictive of depression, organizations need to be aware of the negative effects of depression at work. Importantly, although less than half of workers tend to leave work (i.e., absenteeism) whilst suffering various levels of depression (Elinson et al., 2004), presenteeism may also cause serious effects. Presenteeism is the phenomenon of workers still being present at their jobs despite their ill health and it is associated with muscular-skeletal pain, fatigue, and depression (Aronsson, Gustafsson, & Dallner, 2000). However, although there is evidence that depressive symptoms at work impair worker behavior and performance, little is known about how organizations can combat the development of depression and its deteriorating effects on positive organizational behaviors (POB). POB research has been defined as the study and application of "positively oriented human resource strengths and psychological capacities that can be measured and effectively managed for performance improvement in today's workplace" (Luthans, 2002, p. 59).

Psychosocial safety climate (PSC) and depression

Psychosocial safety climate is a facet-specific component of organizational climate and refers to shared perceptions regarding policies, practices, and procedures reflected in a communicated organizational position concerning the value of the psychosocial health and safety of employees in the workplace (Dollard, 2012; Dollard & Bakker, 2010). Low levels of PSC would be indicative of the failure of senior managers/supervisors to value workers' psychosocial well-being in the workplace and would result in increased job demands and reduced job resources. For example, low levels of PSC (aggregated to the station level) were associated with higher incidence rates of bullying among a police population (Bond, Tuckey, & Dollard, 2010). On the other hand, high PSC environments would indicate management priority for workers' psychosocial health and should result in increased resources and reduced job demands. Indeed, Dollard and Bakker (2010) found PSC was a precursor to the JD-R model health impairment process as it was negatively related to increases in work pressure and emotional job demands and positively related to decreases in both psychological distress, and emotional exhaustion over time. Other studies have found support for PSC as a precursor to the JD-R model among Malaysian (Idris & Dollard, 2011; Idris, Dollard, Coward, & Dormann, 2012; Idris, Dollard, & Winefield, 2011) and Australian workers (Idris et al., 2012; Law, Dollard, Tuckey & Dormann, 2011). In these studies, PSC through job

demands reduced psychological health problems, and in line with the JD-R motivation process, predicted an increase in employee engagement through its positive relationship with resources.

In the present study, we will extend current research by examining the moderating role of PSC as a macro-level resource between job demands and depression in the JD-R model. Previous interaction effects have been found between PSC and demands in relation to distress and exhaustion (Dollard & Bakker, 2010; Dollard et al., in press; Law et al., 2011) but not depression. Indeed in a recent study by Nahrgang, Morgeson, and Hofmann (2011), *safety climate* was considered an aspect of a supportive environment and was found to act as a resource explaining variance in burnout, engagement, and safety outcomes. Similar to safety climate but specifically addressing the issues of PSC in the workplace, PSC, as a macro-level resource, involves organizational and senior management commitment, priority, participation, and communication with workers' psychosocial safety (Hall, Dollard, & Coward, 2010).

We propose that PSC will have a negative relationship with depression and will buffer the relationship between job demands and depression because within a strong PSC environment a broad spectrum of resources for organizational psychosocial safety is available for employees. In the JD-R model, availability of resources may exert their moderating effects either because employees appraise demands as less stressful, or because they realize they have several options to cope with them (Bakker et al., 2005; Xanthopoulou et al., 2007). Interestingly, such buffering effects seem to occur only if (1) specific resources are considered that closely match the specific demands to be dealt with (de Jonge & Dormann, 2006) or if (2) broadly useful resources are present such as emotional support, which is useful in many more situations than specific forms of instrumental support (Cohen & Wills, 1985). Furthermore, when more than one resource is available, employees are inclined to select those which are best suited to cope with the demands present (van den Tooren & de Jonge, 2010). Therefore, PSC as a macro-level (broadly useful) resource is likely to moderate many different types of job demands because it provides a variety of resources from which workers can choose the most efficient for coping. This leads to our first hypothesis.

Hypothesis 1

Psychosocial safety climate will have a negative relationship with depression and will moderate the positive relationship between job demands and depression. More specifically, the positive relationship between job demands and depression will be weaker when PSC is higher.

Social support is a situational variable often proposed as a potential buffer against job demands and work stress (see van der Doef & Maes, 1999 for a review). Other work situation variables can also help to moderate the effects of job demands and work stress, such as job control/autonomy (see Häusser et al., 2010 for a review). Considering the separate evidence for both control and social support as moderators we tested these variables in separate alternative parsimonious models to PSC. In order to compare the alternate moderator models effectively with PSC, we used non-hierarchical models (e.g., Kline, 2010) because although PSC is measured as individual worker's perceptions of it within the organization, in the main, it is

considered a broader organizational resource. In this way, PSC makes it likely that a variety of more specific and potentially useful resources for employee psychosocial safety are available. Therefore, main and moderating effects of PSC should together explain at least as much overall variance in worker depression as social support or control. This leads to our second hypothesis.

Hypothesis 2

Psychosocial safety climate will moderate the relationship between job demands and depression with fit to the data that is as good as social support and control as moderators.

PSC, depression & POB

When job demands are high and opportunities to recover are insufficient, workers' psychobiological systems used for task performance are over-activated and cannot stabilize (Meijman & Mulder, 1998) which can lead to depression. This in turn forces workers to make additional compensatory effort with the stressor/strain processes accumulating in a loss spiral further affecting their concentration, decision-making, interpersonal communication, and physical coordination (Demerouti, Bakker, & Butlers, 2004; Hockey, 1993). Furthermore, symptoms of depression such as feelings of sadness and emptiness and general loss of interest and pleasure (DSM-IV-TR: APA, 2000) are highly prevalent and co-morbid with other conditions such as migraine and low back pain (Stewart et al., 2003) that also affect worker behavior, job performance and work productivity (Elinson et al., 2004; Lerner & Henke, 2008; Stewart et al., 2003). Given that many workers remain on the job even when suffering from depression (presenteeism), we further tested the buffering role of PSC as a macro-level resource in the JD-R model by examining it as a moderator between depression and POB. In this study, we selected two POB constructs that address the quality of a worker's life at their job: (1) engagement – classified as a positive fulfilling, work-related state of mind (Bakker & Demerouti, 2008; Bakker & Schaufeli, 2008); and (2) job satisfaction – defined as the "degree to which a person reports satisfaction with intrinsic and extrinsic features of the job" (Warr, Cook, & Wall, 1979, p. 133). We expect PSC to buffer the negative effects of depression on POB outcomes because as a macro-level resource it operates as a safety signal for workers that can reduce demand-induced anxiety, indecisiveness, and feelings of helplessness, which all represent symptoms linked to depression (Lohr, Olatunji, & Sawchuk, 2007). Thus, PSC safety signals provide information about options in the workplace that workers can utilize to provide respite or relief from depression. This leads to Hypotheses 3 and 4.

Hypothesis 3

Psychosocial safety climate will have a positive relationship with POB and moderate the negative relationship between depression and POB. Specifically the negative relationship between depression and the POB will be weaker as PSC is higher.

Hypothesis 4

Psychosocial safety climate will moderate the relationship between depression and POB with fit to the data that is as good as control and social support.

Method

Participants and procedure

There were 2343 participants who agreed to participate in the Australian Workplace Barometer survey (Dollard et al., 2009; Dollard & Skinner, 2007). All residential households with a valid telephone connection within New South Wales and Western Australia were considered in-scope for the sample. The sample was drawn using an abbreviated Random Digit Dialling technique (Wilson, Starr, Taylor, & Grande, 1999). The overall sample response rate was 30.7% and the participation rate was 35.9%. Participants were at least 18 years old, in paid employment (not self-employed), and included 1216 males and 1127 females with an average age of 39.50 years ($SD = 13.01$). Most participants, 1286, reported being married, 285 lived with a partner, 42 were separated, 105 divorced, 26 widowed, and 599 never married. The data were weighted to the Australian Bureau of Statistics (c2009) to eliminate or reduce potential biases and to ensure the results accurately reflected the population of interest. The average number of full or part time workers for the first six months of 2009 by age group and sex for each State was determined from these figures and the probabilities of selection were determined by asking how many people in the household aged 18 years and over were in paid employment. The sample weight is the inverse of that person's selection probability, and signifies the number of individuals in the target population that the sampled individual represents.

Employment demographics

The participants' employment status consisted of 1409 permanent full-time, 490 permanent part-time, 394 casual/temporary, and 50 on a fixed term contract. There were 1522 participants working in the private sector, 656 in the public sector, 140 not-for-profit, religious, or community organizations, 23 other, and 2 declining to answer. The Australian Standard Classification of Occupations (2008) classification of the general job type description was 415 employed as mangers or administrators, 559 professional work, 158 technical or associate professional, 178 tradesperson or related work, 203 advanced clerical, sales, or service work, 202 intermediate clerical, sales or service work, 63 intermediate plant operator/transport, 114 elementary clerical, sales or service work, 183 laborer or related work, and 268 other.

Measures

Job demands

Job demands were measured using items from two sub-scales of the new Job Content Questionnaire (JCQ) 2.0 www.jcqcenter.org: (1) *psychological* demands were assessed by six items, an example being "My job requires working very hard"; and (2) *emotional* demands were assessed by four items, an example being "My work places me in emotionally challenging situations." All items were measured on a four-point

Likert scale, ranging from a low score 1 (*strongly disagree*) to the high score 4 (*strongly agree*). Internal consistencies for both the psychological demands (Cronbach's alpha = .72) and emotional demands (Cronbach's alpha = .82) were adequate with Cronbach's alpha coefficients $\geq$.70 as per Nunnaly & Bernstein (1994).

Psychosocial safety climate

To measure PSC we used a 12-item, four factor scale (PSC-12; Hall et al., 2010). The PSC-12 four subscales each comprising three items were: (1) Management commitment to psychological health and safety, an example item is, "Senior management acts decisively when a concern of an employee's psychological status is raised"; (2) Management priority for psychological health and safety, an example item is, "Senior management considers employee psychological health to be as important as productivity"; (3) Organizational communication in the organization about psychological health and safety, an example item is, "There is good communication here about psychological safety issues which affect me"; and (4) Organizational participation and involvement in the organization in relation to psychological health and safety, an example item is, "Employees are encouraged to become involved in psychological safety matters." All items were measured on a five-point Likert scale, ranging from the low score 1 (*strongly disagree*) to the high score 5 (*strongly agree*). Cronbach's alpha = .94.

Depression

To measure depression we used nine items adapted from the Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke, Williams, & Patient Health Questionnaire Primary Care Study Group, 1999) a self-report instrument used for making diagnoses of depressive episodes based upon the diagnostic criteria for a depressive disorder in the DSM-IV. The PHQ-9 is a proven reliable and valid screening instrument with a demonstrated ability to make accurate diagnoses and to track severity of depression (Kroenke & Spitzer, 2002; Lowe, Unutzer, Callahan, Perkins & Kroenke, 2004; Lowe et al., 2005; Nease & Malouin, 2003). It has been used with a cross range of adults ($M = 41.1$; 42.8; and 40.2 years: Lowe, Kroenke, Herzog & Grafe, 2004) and it is a very flexible instrument that can be administered in-person or via telephone. For ease of administration we modified the time frame for reporting symptoms in the last two weeks, to the last month to be consistent with the other health outcome measures in the tool. The items were measured on a four-point Likert scale, ranging from the low score 1 (*not at all*) to the high score 4 (*nearly every day*) and an example item is, "During the last month, how often were you bothered by feeling down, depressed, or hopeless?" Cronbach's alpha = .81.

Control

Control was measured using items from the JCQ 2.0. We used six items to measure *skill discretion*, an example item is: "I have an opportunity to develop my own special abilities." We used four items to measure *decision authority,* an example item: "My job allows me to make decisions on my own" and three items to measure *Macro-decision latitude* with an example item being: "In my company/organisation, I have

significant influence over decisions made by my work team or department.'' All items were measured on a four-point Likert scale, ranging from the low score 1 (*strongly disagree*) to the high score 4 (*strongly agree*). Skill discretion (Cronbach's alpha = .72); Decision authority (Cronbach's alpha = .72); Macro decision authority (Cronbach's alpha = .58). The macro-decision latitude reliability score was low, however, because the sample size was large and the measure yielded sufficient variance on the construct it was still included as an indictor for the control latent variable (Little, Lindenberger, & Nesselroade, 1999).

Social support (supervisor and co-worker)

We measured supervisor support based on the JCQ 2.0 using three items beginning with, ''My supervisor/manager is concerned about the welfare of those under him/her.'' Co-worker support was also measured with three items beginning with, ''The people I work with are friendly.'' Items were measured on a four-point Likert scale, ranging from the low score 1 (*strongly disagree*) to the high score 4 (*strongly agree*). Supervisor support (Cronbach's alpha = .84); co-worker support (Cronbach's alpha = .87).

Positive organizational behaviors

Engagement

Nine items from the Utrecht Work Engagement Scale – Shortened Version (UWES-9; Schaufeli, Bakker, & Salanova, 2006) were used to measure engagement consisting of three items each measuring one of the three sub-scales: (1) vigor, ''At my work, I feel bursting with energy''; (2) dedication, ''I am enthusiastic about my work''; and (3) absorption, ''I am immersed in my work.'' All items were measured on a seven-point Likert scale, ranging from the low score 1 (*never*) to the high score 7 (*every day*). Cronbach's alpha = .84.

Job satisfaction

Single item measures of job satisfaction have been deemed suitable to measure overall job satisfaction, even preferable to scales based on a sum of specific job facet satisfactions (Scarpello & Campbell, 1983; Wanous, Reichers, & Hudy, 1997). Therefore, we used the single global item from the job satisfaction scale (Warr et al., 1979). The item asks, ''Taking everything into consideration, how do you feel about your job as a whole?'' The item is measured on a seven-point Likert scale, ranging from the low score 1 (*I'm extremely dissatisfied*) to the high score 7 (*I'm extremely satisfied*).

Strategy of analysis

To test our hypotheses, we used moderated structural equation modeling (MSEM) as the main analytic method using AMOS 17 (Arbuckle, 2005) instead of hierarchical regression because it allowed for assessing and correcting measurement error and it provides measures of fit of the models (Bakker et al., 2010). To analyze the

covariance matrix we used maximum-likelihood estimation and we followed the procedure outlined by Mathieu, Tannenbaum, and Salas (1992), as described in Cortina, Chen, and Dunlap (2001). For the hypotheses we tested two sets of three models all consisting of four latent variables. The models were not nested because we used a simpler parsimonious strategy in order to compare the non-hierarchical models. Non-hierarchical models are "models based on the same variables measured in the same sample that are not hierarchically related" (Kline, 2010, p. 219). Kline advised that differences in Chi-square values between non-hierarchical models cannot be interpreted as a test statistic, however, a family of predictive fit indices can be used to compare fit because the indices assess fit in "hypothetical replications of the same size randomly selected from the same population" (p. 220).

The first set of models tested Depression (see Figure 1) as the outcome latent variable and included Model 1 (M1) with latent variables: Job Demands as the independent variable (IV), consisting of two standardized indicators (psychological demands and emotional demands); PSC as the independent moderator (IM),

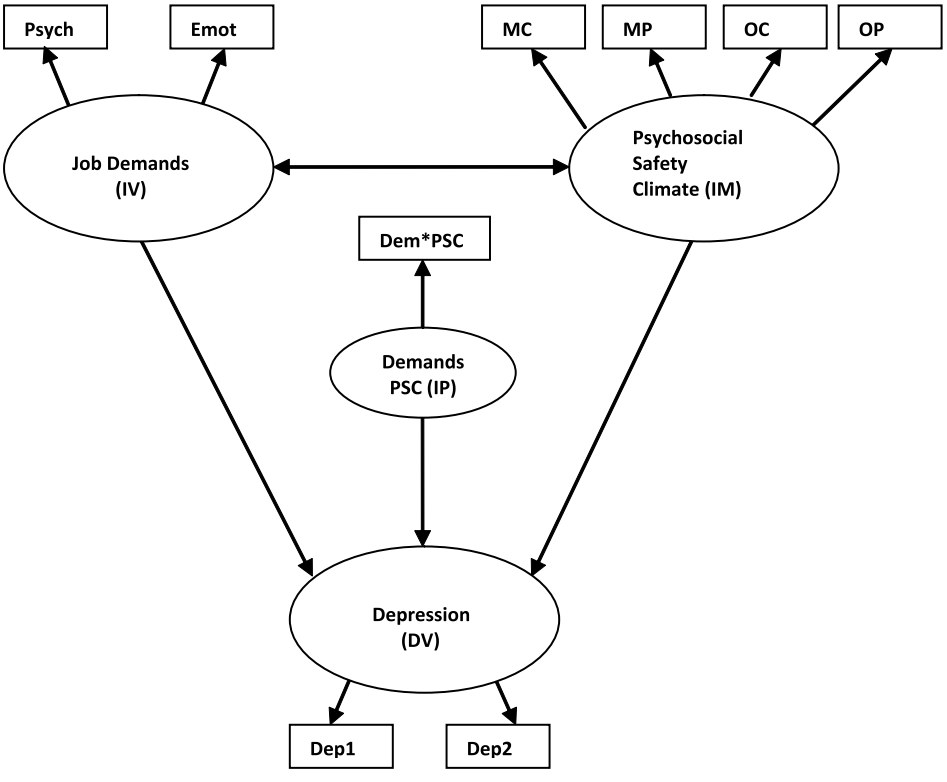

Figure 1. Theoretical model based on the health impairment process of the JD-R Model showing Model 1 (M1) variables with main and moderated pathways. IV = Independent Variable; IM = Independent Moderator Variable; IP = Interaction Product Variable; DV = Dependent Variable; MC = Management Commitment; MP = Management Priority; OC = Organizational Communication; OP = Organizational Participation; Psych = Psycholo-Psychological; Emot = Emotional; Dep1 = Depression1; Dep2 = Depression 2; Dem*PSC = interaction Job Demands × PSC.

consisting of four standardized indicators (management commitment, management priority, organizational communication, and organizational participation); the interaction product (IP) latent variable Job Demands × PSC, consisting of one indicator variable which is the product of the standardized job demands and PSC scores (Frazier, Tix, & Barron, 2004; Mathieu et al., 1992; Ping, 1995); and the latent variable Depression as the dependent variable (DV) parceled into two indicators (depression 1 and 2). Note: a single indicator is not usually sufficient for latent variables as it can lead to problems of identification and unreliable error measurement (Kline, 2005, pp. 70–71). Therefore in order to account for this we used face validity to parcel the nine-item depression scale into two sub-scales: depression 1 comprised five-items representing the psychological aspects of depression (Cronbach's alpha = .74); and depression 2 comprised four-items representing the physical aspects of depression (Cronbach's alpha = .72). The use of parceling results in the estimation of fewer model parameters and hence produces an optimal variable with stable parameter estimates to the sample size ratio (Bagozzi & Edwards, 1998). Regarding the single indictor interaction variable which is the necessary product of the IV and IM standardized scores, Kline (2005), p. 71) also notes: "with SEM if a single indictor must be used then it is crucial that the indicator has good psychometric characteristics." All the constituent factors of the IP variables (job demands, PSC, control, and social support) have validated psychometric characteristics.

Model 2 (M2) also tested Depression as the DV but replaced PSC as the IM variable with the latent variable Control, consisting of three standardized indicators (skill discretion; decision authority, and macro decision authority) and an IP latent variable Job Demands × Control, consisting of one indicator variable which is the product of the standardized job demands and control scores. Model 3 (M3) further tested Depression as the DV latent variable but replaced Control as the IM with the latent variable Social Support (IM) consisting of two standardized indicators (supervisor support and co-worker support) and an IP latent variable Job Demands × Social Support, consisting of one indicator variable which is the product of the standardized job demands and social support scores.

The second set of models tested POB as the outcome variable (see Figure 2) beginning with Model 4 (M4) that contained the latent variables: Depression (IV); PSC (IM); and Depression × PSC (IP), consisting of one standardized indicator variable which is the product of the standardized depression and PSC scores; and the latent POB (DV) consisting of two non-standardized indicators (1) engagement with three endogenous variables (vigor; dedication; and absorption) and (2) job satisfaction. In Model 5 (M5), PSC as the IM was replaced with Control as the IM with a Depression × Control IP variable, and in Model 6 (M6) the Control IM was replaced with Social Support as the IM with a Depression × Social Support IP. The first set of models, M1, M2, and M3, consisted of the main effect paths: Job Demands → Depression; and (M1) PSC → Depression; (M2) Control → Depression; and (M3) Social Support → Depression, and interaction path to test Hypothesis 1 from model (M1) Job Demands × PSC → Depression; and to test Hypothesis 2 model (M2) Job Demands × Control → Depression; and model (M3) Job Demands × Social Support → Depression. The second set of models, M4, M5, and M6, consisted of the paths: Depression → POB; and model (M4) PSC → POB, model (M5) Control → POB and model (M6) Social Support → POB, and interaction paths to test Hypothesis 3

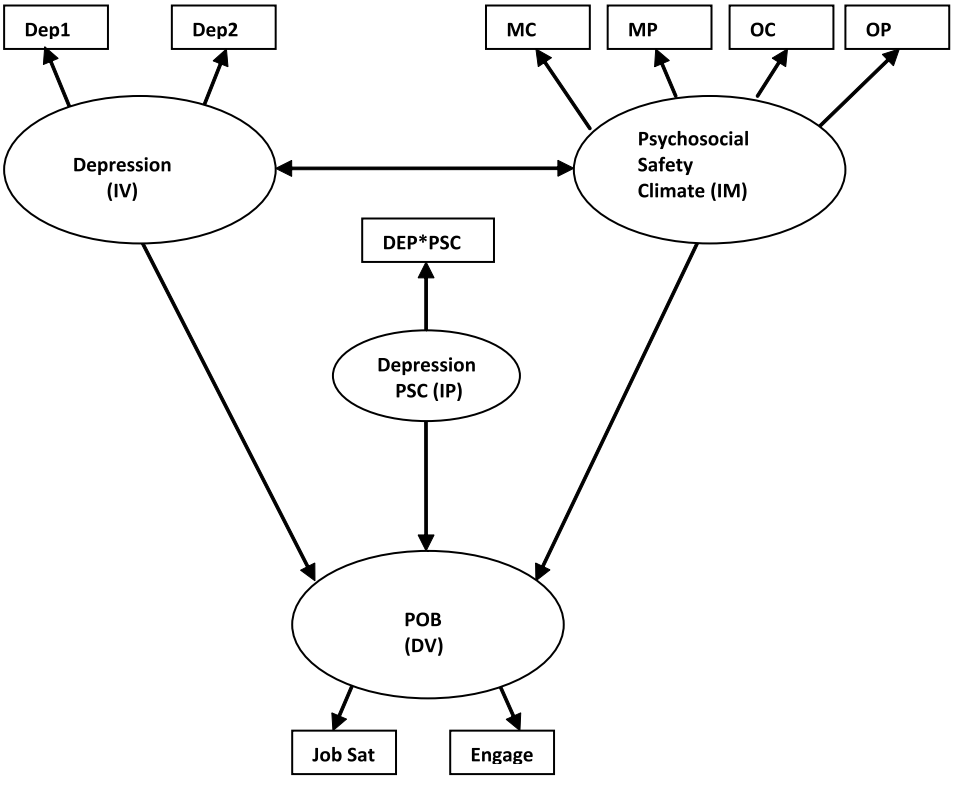

Figure 2. Theoretical Model 4 (M4) showing variables with main and moderated pathways. IV = Independent Variable; IM = Independent Moderator Variable; IP = Interaction Product Variable; DV = Dependent Variable; MC = Management Commitment; MP = Management Priority; OC = Organizational Communication; OP = Organizational Participation; Dep1 = Depression 1; Dep2 = Depression 2; DEP*PSC = interaction Depression × PSC; POB = Posi-Positive Organizational Behaviour; Job Sat = Job Satisfaction; Engage = Engagement.

from model (M4) Depression × PSC → POB; and to test Hypothesis 4 model (M5) Depression × Control → POB; and model (M6) Depression × Social Support → POB.

For both sets of models the standardized products of the interactions were expected to be uncorrelated with the standardized job demands, PSC, control, and social support constituent factors (Kenny & Judd, 1984). In accordance with Cortina et al. (2001) the paths from the interaction latent variable and the indicators were fixed using the square roots of the indicator scale reliabilities (see Mathieu et al., 1992 for calculating the reliabilities of the interaction terms) with the error variances of each single indicator set to the product of their variances by one minus their reliabilities. To assess the moderation effects we tested the models with and without the path from the IP latent variable to the DV, thus allowing a Chi-square test of difference in fit between the main effects only and moderation effects (Mathieu et al., 1992). With regard to model fit, we report the Chi-square and degrees of freedom with the goodness of fit index (GFI), the root mean square error of approximation (RMSEA), and the Akaike Information Criterion (AIC). In general, models with a GFI $> .90$ and RMSEA $< .08$ indicate reasonable fit and GFI $> .95$ and

Table 1. Means, standard deviations, and Pearson correlations $N = 2343$.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
PSC	3.35	.83	1										
JDPsyc	2.59	.45	−.31**	1									
JDEmot	2.56	.61	−.26**	.54**	1								
SkillDisc	2.85	.44	.24**	.19**	.13**	1							
DecAuth	2.86	.55	.30**	−.01	−.04	.57**	1						
MacroD	2.53	.53	.55**	−.16**	−.15**	.34**	.48**	1					
SupSup	3.05	.52	.50**	−.21**	−.14**	.27**	.28**	.39**	1				
CowSup	3.23	.44	.20**	−.09**	−.08**	.27**	.26**	.20**	.46**	1			
Engag	5.64	1.1	.34**	−.04*	−.04*	.38**	.35**	.31**	.23**	.19**	1		
Dep	1.41	.42	−.25**	.23**	.25**	−.15**	−.23**	−.22**	−.17**	−.13**	−.32**	1	
Job Sat	5.37	1.2	.46**	−.24**	−.21**	.31**	.34**	.37**	.34**	.23**	.52**	−.39**	1

SD, standard deviation; PSC, psychosocial safety climate; JDPsyc, psychological demands; JDEmot, emotional demands; Skill Disc, skill discretion; Dec Auth, decision authority; MacroD, macro decision latitude; SupSup, supervisor support; CowSup, coworker support; Engag, engagement; Dep, depression; Job Sat, job satisfaction.
*$p < .05$ (two tailed); **$p < .01$ (two tailed).

RMSEA $< .06$ good fit with the model with the minimum AIC value fitting the data best (Schermelleh-Engel, Moosbrugger, & Muller, 2003).

Results

Descriptive statistics

Means, standard deviations, and correlations between the scales recorded among the participants are presented in Table 1. Results of the correlation analysis were as expected with PSC being negatively related to both the job demands sub-scales and to depression, and positively related to the all three control and both the social support subscales and to the engagement, and job satisfaction used for the POB indictor measures. Both the job demands sub-scales were positively related to depression and negatively related to both the POB measures. Finally, depression was negatively related to the control and social support sub-scales and to both the POB measures.

Main effects

Results of the MSEM analysis are presented in Table 2. As expected the main effects of Job Demands (IV) was positively related to Depression (DV) in all three models: M1, M2, and M3. Also as expected the main effects of the PSC, Control, and Social Support as (IM) were all negatively related to Depression in all three models: M1, M2, and M3. Results of MSEM analysis with POB as the DV also showed the main effect of Depression was negatively related to the POB in all models, M4, M5, and M6, with main effects of PSC, Control, and Social Support (IM) to POB showing as positive in all three models: M4, M5, and M6.

Interaction effects with moderated structural equation modeling

The results of MSEM analysis shown in Table 2 provide support for the predicted IP effects with Depression as the DV. In support of Hypothesis 1, M1 showed that PSC moderated the effect of Job Demands on Depression because the IP variable Job Demands $\times$ PSC had a negative path coefficient with depression. Considering the main positive path coefficient from Job Demands to Depression, the negative path coefficient from the IP variable Job Demands $\times$ PSC and Depression shows PSC moderated the relationship. In M2, Control moderated the effect of Job Demands on Depression and in M3; Social Support moderated the effect of Job Demands on Depression. Both models, M1 and M3, showed acceptable fit to the data with M2 that tested the Job Demands $\times$ Control interaction only reasonable fit to the data.

Note that all the main effects for the IM variables (except social support in M3) and the DV were larger than the IP latent variables and the DV. Therefore, the main effects could be considered substantially more important than their moderating effects with the other DV. So to test the moderation hypotheses further, M1, M2, and M3 were tested with and without the moderation paths in order to assess a Chi-square test of difference in fit between the main effects only and moderation effects. M1 with the main effects and moderation interactions showed a significantly better fit to the data ($\Delta\chi^2$ (2) $= 6.31$, $p < .05$) than the M1 with the main effects only (no moderation paths). Also the moderation M2 showed significantly better fit

Table 2. Results of MSEM: interactions of job demands & depression × PSC, control, and social support ($N = 2343$).

	Depression		POB						
Predictor	UPC *(SE)*	SPC	UPC *(SE)*	SPC	χ^2	*df*	GFI	RMSEA	AIC
M1. Job Demands	.20 (.02)	.32**			206.82	23	.98	.06	268
PSC	−.05 (.01)	−.13**							
Job Demands × PSC	−.04 (.01)	−.07*							
R^2		16.1%							
M2. Job Demands	.23 (.02)	.39**			340.75	17	.92	.09	394
Control	−.26 (.03)	−.24**							
Job Demands × Control	−.07 (.03)	−.09*							
R^2		22.4%							
M3. Job Demands	.24 (.02)	.38**			100.45	12	.98	.06	278
Social Support	−.06 (.02)	−.09**							
Job Demands × Social Support	−.10 (.02)	−.18**							
R^2		20%							
M4. Depression			−.64 (.03)	−.37**	271.53	23	.99	.07	333
PSC			.60 (.05)	.48**					
Depression × PSC			.13 (.04)	.08**					
R^2				47.6%					
M5. Depression			.59 (.05)	−.37**	356.84	17	.93	.09	410
Control			1.5 (.10)	.51**					
Depression × Control			.28 (.09)	.11*					
R^2				51.9%					
M6. Depression			.70 (.05)	−.41**	384.10	11	.90	.12	432
Social Support			.56 (.05)	.43**					
Depression × Social Support			.04 (.04)	.03					
R^2				44.1%					

PSC, psychosocial safety climate; POB, positive organizational behaviors; χ^2, Chi-square; *df,* degrees of freedom; RMSEA, root mean square error of approximation; GFI, goodness fit index; AIC, Akaike Information Criterion; UPC, unstandardized path coefficient; SPC, standardized path coefficient.
*$p < .01$. **$p < .001$.

to the data ($\Delta\chi^2$ (1) = 6.98, $p < .010$) than M2 which contained the main effects only, and the moderation model M3 showed significantly better fit to the data ($\Delta\chi^2$ (1) = 30.27, $p < .001$) than M3 with main effects only. Hypothesis 2 was supported because M1 that tested the Job Demands × PSC interaction showed fit to the data (as measured by the fit indices) that was as good as the M2 Job Demands × Control interaction and M3 Job Demands × Social Support interaction models (see Table 2).

The results of MSEM analysis for the second set of models showed support for two of the interaction effects with POB as the outcome. In support of Hypothesis 3, M4 showed that PSC moderated the effect of Depression on the POB variable as the IP variable Depression × PSC had a positive path coefficient with POB. Once again, considering the main negative path coefficient between Depression and POB, the positive path coefficient between the Depression × PSC interaction variable and POB shows that PSC moderated the relationship. M5 showed that Control also moderated the effect of Depression on the POB variable, however, as shown with M6; there was no support for a moderation effect of Social Support on the effect of Depression to the POB variable. Table 2 shows that M4 had excellent fit to the data and M5 had reasonable fit to the data with M6 resulting in unsatisfactory fit to the data. M4 and M5 were also tested with and without the moderation paths in order to assess a Chi-square test of difference in fit between the main effects only and moderation effects. M4 with the main effects and moderation interactions showed a significantly better fit to the data ($\Delta\chi^2$ (1) = 9.97, $p < .005$) than the model with the main effects only and M5 with the main effects and moderation interactions showed significantly better fit to the data ($\Delta\chi^2$ (1) = 7.87, $p < .010$) than the model which contained the main effects only. In this case, Hypothesis 4 was supported because M4 had fit to the data that was as good as the M5 and M6.

Analysis of interaction effects with graphical plots

The direction of the moderation effects was further derived by inspection of the interactions represented graphically in Figure 3. Plot A represents the relationship

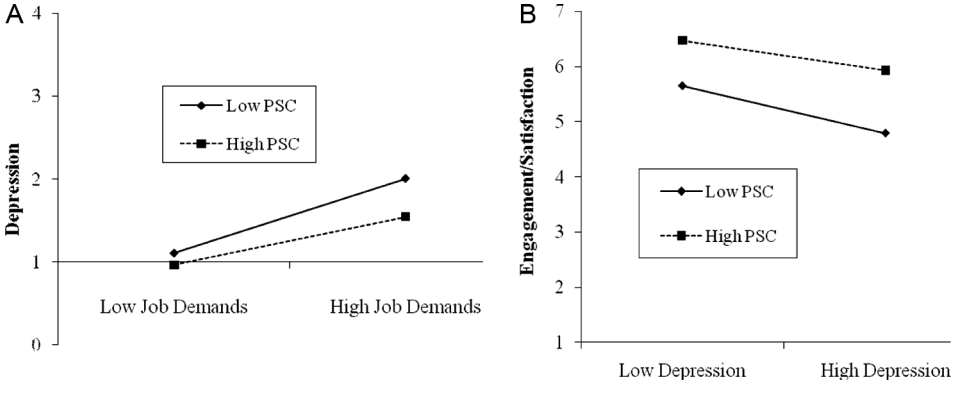

Figure 3. Significant interactions for Plot A: The effect of PSC on the relationship between Job Demands and Depression (cf. buffer Hypothesis 1). Plot B: The effect of PSC on the relationship between Depression and POB outcomes (engagement and job satisfaction) (cf. buffer Hypothesis 3).

between job demands and PSC (moderator) on depression. Demands and PSC were scored $\pm 1SD$ from the mean (zero), high scores one standard deviation above the mean and low scores one standard deviation below the mean. In support of the MSEM analysis and Hypothesis 1, the slope of the interaction plot in Plot A shows that depression increased as job demands increased. However, the slope was not as strong as in conditions of high PSC with the high PSC group ranging from $b = 0.967$ to $b = 1.547$ and the low PSC ranging from $b = 1.107$ to $b = 2.007$ demonstrating the buffering effect of PSC on worker depression. In the second step, significant interactions are represented by Plot B. Plot B represents the relationship between depression and PSC (moderator) on the POB outcomes (worker engagement and job satisfaction). In support of the MSEM analysis and Hypothesis 3, the slope of the interaction plot in Plot B shows that the POB (engagement and job satisfaction) decreased as depression increased. However, the slope was not as strong as in conditions of high PSC with the high PSC group ranging from $b = 6.473$ to $b = 5.933$ and the low PSC ranging from $b = 5.653$ to $b = 4.793$ demonstrating the buffering effect of PSC on engagement and job satisfaction.

Discussion

In this study, we showed PSC to be an important workplace resource within the JD-R model among a general population and occupation demographic. In line with Hypotheses 1 and 2, the MSEM and interaction plot analysis showed that PSC was able to moderate the negative effects of job demands on depression with as good a fit to the data as the job demands and control, and social support interaction with depression. These results are consistent with earlier research on the buffer hypothesis in the JD-R model that showed several job resources can buffer the negative effects of job demands on worker psychological health problems (Bakker et al., 2005; Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003; Dollard & Bakker, 2010; Xanthopoulou et al., 2007). Also in line with the JD-R model that proposes many different job resources can buffer the impact of job demands on worker engagement (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007), in support of Hypotheses 3 and 4, we found PSC to buffer the effects of worker depression on specific POB. Indeed, analysis showed that the depression and PSC interaction with POB had fit the data that was as good as the depression and control, and social support interaction with POB. It is noteworthy that in previous research social support has been a well-known potential buffer against job demands and work stress (see Van der Doef & Maes, 1999 for a review) and in our sample social support did buffer the relationship between job demands and depression, however, it did not buffer the relationship between depression and POB. In explanation, symptoms of depression such as feelings of sadness, emptiness and general loss of interest and pleasure (DSM-IV-TR: APA, 2000) make it very difficult for sufferers to engage socially with anybody – so social support does not necessarily help with regard to worker depression. Indeed, over the years there have been mixed results among studies on different age groups as to whether social support is helpful in buffering the effects of depression (Al-issa & Ismail, 1994; Greenglass, Fiksenbaum, & Eaton, 2006).

Psychosocial safety climate on the other hand is concerned with organizational policies, practices and procedures for the psychosocial health and safety of workers and operates as an overarching organizational climate and broader macro-level

resource for the psychosocial safety of the workplace. This allows depressed workers the comfort of knowing that they can continue to be a useful part of the workforce safely working within an organization that has a robust PSC. In previous studies PSC has been found as a precursor to the JD-R framework (e.g., Dollard & Bakker, 2010; Law et al., 2011; Idris et al., 2011). Progressing from these studies, in accord with the buffering hypothesis in the JD-R model, we have extended research by finding PSC as an important organizational resource moderating the effects of job demands on depression and further moderating the effects of depression on POB. The Dollard and Bakker study found that PSC specifically moderated the impact of emotional demands on psychological health problems but we now have evidence for the buffering role of PSC on both psychological and emotional job demands. In explanation, PSC operates as a broad macro-level resource and safety signal for workers acting to reduce demand-induced anxiety, indecisiveness, and feelings of helplessness, which all represent symptoms linked to depression (Lohr, Olatunji, & Sawchuk, 2007).

Limitations of the study

The current study had some limitations that need to be mentioned. The overall sample response and participation rate was low and could have been influenced by the length of the AWB survey interview (30+ minutes). Also data for this study were collected at the individual or population level but PSC as a climate phenomenon is theorized to be the property of the group or organization. Therefore a possible study limitation is that PSC was assessed as a psychological climate rather than as a shared perception, so results need to be interpreted with caution. However, in line with safety climate (Zohar & Luria, 2005), PSC was expected to vary across organizations as it is largely influenced by senior management values and beliefs. Indeed, previous studies have shown that organizational variance may account for between 14 and 22% of the variance in PSC (Dollard & Bakker, 2010; Hall et al., 2010) therefore given the large geographical coverage of our sample population, individual responses represent data from a wide cross-section of different organizations so we expect the dependence of data problems on climate studies that use organizational samples to be greatly reduced.

A further limitation is that the problem of common method variance could result because we used self-report measures for the levels of the variables analyzed (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Furthermore, by using self-report ratings of work characteristics it is a worker's subjective perception of job demands and resources that are measured and because we also measured depression, which is characterized by negative feelings, there could be a reversed effect of depression on self-rated work characteristics rather than vice versa (Rau, Morling, & Rosler, 2010). Also, because of the cross-sectional nature of the study the potential to draw conclusions about causality is limited. However, results from a previous study do indicate that PSC is related to change in job demands and resources longitudinally in expected directions (Dollard & Bakker, 2010). Moreover, even though spuriousness and reversed causation prevent drawing causal conclusions regarding the main effects of demands and resources, common method variance does not contradict a causal interpretation of the demands $\times$ resources moderating effects that our study has revealed.

Practical implications and conclusion

In our general population sample when job demands increased so did worker depression but not as strongly as under conditions of high PSC. Furthermore, when worker depression increased levels of POB decreased but once again not as strongly as under conditions of high PSC. Within the JD-R model organizational level intervention strategies that focus on decreasing excessive job demands, increasing resources, and promoting greater engagement help to ameliorate worker health (Hakanen, Schaufeli, & Ahola, 2008). When senior managers and supervisors value workers' psychosocial safety and this is reflected as a communicated organizational position then the PSC of the organization can buffer the effects of job demands on individual worker depression. Actions initiated at the organization and senior management level regarding psychosocial safety can have a favorable impact on the working environment because daily demands and resources will be congruent with the philosophy of management. For example, excessive job demands in conjunction with low resources should be absent in that organization when the senior management of an organization clearly considers the psychological health of employees to be of great importance, acts quickly and decisively when concerns of a employees' psychological health is raised, fosters good communication and encourages employees to be involved in psychological health and safety.

Importantly, because it is common for workers to remain at work even though suffering from depression it is crucial to address worker depression in the workplace. Organizations that address environmental as well as individual factors such as the work design and organizational climate can create broader overarching strategies for a psychologically safer workplace (Neal & Griffin, 2002). This study has shown that PSC, acting as a broad macro-level organizational resource, moderates the effects of job demands on depression and the effects of depression on POB. We conclude that senior managers and supervisors within organizations need to focus on the development of a robust PSC that can build environments conducive to worker psychological health, engagement, and job satisfaction.

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