Psychosocial safety climate as a moderator of the moderators: Contextualizing JDR models and emotional demands effects

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Psychosocial safety climate (PSC) is a facet-specific aspect of organizational climate that pertains to employees' psychological health. We sought to deepen our understanding of how and when resources function by considering the role of PSC as a contextual factor for job demands-resources model. We explained this using two different mechanisms – PSC as a resource passageway (i.e., channelling, supplying, bolstering, complementing resources) or PSC as a safety signal (i.e., enabling resource use) effect. Using longitudinal data from 429 Malaysian health care workers from 53 teams and hierarchical linear modelling (HLM), we found team PSC was a stronger moderator of emotional demands than control or rewards on psychological health problems (emotional exhaustion and somatic symptoms), after controlling for the baseline outcomes. A three-way interaction of team PSC at Time 1 with demands and resources (rewards only) at Time 2 showed that PSC is able to moderate the moderation relationship of demands and resources. Specifically, PSC, as a resource passageway, is providing a range of resources, that likely to compensate and complement low rewards. Hence, when both PSC and rewards were low, emotional demands had the strongest effect on psychological health. This result is robust as it was validated using HLM and split samples of PSC at the upper level. Given the important contextual role of PSC as a ‘moderator of the moderators’, building PSC should be the focus of workplace interventions to protect the psychological health of workers.

Practitioner points

- Psychosocial safety climate may compensate for job resources, particularly rewards in an organization to protect workers’ psychological health.

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Psychosocial safety climate buffers the detrimental effect of emotional demands on workers’ psychological health better than rewards and control.

Work stress is the second most frequently reported occupational health issue in Europe (European Agency for Safety and Health at Work, 2012). It affects more than 60% of US workers (American Psychological Association, 2013), and 31% of Australians report that work factors contribute to their stress (Australian Psychological Society, 2015). Work stressors have significant detrimental personal (e.g., psychological strain such as burnout and somatic symptoms) and organizational productivity (e.g., lost working days) effects (Health and Safety Executive, 2016). While the prevention of work stressors is desirable, in settings such as health care, job demands, such as emotional demands arising from interaction with clients or patients, may be inevitable. As high levels of demands are often implicated in a stress response, it is crucial to consider factors that could lessen the impact of demands. As a general framework, the job demands-resources model proposes that a range of resources (i.e., job aspects which help to achieve work goals and boost personal development), such as job control and rewards, may moderate the stressful impact of high demands at work (Bakker & Demerouti, 2007, 2017); drilling down to specific theoretical models, the job demand-control model (Karasek, 1979) proposes that job control is the most important moderator, and the effort-reward Imbalance model (Siegrist, 1996) proposes that rewards is the most important moderator. However, given meta-analytic evidence, that moderators (e.g., such as job control) have yielded inconsistent effects (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010), researchers have called for the consideration of more distal contextual multilevel parameters such as organizational climate (Dollard & Bakker, 2010; Guediri & Griffin, 2016).

This study aimed to examine how a facet-specific aspect of organizational climate, namely psychosocial safety climate (PSC; Dollard & Bakker, 2010), interrelates with job demands to affect psychological health (i.e., emotional exhaustion and somatic symptoms). First, we examine whether PSC provides a stronger account than job design models such as job demands-resources model (and submodels job demand-control model and effort-reward imbalance model) when considering potential moderators of job demands, evident as a two-way interaction effect). Second, we go further and explore whether PSC extends prior work stress models as an important contextual factor for the demands–resources interaction, as a contextual ‘moderator of the moderators’ proposed in the theories, evident as a three-way interaction effect. In other words, we would like to understand the role of PSC as a buffer of the interaction between demands and resources.

In understanding why PSC acts in combination with job resources to reduce the impact of job demands, we draw on conservation of resources theory (Hobfoll & Shirom, 1993, 2000) and investigate two potential mechanisms. First is that PSC acts as a resource caravan passageway (i.e., a mechanism which helps to channel, funnel, and supply resources) – here PSC, through pro-social management decisions, helps to supply, protect, and maintain a resources caravan, by bolstering and compensating for low resources at the job level. Second, PSC acts as a safety signal (i.e., a sense of security; Dollard, Tuckey, & Dormann, 2012; Law, Dollard, Tuckey, & Dormann, 2011) providing social cues regarding how safe it is to use high job resources to offset demands. According to this proposition, resources will only be utilized when there is a high PSC context.
Psychosocial safety climate theoretical framework

Psychosocial safety climate refers to the shared employee appraisals of organizational ‘policies, procedures and practices for the protection of workers’ psychological health and safety’ (Dollard & Bakker, 2010, p. 580). PSC is a facet-specific climate pertaining to the psychological health and safety of workers, as distinct from other related organizational climate, such as safety climate, which mainly focuses on physical health and safety (Zohar, 1980). Dollard and Bakker (2010) in their seminal work argued that a primary role of PSC is as a precursor to job characteristics (e.g., job demands and job resources) and is mainly driven by top-level management values and ensuing organizational policies, practices, and procedures. For instance, if management is concerned about employees’ well-being (i.e., high PSC), managers will act to decrease job demands and increase job resources to protect employees from psychosocial harm (Idris, Dollard, & Tuckey, 2015; Yulita, Idris, & Dollard, 2014).

Of interest to the current study is the secondary role that PSC plays; Dollard and Bakker (2010) proposed a moderating role of PSC on demands, acting to reduce their deleterious effect on psychological health. We propose two possible mechanisms whereby PSC moderates the demand–psychological health relationship. First, we argue, is that PSC functions as a moderator because of its resource passageway function (i.e., bolstering, complementing, compensating resources) – a concept recently made explicit in the conservation of resources theory (Hobfoll, 2011). According to conservation of resources theory, ‘individuals strive to obtain, retain, foster, and protect those things they centrally value’ (Hobfoll, 2011, p. 117) such as health and well-being and a positive sense of self. Resources pertinent to the work setting include object resources (e.g., computers, software), condition resources (e.g., support from colleagues, rewards, job control), and personal resources (e.g., ability, self-esteem, self-efficacy; Hobfoll, 2011, p. 117). To operate within organizations, workers use these resources to regulate the self, conduct social relations, and carry out work tasks. In this study, we argue that the social ecology of PSC is manifest as a resource caravan passageway. According to conservation of resources theory, resources tend to accumulate and link together, creating ‘resource caravans’ (Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010). The ‘responsibility for caravan creation and sustenance [is] on the social ecology’ (Hobfoll, 2011, p. 118). The caravan passageway concept refers to organizational ‘environmental conditions that support, foster, enrich, and protect the resources of individuals, sections or segments of workers, and organizations in total, or that detract, undermine, obstruct, or impoverish people’s or group’s resource reservoirs’ (p. 119). We concede of PSC as a resource caravan passageway that can bring omnibus resources to employees.

In a high PSC context, there is a pro-social ecology; through management commitment and support, and priority for worker psychological being, along with its structural and functional components for communication between management and workers, and participation of all levels of the organization in addressing stress issues, many resources are supplied, and others are supported, fostered, enriched, and protected through a high PSC. When PSC is low, these potential resources are lost and cannot be used to manage demands or regulate emotional responses to them.

The second way PSC could moderate the emotional demands to psychological health relationship is explained by the safety signal hypothesis (Lohr, Olatunji, & Sawchuk, 2007; Seligman, 1968). In a high PSC context, if employers are concerned about employees' psychological safety, they will take steps to ensure that employees feel a sense of security (Dollard, Tuckey, et al., 2012). When PSC is high, the safety signal cue is that it is safe to use resources (such as job control) to cope with adverse events (Hall, Dollard, Winefield,
Dormann, & Bakker, 2013; Law et al., 2011); learning of this association between taking action, and reducing demands, in the presence of the signal, is positive reinforcement of the signal (Lohr et al., 2007). Workers can predict that taking action to utilize resources, such as asking for feedback, making discretionary decisions, asking for social support, and/or promotion, will be met with a positive response in high PSC contexts. In comparison, in a low PSC environment where the perception of psychological safety is lower (e.g., high-conflict environment), we expect that there would be negative reaction, such as criticism, and admonishment, when seeking, using, and applying resources. The resource passageway or the safety signal role of PSC as a moderator leads to the first hypothesis:

**Hypothesis 1:** PSC moderates the positive relationship between emotional demands and (a) emotional exhaustion and (b) somatic symptoms, such that under conditions of low PSC the relationship will remain, but under high PSC the strength of the relationship will be reduced.

The interaction of job resources (i.e., control and rewards) and emotional demands

In addition to social ecological factors (such as organizational PSC), more proximal factors such as job resources (i.e., job control and job rewards) are also likely moderate the effects of demands on psychological health. The job demands-resources model, for instance, posits that an individual will experience psychological health problems when job demands are high, but resources, such as job control or job rewards, are low. Taking job control as the first resource exemplar, there is a highly defined model, the job demand-control model that proposes job control specifically moderates the demand–psychological health relationship. When demands are high and workers have low decision authority, or say about how to do the work, or make their own decisions (i.e., the degree of autonomy that an individual has to make decisions at work), the risk of work stress and physical illness is increased (Karasek, 1989). Alternatively, when demands are high and decision authority is high, workers can make decisions about how to manage demands, for example, by spacing demands or by taking time away from demands (Häusser et al., 2010). Longitudinal study and objective measurement have supported this notion (de Jonge, van Vegchel, Shimazu, Schaufeli, & Dormann, 2010; Gonzalez-Mulé & Cockburn, 2017). Using specific job demands (e.g., emotional demands, physical demands) and job resources (i.e., decision authority), de Jonge et al. (2010) found that decision authority buffers the effects of demands on somatic symptoms and sickness absence 2 years later. From the previous studies, researchers argued the need to separate decision authority and skill discretion. Factor analytic results have shown that decision authority and skill discretion reflect two disparate factors (Schreurs & Taris, 1998). Based on the previous empirical results, researchers suggested that too much skill discretion may cause burden on employees and hence be perceived as a demand rather than resources (de Jonge et al., 2010). Therefore, we hypothesized as in previous research, that, while high emotional demands would increase emotional exhaustion and somatic symptoms, decision authority may buffer this relationship.

**Hypothesis 2a:** Decision authority moderates the positive relationship between emotional demands and emotional exhaustion, and

**Hypothesis 2b:** Decision authority moderates the positive relationship between emotional demands and somatic symptoms.
Taking rewards as the second resource exemplar, effort-reward imbalance model provides some insights as to why rewards would moderate the effect of job demands on psychological health. Rewards include both monetary and non-monetary rewards such as self-esteem, appreciation, job security, and job promotion. If employees feel they are not receiving adequate rewards in exchange for the effort they have invested, this will lead to stress responses and, in turn, will affect their health. In other words, an imbalance of high effort and low rewards will lead to a reduction in health status above risks arising from each component (van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). However, studies on rewards have found the interaction effect of effort and rewards on workers’ somatic and psychological health to be inconsistent. Meta-analysis of previous literature showed that the imbalance of effort–reward is associated with poor immune functioning (Eddy, Heckenberg, Wertheim, Kent, & Wright, 2016), but some research revealed that the interaction of effort and rewards does not affect workers’ psychological health (Preckel, Meinel, Kudielka, Haug, & Fischer, 2007; Rasmussen et al., 2016). Despite this, some empirical evidence shows the interaction between effort and rewards and its influence on employees’ psychological distress and physical health longitudinally (Shimazu & de Jonge, 2009). We thus hypothesized as in previous research that,

**Hypothesis 3a:** Rewards moderate the positive relationship between emotional demands and emotional exhaustion, and

**Hypothesis 3b:** Rewards moderate the positive relationship between emotional demands and somatic symptoms.

As PSC is a resource passageway, we expect that it will be a stronger moderator of job demands than resources supplied at the task level only – as proposed broadly in job demands-resources model and specifically in job demand-control model (in relation to job control) and effort-reward imbalance model (in relation to job rewards).

### Three-way interaction of PSC on the demands–resources interaction

The three-way interaction of PSC on demands–resources relationship has seldom been studied by the scholars. As mentioned above that the hypothesis regarding the interaction between demands and resources has not always been supported (Häusser et al., 2010), scholars have proposed that the inconsistent findings may be due to a lack of consideration of the organizational context or climate, and the multilevel nature of stress influences (de Lange, Taris, Kompier, Houtman, & Bongers, 2003). Here, we consider the role of PSC as such a multilevel influence – a ‘moderator of the moderators’.

Theoretically, there are two possible mechanisms regarding how PSC could ‘moderate the moderators’ of the demands to psychological health relationship. First, as explained above, PSC could act as a resource caravan passageway protecting and enabling a range of resources to bolster, compensate, or complement low levels of job resources (such as job control and rewards). In this case, emotional demands maintain a positive relationship with poor psychological health outcomes only in the case of resource loss at both the organization (PSC) and the task (job control, reward) levels. When both PSC and resource conditions are high, or either is high, emotional demands may be managed through complementary or compensatory processes and then psychological health effects dissipate.

Second, PSC serves as a safety signal for employees enabling them to feel more secure and comfortable in utilizing the available resources. For example, when a team supervisor is more open and caring about subordinates’ psychological health, a subordinate is more
likely to approach the supervisor for consultation or to voice a complaint. Consequently, this may help stress reduction and sustain well-being.

Empirically, Dollard and Tuckey, et al. (2012) found explicit support for the safety signal effect of PSC. Among police officers, they found that emotional resources (i.e., received emotional support from colleagues and supervisors when needed, obtained psychological help when needed or wanted) reduced the impact of emotional demands on psychological health only in the context of high PSC. Even when resources were high, their function remained latent if PSC was low, and psychological distress consequently remained high. Hence, we propose that PSC is the contextual variable, which may explain the variability of the interaction effect between both demands–control and demands–rewards. Thus:

**Hypothesis 4:** PSC moderates the two-way interaction of emotional demands and resources (job control and rewards) on emotional exhaustion and somatic symptoms.

The form of the interaction will be examined in relation to PSC as a resource caravan passageway or as a safety signal. In the former, the strongest positive slope will occur when PSC is low and job resources are low; in the latter, the strongest negative slope will occur when PSC is high, and resources are high (can only use resources when PSC is high).

**Current study**

Psychosocial safety climate, as with related constructs such as safety climate (Zohar, 2008), is conceptualized as a multilevel concept, stemming from the different roles and responsibilities of people at different levels within the organization. At the organization level, the most senior managers are responsible for developing corporate policies and procedures in relation to PSC. At the unit level (in our case, hospital wards, clinics, and departments), managers and supervisors are responsible for translating the policies and procedures into practice. At both levels, choices are made regarding what policies, procedures, or practices to implement, and what trade-offs are made between safety (in our case, PSC) and productivity (see Colley & Neal, 2012). In our study, we investigated PSC as a collective concept from the point of view of the team. Teams were defined as several employees with different roles and responsibilities, that had an identifiable leader, where employees worked interactively and interdependently in pursuit of unit goals, with identifiable boundaries and linkages with the organization as a whole (Kozlowski & Ilgen, 2006).

We chose to focus on the emotional dimension of job demands, as emotional demands are common for human service workers who are in constant interaction with people, and are emotional demands are a stronger predictor (more damaging) of psychological health compared to other job stressors such as quantitative demands (Maslach & Jackson, 1981; van Vegchel, de Jonge, Söderfeldt, Dormann, & Schaufeli, 2004). Employees working in the health care sector are often expected to express ‘good’ manners to the patients and their families despite their true feelings. In particular, they are required to invest their energy to deal with clients’ negative moods or to handle difficult situations such as death and dying (McVicar, 2003). Such conditions require a huge emotional effort. Conservation of resources theory proposes that the individual deploys their resources to cope with demands (Hobfoll & Freedy, 1993). Yet prolonged exposure to emotional demands comes with the loss of resources, which leads the individual to feel stressed and eventually leads to poor physical health (Siegrist, 1996) and emotional exhaustion (de Jonge, Le Blanc, Peeters, & Noordam, 2008; Dollard, Opie et al., 2012; McVicar, 2003).
We used a two-wave longitudinal design (Cole & Maxwell, 2003) with a 4-month interval time lag. We studied the effect of PSC at Time 1 on the interaction effect of job demands and resources on psychological health at Time 2. As an organizational climate construct, PSC is assumed to be stable over time and its lagged moderation effect has been previously tested using several time intervals, for instance, at 3 months (Idris, Dollard, & Yulita, 2014), 12 months (Bailey, Dollard, McLinton, & Richards, 2015) and 24 months (Dollard, Opie, et al., 2012). While the 'correct time lag' (Dormann & Griffin, 2015) is often debatable (Preacher, 2015), the effects are influenced by various factors including the stability of variables (Dormann & Griffin, 2015) and the types of strain (Ford et al., 2014). The calculation of optimal time lag (i.e., the amount of time that allows the maximum effect of a cause to happen) can also be complicated (Dormann & Van de Ven, 2014). Hence, we used a time lag that has not been used before to better understand the effect of PSC as moderator on demand to health outcomes across this time period (Selig, Preacher, & Little, 2012).

Our study contributes to the body of knowledge in several ways. This is the first study to explore the moderating effect of PSC using the conservation of resources theory of resource caravan passageway. Although conservation of resources theory has been widely used in work stress studies, most studies have examined resources at the task level rather than the ecological- or organizational-level perspective. Second, we compare the effect of PSC, job control, and job rewards on emotional demands, investigating the best moderator of demands for the prevention of a stress reaction (i.e., psychological health problems). While most of the previous studies on PSC have focused on the primary function of PSC, as direct effect or the mediating effect (Idris, Dollard, Coward, & Dormann, 2012; Idris et al., 2014), our study adds to the PSC literature by exploring its secondary function (i.e., as a moderating effect) and the mechanism behind this. Third, with increased research attention on health care workplace safety, as PSC is related to workplace injuries (Zadow, Dollard, McLinton, Lawrence, & Tuckey, 2017), we have responded to the calls from researchers to examine the origins of workplace safety such as organizational climate and worker psychological health in health care settings. Finally, we tested our research framework in Malaysia, a developing Eastern country with rapidly increasing work pace and competitiveness due to global demands, given that research on the psychosocial risk factors in developing countries is still lacking (Kortum & Leka, 2014; Figure 1).

**Research methods**

**Design and participants**

Ethical approval was obtained from the ethics committee of a Malaysian medical hospital. The data were collected between November 2015 and March 2016 using paper questionnaires. The sample comprised 429 participants from 53 workgroups and included wards, clinics, and departments, within one hospital. We first obtained permission from the hospital’s management to conduct the survey and then approached all of the hospital’s wards, clinics, and departments, which had at least five workers (Mathieu & Taylor, 2007). As Malaysian researchers have reported a very low response rate from using random sampling among Malaysians (Ali, Abdullah, & Subramaniam, 2009), in the ward, we asked the permission from the head nurses (i.e., ward manager) and randomly approached the nurses working inside to invite them to participate. Those who agreed were given the questionnaire. The completed questionnaires were put into a sealed envelope and were kept by the head nurses. We collected the questionnaires from
the head nurses 2 weeks after the date of distribution. This resulted in a total of 88 target workgroups at the beginning of the study. At Time 1 (T1), we received 951 responses (71% response rate) from 74 workgroups (86% response rate). To ensure the anonymity, each participant was given a unique code by the researchers at the first time of data collection. The same workgroups were approached at Time 2 (T2), and data were matched using the unique code assigned to each participant at the beginning of the study. The response rate for T2 was 56% for individuals and 73% for workgroups. Only responses from participants who had participated on both occasions, and teams with more than three participants (Maas & Hox, 2005) were used to yield the final matched sample.

Participants were 311 nurses and 113 nursing assistants, while five other participants did not indicate their designation. Most of the participants were female (89.5%) who worked an average of 44.36 (SD = 5.49) hours per week. Of the participants, 92.8% were permanent staff with only 22 being contract workers.

Measures
All study measures were administered in the Malay language. Unless otherwise indicated, all questionnaires were translated using the back-translation technique (Brislin, 1970). Both the English and the Malay language translators were trained in psychology and had a good command of English and Malay.

Psychosocial safety climate
Psychosocial safety climate was assessed using a 12-item Malay translation of the PSC-12 scale (Idris et al., 2012) derived from the original English version (Hall, Dollard, & Coward, 2010). An example item is as follows: 'Psychological well-being of staff is a priority for this organisation'. The measure uses a 5-point Likert scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree). The total mean score obtained was 42.39. The scale has good internal consistency and construct validity (Hall et al., 2010; Law et al., 2011), which was also found among other Malaysian samples (Idris et al., 2012, 2015). Previous Australian and Malaysian research has shown that the PSC scale has good discriminant validity when tested with related constructs such as physical safety climate and perceived organizational support (Idris et al., 2012), indicating PSC as a distinctive concept. The alpha (α) value of this scale in the current study was .92.

Emotional demands
Emotional demands were assessed using the 4-item emotional demand subscale of the Copenhagen Psychosocial Questionnaire (Kristensen, Hannerz, Hogh, & Borg, 2005). The
reliability and validity of the scale is good as reported in previous studies using Malaysian samples (Idris et al., 2012, 2014). An example item is as follows: ‘Does your work require that you get personally involved?’ with a 5-point scale from 1 = never/barely ever to 5 = always) (for this study, $\alpha = .77$ at both T1 and T2).

**Decision authority**

Decision authority was assessed using three Malay-translated items adapted from the decision authority subscale of the Job Content Questionnaire (Karasek et al., 1998). Good reliability and validity has been shown in Malaysian work setting (Amin, Quek, Oxley, Noah, & Nordin, 2015; Edimansyah, Rusli, Naing, & Mazalisah, 2006). An example item is as follows: ‘On my job, I have very little freedom to decide how I do my work’. A 4-point scale was used, and responses ranged from 1 (strongly disagree) to 4 (strongly agree) (for this study, $\alpha = .77$ at T1 and $\alpha = .78$ at T2).

**Rewards**

Rewards were assessed using the 5-item reward subscale of the Effort-Reward Imbalance questionnaire (Siegrist, 1996). The scale displayed good reliability and validity in previous study among Asian countries (Siegrist, Li, & Montano, 2014). An example of an item is as follows: ‘Considering all my efforts and achievements, I receive the respect and prestige I deserve at work’. Responses were on a 4-point scale (1 = strongly disagree to 4 = strongly agree) (for this study, $\alpha = .66$ at T1, $\alpha = .72$ at T2).

**Emotional exhaustion**

Emotional exhaustion was measured using five items of the Malay-translated exhaustion scale (Idris et al., 2012) adapted from the Maslach Burnout Inventory measure (Schaufeli, Leiter, Maslach, & Jackson, 1996). The scale has good reliability and validity among Malaysian employees as reported in recent research (Idris et al., 2012, 2014). An example item is as follows: ‘I feel used up at the end of the workday’. A 7-point scale was used for this scale (0 = never to 6 = every day) (for this study, $\alpha = .90$ at T1, $\alpha = .91$ at T2).

**Somatic symptoms**

The somatic symptoms scale was abbreviated from the Patient Health Questionnaire–15 (PHQ-15; Kroenke, Spitzer, & Williams, 2002). The scale recognizes somatic symptoms that are associated with depression and anxiety disorders (Han et al., 2009). Good psychometric properties of high internal consistency $\alpha = .80$ and construct validity were reported in previous studies (Gierk et al., 2015; Hauser, Brahler, Wolfe, & Henningsen, 2014; Kroenke et al., 2002). Five items were used to measure somatic symptoms in the previous 4 weeks, with items comprising, ‘headache’, ‘muscular pain’, ‘back pain’, ‘fatigue’, and ‘dizziness’. A 5-point scale was used to measure somatic symptoms (1 = never/barely ever to 5 = always) (for this study, $\alpha = .86$ at T1, $\alpha = .84$ at T2).

**Analysis strategy**

To test all hypotheses, we used hierarchical linear modelling (HLM) software (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). To evaluate the climate properties of PSC, we
ran several tests including a one-way random analysis of variance (ANOVA), the intraclass correlation (ICC [1]) (see Table 1), and within-group agreement ($r_{WG}$) (James, Demaree, & Wolf, 1984) to ensure that the PSC construct possessed team-level features. The ICC (1) for PSC at T1 was .23, indicating an adequate amount of variance, 23%, was due to random team factors. As reported by Mathieu and Taylor (2007), values between .15 and .30 are common in multilevel studies. For within-group agreement, a value for $r_{WG} > .90$ would indicate very strong agreement (LeBreton & Senter, 2007). The mean of $r_{WG}$ for PSC at T1 was .97 (standard error $[SE] = .01$), with a significant $F$ value. Together, these results suggested that PSC shows significant differences between groups, and strong agreement within groups, with an ICC (1) higher than any of the other (non-climate) measures. Taken together, the evidence indicates that it is appropriate to consider this construct as team-level construct and that responses could be aggregated to the team level.

To test the cross-level moderation effect of PSC on the lower-level interaction of job demands and resources, we firstly regress the Time 2 outcome variables on Time 2 demands, resources, and demand–resources interaction at Level 1 while controlling for the Time 1 Level 1-dependent variables; within these regressions, we also entered PSC at Time 1 at Level 2. This allows us to understand the interaction of demands and resources without taken into account the buffering effect of PSC. Secondly, we had PSC interact with all Level 1 variables, and finally, we entered the interaction between PSC and demands–resources interaction terms. All the variables were standardized (Mathieu & Taylor, 2007); thus, the product term of the interaction effect is a product of standardized values. We then plotted the significant interaction effect by following the technique of Dawson and Richter (2006). In order to plot these figures, we entered the interaction regression coefficients into a Microsoft Excel worksheet, which is prepared by Dawson and is available online.

To further validate the results and reduce the possible response bias in multilevel analysis using single sources (Ostroff, Kinicki, & Clark, 2002), we generated two subsamples of PSC at Level 2 by splitting the sample into two subgroups; we randomly assigned the sample into subgroups A and B. Then, we reran the analysis with each subsample (A and B) PSC with the full sample at Level 1 to provide two validation tests. If results can be validated with this technique, this is additional confirmation that PSC is a shared entity and exerts effects somewhat independent of perceiver effects.

Results

Table 1 shows the results of the descriptive analysis and the Pearson bivariate correlations between the variables at individual level. All correlations were in the expected direction.

For hypothesis testing, we first ran the baseline model and the variance components of the Level 1 outcomes (i.e., emotional exhaustion and somatic symptoms) at Time 2, controlling for Time 1 emotional exhaustion and somatic symptoms. This step helps reduce or eliminate the effects of other possible variables (Kenny, 2016). Initially, we ran the tests with Time 2 outcomes regressed on the Time 1 measures of demands and resources (and their interactions). However, we found no support for the hypotheses using these Time 1 measures. Hence, we proceeded to test with Time 2 measures of demands and resources. The findings of the HLM analysis are presented in Tables 2 and 3.

In Hypothesis 1, we predicted that PSC would moderate the positive relationship between emotional demands and psychological health. For both emotional exhaustion (Table 2, Model 2, Figure 2), $\gamma = -.16$, $SE = .08$, $p < .01$, and somatic symptoms
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<td>0.38</td>
<td>.34***</td>
<td>-.17***</td>
<td>-.14***</td>
<td>.72</td>
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<tr>
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<td>Rewards T2</td>
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<td>.11*</td>
<td>-.10*</td>
<td>-.09</td>
<td>.31***</td>
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<td>.15***</td>
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<td>8</td>
<td>Emotional exhaustion T1</td>
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<td>.26***</td>
<td>.04</td>
<td>-.16**</td>
<td>-.02</td>
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<td>.90</td>
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<td>3.12</td>
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<td>.27***</td>
<td>.35**</td>
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<td>-.13**</td>
<td>.00</td>
<td>-.02</td>
<td>.26**</td>
<td>.91</td>
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<td>10</td>
<td>Somatic symptoms T1</td>
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<td>.33***</td>
<td>.17***</td>
<td>-.19**</td>
<td>-.10</td>
<td>-.07</td>
<td>-.08</td>
<td>.26**</td>
<td>.23**</td>
<td>.86</td>
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<td>11</td>
<td>Somatic symptoms T2</td>
<td>2.53</td>
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<td>.17***</td>
<td>.19***</td>
<td>-.14***</td>
<td>-.13***</td>
<td>-.05</td>
<td>-.03</td>
<td>.16***</td>
<td>.41***</td>
<td>.42***</td>
<td>.84</td>
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</tr>
</tbody>
</table>

**Notes.** PSC = psychosocial safety climate.

Values in bold font on the diagonal indicate the Cronbach alpha (α) value of each variable. $N = 429$; 53 teams.

* $p < .05$; ** $p < .01$. 

PSC as a moderator of the moderators
Hypothesis 2a predicted that decision authority moderates the effect of emotional demands on emotional exhaustion. As shown in Model 1, Table 2, the relationship between emotional demands Time 2 and emotional exhaustion Time 2 was not moderated by decision authority at Time 2, \( \gamma = -.07, SE = .04 \), not significant [ns]. Hypothesis 2b predicted that decision authority moderates the effect of emotional demands on somatic symptoms; as shown in Model 3, Table 3 the relationship between emotional demands and somatic symptoms was not moderated by decision authority Time 2, \( \gamma = .01, SE = .05, ns \). Hypothesis 2a and Hypothesis 2b were not supported.

Hypothesis 3a predicted that rewards moderate the positive effect of emotional demands on emotional exhaustion. As shown in Model 2, Table 2, the interaction term of emotional demands and rewards was not significant in relation to emotional exhaustion, \( \gamma = -.01, SE = .04, ns \). Hypothesis 3b proposed that rewards moderate the positive effect of emotional demands on somatic symptoms; as shown in Model 4, Table 3, this was not significant, \( \gamma = .00, SE = .04, ns \). Hypothesis 3a and Hypothesis 3b were not supported.

Hypothesis 4 predicted that PSC moderates the demands–resources interaction on workers’ psychological health. To test this, we added the relevant three-way cross-level interaction effect to the relevant models. Findings showed that PSC only moderated the interaction of emotional demands and rewards in association with somatic symptoms, \( \gamma = .14, SE = .05, p < .01 \) (see Model 4). This specific result was further validated by two additional tests in the split samples as shown in Table 3. Hypothesis 4 was strongly supported when the outcome was somatic symptoms, but not supported in relation to emotional exhaustion.

The three-way interaction of PSC on the interaction between emotional demands and rewards on somatic symptoms is shown in Figure 4. We followed the techniques of Dawson and Richter (2006) to probe the slope differences and examine the significance of the differences using t-tests. We confirmed that the difference between all slopes was significant except for Slope 1 and Slope 2 as shown in Table 4. As we can see from the plot, and confirmed statistically, Slope 4 of Figure 4 is significantly different from the other slopes, illustrating that the worst scenario is when rewards and PSC are both low (supporting the PSC resource passageway effect). In cases when either PSC or rewards was low, somatic symptoms were reduced or stabilized as emotional demands increase; when PSC and rewards were high, there was no increase in somatic symptoms as demands increased. Note that if this was a safety signal effect, we would have observed a significant difference between Slope 1 and 2; as emotional demands increase, we would expect that positive effects on somatic symptoms – even if rewards are high, the relationship will only reduce when there is also high PSC; we did not observe this effect, as both slopes are parallel. We validated this model using the same procedures in the split-sample models and similar slope patterns were found.

**Discussion**

This study of health care workers sought to investigate how well PSC theory fares against job demands-resources model and two job resources, that is, control and rewards, as
moderators of the effects of emotional demands on psychological health outcomes (assessed as emotional exhaustion and somatic complaints). In a series of two-way interactions, we found that PSC was a stronger moderator of emotional demands than either job control or job rewards in accounting for both emotional exhaustion and somatic symptoms. Specifically, PSC at the team level acted on the positive lower-level relationship between job emotional demands and psychological health outcomes. The effect was evident in models that also included the lower-level interactions as predicted in general by job demands-resources model (and specifically by the job demand-control model and effort-reward imbalance model). In the two-way analysis, it was not possible to discern whether the PSC moderation could be explained by the safety signal hypotheses. However, the results could be due to a resource caravan passageway; the fact that only PSC buffered emotional demands may be because PSC offers additional emotional resources (supervisor support, debriefing services); researchers have argued that demands–resources interaction may be attributable to the strength of the matching hypothesis (de Jonge & Dormann, 2003, 2006). Matching hypothesis proposes that the moderating effect of a resource on the relationship between demands and outcomes is the most salient when they are in the same domain, in other words, when they match

Table 2. Three-way interaction: PSC moderating the demands–resources interaction on emotional exhaustion

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Emotional exhaustion T2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline model</td>
</tr>
<tr>
<td>Level 1 (Within-group effects)</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.02 (.07)</td>
</tr>
<tr>
<td>Emotional exhaustion T1</td>
<td>.24 (.04)***</td>
</tr>
<tr>
<td>Emotional demands T2</td>
<td>.38 (.05)***</td>
</tr>
<tr>
<td>Decision authority T2</td>
<td>.02 (.04)</td>
</tr>
<tr>
<td>Rewards T2</td>
<td>-.07 (.06)</td>
</tr>
<tr>
<td>Emotional demands T2 x Rewards T2</td>
<td>-.07 (.04)</td>
</tr>
<tr>
<td>Emotional demands T2 x Decision authority T2</td>
<td>.02 (.05)</td>
</tr>
<tr>
<td>Level 2 (Between-group effects)</td>
<td></td>
</tr>
<tr>
<td>PSC T1</td>
<td>-.13 (.06)*</td>
</tr>
<tr>
<td>PSC T1 x Emotional demands T2</td>
<td>-.11 (.05)</td>
</tr>
<tr>
<td>PSC T1 x Decision authority T2</td>
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<tr>
<td>T2 x Decision authority T2</td>
<td>.02 (.05)</td>
</tr>
<tr>
<td>ICC (1)</td>
<td>.13</td>
</tr>
<tr>
<td>Within-team (L1) variance ($\sigma^2$)</td>
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</tr>
<tr>
<td>Intercept (L2) variance ($\gamma_{00}$)</td>
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<tr>
<td>$-2 \log$ likelihood (FIML)</td>
<td>1175.03</td>
</tr>
</tbody>
</table>

Notes. PSC = psychosocial safety climate; FIML = full-information maximum likelihood. 
$N = 429$, 53 teams. 
*p < .05; **p < .01; ***p < .001.
Table 3. Three-way interaction: PSC moderating the demands–resources interaction on somatic symptoms

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Baseline model</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Split-sample Model 4a</th>
<th>Split-sample Model 4b</th>
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<tr>
<td>Level 1 (Within-group effects)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.03 (.06)</td>
<td>-.02 (.06)</td>
<td>-.02 (.06)</td>
<td>-.01 (.06)</td>
<td>-.00 (.06)</td>
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<tr>
<td>Somatic symptoms T1</td>
<td>.42 (.05)***</td>
<td>.40 (.05)***</td>
<td>.37 (.05)***</td>
<td>.41 (.05)***</td>
<td>.41 (.06)***</td>
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<tr>
<td>Emotional demands T2</td>
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<td>.15 (.06)*</td>
<td>.12 (.07)*</td>
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<tr>
<td>Emotional demands T2 × Decision authority T2</td>
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<tr>
<td>Emotional demands T2 × Rewards T2</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2 (Between-group effects)</td>
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<tr>
<td>PSC T1</td>
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<td>-.11 (.06)*</td>
<td>-.15 (.05)***</td>
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<tr>
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<td>-.17 (.06)***</td>
<td>-.11 (.07)</td>
<td>-.05 (.07)</td>
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<tr>
<td>PSC T1 × Decision authority T2</td>
<td>.13 (.05)*</td>
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<tr>
<td>PSC T1 × Rewards T2</td>
<td>-.07 (.04)*</td>
<td>-.05 (.03)*</td>
<td>-.05 (.03)</td>
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<td></td>
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<tr>
<td>PSC T1 × Emotional demands T2 × Decision authority T2</td>
<td>-.00 (.05)</td>
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</tr>
<tr>
<td>PSC T1 × Emotional demands T2 × Rewards T2</td>
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<td></td>
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<tr>
<td>ICC (1)</td>
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<td>.67</td>
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<td>.09</td>
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<td>.07</td>
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<td>1103.43</td>
<td>1097.94</td>
<td>923.84</td>
<td>931.45</td>
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Notes. PSC = psychosocial safety climate; FIML = full-information maximum likelihood.
N = 429; 53 teams.
*p < .05; **p < .01; ***p < .001; + significant at one-tailed.
(e.g., emotional demands, emotional resources, and emotional distress; Chrisopoulos, Dollard, Winefield, & Dormann, 2010; Daniels & de Jonge, 2010), and this would apply to the role of PSC more so than control and rewards in account for emotion-related outcomes.

Moreover, we sought to contextualize the job demands-resources model by considering PSC as a ‘moderator of the moderators’ of resources (i.e., decision authority and rewards). In a series of three-way cross-level interactions, we tested how PSC moderated the two-way interaction between job emotional demands and resources, and consequently their effects on the psychological health among health care workers. Specifically,
we proposed that PSC is the distal factor, which buffers the interaction effect between demands (i.e., emotional demands) and resources (i.e., decision authority and rewards) on workers’ psychological health status, as a safety signal process or as a resource caravan passageway.

We found that team-level PSC moderates the effect of the interaction of rewards and emotional demands on worker somatic symptoms, but not on emotional exhaustion. Our results showed that emotional demands have the most harmful impact on somatic symptoms when rewards are low and when PSC is low too. Put simply, when both rewards and PSC are low, high emotional demands lead to highest level of somatic symptoms. For the other scenarios, this suggests rewards and PSC may provide complementary resources in tackling the deleterious effect of emotional demands, operating as a resource passageway rather than the proposed safety signal effect. The latter posits that in a context of high PSC, employees feel safer to use resources, so we would expect that the relationship between demands and rewards is non-significant (i.e., slope is flat in the graph) when PSC is low. However, when PSC acts as a resources passageway, the interaction between demands and rewards is presented regardless the level of PSC, but it is improved when PSC is high. Aligned with the theory of PSC, PSC itself may serve as a higher-order resource mechanism originating from the management. This team-level resource could diminish the impact of demands and ensure that the employees’ well-being (Bakker & Demerouti, 2007, 2017; Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007).

It is important to note that we found the interactive relationship between lower-level emotional demands and job resources was only significant cross-sectionally (all demands,
resources, and outcomes at Time 2). As noted, we examined the longitudinal effect of these relationships by testing all the independent variables at Time 1 to predict health outcomes at Time 2, and controlling for Time 1 outcomes. However, no significant moderating effect was found for either control or rewards. This indicates that the interaction effect of demands by job resources is not longitudinal. Indeed, Siegrist (1996) explained that, for an unbalanced effort–reward condition to be sustained, certain conditions are required, which include the labour market situation, strategic reasons, and personal commitment. When an individual encounters an imbalance of effort and rewards (which indicates loss of resources), they will actively and almost immediately seek resources to regain and retain the balance, according to the conservation of resources theory (Hobfoll, 2002; Hobfoll & Freedy, 1993). This explains why it is less likely that evidence of the reward buffering effect will be found longitudinally (van Vegchel et al., 2005). Similarly, previous meta-analyses have found less evidence on the longitudinal interaction effect of control on demands compared to their cross-sectional effect (Häusser et al., 2010). By contrast, the moderating effect of PSC was longitudinal (even though the relationship to be moderated was cross-sectional), indicating the more pervasive effect of climate.

**Theoretical implications**

There are several theoretical implications arising from this research. We found that PSC theory may provide some explanations for how the negative effects of workplace emotional demands could be offset, in addition to the Job Demand-Control and effort-reward imbalance model. The evidence for this statement is that PSC as an organizational-level factor moderated emotional demands in relation to both emotional exhaustion and somatic symptoms, yet there was no evidence about the functionality of job resources (control and rewards) to do so, in current study.

Second, the contextual role of PSC, as a ‘moderator of the moderators’, was supported somewhat when considering rewards, emotional demands, and their effects on somatic symptoms. Our evidence was validated in two split-sample models. Similar findings showed that PSC has a buffering effect towards the interaction between rewards and emotional demands. The notion that PSC asserts boundary conditions about how resources work, could help to clear up prior inconsistent research findings of the interactive effects between control–demands and rewards–demands relationship.

Third, the results provide evidence for the theoretical mechanisms concerning how PSC operates as a moderator of other moderators. Two processes were considered, the

<table>
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<th>Pair of slopes</th>
<th>t-Value</th>
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<td>Slope 1 and Slope 2</td>
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</tr>
<tr>
<td>Slope 1 and Slope 3</td>
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<td>Slope 1 and Slope 4</td>
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<td>Slope 2 and Slope 4</td>
<td>−2.25*</td>
</tr>
<tr>
<td>Slope 3 and Slope 4</td>
<td>−3.65**</td>
</tr>
</tbody>
</table>

*Note. *p < .05; **p < .01; + significant at one-tailed.
safety signal mechanism, uncovered in prior research (Dollard, Tuckey, et al., 2012), and a resource passageway mechanism. Here, we found support for the assumption of PSC as a resource passageway. In interacting with rewards, when somatic symptoms are at stake and emotional demands are being experienced, PSC acted to compensate when rewards were low; even though rewards were low PSC acted to compensation for low rewards (by providing a passageway for a range of resources) and still reduce the effect of high emotional demands; the situation was worst when PSC and rewards were low.

Furthermore, our findings suggest that the design of working conditions alone is not comprehensive enough to explain the causes of the reduction in health status among workers. To achieve the optimal effect of the interaction of demands and resources, a ‘right’ climate should be implied which, in this study, we refer to as high PSC, a climate that focuses on workers’ psychological health. Through a high PSC, employees can work in a stress-free environment, by compensating for resources, and optimizing resource use (as shown in other research).

However, in the current study, we found no support for PSC buffering the interaction of demands and control, even though PSC is a precursor to the job demand-control model in an Australian study (Dollard, Opie, et al., 2012). We believe this may be due to the cultural differences between Australians and Malaysians. Erez (2010) argued that the cultural background of an employee will affect the employee’s perception of their working conditions, which, in turn, will have different effects on different employees’ outcomes. To further illustrate, work control or autonomy is less valued by employees working within a high power distance and collectivistic culture than by those within individualistic and low power distance cultures (Erez, 2010; Williamson, Burnett, & Bartol, 2009). Individualists are described as more self-reliant and competitive and more focused on their own needs and goals, while collectivists are said to highly value the advantages of being members of a group and are more cooperative and interdependent (Hofstede, 1980). Autonomy in the workplace is a key resource, which is closely related to the individualistic value in which freedom of choice is provided to cultivate work meaningfulness and responsibility (Erez, 2010). In contrast, employees in a collectivistic society are more likely to perform when they have direct instructions from their superiors. Research has confirmed that Malaysia is a country which is more collectivistic, in comparison with Australia (Noordin & Jusoff, 2010). In other words, the effect of job control for Malaysian workers’ outcomes is not as salient as it is when applied within an individualistic society. PSC therefore could not act to compensate for low job control (which did not have an effect) or promote its beneficial use.

**Practical implications**
The current study’s findings suggest that PSC served as a resource passageway, funnelling resources through pro-social decisions that enable workers to offset the deleterious effect of demands (and as it turns out low resources). It also served as a safety signal within a team, signalling to the workers whether or not they could feel safe and secure in using reward resources available to them.

The PSC as a ‘moderator of the moderators’ shows the importance of considering organizational, ecological, or contextual factors in reducing the dangers of demands which at times, particularly in the health care sector, may be unavoidable. In a high PSC context, workers may be more active in seeking appreciation, rewards and reassurance from their supervisors, allowing resources to be accumulated. The reason is that supervisors with a high sense of PSC understands the importance of job resources in a
workplace and will willingly engage in promoting workers’ health by providing resources. Hence, management should not only focus on the actions involved in structural job design but should also incorporate efforts to promote a high PSC by increasing awareness among supervisors of the importance of workers’ psychological health.

Previous research in Malaysia by Idris et al. (2012) reported a low PSC mean score of 26.03 among Malaysian private sector workers. Surprisingly, we found a high PSC mean score of 41.76 at Time 1 and 43.19 at Time 2. Both of our study’s mean scores are higher than the benchmark of a PSC of 41, which indicates a low risk of poor work conditions and psychological health problems such as depression (Bailey, Dollard, & Richards, 2014). The different PSC results between our study and that of Idris et al. (2012) may be due to the different nature of the jobs of the workers involved in these two studies. The practical implications are that, although on average the teams in the hospital sample scored high on PSC, 23% of the teams scored low on PSC (PSC score < 36). Work should be undertaken to improve the level of PSC across all teams by considering the training and selection of supervisors and middle managers, seeking to recruit and/or develop those who value workers’ psychological health and endeavour to construct working contexts that are not too emotionally demanding, where resources particularly rewards are available and can be used by workers to enhance their own resource caravan. Providing feedback to supervisors on PSC levels in teams is important to create congruence between supervisors/managers and employee perceptions regarding PSC performance by leaders, whether they show concern, how they prioritize psychological health, how they establish communication systems regarding psychological health, and how they establish systems for employees to participate in informing and shaping new policies and procedures. Also being consistent in saying (espoused PSC) and doing (enacted) PSC is also important for ensuring that PSC is effective, and ensuring a resource passageway and a strong consistent reliable safety signal (Yulita, Dollard, & Idris, 2017).

**Limitations and future research**

Notwithstanding the innovative theoretical framework in this study, the following limitations need to be considered. Firstly, we used a self-rated questionnaire which may lead to common method explanations for relationships between variables. However, our methods, using longitudinal multilevel modelling, testing interactions, and using aggregated PSC data, help to rule out individual response biases as explanations for the findings. Moreover, we used split-sample models to verify our findings. Using the split sample, we found a consistent pattern on the three-way interaction of PSC–demands–rewards. Secondly, although we were innovative in contextualizing demands–resources relationship with PSC using the concept of resources caravan passageway, we were limited in that we tested only one demand and two resources (i.e., control and rewards) from the wide range possible in the workplace. As suggested by Brough and Biggs (2014), researchers may also need to consider other job-specific work characteristics (e.g., the time needed to prepare medicines for patients) when assessing the impact of job characteristics.

Thirdly, due to our sampling methods, most of the study sample were nurses and nursing assistants which may lower the generalizability of our study to other health care professions and occupations. As a final note, we suggest that future research should consider including different occupations and multiple data sources (e.g., objective safety outcomes, recorded sickness absences) to increase the validity of the data, together with the use of multiple-wave longitudinal design to uncover the causal link between
organizational climate and workers’ health. The role of culture (individualism vs. collectivism) might also be an interesting variable to be considered in future studies.

**Conclusion**

This study contributes to the literature by finding among health care workers that PSC as an organizational resource is a stronger moderator of emotional demands to psychological health relationship than job task resources, as proposed in several traditional work stress theories, such as the Job Demand-Control (job control) and Effort-Reward Imbalance (job rewards) models. Further, there was evidence that PSC contextualizes the relationship between demands and psychological health as a ‘moderator of the moderator (rewards)’. As such, contextual factors such as PSC may explain inconsistencies in prior research of job demands–control and demands–rewards interactions. The study uncovers the mechanism for how PSC functions as a moderator, through a resource carriageway, adding to prior evidence about safety signal processes. Our findings suggest that PSC should be the main target in designing interventions to prevent the detrimental effects of occupational hazards such as emotional demands for health care workers, specifically to reduce somatic symptoms. We believe that evidence from this study will help both policy makers and practitioners in developing the organizational context, job design, and practical interventions for worker psychological health.

**Acknowledgements**

This study is part of the research project entitled ‘The dynamic interplay of physical and psychosocial safety in frontline health care workplaces in Australia and Malaysia’, investigated by Prof. Maureen Dollard, Dr. Michelle Tuckey, Prof. Peter Chen, Prof. Bill Runciman, Dr. Sharon Morton, Ms. Mardi Webber, and Dr. Mohd Awang Idris. The research is funded by the Australian Research Council Linkage Grant, SafeWork SA; University of Malaya, and SA Health (RU027-2014).

**References**


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