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Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement

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We constructed a model of workplace psychosocial safety climate (PSC) to explain the origins of job demands and resources, worker psychological health, and employee engagement. PSC refers to policies, practices, and procedures for the protection of worker psychological health and safety. Using the job demands–resources framework, we hypothesized that PSC as an upstream organizational resource influenced largely by senior management, would precede the work context (i.e., job demands and resources) and would in turn predict psychological health and work engagement via mediation and moderation pathways. We operationalized PSC at the school level and tested meso-mediational models using two-level (longitudinal) hierarchical linear modelling in a sample of Australian education workers ($N = 209-288$). Data were repeated measures separated by 12 months, nested within 18 schools. PSC predicted change in individual psychological health problems (psychological distress, emotional exhaustion) through its relationship with individual job demands (work pressure and emotional demands). PSC moderated the relationship between emotional demands and emotional exhaustion. PSC predicted change in employee engagement, through its relationship with skill discretion. The results show that the PSC construct is a key upstream component of work stress theory and a logical intervention site for work stress intervention.

This article addresses a gap in the work psychology literature regarding the origins of psychosocial working conditions. We define a new construct, psychosocial safety climate (PSC), and explain how PSC as influenced by senior management affects psychosocial working conditions and in turn psychological health and engagement, via

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mediation and moderation paths. We use the job demands–resources (JD-R) framework (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) and build multi-level thinking into our explanation (Hackman, 2003; Kang, Staniford, Dollard, & Kompier, 2008). We examine PSC at the school level and explore its effects on the individual level, in a longitudinal study of education workers.

Safety and climate perspectives

PSC is defined as policies, practices, and procedures for the protection of worker psychological health and safety (Dollard, 2007). Psychosocial safety relates to *freedom* from psychological and social risk or harm. We see low PSC as *the* pre-eminent psychosocial risk factor at work capable of causing psychological and social harm through its influence on other psychosocial risk factors. Next, we delineate the construct of PSC by contrasting it with related constructs.

In general, organizational climate refers to 'shared perceptions of organizational policies, practices, and procedures' (Reichers & Schneider, 1990, p. 22). Organizational climate research that uses broad climate constructs has been criticized, due to lack of specificity in predicting outcomes (Carr, Schmidit, Ford, & DeShon, 2003). Therefore, Schneider (2000) argued that climate measures should be specific to the predicted outcome, for example, a 'climate for service' or a 'climate for safety'. In our framework, PSC is a facet-specific component of organizational climate, a 'climate for psychosocial health and safety', which is expected to precede working conditions.

A specific facet of organizational climate, safety climate, was introduced nearly 30 years ago (Zohar, 1980). Safety climate refers to a climate for physical health and safety, and is shown to predict individual safety behaviour (Coyle, Sleeman, & Adams, 1995), industrial accidents (Neal & Griffin, 2006), and injury to physical health (e.g., Silva, Lima, & Baptista, 2004). Safety climate relates to employees' perceptions of 'management's commitment and performance with regards to safety policy, procedures, and practice' (Rasmussen *et al.*, 2006, p. 770). Despite its influential history in relation to worker physical health and safety, the safety climate construct has not been used in relation to psychological health and safety. Indeed, two separate lines of research have emerged: safety climate, focusing on workplace climate, work systems and environment, and physical health outcomes; and work stress literature focusing on psychosocial risk factors and psychological health outcomes. Importantly, we identify a unique facet-specific construct, PSC, potentially unifying these disparate lines of research.

Another related construct, psychological safety, relates to team psychological climate, 'a shared belief held by a work team that the team is safe for interpersonal risk taking' (Edmondson, 1999, p. 354). Workers who experience a team environment that is psychologically safe are free to engage in risk taking behaviour that is necessary for learning. Edmonson models two antecedents to team psychological safety: context support and team leader coaching. In particular, the construct 'context support', combining instrumental, social, and emotional support, is possibly closer to (but not the same as) our conceptualization of PSC, than the construct team psychological safety. Importantly, we see PSC as an *antecedent* to Edmonson's psychological safety construct. Theoretically, we see PSC as *causally prior to* psychosocial working conditions, not indicated by them as suggested in the psychological safety literature (Kahn, 1990). Additionally, we see PSC as affecting not just interpersonal factors but a range of psychosocial risk factors (e.g., work pressure, job control).

We build on the foundational work of psychological safety, and the safety climate literature, and illuminate the features of climate specifically expected to affect psychological health by defining a new construct PSC. We argue that PSC flows principally from the priority given by senior management to production versus the psychological health of workers. Where there is political will and senior management favours a balance, we expect a number of policies, practices, and procedures to reflect this.

Zohar and Luria (2005) argue that as focal organizational facets may represent competing operational demands (e.g., safety vs. productivity; service climate vs. efficiency), the best indicators of an organization's true priorities are enacted policies, procedures, and practices. Therefore, our operational definition follows the safety literature and attempts to assess the priority of regard for psychological health, through evidence of relevant policies, procedures, and practices (Neal & Griffin, 2006).

Management commitment to safety is the central mechanism underlying safety climate (Flin & Yule, 2004; Zohar & Luria, 2005). Leadership commitment and awareness of safety varies across organizations (e.g., in hospitals, see Singer *et al.*, 2003). This variation means that safety climate may be evident at the organizational level, or the unit level. Psychological safety also varies between teams (Edmonson, 1999) and between organizations (Nembhard & Edmondson, 2006). Likewise, we expect that PSC varies because of senior management priorities, and may vary between organizations, units, and teams.

Finally, whereas in the literature psychological safety in teams is seemingly an optional benefit to enhancing team and organizational performance (Edmonson, 1999), PSC like safety climate, may well be mandated legally in many countries, under occupational health and safety legislation and duty of care provisions (See & Jhinku, 2003).

Next we examine relationships between PSC and the JD-R model.

PSC model

Within the JD-R model (Bakker & Demerouti, 2007; Demerouti *et al.*, 2001), job demands (e.g., work pressure, emotional demands) and job resources (e.g., job control, pay) impact on health and engagement in two separate psychological process pathways. The health impairment process is where sustained effort to cope with chronic job demands leads to over-taxing and erosion of a worker's energy reserve, leading, in turn, to negative responses (e.g., psychological distress). The motivational process is where adequate resources lead to engagement and positive organizational outcomes (Bakker & Demerouti, 2007, 2008).

We conceive of PSC as an organizational resource and expect that it will influence the work context (both job demands and resources; see Figure 1). First, it is plausible that a lack of PSC in an organization could lead to poorly designed jobs and chronic job demands. For example, high levels of work pressure may prevail because of a lack of policies, practices, and procedures aimed at maintaining work demands at manageable levels. An example could be a lack of procedures to report work overload and fatigue. A lack of PSC could also lead to increased pressure to hide emotions rather than express them. This may occur if worker concerns are not listened to, or if the importance of psychological well-being is not recognized, so that fear of expression is increased, along with associated emotional demands.
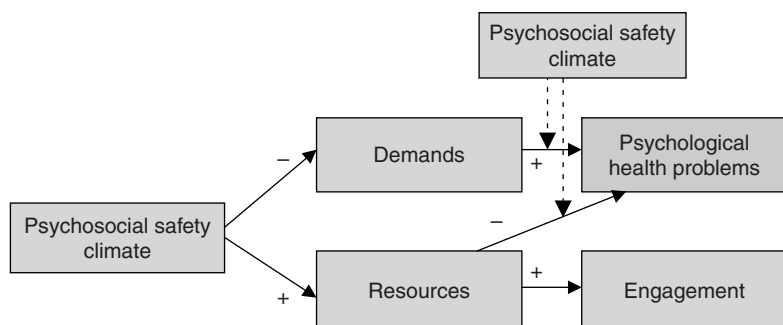
Figure 1. The PSC model.

Thus, we expect that PSC will have a negative effect on job demands. Additionally, in line with the health erosion pathway of the JD-R model, we expect that job demands will be positively related to psychological health problems. As an organizational resource, and because of the hierarchical nature of occupational health causes (Sauter *et al.*, 2002), we predict an indirect (or meditational) pathway, such that:

> *Hypothesis 1a:*   PSC is indirectly negatively related to psychological health problems through its negative relationship with job demands.

Additionally, PSC may moderate the relationship between job demands and psychological health problems. PSC will enable employees to cope with their job demands, for example, by providing relevant supportive practices such as the opportunity to debrief after emotionally challenging experiences. Conservation of resources (COR) theory in particular helps elucidate the process of moderation (Hobfoll, 1989, 2001). According to COR theory, individuals have a tendency to conserve and accumulate valuable resources, such as work conditions, job rewards, and personal energy. Resources are linked together and create 'resource caravans' (Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010). COR-theory predicts that personal resources such as beliefs in capability may increase, leading to outcomes like better coping (Salanova *et al.*, 2010). In high PSC contexts, therefore, increased coping capacity may reduce the impact of demands.

> *Hypothesis 1b:*   PSC will moderate the positive relationship between job demands and psychological health problems, such that, under conditions of high PSC, the strength of that relationship will be reduced.

PSC could also trigger the motivational pathway, posited by the JD-R model. As an organizational resource, and in line with Sauter *et al.* (2002), we expect that PSC will foster growth in other resources, including task level resources. As noted, senior managers play a significant role in setting the tone of the organizational climate, establishing priorities, and allocating resources (Flin, Mearns, O'Connor, & Bryden, 2000). A management style supportive of psychological well-being would give workers control over work timing and methods, and the freedom to develop new skills (Brown & Leigh, 1996). Therefore, we expect that individuals in more positive PSC contexts will experience increased resources (e.g., job control) over time.

In turn, we also expect that job resources will be positively related to work engagement. According to social exchange theory workers who perceive that the

organization cares about their well-being through adequate resource allocation, are more likely to be motivated and engaged (Bakker & Demerouti, 2008; Blau, 1964; Schaufeli & Bakker, 2004). Empirical evidence linking job resources to engagement is substantial (for a meta-analysis, see Halbesleben, 2010), with job control a strong predictor of engagement (Mauno, Kinnunen, & Ruokolainen, 2007). Bringing these two paths together we predict:

> *Hypothesis 2:*   PSC has a positive effect on work engagement through its positive relationship with job resources (control).

Additionally, cross-links between the health and motivation pathway, specifically between resources and psychological health problems, are well supported (Hakanen, Bakker, & Schaufeli, 2006). For example, a lack of control may lead to psychological health problems, owing to a lack of opportunities to cope with stressful situations (Karasek & Theorell, 1990; Schaufeli & Bakker, 2004). Therefore, we predict:

> *Hypothesis 3a:*   PSC is negatively related to psychological health problems through its positive relationship with job resources.

Finally, PSC may also moderate the relationship between resources and psychological health problems, by offsetting the impact of low individual resources. This could occur through the supply of resources in other areas (e.g., recognition) through a compensation process.

> *Hypothesis 3b:*   PSC will moderate the negative relationship between job resources and psychological health problems, such that under conditions of low PSC the strength of the relationship will be reduced.

We consider these hypotheses, specifically focusing on PSC at a school level, and its distal longitudinal impact on health and engagement via the job context measured at an individual level.

Method

Design and participants

Participants were Australian Education Department employees, comprising teachers (80%) and administrators (20%), from 19 schools: 11 primary schools, 1 high school, 4 secondary colleges, 1 preparation to year 12 college, and 2 special schools. Schools within two metropolitan regions considered similar to the department overall in terms of socio-economic demographics were selected and then schools within the regions were approached to volunteer. The number of schools participating was restricted to approximately 20 due to constraints on project resources. Note that one of the schools was ultimately not used in hierarchical linear modelling (HLM) due to low responses over time (< 5 participants from the school).

There were 288 participants at Time 1 (response rate 21%), 212 at Time 2, 6 weeks later, and 209 participants at Time 3, 12 months after Time 1. We could not reliably assess response rate at Times 2 and 3 due to a changing population base. Responses from each school ranged from 6 to 29. Participants were recruited as part of an organization stress prevention study via briefing sessions. Full ethics approval was obtained and confidentiality was assured.

The proportion of females to males at Time 1 was 81% ($N = 232$) to 19% ($N = 54$); at Time 2 it was 80% ($N = 168$) females to 20% ($N = 41$) males; and at Time 3 it was 82% ($N = 164$) females, to 18% ($N = 36$) males (note some data were missing on gender). Gender proportions were representative of the overall department across time (79% F; 21% M).

Ages ranged from 17 to 65 + years, and the median range on each occasion was 45 to 54 years, with most respondents (45%) in this range, representative of the department. Most worked 41–50 h per week with around 41% in this range across time points. Teaching to non-teaching staff proportions across all schools in the department (81:19) was nearly identical to the sample average over time (80:20).

We found no differences between the objective sickness absence rates obtained from the organization for the actual sample, for the 12 months prior to Time 1 ($M = 7.25$ days, $SD = 3.61$): (1) compared with the overall department mean ($M = 8.23$ days), $t(17) = -1.44$, $p = .27$; and (2) when schools were ranked against departmental absence rates for each school ($M = 7.44$ days, $SD = 1.51$), Wilcoxon signed ranks test $Z = -.36$, $p = .72$. In sum, demographic and sick leave evidence points to a non-biased participating sample over the three waves.

Measures

All measures were repeated measures, taken at Times 1 and 3 (12 months after Time 1), except for PSC, which was measured at Time 2 only (8 weeks after Time 1).

Psychosocial safety climate

We measured the construct using a four-item scale, using a recommended five-item response (Hinkin, 1995). Items were induced by reviewing the literature to derive evidence-based principles underlying successful stress prevention interventions (European Agency for Safety and Health at Work [EASHW], 2002; Jordan *et al.*, 2003; Kompier & Cooper, 1999; Kompier & Kristensen, 2001). We believed that evidence of these ingredients would indicate varying levels of PSC within the organization.

Top management support and commitment are necessary in stress prevention to ensure that appropriate values and philosophies are adopted and that adequate resources are available for workplace changes to occur, and to enable the integration of prevention activities into regular management systems (EASHW, 2002). This leads to the first PSC principle, that (1) senior management show support for stress prevention through involvement and commitment (Kompier & Cooper, 1999).

Interventions are more likely to be successful if they are embedded in an organizational philosophy that recognizes the interdependence of individual and organizational health and emphasizes the responsibility of every member of the organization in stress prevention (Jordan *et al.*, 2003). This leads to a second PSC principle, that (2) all layers of the organization are involved in the prevention of stress.

Involvement of workers can lead to increased ownership and improved organizational initiatives and outcomes (Bond & Bunce, 2001; Jordan *et al.*, 2003; Landsbergis & Vivona-Vaughan, 1995). Participation of workers is an essential ingredient in successful stress interventions (Kompier & Cooper, 1999). Particularly important is the establishment of channels for upward communication from staff to management (Jordan *et al.*, 2003), and the use of participatory problem solving (Cox, Randall, & Griffiths, 2002). This leads to the third PSC principle, an elaboration of principle 2, that

(3) participation and consultation in occupational health and safety issues occurs with employees, unions, and occupational health and safety representatives.

Finally, giving people a voice can be productive and empowering, giving workers a sense of control (Rosecrance & Cook, 2000), increased ownership of ideas, responsibility, and a legitimate role in occupational health and safety and work stress prevention (Dollard, LeBlanc, & Cotton, 2007; Pasmore & Friedlander, 1982). This leads to the final PSC principle that, (4) the organization listens to occupational health and safety contributions of workers. Together, these principles embody management commitment, communication, involvement, and participation, and were used in the study to operationalize PSC.

Principal components analysis with varimax rotation revealed one factor with loadings as follows: (1) 'Senior management show support for stress prevention through involvement and commitment' (.83); (2) 'Participation and consultation in occupational health and safety issues occurs with employees, unions, and occupational health and safety representatives' (.89); (3) 'In practice, the prevention of stress involves all layers of the organization' (.62); and (4) 'My contributions to resolving occupational health and safety concerns in the organization are listened to' (.85). One factor was extracted explaining 65% of the variance. The response scale ranged from 0 (strongly disagree) to 4 (strongly agree) ($\alpha = .81$).

We assessed the reliability and validity of PSC through administration of the measure to a different sample (cf. Hinkin, 1995). In an additional sample of Australian non-government human service workers ($N = 425$) all items loaded on a single factor, accounting for 57% of the variance following varimax rotation ($\alpha = .74$). Further concurrent validity was demonstrated by significant correlations with psychological distress ($r = -.30$, $p < .01$), emotional exhaustion ($r = -.25$, $p < .01$), and engagement ($r = .26$, $p < .01$). Finally, the four-item version correlated highly with an expanded 12-item version of the scale, $r = .78$, $p < .01$ (results available from the first author).

Resources (control)

This was assessed using two subscales of the short Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen, Hannerz, Høgh, & Borg, 2005). *Decision authority* was assessed using three items such as 'Do you have any influence in deciding how to do your work?' (Time 1, $\alpha = .62$; Time 3, $\alpha = .68$). Stability was $r = .55$, $p < .01$. *Skill latitude* was assessed using three items (Time 1, $\alpha = .71$; Time 3, $\alpha = .75$), such as 'I can use my skills and expertise in my work'. Stability was $r = .56$, $p < .01$. Both scale responses were on a five-point scale, from 0 (very rarely/never) to 4 (very often/always).

Demands

Psychological demands were assessed using four items from a COPSOQ subscale. An example item is 'I have to work very fast' (Time 1, $\alpha = .75$; Time 3, $\alpha = .77$). Stability was $r = .40$, $p < .01$. *Emotional demands* were assessed using four items from the COPSOQ subscale (Time 1, $\alpha = .75$; Time 3, $\alpha = .79$). An example item is 'Does your work require you to hide your true feelings?' ($\alpha = .73$). Stability was $r = .68$, $p < .01$. Both scale responses were on a five-point scale, 0 (very rarely/never) to 4 (very often/always).

Psychological well-being
We used the General Health Questionnaire (GHQ-12) (Goldberg, 1978; e.g., 'Have you recently felt you couldn't overcome your difficulties?'). Typical responses were: $0 = $ *not at all*; $1 = $ *no more than usual*; $2 = $ *rather more than usual*; and $3 = $ *much more than usual* (Time 1, $\alpha = .78$; Time 3, $\alpha = .79$). The GHQ-12 is a valid and reliable measure of psychological impairment (Andrews, Hall, Teeson, & Henderson, 1999). Stability was $r = .33$, $p < .01$.

Emotional exhaustion
The MBI-exhaustion (Maslach Burnout Inventory) subscale was used (Schaufeli, Leiter, Maslach, & Jackson, 1996). Due to length restrictions, we used two items from the five-item scale (i.e., 'I feel emotionally drained from my work'; and 'I feel used up at the end of the work day'). Responses were scored on a seven-point scale, 0 (never) to 6 (always, everyday). Inter-item correlations were: Time 1, $r = .73$ and Time 3, $r = .79$. In a separate sample of human service workers ($N = 425$), these two items correlated with the remaining three items of the full scale $r = .75$, $p < .01$. Further using exploratory factor analysis with varimax rotation, both items loaded $> .80$ on the overall scale. Stability was $r = .59$, $p < .01$.

Engagement
Similarly, we used two items from the nine-item shortened version of the Utrecht Work Engagement Scale (UWES), 'I am full of energy at work' and 'I am enthusiastic about my job' (Schaufeli, Bakker, & Salanova, 2006). To verify that two items could indicate engagement we again used a separate sample of human service workers ($N = 425$) and showed the two-item scale correlated with the remaining seven items of the full scale ($r = .84$, $p < .01$). Both items loaded $> .80$ on the nine-item scale using exploratory factor analysis with varimax rotation. Responses were scored on a seven-point scale, 0 (never) to 6 (always, everyday). Inter-item correlations were: Time 1, $r = .74$ and Time 3, $r = .74$. Stability was $r = .58$, $p < .01$.

   Psychometric properties of measures used at Time 1 and PSC Time 2 were assessed using confirmatory factor analysis. We assessed relative fit indices (i.e., comparative fit index (CFI), incremental fit index (IFI) and the Root Mean Square Error (RMSEA)). We confirmed an expected eight-factor structure, $\chi^2(495) = 852.58$, $p < .001$, with the fit indices showing acceptable fit (Hoyle, 1995); RMSEA $< .06$, CFI $= .90$, and the IFI $= .90$. The results confirm that PSC is a distinct variable and provides evidence against common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In aggregate, the new measure of PSC had good validity and reliability.

Statistical analyses
To assess for sample bias across panels, we devised a trichotomous measure with $0 = $ participated at Time 1 only ($N = 35$), $1 = $ participated at Time 2 only ($N = 42$), and $2 = $ participated at Times 1, 2, and 3 ($N = 211$). First, we contrasted participation at Time 1 with participation at all times. We regressed this (as the dependent measure) on to the outcome measures collectively for both Times 1 and 3. The results were not significant for Time 1 outcomes, $F(3, 235) = 0.64$, $p = .59$, $\eta^2 = .008$, nor for Time 3 outcomes, $F(3, 204) = 0.05$, $p = .99$, $\eta^2 = .001$, indicating no response bias. Next, we contrasted participation at Time 2 only with participation at all times, for both Times 1

and 3 outcomes, with $F(3, 245) = 0.69$, $p = .56$, $\eta^2 = .008$, and $F(3, 204) = 1.33$, $p = .27$, $\eta^2 = .019$, respectively. There were no differences between the three participation groups on the outcome measures at Times 1 and 3. Finally, we used a chi-squared test to check whether gender ($\chi^2(2, N = 286) = 0.04$, $p = .98$), and a Fisher's exact test to test whether age ($\chi^2(10, N = 287) = 16.03$, $p = .07$), was related to missingness. Again, there was no evidence of selectiveness in attrition.

We used HLM to test all hypotheses because: (1) HLM does not require listwise deletion of missing data but uses all the data, important given our sizable drop-out rate (Le Blanc, Hox, Schaufeli, Taris, & Peeters, 2007); (2) HLM assumes that the data are missing at random, and even though we showed that missingness was not related to key variables, HLM is tolerant of correlations between the attrition process and other variables of interest (Le Blanc *et al.*, 2007); (3) our data were nested: individuals nested within schools. We used HLM 6.06 software (Raudenbush, Bryk, Cheong, & Congdon, 2005).

We followed Mathieu and Taylor's (2007) rules of evidence for meso-mediation. In preparation, we assessed the intra-class coefficient, ICC(1), the relative magnitude and significance of variance that resides within and between Level 2 units (schools) and each level 1 criterion variable (see Table 1). Step 1 evaluated all univariate cross-level X (independent)–Y (outcome) relations (Table 3). Step 2 required a test of X on M (mediators; Table 3). Step 3 tested the $M \rightarrow Y$ relationship (Table 4). Step 4 required adding X into the model containing $M \rightarrow Y$, with X not adding any significant additional variance for full meditation (Table 4). School PSC measures were aggregated at Level 2. Note that all mediators and outcomes were assessed at the individual level (Level 1).

Table 1. Analysis of variance and ICC(1) statistics

Time 1	$F_{III}(17,270)$	ICC(1)
Pressure	2.11**	.0601
Emotional demands	4.50***	.1517
Skill latitude	1.78*	.0605
Decision authority	1.58	.0140
Psychological distress	2.36**	.0884
Emotional exhaustion	1.98*	.0519
Engagement	2.11**	.0592
Time 2	$F_{III}(17,190)$	ICC(1)
PSC	3.90***	.2215

*$p < .05$; **$p < .01$; ***$p < .001$.

For Hypothesis 1b, that PSC at the school level would moderate the longitudinal relationship, demands → psychological health problems, we used the following model:

Level 1. Psychological health problems T3 $= \beta_0 + \beta_1 \times$ dependent T1 $+ \beta_2 \times$ demands T3 $+ r$.

Level 2. $\beta_0 = \gamma_{00} + \gamma_{01} \times PSC + \mu_0$,
$\quad \beta_1 = \gamma_{10} + \gamma_{11} \times PSC$,
$\quad \beta_2 = \gamma_{20} + \gamma_{21} \times PSC$.

We substituted resources for demands to test Hypothesis 3b. All measures were standardized before entering them into the equation.

Aggregation procedures

We confirmed that PSC could be aggregated to the school level as the James, Demaree, and Wolf (1984) mean $r_{(WG)(j)}$ agreement index was .76 ($SD = 0.18$, range = .38 – .98), representing homogeneity of perceptions within schools. One-way random effects ANOVA, $F_{III}(17, 190) = 3.90$, $p < .001$, showed significant between-group variance. The ICC(1) was .22 and significant $\chi^2(17) = 66.56$, $p < .001$, indicating 22% of the variance in PSC could be explained by differences between schools (Table 1). The reliability of the group mean, the ICC(2), for PSC was .74, reaching the threshold of $\alpha > .70$ (Nunnally, 1978). These results provide good justification for aggregating PSC to the school level (Bliese, 2000).

We confirmed the validity of group PSC by aggregation of the PSC scores at the school level and correlating with objective sickness absence data supplied by the organization at the school level. The result was significant and negative, Spearman $\rho(18) = -.56$, $p < .05$, further confirming the construct validity of PSC.

Results

Descriptive statistics

As shown in Table 1, following Mathieu and Taylor's rules of evidence, analysis of variance, and the ICC(1) for all level 1 mediators and criterion variables were assessed to determine if sufficient between-group variance existed for meso-mediation testing (Bliese, 2000). All F_{III} values were > 1, and the ICC(1)s ranged from 1.4 to 15% suggesting sufficient variance for testing meso-relationships (Mathieu & Taylor, 2007). The means, standard deviations, correlations, and parameter estimates are shown in Table 2.

Test of the PSC model

In relation to Hypothesis 1, we proposed that PSC would be negatively related to health problems through its negative relationship with job demands. As shown in Table 3 for Step 1, school PSC was negatively and significantly related to changes in psychological distress T3 $\gamma = -.57$, $p < .05$ and emotional exhaustion T3 $\gamma = -.23$, $p < .01$ after controlling for baseline Time 1 levels. Step 2 required an examination of the independent measure on the mediators. Table 3 shows that school PSC was negatively related to work pressure T3 $\gamma = -.39$, $p < .001$, and emotional demands T3 $\gamma = -.27$, $p < .01$, again after controlling for baseline T1 levels on these variables, respectively. Step 3 required a test of the mediator to outcome relationships. Controlling for the respective dependent measures at Time 1 and other possible mediators (control, skill discretion), work pressure, $\beta = 0.33$, $p < .05$ and emotional demands, $\beta = 0.36$ $p < .05$, were significantly and positively associated with change in psychological distress over time (see Table 4, Step 3). Additionally, work pressure, $\beta = 0.15$, $p < .001$, and emotional demands, $\beta = 0.19$, $p < .001$, were significantly, positively related to change in emotional exhaustion over time.

In Step 4, school PSC added no significant variance to either psychological distress or emotional exhaustion. A significant indirect effect of school PSC on psychological distress was confirmed with work pressure significantly carrying the effect, Sobel $= -1.96$, $p < .05$. A significant indirect effect of school PSC on emotional exhaustion was also confirmed, with emotional demands as a mediator,

Table 2. Study variable descriptives and correlations

	N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. School PSC T2	288	10.79	1.70	—													
2. Skill discretion T1	288	10.34	1.57	.15**	—												
3. Decision authority T1	287	7.67	1.99	.07	.46**	—											
4. Work pressure T1	287	9.49	3.04	−.18**	.06	−.21**	—										
5. Emotional demands T1	285	10.02	2.65	−.26**	.05	−.07	.45**	—									
6. Psychological distress T1	288	12.94	5.30	−.23**	−.17**	−.21**	.37**	.32**	—								
7. Emotional exhaustion T1	286	4.35	1.93	−.21**	−.08	−.12*	.49**	.48**	.57**	—							
8. Engagement T1	287	5.95	1.41	.19**	.32**	.36**	−.15**	−.17**	−.42**	−.40**	—						
9. Skill latitude T3	213	10.15	1.76	.21**	.56**	.32**	.14*	.05	−.14*	−.07	.36**	—					
10. Decision authority T3	212	7.61	2.13	.12	.43**	.55**	.02	.00	−.23**	−.03	.25**	.52**	—				
11. Work pressure T3	209	9.16	2.98	−.33*	.02	−.15*	.59**	.43**	.29**	.35**	−.01	−.03	−.18**	—			
12. Emotional demands T3	211	9.66	2.96	−.34**	.08	.01	.36**	.68**	.30**	.41**	−.11	.03	−.04	.55**	—		
13. Psychological distress T3	210	12.09	6.27	−.20**	−.23**	−.27**	.14*	.17*	.33**	.24**	−.18*	−.36**	−.44**	.33**	.29**	—	
14. Emotional exhaustion T3	213	3.92	2.09	−.32**	−.08	−.08	.34**	.41**	.49**	.59**	−.22**	−.19**	−.26**	.54**	.56**	.44**	—
15. Engagement T3	212	5.86	1.68	.29**	.32**	.29**	−.13	−.16**	−.35**	−.27**	.58**	.43**	.41**	−.31**	−.26**	−.49**	−.40**

Note. All Pearson correlations, except with school PSC, parameter estimates are presented using HLM. *$p < .05$; **$p < .01$.

Table 3. HLM analysis of PSC predicting Time 3 mediator and dependent measures

| | Level 1 Time 3 Variable | | | | | | |
| | Step 1 | | | Step 2 | | | |
	Psychological distress	Emotional exhaustion	Engagement	Skill discretion	Decision authority	Pressure	Emotional demands
School PSC T2	−.57(.30)*	−.23(.07)**	.17(.08)*	.16(.07)*	.10 (08)	−.39(.09)***	−.27(.09)**
T1 dependent/mediator	.37(.08)***	.60(.06)***	.64(.06)***	.57(.06)***	.58(.06)***	.53(.05)***	.71(.07)***

Note. $df = 16, 209$. The first value is the parameter estimate and the value in parentheses is the standard error. Each analysis controls for the matching Time 1 measure. $*p < .05$; $**p < .01$; $***p < .001$ (one-tailed).

Table 4. HLM analyses of cross-level mediation–lower-level mediator

	Psychological distress T3			Emotional exhaustion T3		
	Step 3	Step 4	Sobel	Step 3	Step 4	Sobel
School PSC T2		− 0.03 (.25)			− 0.04 (.06)	
Dependent T1	0.17 (.07)*	0.18 (.08)*		0.41 (.06)***	0.41 (.06)***	
Skill discretion T3	− 0.69 (.25)**	− 0.69 (.26)**	− 1.73^	− 0.10 (.06)	− 0.09 (.07)	
Decision authority T3	− 0.89 (.22)***	− 0.88 (.22)***		− 0.16 (.06)**	− 0.17 (.06)**	
Pressure T3	0.33 (.15)*	0.33 (.15)*	− 1.96*	0.15 (.04)***	0.15 (.04)***	− 2.84**
Emotional demands T3	0.36 (.15)*	0.37 (.15)*	− 1.91^	0.19 (.04)***	0.19 (.04)***	− 2.54*

	Engagement T3		
	Step 3	Step 4	Sobel
School PSC T2		0.05 (.06)	
Engagement T1	0.56 (.07)***	0.54 (.07)***	
Skill discretion T3	0.15 (.06)*	0.16 (.06)**	1.75^
Decision authority T3	0.13 (.05)*	0.12 (.05)*	
Pressure T3	− 0.12 (.04)**	− 0.11 (.03)**	
Emotional demands T3	− 0.04 (.03)	− 0.04 (.04)	

Notes. The first value is the parameter estimate and the value in parentheses is the standard error. ^$p < .05$ (one-tailed); *$p < .05$; **$p < .01$; ***$p < .001$.

Sobel -2.54, $p < .05$, and with work pressure as a mediator, Sobel -2.84, $p < .01$. In sum, four possible tests of the fully mediated pathway, PSC $\rightarrow$ demands $\rightarrow$ psychological health problems were significant, providing strong support for Hypothesis 1a.

Hypothesis 1b specified PSC as a potential moderator of the demands to psychological health problems relationships. Table 5 shows main and interaction effects. For emotional exhaustion there was a significant interaction between PSC and emotional demands, $\gamma = -.18$, $p < .01$, after controlling for emotional exhaustion T1, main effects, and PSC $\times$ emotional exhaustion T1 interaction (see Figure 2). Graphical representation shows that at low levels of PSC the relationship between emotional demands and change in emotional exhaustion was positive and significant, $\beta = 0.79$, $p < .001$. At high levels of PSC, the slope was no longer significant. Thus, Hypothesis 1b is supported in relation to emotional demands, with emotional exhaustion as the outcome.

Table 5. Longitudinal multi-level random coefficient model of main and interaction effects of school PSC and emotional demands on emotional exhaustion

	Emotional exhaustion T3
Intercept	-0.04 (.05)
Emotional exhaustion T1	0.40 (.05)***
School PSC $\times$ emotional exhaustion T1	0.01 (.07)
Emotional demands T3	0.41 (.05)***
School PSC	-0.10 (.06)
School PSC $\times$ emotional demands T3	-0.18 (.06)**

Note. $df = 16{,}205$. The first value is the parameter estimate and the value in parentheses is the standard error. *$p < .05$; **$p < .01$; ***$p < .001$.

Hypothesis 2 stated that PSC has a positive effect on work engagement through its positive relationship with job resources. As shown in Table 3 for Step 1, school PSC was negatively and positively related to changes in work engagement T3 $\gamma = .17$, $p < .05$ after controlling for Time 1 work engagement. Step 2 required an examination of the independent measure on the mediators. Table 3 shows that school PSC was significantly and positively related to change in skill discretion T3 $\gamma = .16$, $p < .05$ but not decision authority. Step 3 required a test of the mediator to outcome relationships. Controlling for the dependent measures at Time 1 and other possible mediators (work pressure, emotional demands), skill discretion, $\beta = 0.16$, $p < .05$ and decision authority, $\beta = 0.12$ $p < .05$, were significantly and positively associated with change in work engagement over time (see Table 4, Step 3). The Sobel test statistic $= 1.75$, $p < .05$ (one-tailed) showed the skill discretion significantly carried the effect of PSC on to work engagement, supporting Hypothesis 2.

Hypothesis 3a, that PSC is negatively related to psychological health problems through its positive relationship with job resources, was not supported due to the lack of association between PSC and decision authority, the lack of association between skill discretion and emotional exhaustion, and only one significant Sobel test (of four tests) for skill discretion in the psychological distress model. Finally, there was no support for Hypothesis 3b that PSC would moderate the impact of job resources on psychological health problems.
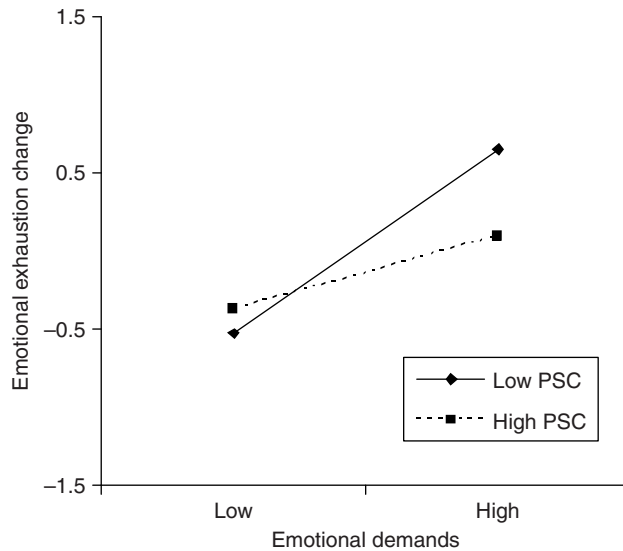
Figure 2. The longitudinal relationship between emotional demands and change in emotional exhaustion at high and low levels of school PSC.

Discussion

This study expands the JD-R model (Bakker & Demerouti, 2007, 2008), melds the safety climate and work stress literatures, and builds a theoretical model of workplace PSC. We conceived of PSC climate in terms of organizational policies, practices, and procedures about psychological health and safety. Within the PSC model, as an upstream organizational condition, we argued that PSC would presage psychosocial work conditions. The model was tested longitudinally using multi-level modelling in a representative sample of Australian education workers.

An important contribution of the study is that we proposed a new construct that is causally prior to working conditions. We found evidence of a top-down effect of PSC on lower level work entities, PSC predicting changes in skill discretion, work pressure, and emotional demands over time. We found strong evidence of a full meso-mediation process, school PSC → individual demands → changing individual psychological health problems. This finding is an important contribution because it provides some insights into the reasons for the experience of high levels of work pressure and emotional demands, which are known predictors of psychological distress (Dollard, Skinner, Tuckey, & Bailey, 2007).

In our sample, when senior managers failed to value worker well-being, we found, as expected, that this would be evident in terms of increased demands, perhaps because of a lack of attentiveness to work scheduling and adjustments of workload, for example, leading to an erosion of health. The evidence of mediation outlined a process through which PSC affects psychological health problems.

PSC also operated to moderate the impact of emotional demands on psychological health problems. Theoretically, the finding that PSC moderated the relationship between emotional demands and psychological health outcomes, but did not moderate work pressure can be explained by the triple-match principle of the demand induced compensation model (de Jonge & Dormann, 2006). The likelihood of finding an

interaction between demands (emotional demands) and resources (organizational PSC) is greatest when demands, resources, and strain are measured within qualitatively similar domains (de Jonge & Dormann, 2006). Results indicate that the emotional components of PSC are likely operational in attenuating the emotional demands → psychological health problem relationship. Teachers are increasingly exposed to emotionally demanding situations, as well as to violence from parents and students, and yet are required to hide their true feelings. High levels of PSC may reflect a level of understanding, and responsiveness to teachers concerns, enabling teachers to cope better with emotional demands that may not be directly preventable. Unexpectedly, we did not find that PSC moderated the negative impact of low decision authority. Again this tends to support the argument regarding matching, PSC possibly more aligned to an emotional rather than a cognitive resource.

We did find some evidence that PSC was directly related to job resources (see limitations below), specifically with skill discretion, and this in turn mediated the effect of PSC on work engagement. As organization resources boost individual skill discretion, as expected according to social exchange theory (Blau, 1964), levels of employee engagement increased.

Empirically this is the first paper to operationalize upstream organizational conditions (as PSC) within the JD-R framework. It shows that PSC is a fundamental organizational condition associated with both work psychological health and employee engagement. The results show that modelling work stress and motivation without attention to PSC gives an incomplete account. According to Cronbach and Meehl (1955), if a nomological network as we have outlined here, is confirmed by observation, then construct validity is supported and a new construct may be added to the framework (Trochim, 2006). Consequently, the significant results of this research provide evidence of construct validity, and support the extension of JD-R theory (Bakker & Demerouti, 2007) and other work stress theories specifying similar constructs and pathways.

An important contribution of the study is that it tests the longitudinal relationship of PSC to changing working conditions over a 12-month period and gives confidence that PSC predicts job demands, psychological health problems, and employee engagement. Importantly, PSC showed climate-like properties, and its aggregation to the group level somewhat offsets the argument that those negatively affected by PSC view the job more unfavourably, because the findings relate to group level rather than individual PSC effects. Finally, this research adds to the literature by introducing a new construct that helps to unify work in disparate areas of safety climate, psychological safety, and work stress research.

Study limitations, strengths, and directions for further research

The original research was commissioned by the organization, therefore there were constraints regarding the length of the tool, the content of the tool at various measurement points, and the number of items used. Thus, PSC was measured only once. It is important for future research to assess how PSC behaves over time and whether it varies with outcome measures. We found good psychometric properties for PSC at the group level, including reliability, convergent and divergent validity in relation to objective organizational data and nomological network validity. However, we only used a four-item scale. Hinkin (1995) argues for a balance between parsimony and adequate domain sampling. In subsequent research, we have expanded the domain coverage for

PSC to include elements explored in the general safety literature (e.g., management commitment, priority of safety, communication, involvement, Cox & Cheyne, 2000). As reported, we have found a high correlation ($r = .78$) between the four-item version and additional items in an expanded 12-item version, building confidence in the results reported here.

Further work is required to establish PSC as a new facet-specific component of organizational climate, to determine its unique contribution against similar constructs (organizational climate, safety climate, psychological safety). Future research could specify referents for the PSC measure to more accurately distinguish team/group and organizational levels (Zohar & Luria, 2005). PSC could be measured in other ways as well, for example, as awareness of actual organizational policies, practices, and procedures, and assessing whether monitoring of working conditions actually occurs.

Evidence was provided regarding the adequacy of the two-item emotional exhaustion and engagement measures; items within the measures were intercorrelated; in a comparative sample short scales were correlated highly with full scales traditionally used; and the correlation size and direction of the relationship between the PSC measure and the two full scales was very similar. Nevertheless, comparisons of this study to others should be exercised with caution.

Given this is the first test of the theory, we recommend further tests rather than rejection of the resource related hypotheses (Hypotheses 3a and 3b). Firstly, the internal consistency of decision authority was rather low possibly due to a small number of items used (Kristensen *et al.*, 2005). In a comparative sample of human service workers ($N = 155$), the reliability was acceptable ($\alpha = .75$) so the issue appears to be related to this sample. Low consistency could underpin the failure to find support the relationship between PSC and decision authority. Nevertheless, we did find that PSC predicted change in skill discretion overtime, and in turn employee engagement. Finally, future research should explore the relationship between PSC and other resources (e.g., rewards, supervisory adequacy) and demands (see Bakker & Demerouti, 2007; Schaufeli & Bakker, 2004).

During T2 to T3 a participatory stress intervention was implemented in half of the schools. Teams worked together to develop and implement interventions with the assistance of a facilitator. We considered the possibility that results of the present study were affected by the intervention. PSC was independent of group (intervention vs. control) and number of interventions implemented. We rerun analyses controlling for group membership and none of the results or effect sizes changed. Additionally, a PSC × group interaction was also considered on mediators and outcomes with no effects noted. Therefore, we are confident that the results are due to PSC.

Despite a low response rate we established that the sample was representative by gender, age, job role, and sickness absence rates therefore we do not consider the results to be biased. Further, we chose general job demands and resources therefore expect that the results are generalizable to other occupations.

Practical implications and conclusion

There is a theoretical and empirical case for managers to develop a robust PSC in organizations, to potentially reduce demands, bolster resources, and build environments conducive to health and engagement (Bond, Flaxman, & Loivette, 2006). The key action is to build PSC through senior management involvement and commitment and the enactment of related policies, practices, and procedures. Arguably the safety climate

movement tackling physical health problems and injuries and has gained considerable traction in organizations. However, the cost of psychological ill-health is significant (ASCC, 2006) and also requires attention. In addition to a conceptual gap, we see a social, moral, and legal imperative for the identification of PSC.

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