Chapter 2
Psychosocial Safety Climate: A Review of the Evidence

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Psychosocial Safety Climate (PSC) theory has developed over the past nine years providing a multilevel explanation of the causes of work stress. Previously, individual explanations of occupational stress dominated the research literature including the Job Demands-Control (JD-C) model (Karasek, 1979), the Effort-Reward Imbalance (ERI) model (Siegrist, 1996), and the Job Demands-Resources (JD-R) model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) which all examine how aspects of work design influence individual psychological health or engagement. PSC theory added to these models of individually perceived work conditions by explaining how the climate of an organisation or work group *created* the work conditions articulated in these models. The advantage of this multilevel approach became evident, as by measuring PSC in an organisation or work group, it was possible to predict the types of work conditions employees were experiencing and in turn whether employees were likely to be highly stressed or engaged. PSC theory was the first multilevel explanation of work stress in the research literature, providing a theoretical model for academics and practitioners to measure, monitor, benchmark and evaluate organisational, team level, and individual causes of work related stress within one conceptual framework.

This chapter provides a narrative review of PSC research completed over the past nine years. It covers published books, journal articles, book chapters, articles currently under review, and industry reports from 63 samples, during the period 2010–2018, that use PSC as the primary guiding theory. Key research findings from this work are catalogued by author/s, country, sample, study design, variables, and findings (presented in Table 2.1). Finally, gaps in the PSC literature requiring greater research attention are highlighted along with recommendations for future research and theoretical development.

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2.1 Development of PSC Tool and Theoretical Framework

Dollard and Bakker (2010), in a paper ***Psychosocial Safety Climate as a Precursor to Conducive Work Environments, Psychological Health Problems, and Employee Engagement***, defined PSC for the first time as "policies, practices, and procedures for the protection of worker psychological health and safety" (Dollard & Bakker, 2010, p. 580). They theorised that PSC is "the pre-eminent psychosocial risk factor at work capable of causing psychological and social harm through its influence on other psychosocial factors" (p. 580), and proposed that PSC is the "cause of the causes" of work stress. They proposed the first model of PSC to explain the upstream origins of job demands and resources, worker psychological health, and employee engagement. The model was tested in a sample of Australian education workers ($N =$ 209–288), nested in schools ($N = 18$), using two-level longitudinal hierarchical linear modelling with repeated measures spaced twelve months apart. PSC was aggregated to the school level. The researchers measured PSC using a 4-item scale, with a 5-point response format. The results showed that PSC was negatively related to individual psychological health problems (emotional exhaustion and psychological distress) because of its negative impact on individual job demands (work pressure and emotional demands). PSC also moderated the relationship between emotional demands and emotional exhaustion. Employee engagement was also predicted by PSC through its positive relationship with skill discretion. The results showed that PSC predicted psychosocial work conditions and could be an effective upstream action point for intervention.

Following these initial findings Bond, Tuckey, and Dollard (2010), in ***Psychosocial Safety Climate, Workplace Bullying, and Symptoms of Post-traumatic Stress***, linked PSC, workplace bullying, and post-traumatic stress symptoms. Using a sample of police officers ($N = 139$) from 22 police stations they found that PSC was related to the occurrence of workplace bullying, which was subsequently related to post-traumatic stress symptoms. High PSC also moderated the impact of bullying on post-traumatic stress symptoms. In this study, PSC was measured using an 8-item scale, which was an expanded version of the 4-item PSC scale created by Dollard and Bakker (2010). The study concluded that low PSC contributes to the development of bullying and subsequent mental health disability (post-traumatic stress symptoms).

Expanding the initial PSC measure Hall, Dollard, and Coward (2010), in ***Psychosocial Safety Climate: Development of the PSC-12***, used a pilot sample ($N = 78$) to develop a 12-item, 4-factor scale (PSC-12). The PSC-12 was then assessed using confirmatory factor analysis, and the scale was validated in a second representative sample of Australian workers ($N = 398$). The PSC-12 demonstrated relationships with psychosocial risk factors (e.g., job demands, job resources), worker engagement and health, and work-related outcomes (e.g., job satisfaction). Then, using a third multilevel sample of 16 teams of health care workers ($N = 106$), the researchers found that PSC showed group like psychometric properties and that team level PSC was associated with psychological distress and work engagement at the individual level. PSC also demonstrated incremental value in accounting for variance in emo-

tional exhaustion and work engagement beyond a physical safety climate measure. These results demonstrated that the PSC-12 could be used across a range of occupations, and amongst work teams within organisations, to predict psychosocial risk factors and subsequent worker health and engagement.

Dollard and Karasek (2010) in ***Building Psychosocial Safety Climate: Evaluation of a Socially Coordinated PAR Risk Management Stress Prevention Study,*** described an intervention undertaken using a sample of education workers in 18 different schools in Australia. (note this is a more detailed analysis of data from Dollard & Bakker, 2010). The study comprised a baseline ($n = 288$) and a post-intervention measure ($n = 212$). Workshops including employees, managers, supervisors, teachers, and administrators, were conducted within schools during the first eight weeks of the project. These workshops involved training participants in psychosocial risk management focusing mainly on work and organisational psychosocial risks, rather than individual risks. The authors found that: (1) a socially coordinated participatory action research based organisational risk management approach provides the structure and process to reduce work-related stress; and (2) the total impacts of a work-related stress intervention, including the actions, process, and progress, can create fundamental elements of PSC. The authors identified a moderating impact of PSC on the relationship between demands/control and psychological health outcomes, using a longitudinal design. A new model, the Health Conducive Production Model, was used to describe inputs and processes. The authors showed how theoretically, PSC can develop from the actions (what), progress (extent), and the process (how) of a work stress intervention.

2.2 PSC: Cross Cultural Application

Idris and Dollard (2011), in ***Psychosocial Safety Climate, Work Conditions, and Emotions in the Workplace: A Malaysian Population-Based Work Stress Study***, integrated PSC with the job demands and resources framework to examine the impact of both job demands and job resources at work on employee depression, anger, and engagement, using a population-based sample consisting of 269 Malaysian employees. In a mono-level cross-sectional study, results showed that PSC was negatively related to job demands and positively related to job resources. In mediated paths, job demands carried the effect of PSC on anger and depression, whereas job resources carried the effect of PSC on engagement. The study also showed that job demands related negatively to engagement, and that the effect was carried by anger and depression. Using multi-group analysis, the researchers found that the model had a similar fit with both public and private sector data. The study supported Dollard and Bakker (2010) in finding that PSC extended the JD-R model, and also showed that the PSC framework can be generalised and utilised within Eastern (predominantly Muslim) workplaces.

Idris, Dollard, and Winefield (2011) in ***Integrating Psychosocial Safety Climate in the JD-R Model: A Study Amongst Malaysian Workers***, further tested the emerging construct of PSC in Malaysia. The research design, approach and method

was a random population based sample using household maps provided by the Malaysian Department of Statistics ($N = 291$). Cross-sectional mono-level data were analysed using structural equation modelling. The main finding was that PSC was negatively related to job demands and positively related to job resources. Job demands, in turn, predicted burnout (i.e. exhaustion and cynicism), whereas job resources predicted engagement. Both burnout and engagement were associated with performance. Bootstrapping methods showed significant indirect effects of PSC on burnout via job demands, PSC on performance via burnout and PSC on performance via the resources-engagement pathway. These findings again confirmed Dollard and Bakker (2010) that JD-R theory may be expanded to include PSC as an antecedent and that the expanded JD-R model is largely valid in an Eastern, developing economy setting.

2.3 PSC: Predicting and Moderating Functions

Law, Dollard, Tuckey, and Dormann (2011) in ***Psychosocial Safety Climate as a Lead Indicator of Workplace Bullying and Harassment, Job Resources, Psychological Health and Employee Engagement,*** used a sample derived from the Australian Workplace Barometer project comprising 30 organisations, and 220 Australian employees. Hierarchical linear modelling showed that organisational PSC was negatively associated with workplace bullying and harassment (demands) and in turn psychological health problems (health impairment path). PSC was also positively associated with work rewards (resources) and in turn work engagement (motivational path). Accordingly, the researchers found that PSC triggered both the health impairment and motivational pathways, again confirming Dollard and Bakker (2010) by extending the JD-R model within a multilevel framework. The paper introduced the idea that PSC could act as a safety-signal providing cues about when it was safe to utilise resources. They found that PSC, as an organisation-based resource, moderated the positive relationship between bullying/harassment and psychological health problems, and the negative relationship between bullying/harassment and engagement. The findings provided evidence for a multilevel model of PSC as a lead indicator of workplace psychosocial hazards (high demands, low resources), psychological health and employee engagement, and as a potential moderator of psychosocial hazard effects.

Dollard (2012) in ***Psychosocial Safety Climate: A Lead Indicator of Workplace Psychological Health and Engagement and a Precursor to Intervention Success***, asserted that PSC is a starting condition into which an organisational intervention is implemented. It assessed the influence of PSC on intervention quality and the progress of a participatory action risk management stress intervention. Participants ($N = 181$) from two public sector departments in 18 intervention groups attended training and development workshops during an 8 week period and then implemented action plans during the following 10 months. Note this study uses the intervention group data from one department from Dollard and Karasek 2010 but focuses on

PSC as a predictor of outcomes rather than moderator of work conditions. Starting conditions were very important; PSC gave rise to better intervention implementation (participants attended more workshops, there was more change due to actions implemented, actions were implemented to a greater extent) and better qualitative outcomes (participants were listened to more, and trust was improved in the work group). Moreover, starting PSC was the best predictor of reduced emotional exhaustion and psychological distress, increased job satisfaction and engagement, and reduced intention to leave and sickness absence (obtained from department records). These results were over and above personal perceptions of PSC and other intervention measures such as intervention progress and quality. Thus, PSC is important for subsequent attempts to implement strategies for risk reduction and improve worker psychological health. Continuous building of the intervention context particularly PSC, participation and consultation with key groups (i.e. unions and their representatives, OHS personnel), should improve the climate for future risk and psychological health management.

Dollard, Tuckey, and Dormann (2012b) in ***Psychosocial Safety Climate Moderates the Job Demand–Resource Interaction in Predicting Workgroup Distress***, reported that many work-stress theories are based on the fundamental interaction hypothesis—that a high level of job demands will lead to psychological distress and that this relationship will be offset when there are high job resources. The researchers proposed that this interaction is contingent upon the organisational context; in particular, high levels of PSC will enable the safe utilisation of resources to reduce demands. The study sample consisted of police constables from 23 police units (stations) with longitudinal survey responses at two time points separated by 14 months (Time 1, $n = 319$, Time 2, $n = 139$). The researchers used hierarchical linear modelling to assess the effect of a proposed three-way interaction term (PSC $\times$ job demands $\times$ job resources) on change in workgroup distress variance over time. An interaction was confirmed between emotional demands and emotional resources (assessed at the individual level). In the context of unit PSC using aggregated individual data, as predicted, high emotional resources moderated the positive relationship between emotional demands and change in workgroup distress but only when there were high levels of unit PSC. Results were confirmed using a split-sample analysis. Results support PSC as a property of the organisation and a target for higher order controls to reduce work-stress.

Dollard and colleagues (2012a) in ***Psychosocial Safety Climate as an Antecedent of Work Characteristics and Psychological Strain: A Multilevel Model*** examined the 24 month cross-level lagged effects of PSC on psychological strain via work conditions. The researchers used an innovative design where data from two unrelated samples of nurses working in remote areas were used across time ($N = 202$, Time 1; $N = 163$, Time 2), matched at the work unit level ($N = 48$). The researchers identified that unit PSC as assessed by nurses predicted work conditions (workload, control, supervisor support) and psychological strain in different nurses in the same work unit, 24 months later. Results showed that the between-group relationship of unit PSC and psychological strain was mediated via Time 2 work conditions (workload, job control) and Time 1 emotional demands. The researchers proposed a multilevel work-stress model with PSC, an organisational contextual factor, precipitating the work-stress process.

Idris, Dollard, Coward, and Dormann (2012) in ***Psychosocial Safety Climate: Conceptual Distinctiveness and Effect on Job Demands and Worker Psychological Health*** used samples from two different cultures; an Australian sample ($N = 126$ workers in 16 teams within a primary health care organisation) and a Malaysian sample ($N = 180$ workers in 31 teams from different organisations and diverse industries). In both samples, confirmatory factor analysis verified that PSC was a construct distinct from related climate measures. Using hierarchical linear modelling, PSC was a more effective predictor, compared to other team level climate measures, of both job demands and psychological health problems. Results showed a mediation process, from PSC to job demands to psychological health problems. The researchers found both physical safety and PSC at higher levels in Australia, compared with the Malaysian organisations. The study also noted that levels of PSC were lower than those of physical safety climate in both countries, indicating that across these cultures there was lack of attention to workplace psychological health.

Rickard and colleagues (2012) in ***Organisational Intervention to Reduce Occupational Stress and Turnover in Hospital Nurses in the Northern Territory, Australia*** surveyed 484 nurses from the two Australian hospitals (T1, $n = 178$, T2, $n = 306$). The system level intervention included strategies such as the development and implementation of a nursing workload tool to manage nurse workloads, roster audits, increasing the amount of nursing personnel to address workload, improving access to clinical supervision and the availability of support for new graduates, the ability to access professional development opportunities including postgraduate and short courses, and a recruitment campaign to increase the number of new staff and graduates. The results showed a reduction in job demands, psychological distress, emotional exhaustion and turnover, and a significant improvement in job resources and system capacity (adaptability, communication). PSC improved across the hospitals although the difference was only significant for one hospital, possibly due to the high levels of turnover experienced.

Hall, Dollard, Winefield, Dormann, and Bakker (2013) in ***Psychosocial Safety Climate Buffers Effects of Job Demands on Depression and Positive Organisational Behaviors***, used individual-level cross-sectional research and moderated structural equation modelling ($N = 2343$ Australian workers) to test PSC as a moderator between (1) emotional and psychological job demands and worker depression compared with control and social support as alternative moderators and (2) depression and positive organisational behaviours (POB; engagement and job satisfaction) compared with control and social support as moderators. They found that PSC moderated the effects of job demands on depression and further moderated the effects of depression on POB, with a fit to the data that was as good as control and social support as moderators. The researchers concluded that PSC operates as a macro-level resource and safety signal to reduce work-demand related depression. They determined that organisations need to focus on the development of a robust PSC to improve workplace psychological health and positive organisational behaviours.

Winwood, Bowden, and Stevens (2013) in ***Psychosocial Safety Climate: Role and Significance in Aged Care***, examined a sample of aged care homes ($N = 184$). The authors found that high PSC was related to higher levels of workplace morale and lower levels of cynicism. Observational qualitative data gathered by the researchers

indicated that high PSC workplaces had managers who spoke in positive terms about employees such as "…my staff are my biggest asset" while low PSC workplace managers at times exhibited outright distrust of staff stating that employees were "…out for what they can get" or that they "make false claims for injury". The study also linked 13 aged care homes with workers' compensation costs. When PSC was high (PSC level was assessed on a 0–10 scale as a function of EAP support described by the facility manager) then workers' compensation claim costs for the aged care home specified by the state based workers' compensation agent were lower, and alternatively low PSC organisations exhibited higher costs.

Dollard and Neser (2013) in ***Worker Health is Good for the Economy: Union Density and Psychosocial Safety Climate as Determinants of Country Differences in Worker Health and Productivity in 31 European Countries***, explored whether work-stress related factors explained national differences in health and productivity (gross domestic product, GDP). They proposed a national worker health productivity model whereby macro market power factors (i.e. union density), predicted national worker health and GDP via work psychosocial factors and income inequality. Combining five data sets covering 31 wealthy European countries the authors aggregated worker self-reported health to the national level, finding that it accounted for 13% of the variance in national life expectancy and in national GDP. The most important factors explaining worker self-reported health and GDP between nations were two levels of labour protection, macro-level (union density), and organisational-level (PSC i.e. the extent of management concern for worker psychological health). In this study, PSC was assessed by how the most senior work health and safety personnel responded to questions about policies, practices and procedures in their organisation for worker psychological health. Most nations with high levels of union density and PSC (i.e., workplace protections) were Social Democratic countries (i.e., Sweden, Finland, Denmark, and Norway). The results supported the proposition that social and economic factors (e.g., welfare regimes, work related policies) in combination with political ideology at a national level explain differences in workplace protection (PSC) that are important for worker health and productivity. The results suggest that improving national and local democratic processes including unionism, will improve the implementation of policies for psychosocial risk factors at work including stress, bullying and violence, which are good for worker health and the economy, and should be considered in national health and productivity accounting.

Garrick and colleagues (2014) in ***Psychosocial Safety Climate Moderating the Effects of Daily Job Demands and Recovery on Fatigue and Work Engagement***, studied Australian school teachers ($N = 61$) who completed a diary for 5 consecutive days that was repeated three times over the course of approximately eight months. Diaries measured daily self-reports of job demands, recovery, fatigue, and engagement while perceived PSC was measured once per diary. Multilevel analyses demonstrated that between-individual PSC moderated the within-individual relationships between (1) job demands and fatigue, (2) job demands and engagement, (3) recovery and fatigue, and (4) recovery and engagement. PSC was also directly related to both fatigue and engagement. These results offer insight into how PSC acts as a buffer to protect worker mental health, and also highlights the benefits for schools to promote PSC within their organisation.

Idris, Dollard, and Yulita (2014) in ***Psychosocial Safety Climate, Emotional Demands, Burnout, and Depression: A Longitudinal Multilevel Study in the Malaysian Private Sector***, outlined a multilevel longitudinal study investigating PSC as a predictor of job characteristics (e.g., emotional demands), and psychological outcomes (i.e., emotional exhaustion and depression). Data were collected from employees in 36 Malaysian private sector organisations ($n = 253$, Time 1) (at Time 2, 27 organisations, $n = 117$ employees). Using hierarchical linear modelling they found that there were cross-level effects of PSC (measured at Time 1) on emotional demands and emotional exhaustion but not on depression (all measured 3 months later at Time 2). The authors also found evidence for a lagged mediated effect; emotional demands mediated the relationship between PSC and emotional exhaustion. Emotional exhaustion, however, did not predict depression.

2.4 PSC: Two Edited Books Provide Additional Evidence

In an edited book, ***The Australian Workplace Barometer: Psychosocial Safety Climate and Working Conditions in Australia***, Dollard and Bailey (2014) presented results from the Australian Workplace Barometer (AWB) which is a national surveillance project about Australian work environments based on the PSC framework. Evidence is presented from telephone interviews with a population based sample of employees ($N = 5743$). The book includes a chapter describing the surveillance system titled ***Surveillance System for Psychosocial Risk and Testing the Australian Workplace Barometer Theoretical Model*** (Dollard, Bailey, & Hall, 2014). A further chapter outlines the methods used to obtain the data, ***The Methodology Associated with Collection of AWB Data*** (Taylor, Gill, & Dal Grande, 2014), and another chapter, ***AWB Benchmarks: PSC, Demands, Resources, Health and Productivity Outcomes***, outlines benchmarking data for PSC, demands, resources, health and motivational outcomes such as job satisfaction, intention to leave, absenteeism, sickness absence, presenteeism and engagement (McLinton & Bailey, 2014). A subsequent chapter, ***Psychosocial Safety Climate (PSC) and Implications for Australian Industries***, describes differences in PSC across industries identifying that some industries such as transport and storage, accommodation, cafes and restaurants, and health and community services, exhibited PSC levels below the national benchmark across the country, while other industries showed variability between states (Bailey & Dollard, 2014). There is a further chapter that examines PSC as a predictor of engagement according to differences in age, ***Differences in the Psychosocial Work Environment, Engagement, and Psychological Health According to Age***, finding that for the youngest working age group (18–24 years) engagement was more strongly associated with PSC compared to other working age groups (Richards, Smith, & Winefield, 2014). In terms of bullying, the chapter ***Prevalence, Antecedents and Implications of Workplace Bullying and Harassment in Australia***, identified that nearly 7% or approximately 700,000 workers in Australia were bullied in the previous six months, and that differences existed between the experiences of

women and men in relation to bullying. In addition, poor PSC was an antecedent to bullying, violence and harassment, and high PSC moderated the effects of bullying and harassment on psychological health (Bailey, Dollard, & Tuckey, 2014). Finally, ***Psychosocial Hazard Management and the Psychosocial Safety Climate Hierarchy of Control (PSC-HOC)***, presents a PSC Hierarchy of Control (PSC-HOC) that is a practical tool that can be used to guide the management of psychosocial workplace hazards including the development of assessments to monitor risk and the design of interventions (Bailey & Dollard, 2014).

Another book, ***Psychosocial Factors at Work in the Asia Pacific***, edited by Dollard, Shimazu, Nordin, Brough, and Tuckey includes a chapter that outlined a study of 909 police personnel from 58 departments in Malaysia, ***A Multi-level Study of Psychosocial Safety Climate, Challenge and Hindrance Demands, Employee Exhaustion, Engagement and Physical Health.*** A key finding was that PSC at the team level was related to specific types of job demands (Yulita, Idris, & Dollard, 2014). Specifically, PSC at the team level was negatively related to hindrance demands, which were defined as demands that were perceived as negative hindrances to work goal achievement. Conversely, PSC was not related to challenge demands, which were described as positive challenging demands for employees. The study provides an explanation for inconsistent findings in the research literature in relation to job demands and supports the theoretical specification of the demand dimension in PSC research (Yulita et al., 2014).

2.5 PSC Benchmarks and Interventions

Highlighting a lack of tools to guide practice, Bailey, Dollard, and Richards (2015) in ***A National Standard for Psychosocial Safety Climate (PSC): PSC 41 as the Benchmark for Low Risk of Job Strain and Depressive Symptoms***, established benchmark levels of PSC to identify risk of job strain (work with high job demands and low control) and subsequent depression. First, interview data from Australian employees matched at two time points spaced 12 months apart ($n = 1081$) were used to verify PSC as a significant leading predictor of job strain and in turn depression. Next, using two additional samples ($n = 2097$; $n = 1043$), benchmarks of organisational PSC were determined (range 12–60) for low levels of risk (PSC > 41) and high levels of risk (PSC < 37) for employee job strain and depressive symptoms. Finally, using the newly established benchmarks the authors estimated the population attributable risk (PAR) and reported that if organisations could improve levels of PSC to above 37 it would reduce 14% of job strain and 16% of depressive symptoms in the Australian working population. The results provide benchmarks that can be used by regulatory agencies and organisations to develop safer working environments with less risk of harm to worker mental health.

Examining the role of psychosocial factors in the development of physical injuries, Bailey, Dollard, McLinton, and Richards (2015) in ***Psychosocial Safety Climate, Psychosocial and Physical Factors in the Aetiology of Musculoskeletal Disorder***

Symptoms and Workplace Injury Compensation Claims, used an individual-level longitudinal random population-based survey with a sample of 1095 Australian workers (AWB sample) on two occasions (12 months apart). As expected, the physical mechanism was supported; physical demands were related to musculoskeletal disorders (MSDs), which in turn predicted workers' compensation claims. Further, a psychosocial mechanism was demonstrated where PSC was a precursor to psychosocial risks (e.g., harassment, violence, bullying and work pressure), which in turn were related to emotional exhaustion, MSDs and then workers' compensation claims. The authors proposed that occupational health and safety legislators and policymakers should be aware that psychosocial factors at work (e.g., harassment, bullying, and violence) arising from PSC may additionally manifest in physical health problems and workers' compensation claims.

Noting that employees who experience high job demands are more inclined to demonstrate unsafe behaviours in the workplace, Bronkhorst (2015) in ***Behaving Safely Under Pressure: The Effects of Job Demands, Resources, and Safety Climate on Employee Physical and Psychosocial Safety Behaviour***, used the PSC construct to examine why some employees behave safely when faced with demands while others do not. Surveys across 52 health care organisations ($N = 6230$) identified that job demands (i.e., work pressure), decreased physical and psychosocial safety behaviour, while job resources (i.e., job autonomy, supervisor support, and coworker support) and safety climate (both PSC and physical safety climate) increased physical and psychosocial safety behaviour. Additionally, PSC also moderated the relationship between job insecurity and psychosocial safety behaviour indicating that a strong PSC may reduce or eliminate the adverse effect of job insecurity on psychosocial safety behaviour. The results indicated that strengthening the PSC within an organisation can increase employees' safety behaviour and that PSC is an important target to ameliorate negative psychological health outcomes when workers are facing uncertainty and change in their workplace.

Extending the PSC literature to include interventions, Bailey, Pignata, and Dollard (2015), in ***Programmes and Interventions for Psychosocial Risk and Worker Well-Being: The Psychosocial Safety Climate (PSC) Framework***, reviewed different types of organisational interventions, and outlined the importance of including PSC in programmes to effectively address psychosocial hazards and risks at work. Practical steps were provided so that organisations and employers can integrate PSC concepts into existing policy and procedure. The PSC-HOC was presented to provide a guide for work health and safety practitioners and employers to more effectively address identified hazards by developing intervention programmes that include all levels of the organisation.

Examining the influence of PSC on workplace learning, Idris, Dollard, and Tuckey (2015) in ***Psychosocial Safety Climate as a Management Tool for Employee Engagement and Performance: A Multilevel Analysis***, investigated a multilevel model of learning opportunities and subsequent worker engagement and performance. The authors theorised that PSC plays an important role in engagement and performance by increasing the provision of learning opportunities, and the probability that they will be enacted within the workplace. The study included 427 employees

from 56 teams (each from a different organisation) in Malaysia. Team level PSC increased job engagement, and this relationship was mediated by learning opportunities. PSC was also positively related to performance and this relationship was mediated by job engagement. The findings indicated that high PSC improves workplace learning opportunities, engagement and work performance.

Dollard, Zadow, Pignata, and Bailey (2016) provided a chapter in the ***Global Encyclopaedia of Public Administration, Public Policy, and Governance*** titled ***Stress Management*** which reviewed work-focused models of stress and stress management, including the PSC theoretical framework. The article described stress management at the national level and within organisations. Intervention approaches were reviewed including primary, secondary and tertiary approaches and common targets of stress management. A table was presented with examples of individual (person-directed) stress management, organisational (work-directed) stress management and national or industry level management of workplace stress. Recommendations for developing and evaluating interventions using best practice approaches and the PSC framework were provided.

2.6 PSC Across the Asia Pacific Region

In 2016 another book was published called ***Psychosocial Factors at Work in the Asia Pacific*** edited by Shimazu, Nordin, Dollard, and Oakman. The book included discussion about the PSC construct by chapter authors who reviewed the role of PSC in the mining industry (McTernan, Dollard, Tuckey, & Vandenberg, 2016), the comparison of PSC theory between two different cultural groups including Iran and Australian healthcare organisations (Afsharian, Zadow, & Dollard, 2016), and a review of the PSC research including recommendations for future research directions (Yulita, Idris, & Dollard, 2016). McTernan and colleagues in ***Beneath the Surface: An Exploration of Remoteness and Work Stress in the Mines***, conducted interviews with mining employees ($N = 19$) identifying that work-stress was prevalent across the sample and that the most prominent demands were work pressure and environmental exposure (with additional demands of work-family and work-life conflict reported for the remote workers). The authors identified that social support was a critical job resource for remote workers to balance increased job demands. While the sample reported a strong safety climate, the concept of PSC still required attention and evidence suggested that communication about mental health in this sector was highly underdeveloped (McTernan et al., 2016).

Afsharian and colleagues in ***Psychosocial Safety Climate from Two Different Cultural Perspectives in the Asia Pacific: Iran and Australian Hospitals*** investigated PSC levels, psychosocial work conditions and health outcomes amongst 33 work groups in an Iranian hospital ($N = 257$), and then compared these results with an Australian sample of hospital employees ($N = 239$, across 21 work groups). The findings showed that PSC is a climate construct that exists as a group phenomenon across cultures (i.e., in Iran). Notably, Australian workers reported higher

levels of PSC, skill discretion and decision authority, and lower levels of emotional demands, compared to the Iranian sample. The major theoretical paths outlined in the PSC theoretical framework were also demonstrated in the Iranian data. For both Iran and Australia, team PSC was negatively related to psychological demands, and emotional exhaustion and positively related to job resources, decision authority and work engagement. In Australia, high team PSC was also positively related to skill discretion. The results support the utility of PSC theory cross-culturally to assist in the development of organisational systems to prevent workplace psychosocial risk factors (Afsharian et al., 2016). Yulita and colleagues (2016) in ***Psychosocial Safety Climate: Past, Present, and Future Research***, also completed a review of the PSC literature identifying 13 articles, and outlining findings and future challenges. Potential future challenges proposed include the examination of several types of climate simultaneously to differentiate between-climate relationships and influences on psychosocial factors at work, and identifying how espoused PSC interrelates with enacted PSC.

2.7 PSC: A Global Research Agenda

Examining the role of PSC in the development of health performance outcomes in ***Safety Climate, Worker Health and Organizational Health Performance. Testing a Physical, Psychosocial and Combined Pathway,*** Bronkhorst and Vermeeren (2016) completed a large multilevel analysis using a sample of 8761 employees working across 177 health care organisations in the Netherlands. Organisational PSC was related to high levels of emotional exhaustion and two subsequent health performance outcomes (absenteeism and presenteeism). An additional psychosocial pathway was shown between low organisational PSC, high levels of emotional exhaustion, and increased MSDs. High MSDs was related to higher rates of healthcare utilisation. The results underscored the importance of paying attention to PSC, to protect the psychological health of employees, and to also improve their physical health and subsequent organisational health performance.

Kwan, Tuckey, and Dollard (2016) in ***The Role of the Psychosocial Safety Climate in Coping with Workplace Bullying: A Grounded Theory and Sequential Tree Analysis***, used a qualitative, grounded theory approach to examine the role of PSC as an influencer of employees' coping strategies and their effect on bullying resolution. Interviews were conducted with 20 Malaysian workers derived from diverse occupational backgrounds, who also completed the PSC-12. The study identified that coping strategies took the form of a modified exit-voice-loyalty-neglect (EVLN) model where loyalty was replaced by acquiescence. Further, there were five escalation patterns of bullying identified that could be linked to the coping options. The authors found that employees tended to use the coping strategy of voice in high PSC contexts, which resulted in a faster resolution of bullying issues. Conversely, in low PSC contexts, workers were more likely to use coping strategies such as neglect or acquiescence followed by exiting the organisation when the bullying remained unre-

solved. These results suggest that PSC shapes the coping options used by bullied workers, and the resultant success of these strategies to resolve bullying.

Another qualitative study by Zinsser and Zinsser (2016) in ***Two Case Studies of Preschool Psychosocial Safety Climates*** examined the extent to which PSC applies to preschool contexts in the United States. Using employees from two separate preschools including school teacher focus groups with 12 teachers and administrator interviews ($N = 4$) the researchers found that the PSC model may apply similarly in preschool settings as it has in previous research in elementary and secondary schools. The authors argued that future research is needed to directly link the PSC domains to teachers' abilities to engage in high-quality and emotionally sensitive teaching, and student academic, social and emotional outcomes.

Zadow and Dollard (2016) published a book chapter in ***The Wiley Blackwell Handbook of the Psychology of Occupational Safety and Workplace Health*** titled ***Psychosocial Safety Climate***, outlining a review of PSC theory, the PSC evidence base and proposed options for future research directions. Future research recommendations included the use of four-level frameworks incorporating sociopolitical, organisational, work group, and individual factors to explain influences on PSC and influence of PSC across a broader range of contexts (Dollard & Neser, 2013), and the examination of different leadership styles and training practices on the development of workplace PSC (Dollard et al. 2012b). Havermans et al. (2017) in ***The Role of Autonomy and Social Support in the Relation Between Psychosocial Safety Climate and Stress in Health Care Workers*** assessed the extent which the relationship between PSC and stress in health care workers can be explained by autonomy and social support. This cross-sectional study used a sample of health care workers ($N =$ 277) to measure PSC, stress, autonomy, co-worker support, and supervisor support. Lower PSC was associated with higher stress. Neither co-worker support, supervisor support, nor autonomy explained the relationship between PSC and stress. Taken together, autonomy and both social support measures diminished the relationship between PSC and stress by 12%. The authors concluded that autonomy and social support together create a small decrease in the relationship between PSC and stress. They argued that future research should establish whether other psychosocial work conditions explain a larger portion of this relationship.

Lee and Idris (2017) in ***Psychosocial Safety Climate Versus Team Climate: The Distinctiveness Between the Two Organizational Climate Constructs*** surveyed 412 employees from 44 teams across a range of Malaysian private organisations. Using multilevel analysis researchers identified that performance feedback and role clarity mediate the relationship between PSC and job engagement. The study also demonstrated that job engagement mediated the relationship between PSC and team level job performance climate (measured using 3-items from the World Health Organization Health and Work Performance Questionnaire, Kessler, Berglund, Demler, Jin, Koretz, Merikangas, et al., 2003). Further, there was no direct effect between general measures of team climate and job resources. The findings supported the concept of PSC as a precursor to better working conditions, such as improved job resources, and indirectly to improve employees' engagement and job performance.

Examining the relationship between PSC and bullying, Nguyen, Teo, Grover, and Nguyen (2017) in ***Psychological Safety Climate and Workplace Bullying in Vietnam's Public Sector***, examined PSC and its effects using 274 employees from six branches of a Vietnamese public sector organisation. The results showed that PSC was positively related to positive organisational support, engagement and wellbeing, and negatively related to workplace bullying. Various mediation paths were found such as PSC is related to engagement via perceived organisational support; and PSC is related to engagement via bullying. High PSC also moderated the negative impact of bullying on employee engagement. Evidence is shown here that PSC is a stronger predictor of bullying and engagement than a related construct, perceived organisational support. The authors propose that senior management in organisations need to consider an effective and cohesive system of policies, procedures, and practices to promote high PSC for the prevention of psychosocial hazards.

2.8 PSC and Policy Implications

Potter and colleagues (2017) in ***Assessing a National Work Health and Safety Policy Intervention Using the Psychosocial Safety Climate Framework*** used the PSC framework, including the measurement tool (PSC-12) and benchmarks, to investigate the impact of a work health and safety policy intervention, across Australian jurisdictions that standardised policy approaches (i.e. harmonisation) and legislated the protection of psychological health. The authors investigated PSC across jurisdictions and time, and contrasted effects between those that did (harmonised) and did not (non-harmonised) standardise policy approaches. Results showed a significant difference over time between the harmonised and non-harmonised jurisdictions with PSC levels significantly reduced in the non-harmonised jurisdiction across the timeframe. The authors identified through further review of the PSC subscales that there was a significant decline in management commitment and priority, and communication in relation to employee psychological health, within the non-harmonised group. The researchers also noted that there was no significant overall PSC change across the harmonised jurisdictions, with the exception that participation and consultation in relation to employee psychological health significantly improved. Overall, results implied that the areas without harmonisation experienced reduction in PSC levels. Potter and colleagues suggested that future research should seek perspectives from regulator and employer data to explain the findings in more detail.

Investigating the role of espoused and enacted PSC, in ***Climate Congruence: How Espoused Psychosocial Safety Climate and Enacted Managerial Support Affect Emotional Exhaustion and Work Engagement***, Yulita, Dollard, and Idris (2017) examined the alignment between espoused PSC (saying) and enacted PSC (doing) in relation to health and work outcomes. This multilevel daily diary study examined the relationships (moderation and mediation) between espoused PSC (organisational level PSC), enacted PSC (operationalised in the specific domain of managerial support), and their relationships to worker emotional exhaustion and work engagement.

A total of 545 diary data points were collected over 5 consecutive days from 109 secondary school teachers across 23 schools in Malaysia. Espoused PSC was positively related to daily enacted managerial support. Espoused PSC was also related to work engagement through enacted managerial support. Enacted managerial support also moderated the negative relationship between espoused PSC and daily emotional exhaustion. The results imply that building PSC with an outcome of positive effects could occur via managers translating PSC into action, showing integrity in saying and doing.

Examining the influence of PSC on work injuries Zadow, Dollard, McLinton, Lawrence, and Tuckey (2017) in ***Psychosocial Safety Climate, Emotional Exhaustion, and Work Injuries in Healthcare Workplaces*** examined how PSC influences the development of reported and unreported physical and psychological workplace injuries beyond (physical) safety climate, through the erosion of psychological health (emotional exhaustion). Self-report data (Time 2, 2013) from 214 hospital employees (18 teams) were linked at the team level to the registered work injuries recorded on the hospital safety learning system (Time 1, 2012; Time 2, 2013; and Time 3, 2014). Low physical safety climate, low PSC and high levels of emotional exhaustion all predicted Time 2 registered injury rates (controlling for Time 1). When PSC, physical safety climate and emotional exhaustion were placed in the same multilevel model, emotional exhaustion was the strongest predictor of survey-reported total injuries and underreporting. Multilevel analysis showed that low PSC was the origin of emotional exhaustion resulting in higher rates of self-reported work injuries and injury underreporting (physical and psychological). The findings indicated that to address registered injuries, physical safety climate is a plausible target, but to address all work injuries, including those that are not reported, then PSC should be prioritised as an intervention target.

2.9 PSC Strength

The first study to explore PSC strength (low variability in PSC perceptions) in conjunction with average PSC levels was Afsharian, Zadow, Dollard, Dormann, and Ziaian (2017) in ***Should Psychosocial Safety Climate Theory be Extended to Include Climate Strength.*** They tested PSC level and strength as main and interactive predictors of work conditions, psychological health, and work engagement. Using multilevel analysis the effects of unit-level PSC were investigated in 21 Australian hospital work units and across 249 employees. PSC level was a better predictor than PSC strength or their interactions for job demands (emotional or psychological), job resources (skill discretion and organisational support), and health (emotional exhaustion). A different result was seen for work engagement as the PSC level x PSC strength interaction was significant. This indicated that PSC has a stronger relationship with work engagement when PSC strength is high within work units. In general, PSC mean scores seem adequate, but improvements in prediction could be

achieved by taking into consideration how consistent perceptions of PSC are within the unit, when considering work engagement.

2.10 PSC: Mindfulness, Enactment, and Depression

Identifying the influence of PSC and work conditions on everyday mindfulness and learning, Lawrie, Tuckey, and Dollard (2017) in ***Job Design for Mindful Work: The Boosting Effect of Psychosocial Safety Climate*** utilised a sample of 57 employees, primarily working in education, health care, and finance, who completed a diary for 5 days encompassing measures of mindfulness, psychological demands, job control, and learning. PSC was measured in a baseline survey of up to four colleagues, then aggregated for each diary to measure objective shared perceptions of the climate. Multilevel results showed that daily psychological job demands were negatively related to daily mindfulness, while daily job control was positively related to daily mindfulness particularly as levels of PSC improved (i.e. moderated by PSC). An additional finding was that daily mindfulness showed a positive relationship with daily workplace learning. This study is the first to identify PSC and work conditions as antecedents to everyday employee mindfulness.

Studying how PSC enactment unfolds in the management of workplace bullying in ***Psychosocial Safety Climate (PSC) and Enacted PSC for Workplace Bullying and Psychological Health Problem Reduction***, Dollard, Dormann, Tuckey, and Escartín (2017) used two-waves of Australian longitudinal survey data from 1062 employees to explore relationships between organisational PSC, workplace bullying, psychological health problems, and PSC enactment. The authors theorised that PSC enactment is epitomised by psychosocial procedures such as an anti-bullying policy, work redesign to reduce stress, and actions to promote conflict resolution. High PSC at Time 1 predicted enacted PSC and lower rates of bullying 4 years afterwards. High PSC at Time 1 was related to improved psychological health (Time 2) through enacted PSC and bullying. Higher bullying rates at Time 1 also gave rise to procedures which in turn reduced levels of bullying at Time 2. The findings indicated that procedures to reduce workplace psychosocial hazards that emerge in a high PSC context are more effective than those triggered by bullying itself (as a reactive procedure).

Demonstrating how cross-lagged effects can be used to assess the risk ratio of different levels of PSC in organisations, Dormann, Owen, Dollard, and Guthier (2018) in ***Translating Cross-Lagged Effects into Incidence Rates and Risk Ratios: The Case of Psychosocial Safety Climate and Depression***, used longitudinal data from the Australian Workplace Barometer ($N = 1905$) to estimate cross-lagged effects of PSC on depression. The authors used innovative continuous time modelling to identify time-scalable cross-lagged effects to assess the risk ratio of different PSC levels. They further translated effects in a 4 year Monte Carlo simulation to create 4 year incident rates. The authors reported a critical value of PSC = 26 (−1.4 SD), which predicts more than 100% increased incidents of persistent depressive disorder

in 4 year periods compared to average levels of PSC across the 4 year timeframe. This critical value adds to the PSC benchmarks established by Bailey et al. (2015).

2.11 PSC: Circulatory Diseases and Work Life Interference

Exploring the impact of PSC on circulatory diseases (CDs) in ***Predicting Circulatory Diseases from Psychosocial Safety Climate: A Prospective Cohort Study from Australia***, Becher, Dollard, Smith, and Li (2018) used two waves of interview data with an average lag of 5 years ($N = 1223$); excluding baseline CDs to estimate the prospective associations between PSC at baseline on incident CDs at follow-up. The authors identified that workers in low PSC environments were 59% more likely to develop new CDs than workers in high PSC environments. High PSC at baseline predicted lower CDs risk at follow-up even after adjustment was made for known psychosocial risk factors (effort-reward imbalance and job strain). These results suggested that PSC, including the values and attitudes of management in relation to psychological health, is an independent risk factor for CDs.

Mansour and Tremblay (2018a) in ***Psychosocial Safety Climate as Resource Passageways to Alleviate Work-Family Conflict: A Study in the Health Sector in Quebec***, examined a multidimensional mediating model of PSC and work-family interference. Using a sample of 562 participants from the nursing and health sector the authors tested the direct and indirect effects of PSC on work-family conflict (WFC) - time, family-work conflict (FWC) - time and WFC/FWC-strain via family-supportive supervisor behaviour (FSSB). The results demonstrated that PSC was negatively related to WFC-time, FWC-time, WFC-strain and FWC-strain. PSC was also indirectly related to WFC-time, FWC-time, WFC-strain and FWC-strain via FSSB. The authors propose that PSC would be an appropriate target for intervention to improve work-family interference.

2.12 PSC Meta-Analyses

Conducting a multilevel meta-analysis examining the PSC relationships with work conditions, health, motivation and productivity outcomes, Zadow, Dollard, Tuckey, and Idris (in review) in ***Psychosocial Safety Climate Theory: A Multilevel Meta-Analysis***, reviewed 19 independent samples and 212 effect sizes ($N = 24616$). Results showed that PSC at the individual level is negatively related to job demands, adverse health symptoms, and reduced productivity, and positively related to job resources. As a between-group effect, teams with low PSC experienced higher rates of adverse health symptoms and worse productivity outcomes. These results also showed strong support at the individual level for a relationship between high PSC and low job demands, higher job resources, improved motivation, rates of productivity and better health (psychological and physical). These multilevel meta-analytic findings also

showed relationships between high work unit PSC, and improved health and productivity.

Another meta-analysis examining the efficacy of organisational stress interventions was conducted by Zadow, Dollard, and Tuckey (in review), in ***Psychosocial Safety Climate as a Meta-Analytic Framework for Organisational Stress Intervention Evaluation***. Their review included 41 studies incorporating 80 independent samples ($N = 46962$). This study compared organisational interventions that targeted the organisational context (climate) with interventions that focused on work conditions (job design/social-relational aspects). The meta-analysis identified that organisational interventions that focused on the organisational context to improve the climate (high PSC approaches; specifically the involvement of senior management and active involvement of employees, with policies/procedures developed and implemented) were more effective in improving psychological health, job resources, and employee motivation compared to organisational interventions that focus on improving work conditions (job design or social-relational aspects of the job; low PSC approaches). The study findings imply that future interventions and research should use PSC principles at the macro-level in order to positively influence work conditions.

2.13 PSC: Influence on Psychological Need Thwarting

Teasing out the mediating processes that link PSC to burnout, employees' work-family conflict and turnover intentions, Huyghebaert, Gillet, Fernet, Lahiani, and Fouquereau (2018) in ***Leveraging Psychosocial Safety Climate to Prevent Ill-Being: The Mediating Role of Psychological Need Thwarting***, explored the mediating role of psychological need thwarting in French nursing employees. They found that psychological need thwarting mediated the negative relationship between PSC and employees' work family conflict and turnover intentions (Study 1, $n = 269$), and that PSC, through its relation with psychological need thwarting, related to a decrease in burnout three months later (Study 2, $n = 1143$ Time 1, $n = 393$ Time 2). High rates of burnout were also directly related to work-family conflict and turnover intentions.

2.14 PSC in the Healthcare Industry

Examining how and when resources function by considering the role of PSC as a contextual factor Loh, Idris, Dollard, and Isahak (2018) in ***Psychosocial Safety Climate as a Moderator of the Moderators: Contextualising JDR Models and Emotional Demands Effects*** explored two different mechanisms: PSC as a resource passageway (i.e., supplying, bolstering, or adding compensating resources) or PSC as a safety signal (i.e., supporting resource use). The authors used longitudinal data from 429 Malaysian health care workers from 53 teams and found that team PSC Time 1 was

a stronger moderator of emotional demands than job control or rewards on psychological health symptoms, emotional exhaustion (Time 2) and somatic symptoms (Time 2). A three-way interaction of team PSC at Time 1 with emotional demands and rewards at Time 2 indicated that PSC can moderate the relationship between emotional demands and resources predicting somatic symptoms. These findings suggested that PSC functions as a resource passageway rather than as a safety signal in this instance, as the supply of resources compensated when rewards were low. If the safety signal hypothesis was supported then in the context of high PSC, employees would feel safer to use resources when PSC is high, so the relationship between demands and rewards would be non-significant (i.e., slope is flat). However, the high and low PSC slopes were parallel at high levels of reward. Instead the results supported the hypothesis that PSC acts as a resources passageway, as the interaction between demands and rewards was strongest when PSC was high, but compensating for low reward as a significant effect on somatic symptoms when PSC and rewards were low. This study provided important evidence on the moderating function of PSC: 1) PSC is a stronger moderator as compared to job control and rewards, and 2) PSC is a resources passageway.

McLinton et al. (2018b) in ***Benchmarking Working Conditions for Health and Safety in the Frontline Healthcare Industry: Perspectives from Australia and Malaysia***, presented benchmarks for working conditions in healthcare industries across three hospitals in Australia ($N = 1258$) and Malaysia ($N = 1125$). A cross-sectional design was used incorporating a mixed-methods approach with qualitative interviews to contextualise the findings. Healthcare samples were also compared with benchmarks for non-healthcare general working populations data (Australia, $N = 973$; Malaysia, $N = 225$). The results showed that unlike physical safety, psychosocial safety receives less attention in both countries and PSC was lower for both countries than physical safety climate. Malaysian healthcare workers reported significantly higher level of PSC than Australian healthcare workers. The Australian healthcare benchmarks, compared with the general Australian working population, indicate that healthcare employees experience higher physical, psychological and emotional demands and a greater likelihood of being physically assaulted, threatened, yelled or sworn at and lower levels of PSC. Malaysian healthcare benchmarks were also worse than the general Malaysian working population, with a similar pattern of higher emotional demands, burnout and lower social supports. However, unlike Australia, there was very little difference between Malaysian health care workers and the general working population benchmarks in terms of engagement and PSC.

The relationship between PSC and violence was explored in a book edited by Burke and Cooper (2018) titled ***Violence and Abuse in and Around Organisations***. A chapter within the text, ***Violence and Psychosocial Safety Climate; Quantitative and Qualitative Evidence in the Healthcare Industry*** by McLinton, Zadow, Neall, Tuckey, and Dollard, (2018c), reviewed qualitative interviews with 27 healthcare workers and quantitative multilevel analysis of 26 groups within the healthcare industry across three hospitals ($N = 288$). Results demonstrated that PSC was directly related to the length of violence exposure experienced by workers and violence exposure was related to the amount of musculoskeletal disorders workers experienced at work. The authors proposed that PSC was a crucial protective mechanism to reduce

the experience of occupational violence in workplaces. It is suggested that building high levels of PSC may reduce the frequency and intensity of violence exposure within organisations.

A qualitative study in the healthcare industry, ***New Perspectives on Psychosocial Safety Climate in Healthcare: A Mixed Methods Approach***, exploring how PSC manifests in everyday work from the perspective of workers was conducted by McLinton, Dollard, and Tuckey (2018a). Major themes were identified using a grounded theory approach and content analysis of semi-structured interviews with staff from three government hospitals (N= 27). Notably, teams with high risk PSC were expected to push on through unsafe work conditions (group expectation theme), were exposed to hazards without support (exposure level theme), had a poor role model as team leader (immediate manager leadership style theme), had little or no contact with senior management (top level management involvement theme), had ineffective communication between team members (communication theme) and an expectation to adhere to unrealistic safety procedures (conflicting pressures theme). Three main themes were identified encompassing strategies for improvement with more than half of interviewees suggesting better interaction with Senior Management (96%), fairness and transparency (70%), and feeling trusted and valued (56%) would improve workplace PSC.

A recent industry project by Gupta and colleagues (2018) has identified that PSC may influence cellular ageing in ***The Health, Diet and Wellbeing of Valmar Support Workers***. The telomere is the area of DNA that caps and protects the ends of every chromosome. Telomeres become shorter as individuals age. Telomere measures can therefore be utilised as a measure of stress-related cellular health. In this project telomere length was positively related to the PSC participation domain, with workers who reported greater participation and involvement of stakeholders in relation to psychological health and safety, also demonstrating higher telomere length (r = .65, $p < .05$). These results are preliminary results as the sample size for the project was small ($N = 13$) given the complexity of obtaining passive drool saliva sample to measure telomere length and the testing expense. Further research is needed to identify whether stakeholder participation in psychological safety matters may improve stress related cellular health.

2.15 Interventions that Change PSC

In a book edited by Nielsen and Noblet (2018) ***Organisational Interventions for Health and Well-Being***, a chapter by Dollard and Zadow (2018) ***Evaluation of the Preparatory Phase of a Stress Intervention,*** described and evaluated the preparation phase of an intervention involving educational participatory action workshops with two public sector departments (human service workers, 20 groups; education sector workers, 18 groups). (preparatory phase of Dollard (2012)). No differences were found between intervention participants and control groups (human service workers intervention groups, $n = 65$, control, n = 75; education sector workers intervention groups $n = 120$, control, $n = 181$) on PSC items. These results imply that just

running educational workshops is not likely to improve PSC—specific actions need to be taken. For the education sector sample, one difference was seen with the control group reporting a higher score than the intervention group for organisational attention to work health and safety concerns. The result was in the opposite direction than anticipated. An explanation may be variable starting differences in PSC between the intervention and control group at the beginning of the intervention (which could not be examined as Time 1 data was not available) (see Dollard & Gordon, 2014; Dollard & Karasek, 2010).

Rasdi, Ismail, Kong, and Saliluddih (2018), in ***Introduction to Customized Occupational Safety and Health Website and Its Effectiveness in Improving Psychosocial Safety Climate (PSC) among Police Officers*** examined the prevalence of stress among Malaysian police officers randomly selected from nine departments ($N = 105$). Results indicated that team psychological safety and physical safety climate were positively related to PSC levels. PSC improved following the introduction of an occupational safety website which focused on psychosocial and mental health but also included other physical safety topics such as ergonomics, noise and heat safety. The website included a video with cartoon characters customized to the Malaysian police force which was designed to help police understand stress and provided relevant strategies to manage stress at work. This study showed PSC improved following the introduction of the website indicating an effective strategy for future interventions.

Ansah, Mintah, and Ogah (2018), in ***Psychosocial Safety Climate Predicts Health and Safety Status of Ghanaian Fuel Attendants,*** surveyed 876 attendants from four Oil Marketing Companies (OMCs). PSC directly, and indirectly via the path of job resources, predicted the health and safety of the attendants. Job demands also had a direct influence on health and safety. The researchers identified that the health, safety and well-being of the fuel station attendants was higher when management was able to undertake practical steps to elevate PSC at the fuel stations and when supervisors provided additional support.

Preliminary industry data released by Haar (2018) in ***Overview of the Perpetual Guardian 4-day (paid 5) Work Trial*** surveyed employees before and after a four day working week trial over an eight week period (T1 $n = 155$, T2 $n = 183$). The results indicate that PSC improved after the trial and were highest in the below 30 years and 51–60 year age groups. A range of other measures also improved following the trial including positive organizational support, work-life balance and perceptions of lower work demands.

2.16 Future Research Challenges

Based on the review of current PSC research presented here, a number of challenges can be identified. The interaction between simultaneous strategic molar climates could be examined, for example, whether fostering a positive PSC as well as an organisational justice climate provides incremental benefits (Guediri & Griffin, 2016; Yulita et al., 2016). Alternatively, how aspects of enacted PSC (e.g., policy for social support) create sub-climates that influence espoused PSC could be explored. PSC as a

resource passageway (i.e., channelling, supplying resources) could also be examined in more detail in relation to a range of theoretical perspectives (see Conservation of Resources theory, Halbesleben, 2006; Hobfoll, 1988, 2001; Resource Theory of Social Exchange, Foa & Foa, 1976; Selective Optimisation with Compensation (SOC), Baltes & Baltes, 1990; Wiese, Freund, & Baltes, 2002).

The influence of leadership styles and training on perceptions of PSC could also be examined given evidence indicating the influence of leadership on climates (Zadow & Dollard, 2016). Moreover climate strength (Afsharian et al., 2017) and continuous time structural equation modelling (Dormann et al., 2018) provide for respectively greater understanding of agreement of group members about perceptions of PSC, how PSC affects work conditions and outcomes using shorter time intervals (e.g., weekly affects). Bringing these themes together investigating the impact of leadership styles and training on climate strength over time would provide clear evidence for how and why interventions to improve workplace PSC operate.

The wider health impacts of low PSC need to be further examined. Evidence reviewed indicated that in addition to psychological health, low PSC affects physical health (Bailey et al., 2015a; Becher et al., 2018; Gupta et al., 2018; Zadow et al., 2017). It is theorised that stressful environments threaten optimal body equilibrium requiring activation of the hypothalamic-pituitary-adrenal axis and the autonomic nervous system, which interact with the central and peripheral nervous system, in order to prepare a response to manage the stressor (Tsigos, Kyrou, Kassi, & Chrousos, 2016). These mechanisms, if activated over a sustained period, may restrict growth, immunity and metabolism, impairing physical health and limiting the processes required to heal effectively (Tsigos et al., 2016). Relating PSC to physiological measures such as cellular ageing (telomere length), brain chemistry (e.g., through magnetic resonance spectroscopy, MRS), or cerebral blood flow and neuronal activation (e.g., functional magnetic resonance imaging, fMRI) is needed to deepen understanding of the psychophysiological processes involved when workers experience damaging low PSC work environments. Examining extended hydrocortisone exposure at a stress-like dosage to identify changes of prominent cerebral metabolites, including N-acetylaspartate, creatine and phosphocreatine, choline-containing metabolites, myo-inositol and glutamate (see Scheel, Ströhle, & Bruhn, 2010) would elucidate the psychophysiological impact of low PSC work environments. Alternatively, fMRI has demonstrated that exposure to stress (medical students facing examination) affects prefrontal cortex (PFC) function potentially impairing creativity, flexible problem solving, and working memory, and increases susceptibility to neuropsychiatric conditions such as depression and anxiety disorders (see Liston, McEwen, & Casey, 2009). The buffering role of PSC to prevent disruption of PFC function has not yet been examined. Multidisciplinary research will be critical to these developments.

Finally, the broader impact of low PSC requires further examination. Potential research directions include linking teachers' perceptions of PSC with student actions (e.g., daily behaviour, bullying experiences, exam results, grade point average, Yulita et al., 2017), healthcare workers' perceptions of PSC with hospital data (e.g., patient readmission or mortality rates, patient quality of care, Zadow & Dollard, 2016), or the relationship between PSC at work and consequences at home (e.g., psychological health of spouse or children).

Table 2.1 Summary of studies using the Psychosocial Safety Climate theoretical framework

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
1. Dollard and Bakker (2010)	Australia Education	18 schools	Longitudinal	Skill discretion	PSC moderated psychological health problems via job demands. PSC moderated engagement via skill discretion	PSC predicted psychosocial work conditions
		288 (T1), 212 (T2), 209 (T3)	Multilevel	Decision authority		
				Work pressure		
				Emotional demands		
		ICC = .22		Psychological distress		
				Emotional exhaustion		
				Engagement		
				Skill latitude		
2. Bond et al. (2010)	Australia Police	22 police stations	Longitudinal	Workplace bullying	High PSC moderated the impact of bullying on post-traumatic stress symptoms	Low PSC significantly predicts development of bullying and post-traumatic stress symptoms
		139 constables	Multilevel	Post-traumatic stress symptoms		
		ICC = .05				
3. Hall et al. (2010)	Australia General Employee Population	S1. 78 employees	Cross-sectional	Job demands		S3 Team level PSC was associated with psychological distress and work engagement at the individual level
		S2. 398 employees	Individual level	Control		
		S3. 16 teams, 106	Individual level	Social support		
		Health care workers	Multilevel	Engagement		
		ICC = .14		Emotional exhaustion		S1, S2, PSC could be used across a range of occupations and amongst work teams within organisations to predict psychosocial risk factors and in turn worker health and engagement
				Psychological distress		
				Depression		
				Job satisfaction		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
4. Dollard and Karasek (2010)	Australia Education	18 schools	Longitudinal	Work pressure	PSC moderated the relationship between job control and health outcomes	PSC developed as an outcome of a socially coordinated action research risk management organisational approach to reduce work related stress
		288 (T1) employees,	Multilevel	Emotional demands		
		212 (T2) employees (shares data with (1))		Decision influence		
				Psychological wellbeing		
				Emotional exhaustion		
5. Idris and Dollard (2011)	Malaysia General Employee Population	269 employees	Cross-sectional	Job demands	Job demands mediated PSC on anger and depression	PSC negatively related to job demands; positively related to job resources
			Individual level	Job resources		
				Anger		
				Depression	Job resources mediated PSC on engagement	
				Engagement		
6. Idris et al. (2011)	Malaysia	291 employees	Cross-sectional	Job demands (emotional demand, role conflict)		PSC was negatively related to job demands and positively related to job resources. Job demands predicted burnout. The expanded JD- R model is valid in an Eastern developing economy setting
			Individual level	Burnout (emotional exhaustion, cynicism) Work engagement (vigor, dedication) Performance		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
7. Law et al. (2011)	Australia General Employee Population	30 organisations	Cross-sectional	Demands (organizational	PSC moderated the relationship between bullying/harassment and psychological health problems and the negative relationship between bullying/harassment and engagement	PSC is a lead indicator of workplace psychosocial hazards (high demands, low resources), psychological health and employee engagement
		220 employees	Multilevel	harassment, workplace bullying)		
		ICC = .12		Demands (organisational harassment, workplace bullying) Demands (pressure, physical demands, work hours, emotional demands) Resources (procedural justice, supervisor support, rewards) Psychological health (psychological distress, emotional exhaustion, engagement)		
8. Dollard (2012) (related to Study 1)	Australia Human Services Education	18 intervention groups	Longitudinal	Emotional exhaustion		PSC gave rise to better intervention implementation (participants attended more workshops, there was more change due to actions implemented, actions were implemented to a greater extent) and better qualitative outcomes (participants were listened to and trust was improved in the group). Moreover, PSC was the best predictor of reduced emotional exhaustion and psychological distress, increased job satisfaction and engagement, and reduced intention to leave and sickness absence (obtained from Department records)
			Multilevel	Psychological distress		
		181 personnel		Job satisfaction engagement, intention to leave and sickness absence		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
9. Dollard et al. (2012a)	Australia Police Constables	23 police stations	Longitudinal	Emotional demands	High emotional resources moderated the positive relationship between emotional and demands change in workgroup distress when high levels of unit PSC are concurrent	Results support PSC as a property of the organisation and a target for higher order controls to reduce stress at work PSC at the station level predicted work unit distress
		319 (T1), 139 (T2) employees	Multilevel Split-sample	Emotional resources		
				Workgroup distress		
				Personal distress		
		ICC = .09				
10. Dollard et al. (2012b)	Australia Remote Nurses	48 (work units)	Longitudinal	Psychological strain (psychological distress, emotional exhaustion)	Unit PSC and psychological strain was mediated via T2 work conditions (workload, job control) and T1 emotional demands	Findings indicate a multilevel work stress model with PSC, an organisational contextual factor, as the origins of the work stress process Unit PSC predicted emotional exhaustion and distress
		202 (T1), 163 (T2) nurses	Multilevel			
		ICC = .15		Demands (workload, emotional demands)		
				Job control		
				Social support (supervisor support, co-worker support)		
11. Idris et al. (2012)	Australia Health Care	S1. 16 teams	Cross-sectional	Climate measures (PSC, team psychological safety, perceived organisational support, physical safety climate)	PSC mediated the relationship between job demands to psychological health problems	Both PSC and physical safety climates were stronger in Australia compared to Malaysia
		126 health care workers (shares with 3. Hall)	Multilevel			PSC levels were lower than those of physical safety climate in both countries indicating a global lack of attention to workplace psychological health
	Malaysia Diverse Work	S2. 31 teams	Cross-sectional			

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
		180 diverse workers	Multilevel	Psychological health problems (psychological distress, depression, emotional exhaustion)		
		ICC = .13 Australia				PSC related to psychological distress and exhaustion in Australian sample, and emotional exhaustion only in Malaysian sample
		ICC = .19 Malaysia		Job demands (workload, emotional demands, psychological demands)		
12. Rickard et al. (2012)	Australia Hospital Nurses	2 hospitals	Longitudinal	Psychological health (psychological distress, emotional exhaustion)		PSC improved across hospitals post-intervention, significantly so in one hospital
		178 employees (T1)	Individual level			
		306 employees (T2)	Intervention	Work outcomes (job satisfaction, engagement)		Results showed significant improvements in system capacity and job resources and a decrease in psychological distress, emotional exhaustion, turnover and job demands
				Job demands		
				Job resources (supervisor and co-worker support, opportunities for professional development, job control) System capacity (flexible and adaptable culture, consultation and preparation, communication)		
13. Hall et al. (2013)	Australia General Employee Population AWB, 2010	2343 employees	Cross-sectional/ Individual level	Job demands (psychological demand, emotional demand)	PSC moderated the effects of job demand on depression and further moderated the effects of depression on POB	PSC operates as a macro-level resource and safety signal to reduce work related depression
				Depression		
				Control (skill discretion, decision authority, macro-decision latitude)		PSC significantly related to depression, engagement and satisfaction
				Social support (supervisor support, co-worker support)		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
				Positive organisational behaviours (POB; engagement, job satisfaction)		
14. Winwood et al. (2013)	Australia Aged Care	13 aged care homes	Cross-sectional/ Individual level data linked to registered compensation	Workplace morale		High PSC was related to higher levels of workplace morale and lower levels of cynicism
		184 employees		Cynicism		
				Persevere commitment		
				Affective commitment		
				Engagement		Level of Employee Assistance
			Data	Absenteeism		Program support negatively correlated to agency recorded workers' compensation claims (−.83)
15. Dollard and Neser (2013)	Europe Employed Workers	31 countries	Cross-sectional/ multilevel	Societal attributes (income inequality)		Macro-level (union density) and organisational level PSC were the most important factors in predicting self-reported health and GDP between nations
		34841 employees				
		7226 employee reps		Quality work (managers, workers)		
		28649 most senior				
		OHS managers		Workplace protective factors (union density, job redesign) Health (life expectancy, self-reported health)		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
16. Garrick et al. (2014)	Australia Education	61 teachers	Longitudinal	Job demands	PSC moderated the relationship between (1) job demands and fatigue, (2) job demands and engagement, (3) recovery and fatigue and (4) recovery and engagement	PSC acts as a buffer to protect worker well-being and health
			Multilevel (individual) diary studies	Recovery		
				Acute fatigue		
				Work engagement		PSC (person level) is significantly related to engagement and acute fatigue
17. Idris et al. (2014)	Malaysia	36 organisations	Longitudinal/ Multilevel	Emotional demands	Emotional demands mediated the relationship between PSC and emotional exhaustion	Cross-level longitudinal effects of PSC (T1) on T2 emotional demands and exhaustion but not on depression
		253 employees (T1),		Emotional exhaustion		
		117 (T2)	3 month lag	Depression		
		ICC = .11				
18. Dollard and Bailey (2014)	Australia General Employee Population	5743 employees	Cross-sectional	The AWB survey contained a wide range of psychosocial working conditions, health, motivational, and productivity outcomes		PSC theoretical framework can be used to guide the management of psychosocial workplace hazards
			Individual level			
19. Yulita et al. (2014)	Malaysia	58 department teams	Cross-sectional	Job demands (challenge and hindrance)		Team level PSC related to hindrance not challenging job demands, emotional exhaustion, work engagement and physical health problems
		909 police officers	Multilevel	Emotional exhaustion		
		ICC = .10		Work engagement		
				Physical health		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
20. Bailey et al. (2015)	Australia General Employee Population	1081 employees	Longitudinal/ Individual level	Psychological demands		PSC is a significant predictor of job strain and depression. This study determined benchmarks of organisational PSC of employee job strain and depressive symptoms
		2097 employees		Job control		
		1043 employees		Job strain		
				Depression		
21. Bailey et al. (2015)	Australia General Employee Population	1095 employees	Longitudinal/ Individual level	Harassment, bullying		Physical demands predicted MSDs resulting in workers' compensation claims. PSC was antecedent to all psychosocial risks
				Violence		
				Work pressure		
				Physical demands		
				Emotional exhaustion		
				Musculoskeletal symptoms		
				Compensation claims		
22. Bronkhorst (2015)	Netherlands Health Care	52 organisations 6230 employees	Cross-sectional/ Multilevel	Job demands (work pressure, work-family conflict, job insecurity)	PSC moderated the relationship between job insecurity and psychosocial safety behaviour	Job demands decreased, and job autonomy, supervisor support and co-worker support increased psychosocial safety behaviour; job resources and PSC increased psychosocial safety behaviour
		ICC = .17		Job resources (autonomy, supervisor support, co-worker support)		
				Safety climate (physical, psychosocial)		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
23. Idris et al. (2015)	Malaysia Mixed Occupations	56 teams 427 employees	Cross-sectional/ Multilevel	Learning opportunities Engagement Job performance	The relationship between team level PSC and engagement was mediated by learning opportunities. The relationship between job performance and PSC was mediated by job engagement	High PSC improves workplace, learning, engagement and performance
		ICC = .18				
24. McTernan et al. (2016)	Australia Mining	19 employees	Qualitative interviews	Work pressure Environmental exposure Works stress Work family conflict Work life conflict Social support		Social support was a critical job resource to balance increased job demands. While a strong physical safety climate existed the concept of PSC still required attention and communication about mental health was underdeveloped
25. Afsharian et al. (2016)	Iran Hospital	33 teams 257 employees	Cross-sectional/ multilevel	Job demands Job resources		Australian sample reported higher levels of PSC, skill discretion and decision authority, and lower levels of emotional demands compared to the Iranian sample. Team PSC and psychological demands/emotional exhaustion were negatively related. Team PSC and job resources were positively related
	Australia Hospitals	21 teams 239 employees		Work engagement Emotional exhaustion		
		ICC = .11 Iran;				

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Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
		ICC = .15 Australia				
26. Bronkorst and Vermeeran (2016)	Netherlands Health Care	177 organisations 8761 employees	Cross-sectional/ multilevel	Physical safety climate		PSC was related to high levels of emotional exhaustion and sickness absence, presenteeism, utilisation of health services
				Musculoskeletal disorders		
		ICC = .09		Emotional exhaustion		Low PSC related to increased musculoskeletal disorder symptoms via emotional exhaustion
				Absenteeism		
				Presenteeism		
				Health care utilisation		
27. Kwan et al. (2016)	Malaysia	20 employees	Qualitative individual interviews	Coping strategies (voice, exit, acquiescence, neglect)		PSC predicted bullying/coping strategies in the workplace and the resolution process
				Bullying		
28. Zinsser and Zinsser (2016)	United States Education	One focus group (12 preschool teachers)	Qualitative/ case study individual level	Management support		PSC theoretical model may apply in a preschool settings benefiting health and academic outcomes for both staff and students
				Management priority		
		4 administrators (interviews)		Organisational		
				Communication		
				Participation and		
				involvement		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
29. Havermans et al. (2017)	Netherlands Health Care	277 Health care workers	Cross-sectional/ individual level	Stress		PSC predicted workplace stress.
				Co-worker support		Autonomy and social support diminished the relationship between PSC and stress
				Supervisor support		
				Autonomy		
30. Lee and Idris (2017)	Malaysia	44 teams (separateor-ganisations)	Cross-sectional/ Multilevel	Team climate	Performance feedback and role clarity mediated the relationship between PSC and job engagement. Job engagement mediates the relationship between PSC and team climate related to job performance	PSC is antecedent to better working conditions
	Private Service/Consumer Product Industry			Role clarity		
		412 employees		Performance feedback		
		ICC = .16		Job engagement		
				Job performance		
31. Nguyen et al. (2017)	Vietnam	274 employees	Cross-sectional/ Individual level	Perceived organisational support (POS)	High PSC moderated the negative impact of bullying on employee engagement	PSC is antecedent to bullying, POS, engagement and wellbeing; PSC better predictor than POS for bullying and engagement
	Public Sector			Bullying		
				Engagement		
				Wellbeing		
32. Potter et al. (2017)	Australia	1517 employees	Longitudinal	Management commitment		Observed PSC decline in non-harmonised work jurisdictions in comparison to PSC levels in harmonised environments
			Multilevel	Management priority		
				Communication		
				Participation		
33. Yulita et al. (2017)	Malaysia Education	23 schools	Cross-sectional	Managerial support	Espoused PSC related to engagement via enacted managerial support. Enacted managerial support moderated the relationship between espoused PSC and daily emotional exhaustion	Espoused PSC was positively related to daily enacted managerial support
		109 secondary teachers	Multilevel (3 levels) 5 day diary	Emotional exhaustion		
				Work engagement		
				Gender		
		ICC = .16				

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
34. Zadow et al. (2017)	Australia Hospital Personnel	18 teams	Longitudinal	Physical safety climate		Low team PSC was related to high levels of emotional exhaustion in individual workers leading to increased self-report of total work injuries and greater work injury underreporting
		214 personnel	linkage	Emotional exhaustion		
			Multilevel	Unreported work		
		ICC = .17	Survey and registered data	Injuries		
				Reported work injuries		
				Total work injuries		
				Registered work		
				Injuries		
35. Afsharian et al. (2017)	Australia Hospital Personnel	21 units	Cross-sectional	Psychological demands	PSC strength moderated (improved) the impact of PSC level on engagement	PSC level was a superior predictor than PSC strength for job demands and resources. PSC predicts work better when PSC strength is taken into account
		249 personnel	Multilevel			
			Survey	Emotional demands		
		ICC = .15		Decision authority		
				Skill discretion		
				Organisational support		
				Emotional exhaustion		
				Work engagement		
36. Lawrie et al. (2017)	Australia Education, Health Care, Finance	57 employees	Multilevel	Mindfulness	PSC moderated the effect of job control on mindfulness	Job demands negatively related to daily mindfulness, daily job control positively related to daily mindfulness as PSC levels increased. Daily mindfulness positively influenced workplace learning
			Diary study	Psychological demands		
		ICC = .45	Objective Team	Job control		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
			PSC	Learning		
37. Dollard et al. (2017)	Australia General Employee Population	1062 employees	Longitudinal	Bullying		PSC gives rise to PSC enactment (anti-bullying policies, work redesign, conflict resolution) which reduces bullying. High PSC at Time 1 was related to improved psychological health (Time 2) through enacted PSC and bullying
			Individual level	Psychological health problems (depression, psychological distress, emotional exhaustion) Enacted PSC (mistreatment climate, work redesign, conflict resolution)		
			Structured interviews			
38. Dormann et al. (2018)	Australia General Employee Population	1905 employees	Longitudinal	Depression	Sets a new high risk benchmark for PSC	PSC = 26 (−1.4 SD) predicted > 100% increased incidence of persistent depressive disorder compared to average PSC levels
			Individual level			
			Structured interviews			
39. Becher et al. (2018)	Australia General Employee Population	1223 employees	Longitudinal	Age		PSC as an independent risk factor (over and above ERI and job strain) for new circulatory disease over 5 years was related to job demands, job resources, work motivation, productivity and health at the individual level, and there was also a cross-level relationship between perceptions of PSC at the work unit level, and job demands and resources, work motivation, productivity and health, at the individual level
			Individual level	Gender		
			Structured interviews	Education		
				Income		
				Effort reward		
				Imbalance		
				Job strain		
				Cardiovascular disease		
40. Mansour and Tremblay (2018a)	Canada	562 healthcare workers	Individual level	Work-family conflict		PSC negatively related to WFC-time,
			Cross-sectional	(WFC), WFC-strain		FWC-time, WFC-strain and FWC
				Family-work conflict		Strain via FSSB
				(FWC), FWC-strain,		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
				Family supportive		
				supervisor behavior		
41. Zadow et al. (in review)	International	19 independent samples	Multilevel	Work conditions		High PSC positively influences job demands, job resources and productivity outcomes at the individual and work unit levels
			Meta-analysis	Health		
		24616 employees		Job demands		
				Job resources		
				Motivation		
				Productivity outcomes		
42. Zadow et al. (in review)	International	46962 employees	Individual	Job demands		Intervention approaches incorporating PSC principles was more effective in improving psychological health, job resources and motivation than a low PSC (e.g. targeting work conditions, low participation approaches)
			Meta-analysis	Job resources		
				Psychological health		
				Motivation		
43. Huyghebaert et al. (2018a)	France	S1 269 employees	S1 Longitudinal	Need satisfaction	S1 Psychological need thwarting mediated the negative relationship between PSC and employees' work family conflict and turnover intentions	S2 Need thwarting meditated the effects of PSC on burnout
	Nurses	S2 1143 employees (T1)	S1 Individual level	Need thwarting		
				Burnout		
		393 employees (T2)	S1 Survey	Work family conflict		
			S2 Longitudinal	Affective commitment		
			3 months	to the organization		
				Work engagement		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
44. Loh et al. (2018)	Malaysia Hospital Health Care	53 teams	Longitudinal	Emotional demands	PSC T1 moderated emotional demands on emotional exhaustion	PSC also moderated the moderation of resources on emotional demands to somatic symptoms as a resource passageway effect PSC related to future emotional exhaustion and somatic symptoms
		429 health care workers	Individual level	Decision authority		
			Survey	Rewards		
				Emotional exhaustion	T2, and somatic symptoms T2 (stronger moderator than control or rewards)	
		ICC (1) = .23		Somatic symptoms		
45. McLinton et al. (2018a)	Malaysia	1125 health care workers	Cross-sectional	Job demands	PSC significantly lower in Australia compared to Malaysia in health care	PSC receives less attention than physical safety in both countries
				Job resources		
				Emotional labour		
				Burnout		
	Australia	1258 health care workers	Individual level	Engagement	Australia PSC in in health care is less than in the population (no difference in Malaysia)	
				Safety motivation		
				Patient violence		
	Hospital Health Care	Benchmark samples	Survey			Healthcare workers are exposed to higher emotion demands, violence and burnout than other samples likely an outcome of lower PSC
		225 Malaysian employee population	Cross-sectional			
			Individual level			
		973 Australian employee population	Survey			

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Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
46. McLinton et al. (2018c)	Australia	26 teams	Multilevel	Psychological demands	PSC was related to demands and burnout; PSC was related to violence exposure and in turn MSDs and work injuries	High PSC may reduce the incidence of violent injury to staff
	Hospital Personnel	288 employees	Mixed-methods/ survey	Violence exposure		
		ICC = .08		Burnout		
				Musculoskeletal		
				disorders		
				Work injuries		
47. McLinton et al. (2018b)	Australia	27 interviews	Mixed-methods		Elaborated qualitative data for high and low PSC risk teams	Support for PSC theoretical framework applied to healthcare setting; need to address interaction with senior management
	Hospital Personnel	69 teams assessed	Cross-sectional			
			Surveys			
			Interviews			
48. Gupta et al. (2018)	Australia	13 employees	Experimental			Telomere length positively related to PSC participation indicating the potential for telomere measure to be used as work related stress indicators
49. Ansah et al. (2018)	Ghanaian	876 employees	Cross-sectional	Job demands (physical emotional, work pressure), Job resources (supervisor support, co-worker support),		PSC directly, and also indirectly, via the path of job resources, predicted the physical health and safety of the fuel attendants
	Fuel Attendants		Individual level			
			Survey			
				Physical health and safety		
50. Rasdi et al. (2018)	Malaysia Police Officers	105 employees	Cross-sectional	Age	Team PSC and physical safety climate positively related to PSC levels	The introduction of an occupational safety website improved PSC levels
			Individual level	Gender		

(continued)

Table 2.1 (continued)

Author/s (year)	Country	Sample	Study design/level of analysis	Variables	Moderators/mediators	Key findings
			Survey	Education		
				Department		
				Job rank		
				Team psychological		
				safety		
				Perceived organisational support		
				Physical safety climate		
51. Haar (2018)	New Zealand Personnel	155 employees (T1)	Longitudinal	Support perceptions		PSC level increased post 4 day work week trial
		183 employees (T2)	Individual level	Team work		
			Intervention	Readiness change		
			Mixed-methods	Work factors		
			Survey	Team performance		
				Job attitudes		
				Wellbeing		
				Confidence testing		
				Job performance		
				Other team performance		
				Engagement		

Note T1 = time 1, T2 = time 2, T3 = time 3, S1 = study 1, S2 = study 2, S3 = study 3. ICC = Intra-class correlation. Review papers and meta-analyses are not included in this table

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