



PSC as an organisational level determinant of working time lost and expenditure following workplace injuries and illnesses

Maureen F. Dollard^{a,b,*}, May Loh^a, Harry Becher^a, Daniel Nesar^a, Sophie Richter^a, Amy Zadow^{a,c}, Ali Afsharian^a, Rachael Potter^a

^a Psychosocial Safety Climate Global Observatory, Centre for Workplace Excellence, University of South Australia, South Australia, Australia

^b School of Medicine, University of Nottingham, Nottingham, United Kingdom

^c University of Adelaide, Australia

ARTICLE INFO

Keywords:

Psychosocial safety climate
Injury management
Return to work
Cost of injuries
Psychosocial factors

ABSTRACT

Objectives: Finding an association between organisational factors and working time loss following workplace injury and illness (hereafter injury) could rightfully shift the focus in injury management strategies from the individual to the organisation. We investigate whether working time loss and expenditure following compensable injury can be predicted by knowing about organisational characteristics, particularly the Psychosocial Safety Climate (PSC) – the organisation's climate for worker psychological health.

Methods: Our prospective multisource study linked 'objective' reports of working conditions assessed in an independent Australian Workplace Barometer (AWB) sample (random population interviews of 1067 workers) to future workers compensation claims data held by a government safety regulator, by aggregating both data sets to the organisational (employer) level. We selected compensation data prior to big policy changes to a short tail scheme. We selected claims with working time loss due to injury or illness ≥ 1 day yielding 100 organisations and 12,624 claims.

Results: Results support organisational PSC as a leading indicator of future time loss and expenditure, and its effect was mediated through skill discretion, job satisfaction, and rewards. Decision authority, supervisory support, and bullying were also related to time loss but not as strongly as PSC. In very low PSC organisations, days lost were 160 % higher than for those in high PSC organisations (177 vs 68 days). Likewise, expenditure for the injury or illness (e.g., health expenses, wages) was 104 % higher in very low PSC vs high PSC organisations (AUD \$67 260 vs \$32 939).

Conclusion: PSC is a modifiable social determinant of injured workers working time loss and expenditure. Practically, it is essential to target PSC for safety improvement — beyond injury prevention PSC is important for return to work and to prevent the shift of the burden of organisational problems to the individual and public health.

1. Introduction

Workplace injuries and illnesses (hereafter 'injury') have devastating individual, social, public health, and economic impact, and represent a significant and persistent risk to workers and workplaces globally (Vil-lotti et al., 2021). More than 7500 people die every day from occupational accidents and work-related diseases, accounting for 5–7 % of deaths globally (International Labour Organisation, 2019). In Australia, during 2017–18, an estimated 563,600 people had an injury or illness

related to work, representing 4.2 % of the labour force. In 60 % of cases the injured worker required time off from work (Australian Bureau of Statistics, 2017). The yearly cost of workplace injury and illness is estimated to be around 1.6 % of Australia's GDP, almost equivalent to the annual output of Australia's agricultural sector (Safe Work Australia, 2022). In Canada in 2018, the total cost of injuries (including potential life lived losses, and health-care system costs) was CAD29.4 billion (Parachute, 2021). In the UK, in 2019–20 lost productivity and compensation costs were GBP18.8bn (Health and Safety Executive UK,

* Corresponding author at: Psychosocial Safety Climate Global Observatory, Centre for Workplace Excellence, University of South Australia, South Australia, Australia.

E-mail address: maureen.dollard@unisa.edu.au (M.F. Dollard).

<https://doi.org/10.1016/j.ssci.2024.106602>

Received 27 November 2023; Received in revised form 16 April 2024; Accepted 20 June 2024

Available online 24 June 2024

0925-7535/© 2024 Published by Elsevier Ltd.

2020) and across the European Union, in 2017, costs relating to work-related accidents and injuries were EUR467bn, representing 3.3 % of European GDP (Elsler and Takala, 2017). Time loss from work following injury is a proxy indicator of multiple burdens to workers (may indicate severity of injury, loss of employment benefits), employers (e.g., lost productivity, insurance premiums), and insurers (wage replacement, medical bills). Returning to work (RTW) in a timely fashion is desirable for all stakeholders. The aim of this paper is to understand workplace safety factors that could predict RTW metrics, reduced time loss and expenditure following workplace injury.

Psychosocial factors at work are implicated in RTW as indicated in our literature review on the impact of workplace psychosocial determinants in RTW (see [Supplementary material](#)). We used the keywords “return-to-work” or “work disability” or “long-term sickness absence” or “worker compensation claims” or “work rehabilitation” and “work-related psychosocial risk factors” or “work-related psychosocial hazards” and “work-related injuries” or “work-related illness” or “occupational injuries” in the search. Of 2394 articles returned from the search, 54 examined the association between workplace psychosocial risks and workers’ RTW. Commonly identified determinants were psychosocial components of work design such as support from supervisors and co-workers, and skill discretion. Several gaps were identified. Only one third of the studies were prospective and were mostly reports from workers already injured, rendering their reports of the work context subject to bias. No studies used the organisation as the unit of analysis to explore the role of psychosocial features of organisations. Only one study was multisource and linked self-report to registered data. The review nevertheless identified certain workplace psychosocial factors as important for RTW such as job control, supervisor support, coworker support and work pressure. So far the organisational context, specifically the psychosocial safety climate (PSC) has not yet been investigated for post-injury effects such as time loss and expenditure in RTW. PSC refers to the organisation’s safety system for worker psychological health and is an evidence-based cause of risky psychosocial work conditions. As such the existing evidence investigating these risk factors is looking downstream (at the job task level) rather than upstream (to the organisation system) to a common cause of the risks themselves (PSC the ‘cause of the causes’). Moreover existing evidence collated from injured workers is mainly based on a “reactive” perspective rather than a “prevention” approach highlighting the need to focus on independent ratings of upstream sources of these work conditions, such as the PSC that could affect the likelihood of success in RTW. Despite qualitative research that highlights organisational system factors including the organisational climate comprising management priority with respect to return to work, effective communication and support, low stigmatisation, comprehensive RTW and workplace safety policies (Haas et al., 2018) so far quantitative studies have not proposed and tested a comprehensive integrated theoretical framework for assessing workplace risk factors and effects in RTW (Collie et al., 2019). Understanding a system-level factor such as PSC could help pinpoint an upstream target for intervention that is more likely to lead to wider success.

1.1. Added value of this study

Our study addresses these gaps by using a prospective design, linking independent sources of information, reports of organisational work conditions not specifically from injured workers, to the organisation’s registered compensation data, across 100 organisations. Beyond individual injured worker effects, our study may provide strong evidence about whether workplace psychosocial risks characteristic of organisations themselves, particularly the positive organisational context (i.e., PSC), are fundamental to RTW success. Our research accords with the sentiments of the Lancet series on work and health, critical of a too narrow focus on occupational hazards, and not on work as a positive social determinant of health and a lever to influence population health (Lancet Editorial, 2023). In particular our study will investigate whether

the upstream factor PSC is mediated by downstream psychosocial risks (skill discretion, rewards, satisfaction). If so this would suggest that intervention and policies should target higher-level organisational factors (e.g., management commitment). Our research can extend PSC theory which has proposed a primary preventive role (e.g., PSC negatively predicts future psychosocial risks) and a secondary prevention role (e.g., PSC moderates the impact of psychosocial risks on distress) by proposing a tertiary role of PSC post injury.

2. A systems approach to return to work

We focus on a psychosocial safety climate (PSC) a positive system level factor that reflects how the organisation values and prioritises the psychological health (humanity) of its employees. PSC is defined as employee “shared perceptions of policies, practices and procedures for worker psychological health and safety” (Dollard et al., 2019). PSC reflects the organisational safety system within which to manage psychosocial risks to worker psychological health and covers four domains: (1) senior management commitment to stress prevention, (2) senior management priority for employee psychological health over productivity imperatives, (3) organisational communication about factors that affect employee psychological health, and (4) organisational participation and consultation with all stakeholders about work health and safety issues that affect psychological health. Research shows that PSC predicts a range of downstream psychosocial factors that relate to worker psychological health (Dollard et al., 2019). In a high PSC working environment, in their efforts to prevent work stress, senior management learn about psychosocial risks through PSC communication and participation systems and in response ensure jobs are designed so that workers flourish and psychosocial threats to worker psychological health are prevented and/or workers are supplied with adequate resources to manage them (Hall et al., 2010).

There are several reasons why PSC might relate to post-injury effects. First, PSC concerns management commitment and support for worker psychological health and safety. Wyatt and Lane (Wyatt and Lane, 2017) found in retrospective research, that senior management through their influence on the climate and priority setting, was the most important factor in RTW rates. When workers rated their employer’s response to injury to be fair and constructive, RTW rates were 43 % higher for physical, and 52 % higher for psychological injury, claims. PSC also involves communication systems through which injured worker can report concerns and be listened to, and participation systems, which enable multiple stakeholders to engage, help and support the injured worker. High PSC also implies a multitude of systems and processes including Employee Assistance Programs (EAPs) and psychological services that can help with psychological reactions such as fear of relapse and pain that could help recovery and reduce RTW times. Second, in high PSC contexts we expect favourable working conditions that could assist workers RTW. These could be ample job control (skill discretion and decision authority help with work accommodation), supervisor and co-worker social support (provide instrumental and emotional support), rewards (help build personal resources, job security, esteem), manageable job demands (psychological, emotional, physical), an absence of bullying and harassment, and satisfactory work. When workers are injured, it is likely that psychological reactions emerge, such as pain, fear avoidance, and expectations of recovery. When work conditions are unfavourable, such as in low PSC contexts, these negative psychological effects are likely to persist (Nicholas et al., 2019). This scenario is likely in low PSC contexts.

PSC is related to safety climate, a system-level concept too, which reflects the organisation’s physical safety priorities, and is a predictor of long-term sickness absence (Brandt, 2023). However research finds that PSC is more strongly related to both physical and mental injury compared to safety climate (Collie et al., 2022). Other research links PSC to physical injuries too (e.g., musculoskeletal disorders (Afsharian et al., 2023)). This implies that honing-in on PSC could be important for

recovery from all injuries, since PSC reflects a care and risk management system (Dollard et al., 2017) and because downstream psychosocial factors involved in injury, that are predicted by PSC, could linger to affect recovery too.

For the first time we examine PSC as an organisational systems factor in injury management. We explore the salience of PSC alongside other psychosocial factors (job control, supervisor support, co-worker support, work pressure, job strain, effort-reward imbalance, bullying, harassment, job satisfaction) in RTW. Consistent with the notion of PSC as a lead indicator we expect that PSC relates to time loss directly and through other psychosocial factors via mediation pathways. Second, we overcome perceptual bias and common methodological problems that confounds much of the retrospective self-report cross-sectional research in the field. We linked objective organisational datasets, combining independent employee surveys and company registered compensation data. The rationale is to explain the collective experience of injured workers in terms of social determinants arising from organisational system factors rather than merely work design and individual perceptions. Third, we aim to ascertain future work time loss (days lost) and expenditure related to compensable injury for PSC risk levels. In sum, responding to recent calls our strong linkage to theory and use of innovative and longitudinal methods brings us closer to possible causal inference in this field (Rugulies et al., 2023).

3. Methods

3.1. Study design and participants

This longitudinal study followed the STROBE guidelines for observational studies (Cuschieri, 2019). For the AWB sample, participants were randomly selected from the White Pages, a telephone number directory. An introductory letter was sent to potential participants' homes followed by a telephone call. AWB participants included were individuals in the household with a valid telephone connection, who most recently had their birthday within the household, aged at least 18 years old, in paid employment, and not self-employed. Data were collected from employees across all sectors (private, government, non-government organizations) and professions. A computer assisted telephone interviewing (CATI) technique was used to maximize response rates, minimize data collection time and errors, enable data collection from English as a second language participants, and ensure a representative sample. In total, in 2010 there were 1143 participants from South Australia (SA) who completed the Australian Workplace Barometer (AWB) (Dollard and Bailey, 2014) survey interviews via CATI. All AWB respondents consented to participate in the survey and to data linkage. The study was approved by the University of South Australia human research ethics committee.

3.2. Procedures

AWB survey interview participants were asked to identify their employer and provide information on psychosocial factors in their workplaces. We aggregated AWB data to the organisation/employer level, and then linked this to workers compensation data registered with SafeWork SA (hereafter the SWSA database) which we had also aggregated to the organisation/employer level. Data were matched under strict data security protocols according to SafeWork SA policy and identified in their operating database. We used SWSA claims data prospective from 2010 (time of AWB data collection) but prior to 2015 since legislative changes in 2015 cut possible claim times, thereby reducing the potential to identify true work time loss effects. Given that most businesses in SA are small, using SWSA data across four years enabled us to capture as many organisations as possible, including small workplaces that are often omitted from organisation-level studies (Franche et al., 2005).

In the SWSA 2011–2014 database after exclusions (not medically

approved, aged less than 18, death, and <1 day loss (needed to ensure some time loss), there were 7680 organisations with 43,106 injury cases. We matched 100 organisations in the AWB 2010 database to the SWSA database (see Fig. 1A). Appendix. The working conditions of these 100 organisations were reported by 287 organisational member interviews in the AWB survey (average 2.87 reports per organisation). After matching the 100 organisations, 12,624 injury cases were represented (covering 29.28 % of all injuries in the total SWSA data base) (see Fig. 1A).

3.3. Measures

Psychosocial Safety Climate was assessed using the PSC-12 (Hall et al., 2010) which has four sub-scales each with three items; Management Commitment (e.g., "Senior management show support for stress prevention through involvement and commitment" ($\alpha = .87$)), Management Priority (e.g., "Senior management considers psychological health to be as important as productivity" ($\alpha = .90$)), Organisational Communication (e.g., "There is good communication here about psychological safety issues which affect me" ($\alpha = .78$)), and Participation (e.g., "Participation and consultation in psychological health and safety occurs with employees, unions, and health and safety representatives in my workplace" ($\alpha = .80$)). All items used a 5-point Likert scale response format from 1 (strongly disagree) to 5 (strongly agree) ($\alpha = .94$). PSC has four evidence-based benchmark levels, where each level is indicative of the associated psychosocial risk exposure and psychological distress levels (Bailey et al., 2015). To estimate time loss and expenditure across PSC levels, we used established PSC benchmarks, very low (12 thru 26 = 0), low (26.01 thru 37 = 1), medium (37.01 thru 40.99 = 2), and high (41 thru Highest = 3).

The following measures were from the Job Content Questionnaire 2.0 (JCQ 2.0) (Karasek et al., 1998) unless otherwise indicated. Item responses ranged from 1 (strongly disagree) to 4 (strongly agree). Quantitative and qualitative job demands were measured using three job demands scales: (1) five items measuring work pressure/psychological demands, e.g., "My job requires working very hard" ($\alpha = .67$); (2) five items measuring physical demands, e.g., "My job requires lots of physical effort" ($\alpha = .85$); and (3) four items measuring emotional demands, e.g., "My work places me in emotionally challenging situations" ($\alpha = .80$). Skill discretion was measured with six items, e.g., "I have an opportunity to develop my own special abilities" ($\alpha = .72$). Decision authority was assessed with three items, e.g., "My job allows me to make decisions on my own" ($\alpha = .72$). Supervisor Support was assessed with three items, e.g., "My supervisor/manager is concerned about the welfare of those under him/her" ($\alpha = .77$). Co-worker support was measured with three items, e.g., "The people I work with are friendly" ($\alpha = .84$). Organisational Rewards were assessed with four items from the Effort-Reward Imbalance Scale (ERI) (Siegrist, 1996) now in the JCQ 2.0, e.g., "Considering all my efforts and achievements, I receive the respect and prestige I deserve at work" ($\alpha = .61$). Job strain was assessed by the ratio of psychological demands over job control (decision authority and skill discretion), where higher scores indicate higher job strain. Effort reward imbalance (ERI) was assessed using the ratio of psychological demands over organisational rewards, where higher scores indicate a higher level of imbalance. Workplace bullying was measured by providing a definition then asking participants "Have you been subjected to bullying at the workplace during the last 6 months?", 1 = yes, 0 = no (Dallner et al., 2000). Organisational harassment was assessed with a 7-item scale, (Richman et al., 1996) e.g., "I have experienced unwanted sexual advances", with ratings on a 5-point Likert scale from 1 (very rarely/never) to 5 (very often/always) ($\alpha = .68$). Job satisfaction was assessed with a single global item from the Job Satisfaction scale, (Warr et al., 1979) "Taking everything into consideration, how do you feel about your job as a whole?", measured on a 7-point Likert scale, from 1 (I'm extremely dissatisfied) to 7 (I'm extremely satisfied).

Injury data. Within the South Australian (SA) jurisdiction employees

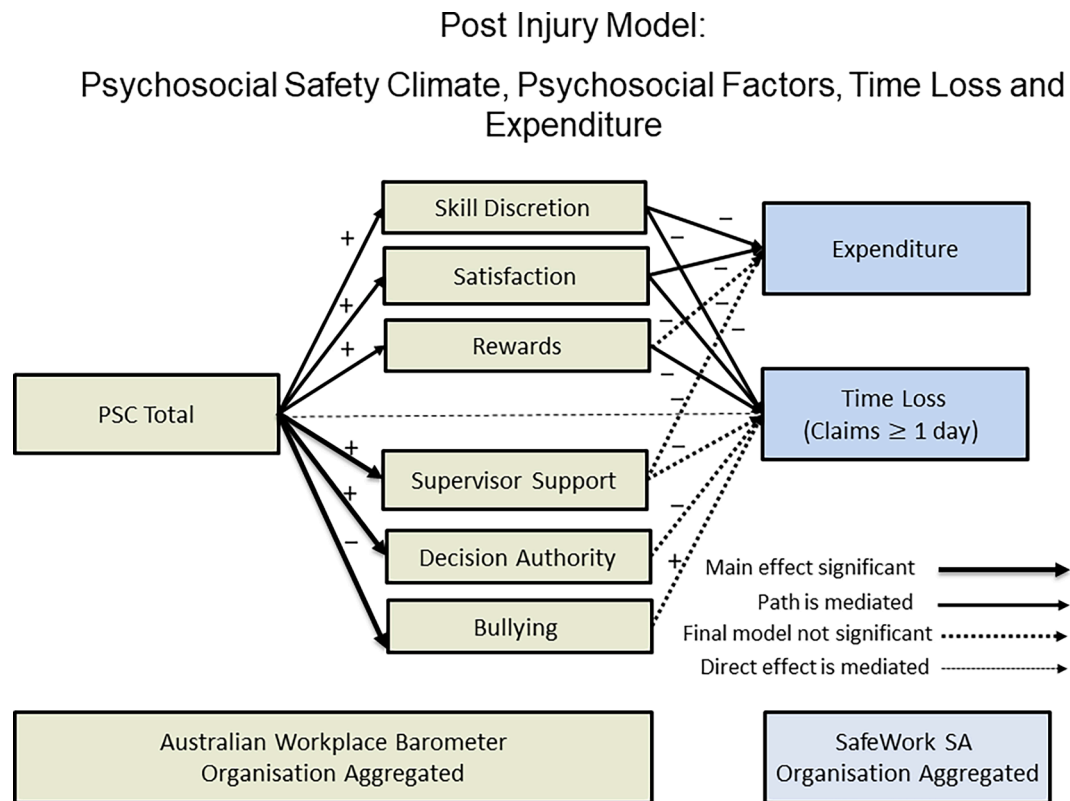


Fig. 1. Post Injury Model: Psychosocial Safety Climate, Psychosocial Factors, Time Loss and Expenditure. Note: AWB reports from 287 employees; 12,624 injury cases. Unit of analysis, $n = 100$ organisations.

are protected by a statutory authority which provides insurance protection for 70 % of businesses and their workers (those registered with SWSA now called ReturnToWorkSA); the remaining 30 % are self insured (e.g., large employers including federal government agencies with resources to fund workers compensation liability). The statutory authority collects injury data on all SA employers of all sizes (exempt and self-insured) and both types are included in our data set. When a compensation claim is lodged by an employer or employee and approved, days lost and expenditure are recorded, along with type of injury and mechanism. Number of days lost are assessed as full-time equivalent days a worker is absent from work due to injury. Expenditure includes all statutory payments, including income support, medical expenses and any lump sum payments (redemptions, economic and non-economic loss) to a worker to finalise a claim or claim(s). Since only around 3 % of employees do not return to work, days lost is a good proxy for RTW following a compensable injury. Since there is a very large correlation between time loss and expenditure ($r = .86, p < .01$), it can also be assumed that expenditure is a proxy for RTW.

Demographic characteristics of organisations (as all psychosocial factors) were gleaned from AWB reporter demographics including whether they were members of a union, their age, gender, education, income, and organisational size. Industry type was ascertained using SWSA categorisations.

Statistical Analysis. Time loss (days) is count data which is highly skewed and overdispersed which requires non-linear analysis with Negative Binomial (NB) distribution modelling (Diez-Roux, 2000). The main effect of each risk factor was regressed onto time loss and assessed using NB distribution modelling in SPSS. The mediation process was assessed in full models (regressing the dependent measure (time loss), on the independent measure (PSC) and mediator (psychosocial risk) and regressing the mediator on the independent measure, simultaneously in MPLUS with an MLR estimator and NB distribution. Reasoning that expenditure is count-like since values are linked to cases, is skewed and

overdispersed, we also used NB and the same analysis for expenditure. We used ANOVA and Kruskal-Wallis H to test differences in time loss and expenditure by levels of PSC and gender.

3.4. Role of the funding source

The funders of the study had no role in the study design, analysis or interpretation, decision to publish or in the writing of the manuscript. SafeWork SA assisted in providing access to their data, explanation of the data set, explanation of their function, and helped to link the data sets only.

4. Results

The AWB response rate was 31.2 % (Dollard and Bailey, 2014). Sex, age, education and organisational size demographics of the samples and populations from which they are drawn are shown in Table 1. With respect to the representativeness of the AWB sample, there was no significant difference in the gender composition of reporters for the 100 organisations ($n = 287$; male 45.3 %, female 54.7 %) vs the AWB reporter population (1067 reports from 746 SA organisations), and national statistics of Australian employees. The SWSA injured worker population showed that more males than females (42 %) reported time loss claims, but for the SWSA sample from which it derived, the claims were more likely to be from females (63 %) chi-square (1) = 20.01, $p = .0001$. The proportions of females represented in the injured worker sample were significantly higher than those in the national worker sample, chi-square (1) = 6.76, $p = .01$.

For education, the AWB population and sample were representative of national proportions. In relation to age, both samples were representative of their respective populations. For organisational size, national data shows 96 % of businesses are small, and although claims were mainly from small organisations (SWSA population) in the

Table 1
Demographics of those reporting work conditions and independently demographics of cases with registered injuries.

Total number in sample	Sample Characteristics				Chi Square (df), p	Chi Square (df), p	Chi Square (df), p	
	Workplace Reporters Australian Workplace Barometer		National Sample ^a	Injured Worker Sample SafeWork SA Cases				
	Population S1: 1067 people reports from 746 organisations)	Sample S2: 287 people reports from 100 organisations	S3:	Population S4: 43,106 total cases				Sample S5: 12,624 cases in 100 organisations
Sex					S2 vs S3	S4 vs S5	S5 vs S3	
Female	590 (55.3 %)	157 (54.7 %)	49.9 %	17,891 (41.5 %)	1.00 (1)	20.01(1)	6.76 (1)	
Male	477 (44.7 %)	130 (45.3 %)	50.1 %	25,212 (58.5 %)	p = .32	p = .001	p = .01	
Unknown				3 (.0)				
Age					S2 vs S3	S4 vs S5		
18–24	76 (7.1 %)	8 (2.8 %)	NA	4721 (10.9 %)	3.32 (6),	6.76 (6),		
25–34	119 (11.2 %)	29 (10.1 %)	NA	7847 (18.2 %)	p = .77	p = .34		
35–44	244 (22.9 %)	65 (22.6 %)	NA	10,022 (23.2 %)				
45–54	328 (30.8 %)	102 (35.5 %)	NA	12,423 (28.8 %)				
55–59	148 (13.9 %)	43 (15.0 %)	NA	4777 (11.1 %)				
60–64	108 (10.1 %)	30 (10.5 %)	NA	2683 (6.2 %)				
65+	44 (4.1 %)	10 (3.5 %)	NA	633 (1.5 %)				
Education					S1 vs S2	S2 vs S3		
≥Bachelor	28.2	32.2	23.8 %	NA	.79 (1)	3.51 (1)		
Up to Bachelor	71.8	67.8	76.2 %	NA	p = .38	p = .06		
Organisational Size	746 Orgs	100 Orgs		7680 orgs				
Small (6 to 20)	176 (23.6)	10 (10 %)	96 %	4912 (64.6 %)				
Medium (21 to 200)	233 (31.2 %)	31 (31 %)	3.8 %	2263 (29.8 %)				
Large (201 +)	337 (45.2 %)	59 (59 %)	< 1 %	425 (5.6 %)				
Missing				+80 (1.0 %)				

Note. ^a, Australian small business: Key statistics and analysis, December 2012. Commonwealth of Australia.

matching of the AWB to SWSA of 100 organisations, there was an overrepresentation of medium and large organisations and an underrepresentation of small organisations (10 % were small, 31 % medium and 59 % large).

Time off injury cases per organisation ranged from one injury (16 organisations), two injuries (seven organisations), three to four injuries (three organisations), five to nine injuries (17 organisations), 10 to 96 injuries (41 organisations), and 100 to 3895 injuries (16 organisations). Women and men took similar time to return to work (men mean rank 6279.74, women, 6330.84, Kruskal-Wallis H (df = 1) = .58, p = .45, yet the cost of claims was higher for men (rank 6520.67 vs women 6190.18) H (df = 1) = 24, 16 p < .001.

Claims with time loss ≥ 1 day were mostly from organisations in the Community Services (which included Education and Health) (33 organisations, 33 %), Retail and Wholesale Trade (14, 14 %), Manufacturing (19, 19 %), and Finance and Property (11, 11 %) (Table A1). Appendix. The most common ten occupations featured in the claims data (e.g., registered nurses, personal care assistants, enrolled nurses, police officer) and mechanisms of injury data (e.g., muscular stress while handling objects not lifting, falls on the same level, muscular stress while lift, carry or put object down, muscular stress with no objects being handled) for the 100 organisations is shown in Table A2. Appendix

Means, standard deviations and Pearson correlations are shown in Appendix Table A3. A point to note is that PSC is related to every psychosocial risk factor assessed in line with the “cause of the causes” theory. Results show that after controlling for organisational demographics, PSC and its subscales were all negatively related to time loss (Table 2). Further, skill discretion, decision authority, supervisor

support, reward and satisfaction were all negatively, and bullying positively, related to time loss. For expenditure, significant effects were found; PSC, skill discretion, supervisor support, rewards and satisfaction were significant.

We proceeded to test the mediation effects of those risk factors shown in this first analysis (Table 2) to be related to time loss and expenditure. For time loss, significant mediations were found from PSC to days lost via skill discretion (Model 1), rewards (Model 4) and job satisfaction (Model 5) (see Table 3). There was no mediation of PSC through decision authority, supervisor support or bullying. These risk factors were not associated with days lost when PSC was in the model. For decision authority, bullying, and supervisor support, PSC was the stronger predictor (see Fig. 1). For expenditure significant mediations were found from PSC to expenditure via skill discretion (Model 7), and satisfaction (Model 10). The effects of rewards and supervisor support on expenditure were no longer significant with PSC in the model. The findings from the analyses are shown in Fig. 1.

4.1. PSC and Workers’ compensation expenditure and days lost

The average organisation’s days lost per claim and expenditure were substantially different depending on an organisation’s PSC level (see Fig. 2). High and medium level PSC organisations had comparable average days lost per claim (68 and 68 respectively). Low and very low PSC level organisations had per-claim days lost figures at 80 and 177 days respectively. Low PSC organisations had 18 % more days lost than medium PSC organisations, and very low PSC organisations had 160 % more days lost than high PSC organisations. Likewise high and medium

Table 2

Negative binomial distributions of time loss on PSC, work psychosocial risks, and organisational demographics.

AWB Psychosocial Factors	Claims Time Loss†					Claims Expenditure†						
	B	SE	95 % CI	p	Exp (B)	B	SE	95 % CI	p	Exp (B)		
Psychosocial Safety Climate	-.02	.01	-.04	-.01	.001	.98	-.56	.23	-1.02	-.11	.015	2.66
Management Commitment	-.09	.02	-.14	-.05	.001	.91	-1.93	.70	-3.31	-.54	.007	2.48
Management Priority	-.09	.02	-.14	-.04	.001	.91	-2.08	.82	-3.68	-.49	.011	2.48
Organisational Communication	-.10	.03	-.16	-.05	.001	.90	-2.33	.95	-4.19	-.47	.014	2.46
Organisational Participation	-.08	.03	-.13	-.02	.011	.92	-1.75	.99	-3.67	.19	.080	2.51
Skill Discretion	-.06	.02	-.10	-.02	.001	.94	-1.36	.42	-2.18	-.53	.001	2.56
Decision Authority	-.04	.02	-.07	-.01	.009	.96	-.56	.37	-1.29	.17	.130	2.61
Supervisor Support	-.20	.05	-.30	-.11	.001	.82	-4.43	1.92	-8.19	-.68	.021	2.27
Coworker Support	-.08	.07	-.22	.06	.270	.92	-1.30	2.34	-5.88	3.29	.579	2.51
Rewards	-.16	.05	-.25	-.07	.001	.85	-3.37	1.19	-5.69	-1.04	.005	2.34
Satisfaction	-.23	.06	-.34	-.11	.001	.79	-5.07	1.95	-8.90	-1.25	.009	2.20
Harassment	.09	.05	-.01	.18	.065	1.09	2.25	2.02	-1.70	6.21	.264	2.97
Bullying	.93	.33	.27	1.59	.006	2.53	22.92	16.48	-9.40	55.23	.165	12.61
Psychological Demands	-.02	.01	-.04	.01	.150	0.98	-.35	.30	-.95	.24	.240	2.66
Emotional Demands	.04	.03	-.03	.10	.240	1.04	.73	.93	-1.09	2.54	.433	2.83
Physical demands	.04	.04	-.04	.12	.340	1.04	1.38	.94	-.46	3.22	.140	2.83
Job Strain	.56	.34	-.10	1.22	.099	1.75	5.29	6.41	-7.29	17.86	.410	5.76
ERI	.23	.13	-.01	.48	.060	1.26	2.54	2.51	-2.39	7.47	.313	3.52
Organisational Demographics												
Age	-.01	.02	-.04	.02	.461	0.99	-.55	.40	-1.34	.03	.166	2.69
Gender	-.30	.31	-.90	.31	.340	0.74	-16.71	7.41	-31.27	-2.18	.024	2.10
Education	-.15	.07	-.28	-.01	.030	0.86	-2.26	2.25	-6.67	2.15	.316	2.36
Income	-.04	.06	-.14	.07	.510	0.96	.98	1.55	-2.07	4.02	.529	2.61
Unionisation	-.51	.22	-.94	-.09	.019	0.60	-7.63	6.57	-20.50	5.25	.246	1.82
Organisational Size	.02	.16	-.29	.38	.909	1.02	5.65	4.67	-3.51	14.80	.227	2.69

Note. Each effect is from univariate analysis and controls for organisational demographics. Organisational demographics results are simply their main effects. Bold factors are significant. AUDs are in '000. Male = 1, Female = 2. AWB reports from 287 employees; † 12,624 cases. Unit of analysis, n = 100 organisations.

level PSC organisations had average organisational costs per claim (\$32,939.01 vs \$29,749.84 respectively), low and very low PSC level organisations generated much higher expenditures (\$34,016.01 vs \$67,260.49) respectively. Relatively, costs per claim for low level PSC organisations were 4 % higher than high level PSC organisations; for very low PSC organisations that figure was 104 %. Days lost were significantly different across PSC levels, $F(3, 96) = 5.20$, $p = .002$ as was expenditure $F(3, 96) = 4.04$, $p = .009$; post-hoc LSD tests showed that despite the wide variation in scores at very low PSC, this group scored significantly higher than all other groups for days lost and expenditure. Although ANOVA is robust to skewness a Kruskal-Wallis H non-parametric test confirmed that the very low PSC group was significantly higher on days lost, $\chi^2(1) = 6.96$, $p = .008$, and expenditure $\chi^2(1) = 6.90$, $p = .009$ than the other groups.

5. Discussion

Our research shows that we can predict future working time loss associated with a medically certified workplace injury or illness by knowing about the objective workplace organisational context (i.e., PSC and other organisational characteristics). Results support organisational PSC as a leading indicator of RTW (future time loss and expenditure), and its effect was mediated through other organisational characteristics, skill discretion, job satisfaction, and rewards. Decision authority, bullying and supervisor support were also related to time loss but not as strongly as PSC. This is only partial confirmation of the mediation models tested. The method used in this study, involving longitudinal linkage of multisource data, overcame the challenge of perceptual bias that has plagued previous research (cross-sectional, single source, retrospective, self-report). Many studies have theorised and shown a link between workplace psychosocial factors and time loss yet have not gone far enough to uncover the root cause of the problem in the form of the organisational system, which is PSC in the current study. The results as a whole suggest the effects of PSC are mediated by some psychosocial resource factors.

5.1. Theoretical implications

Theoretically the results accord with the PSC-extended Job Demands Resources theory (Dollard et al., 2019), particularly the resources motivation pathway. When PSC is high there are likely to be more job resources available compared to low PSC contexts. In a high-PSC context, workers experience greater resources, such as skill discretion, which is important for finding alternative work possibilities for work accommodation, higher job satisfaction which implies fundamental psychological needs are met, and higher rewards which implies esteem, encouragement for efforts, salary, and job security may be motivators to return to decent work with less time loss. Work demands in the form psychological, emotional and physical demands were not associated with time loss and expenditure in this study. This is at odds with the literature but could be due to the fact that at the individual level demands are important but have a different generalised effect at the organisation level as implied in our study. It is interesting to note that the job strain and ERI measures are more strongly related to time loss than work pressure alone (albeit not significantly), because they combine with resource measures (job control, job rewards respectively). It is important to consider that while demands particularly physical demands could be important in injury causation, job resources seem more important in relation to lost time and expenditure. The implications for RTW theory is that at a time of high need resourcing is most helpful to an injured worker, ensuring basic psychological needs for autonomy, competence and relatedness are met, through support and opportunities for growth and motivation, in RTW.

In line with our findings, we suggest that the theory about time loss due to work-related injury and illness, needs revision now to include a focus on PSC as an important starting condition. Multidomain theoretical approaches that include workplace factors can now be proposed to include the PSC context. PSC was related to all psychosocial factors, some of which could explain the link between PSC and RTW proxies. Examining PSC in RTW approaches could inform how and why we should focus on system level factors. Theoretically, the results support

Table 3
Statistical Results of PSC Mediation Models.

	PSC to Mediator	Mediator to Outcome	Mediation Process	Akaike
Time Loss				
Model 1[†]	PSC to Skill Discret.	Skill Discret. to Time	PSC to Skill Discret. to Time	
Beta (SE)	0.21 (0.04)	-0.06 (0.02)	-0.01 (0.005)	1627.85
t, p value	4.78, p < 0.001	-2.74, p = 0.006	-2.56, p = 0.01	
CI (95 %)	0.12, 0.29	-0.10, -.02	-0.02, -0.003	
Model 2[‡]	PSC to Dec. Auth.	Dec. Auth to Time	PSC to Dec. Auth. to Time[‡]	
Beta (SE)	0.32 (0.02)	-0.03 (0.02)	-0.009 (0.006)	1673.46
t, p value	5.33, p < 0.001	-1.50, p = 0.13	-1.41, p = 0.16	
CI (95 %)	0.20, 0.44	-0.06, 0.008	-0.02, 0.003	
Model 3[‡]	PSC to Sup. Support	Sup. Support to Time	PSC to Sup. Support to Time	
Beta (SE)	0.09 (0.01)	-0.10 (0.09)	-0.01 (0.008)	1353.74
t, p value	6.96, p < 0.001	-1.08, p = 0.28	-1.08, p = 0.28	
CI (95 %)	0.07, 0.12	-0.27, 0.08	-0.024, .007	
Model 4[‡]	PSC to Rewards	Rewards to Time	PSC to Rewards to Time	
Beta (SE)	0.10 (0.02)	-0.13 (.06)	-0.01(0.006)	1406.95
t, p value	6.31, p < 0.001	-2.23, p = 0.03	-2.01, p = 0.04	
CI (95 %)	0.07, 0.13	-0.24, -0.01	-0.03, 0.000	
Model 5[‡]	PSC to Satisfaction	Satisfaction to Time	PSC to Satisfaction to Time	
Beta (SE)	0.10 (0.01)	-0.21 (0.08)	-0.02 (0.008)	1332.17
t, p value	6.95, p < 0.001	-2.49, p = 0.01	-2.44, p = 0.02	
CI (95 %)	0.07, 0.12	-0.37, -.04	-0.03, -0.004	
Model 6[‡]	PSC to Bullying	Bullying to Time	PSC to Bullying to Time[‡]	
Beta (SE)	-.008 (0.003)	0.32 (0.41)	-0.002 (0.003)	1010.40
t, p value	-2.34, p < 0.001	0.79, p = 0.43	-0.72, p = 0.48	
CI (95 %)	-.01, -.001	-0.48, 1.12	-0.009, 0.004	
Expenditure				
Model 7[†]	PSC to Skill Discret.	Skill Discret. to Exp	PSC to Skill Discret. to Exp	
Beta (SE)	0.21 (0.04)	-0.04 (0.02)	-0.01 (0.003)	1464.65
t, p value	4.77, p < 0.001	-2.19, p = 0.028	-2.16, p = 0.031	
CI (95 %)	0.12, 0.29	-0.07, -.004	-0.01, -0.001	
Model 8[‡]	PSC to Sup. Support	Sup. Support to Exp	PSC to Sup. Support to Exp	
Beta (SE)	0.09 (0.01)	-0.04 (0.08)	-0.004 (0.007)	1192.39
t, p value	6.96, p < 0.001	-0.47, p = 0.64	-0.47, p = 0.64	
CI (95 %)	0.07, 0.12	-0.20, 0.12	-0.02, .01	

Table 3 (continued)

	PSC to Mediator	Mediator to Outcome	Mediation Process	Akaike
Model 9[†]	PSC to Rewards	Rewards to Exp	PSC to Rewards to Exp	
Beta (SE)	0.10 (0.02)	-0.06 (.06)	-0.006 (0.006)	1248.66
t, p value	6.31, p < 0.001	-1.07, p = 0.29	-1.02, p = 0.31	
CI (95 %)	0.07, 0.13	-.17, .05	-0.01, 0.006	
Model 10[‡]	PSC to Satisfaction	Satisfaction to Exp	PSC to Satisfaction to Exp	
Beta (SE)	0.10 (0.01)	-.18 (0.08)	-0.02 (0.008)	1167.24
t, p value	6.95, p < 0.001	-2.17, p = 0.03	-2.09, p = 0.04	
CI (95 %)	0.07, 0.12	-.34, -.02	-0.03, -0.001	

Note. Models test all paths simultaneously controlling for PSC to outcome effects; Sup. = supervisor. Dec. = decision. PSC, Psychosocial safety climate; Discret. = discretion. In the predictions, we controlled for organisational size, gender, age, education, unionisation, income in a first pass. We then removed non-significant controls for the final models to retain power.

† full model controls for gender, unionisation; ‡, full model controls for gender, unionisation, education.

‡, PSC remains significant in final model.

AWB reports from 287 employees; 12,624 injury cases. Unit of analysis, n = 100 organisations.

the notion of PSC as a bridging concept. Given its established role previously in injury causation and as shown here in injury management, PSC is a potentially unifying concept bridging the safety and injury management literature.

Beyond the primary and secondary function of PSC (Dollard et al., 2019) reasoning and empirical evidence presented here extends this by supporting a tertiary role for PSC, whereby PSC plays a role in how organisations respond to injured and ill workers. PSC is negatively related to time loss, which implies that it is harder to RTW in a low PSC context. Employees may fear that without fundamental change to work conditions that the injury might recur (Young, 2014). The injury is likely associated with psychological components such as pain and distress, and knowledge that management is not concerned about these factors (not prioritising psychological health) could be a psychological deterrent to RTW. The results accord with Robichaud and colleagues, (Robichaud et al., 2019) proposing that poor organisational culture might be a problem in RTW, and Jetha and colleagues’ (Jetha et al., 2018) finding that, in their reaction to the injury, supervisor support was more important than co-worker support.

6. Practical implications

Without attention to the psychosocial context from whence the injured or ill worker originates (specifically the organisation’s safety system), workers may endure unnecessary distress associated with prolonged absence from work. Advances in work health and safety law in many countries (e.g., EU, Australia) require workplaces to monitor and control psychosocial hazards in the workplace. Our research supports the assessment of risk, primarily for prevention but also because it can help return to work. Particularly assessing PSC offers an efficient target for intervention, that if improved, could reduce other risks and the costly after-effects of injury. Recall that PSC is related to all workplace psychosocial factors assessed in the study.

Prioritising improvement of PSC should lead to improvements in productivity shown here in terms of reduced costs of workplace injury and labour loss. Our injury data spanned 2011 to 2014 because the

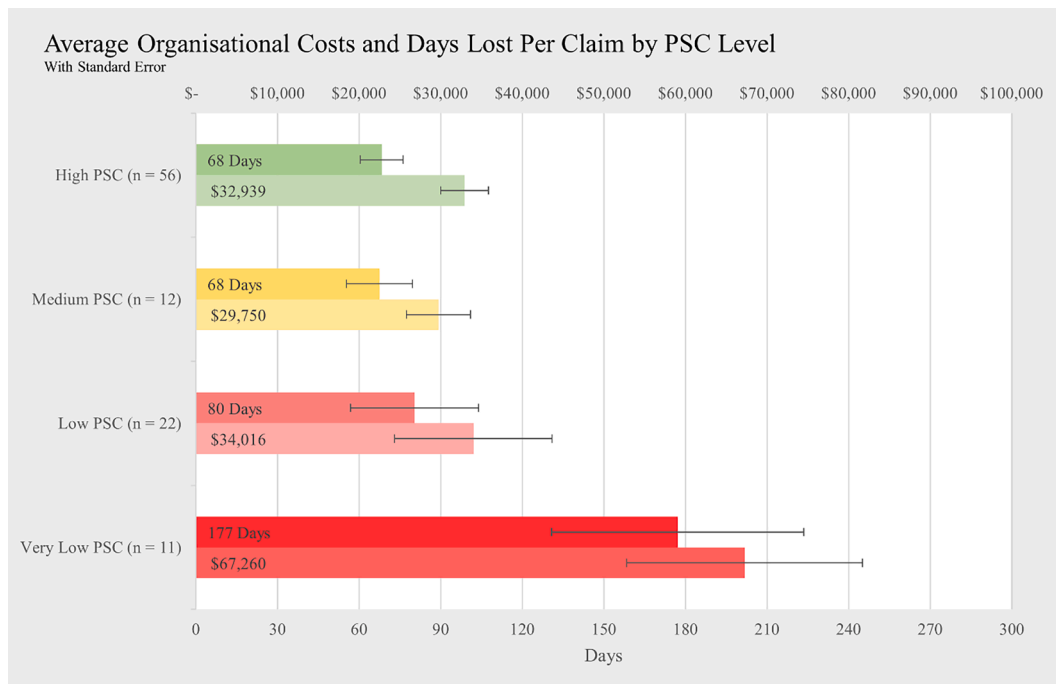


Fig. 2. Average Organisational Costs and Days Lost Per Claim Per Year by PSC Level. Note. \$ are Australian Dollars (AUD); Median expenditure was AUD 36070 per claim. Median days lost was 83 days per claim. AWB PSC reports from 287 employees; 12,624 injury cases. Unit of analysis, $n = 100$ organisations.

workers compensation scheme changed in 2015 to a short tail scheme, meaning that weekly payments for long term injury claimants with a designated work performance impairment $< 35\%$ are now cut off after two years (and medical expenses after three years post-injury). This policy shift can now be seen as transferring workplace problems onto the social system (becoming a public health problem, via medication and health care costs, and social benefits), because we show that long term claims across all injuries and illnesses can be predicted from poor PSC. Other social transference consequences of poor work conditions could be early retirement, which could again be counteracted by primary prevention via PSC. Our research shows that safety specialists have a clear role to play in the assessment of the psychosocial elements of work particularly PSC with the aim to improve PSC with expected benefits beyond injury, to improve recovery-to-work.

6.1. Strengths and limitations

Our study overcame a problem that plagues the literature that of individual recall bias in retrospective responses (injured workers may be biased in their assessment of the work environment). Rather, our data was at the level of the organisation, and linked data prospectively from completely different sources. The Australian Workplace Barometer uses a population-based approach to gather representative data because many organisations gate-keep whether employees are allowed to participate in surveys canvassing their working conditions. In the jurisdiction of our study, most businesses are small. Capturing these using a population-based approach likely results in some organisation reports being represented by one employee, the case in our data set. Moreover, in small organisations injuries are less frequent (18 % are from small vs 56 % from large organisations). We included AWB organisations represented by one member, and SWSA organisations with only one injury across the time period to model reality and maximise the use of precious data. The fact that relationships were detected according to theory gives credence to the validity of this approach and the reliability of the data. It must be acknowledged, however, that the relationships might be stronger with better representation of organisations in the AWB yielding higher reliability of measures used.

Since the statutory authority pays the insurance on registered employers, the data on time loss and expenditure is purported to be more reliable for these employers than it is for self-insured employers. In sensitivity analyses after removing 34 self-insured organisations, all results for time loss were confirmed. Likewise for expenditure but the PSC to rewards to expenditure mediation also became significant ($B = -.02$, $SE = .007$, $t = -.2.27$, $p = .02$).

The first part of the mediation path was only assessed cross-sectionally because PSC and the mediators were assessed with cross-sectional AWB data. However given that previous evidence shows these PSC to psychosocial factor relationships are significant longitudinally, it is not likely that the results are a threat to the conclusion about PSC as an upstream factor 'cause of the causes' in RTW. Future research could add PSC and other psychosocial factors identified here into screening tools¹⁴ which otherwise miss important organisational factors. Future research should also consider the severity of the injury and the availability of functions of the RTW program as additional explanations for time loss and expenditure. Also continuing to focus on collecting multidomain data across organisations and linking this to their workers compensation handling process is important for continuous improvement in injury management processes. Further replication of these results in prospective research with more power is needed to verify the model. Caution should be exercised as results are mainly generalisable to medium to large organisations. Given that women were over-represented in the injured worker sample, and claims were more expensive for men, the real costs at very low PSC could be much higher.

7. Conclusion

An unsafe workplace not only impacts workers' well-being and health but results in a huge cost to employers and society due to the large expenditure on worker compensation. Building an organisation with strong PSC would help to reduce time loss and costs through better injury prevention and management. Our study can contribute to injury management theories which to date have neglected to investigate the organisational system or context and have instead focused on downstream factors. The issue is that without improving PSC, downstream

risk factors are likely to persist compromising future RTW. By investigating PSC in this way, PSC is a potential bridging concept unifying the injury and illness prevention and management literatures, and in practice provides an efficient target for intervention in both systems. PSC theory can be expanded to include a tertiary role for PSC post injury or illness.

CRedit authorship contribution statement

Maureen F. Dollard: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **May Loh:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **Harry Becher:** Writing – original draft, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Daniel Nesar:** Writing – review & editing, Writing – original draft, Visualization, Formal analysis. **Sophie Richter:** Writing – review & editing, Writing – original draft, Investigation. **Amy Zadow:** Writing – review & editing, Writing – original draft, Supervision, Investigation, Conceptualization. **Ali Afsharian:** Writing – review & editing, Writing – original draft, Project administration, Investigation, Data curation. **Rachael Potter:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Funds were provided by: (1) Australian Research Council Discovery Grant, DP087900, 2008-12. \$424,000. Dollard, M.F. Winefield, A.H., LaMontagne, A.D., Taylor, A. W., Bakker, A.B., Mustard, C. Working wounded or engaged? Australian work conditions and consequences through the lens of the Job Demands-Resources Model; (2) Australian Research Council Linkage Grant LP100100449 2010-2012. 340, 000 Dollard, M.F., Winefield, A.H., Taylor, A.W., Smith, P.M., Nafalski, A., Bakker, A., Dormann, C. State, organisational, and team interventions to build psychosocial safety climate using the Australian Workplace Barometer and the StressCafé; (3) SafeWork SA \$150, 000 Contribution to ARC Linkage Grant LP100100449, 2010-12. State, organisational, and team interventions to build psychosocial safety climate using the Australian Workplace Barometer and the StressCafé. The funders had no influence over the findings.

Data availability

The authors do not have permission to share data.

Appendix A

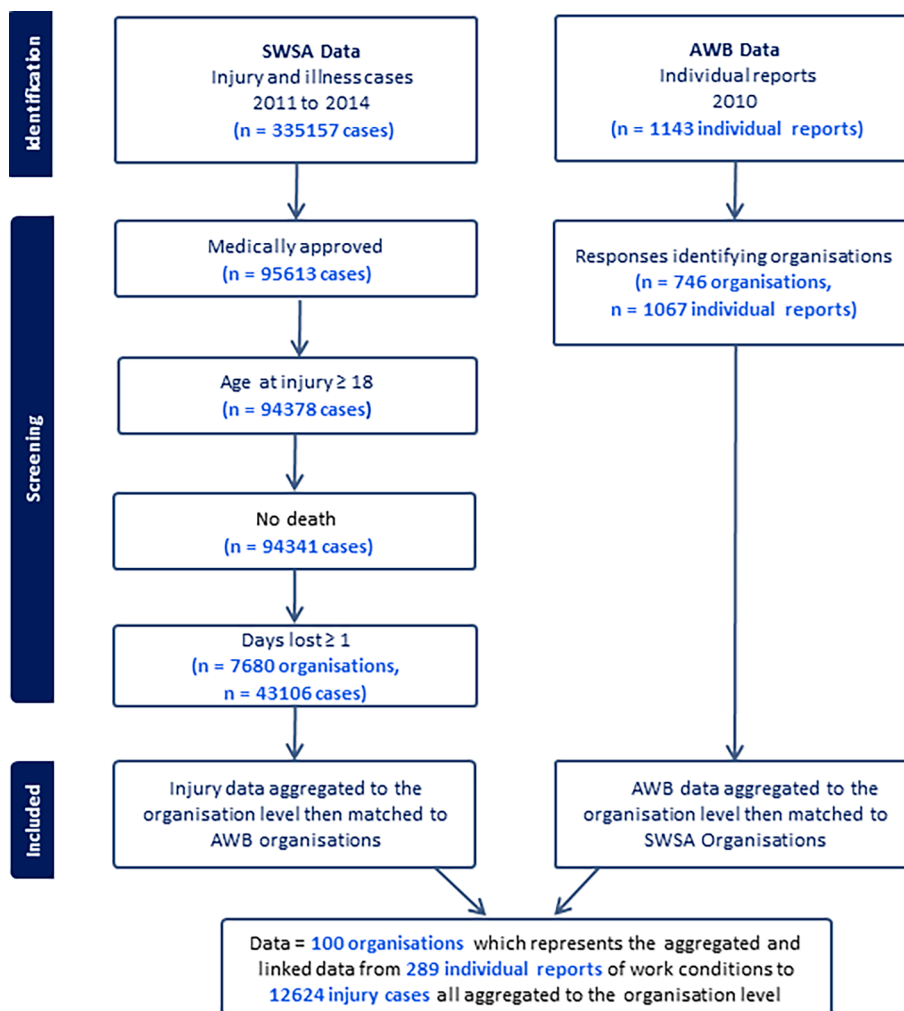


Fig. A1. Flow diagram of sample selection and linkage

Table A1

Industry types represented across 100 organisations with time loss claims (n = 100 organisations, SWSA data 2011–2014, 12 624 claims).

Organisations Matched to AWB with Injury Time Loss ≥ 1 day

AWB Industry	Frequency	Percent
Recreational/Personal	5	5.0
Agriculture, Forestry	2	2.0
Construction	5	5.0
Electricity and Gas	3	3.0
Finance and Property	11	11.0
Public Administration	3	3.0
Community Services	33	33.0
Manufacturing	19	19.0
Mining	1	1.0
Wholesale, Retail Trade	14	14.0
Transport and Storage	4	4.0
Total Organisations	100	100.0

Table A2

Top 10 occupations and mechanism of injury across 100 organisations reporting time loss claims (Injury cases 2011–2014, 12,624 cases within 100 organisations).

Occupation	N of Claims	% of total	Mechanism of Injury	N of Claims	% of total
Registered Nurses	1085.00	8.60	Muscular stress while handling objects not lifting	2859	23.0
Personal Care Assistant	812.00	6.40	Falls on the same level	2262	17.9
Enrolled Nurse	698.00	5.50	Muscular stress while lift, carry or put object down	1193	9.5
Police Officer	660.00	5.20	Muscular stress with no objects being handled	874	6.9
Aged or Disabled Carer	648.00	5.10	Being assaulted by a person or persons	707	5.6
Primary School Teacher	596.00	4.70	Work pressure	705	5.6
Secondary School Teacher	459.00	3.60	Repetitive movement, low muscle loading	566	5.0
Product Assembler	417.00	3.30	Work related harassment and/or workplace bullying	404	3.2
General Clerk	379.00	3.00	Hitting stationary objects	327	2.6
Teacher's Aide	357.00	3.00	Exposure to workplace or occupational violence	302	2.4

Table A3

Means, standard deviation, and Pearson correlations for all study variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Psychosocial Safety Climate	40.01	9.05														
2. Management Commitment	10.11	2.82	.93**	–												
3. Management Priority	9.93	2.65	.96**	.89**	–											
4. Organisational Communication	10.15	2.08	.89**	.75**	.80**	–										
5. Organisational Participation	9.84	2.34	.89**	.71**	.79**	.79**	–									
6. Skill Discretion	34.51	4.42	.43**	.36**	.46**	.36**	.38**	–								
7. Decision Authority	34.18	5.80	.50**	.43**	.52**	.48**	.44**	.64**	–							
8. Supervisor Support	9.24	1.29	.63**	.64**	.62**	.61**	.43**	.46**	.53**	–						
9. Coworker Support	9.70	0.97	.23*	.25*	.27**	.18	.13	.33**	.26**	.27**	–					
10. Rewards	11.50	1.63	.57**	.56**	.55**	.51**	.40**	.45**	.55**	.48**	.43**	–				
11. Satisfaction	5.36	1.27	.69**	.66**	.67**	.64**	.54**	.44**	.48**	.54**	.21*	.58**	–			
12. Harassment	8.73	1.91	–.28**	–.28**	–.24*	–.34**	–.22*	–.04	–.15	–.23*	–.17	–.24*	–.20*	–		
13. Bullying	0.06	0.19	–.37**	–.36**	–.40**	–.36**	–.22*	.00	–.18	–.40**	–.03	–.17	–.34**	.18	–	
14. Psychological Demands	31.27	4.93	–.33**	–.32**	–.31**	–.28**	–.29**	.05	–.21*	–.16	–.07	–.23*	–.25*	.22*	.00	–
15. Emotional Demands	10.43	2.25	–.29**	–.26**	–.26**	–.28**	–.26**	.13	–.10	–.28**	–.05	–.35**	–.22*	.18	.20	.49**
16. Physical demands	10.31	2.34	–.35**	–.39**	–.33**	–.24*	–.32**	–.22*	–.17	–.21*	–.21*	–.40**	–.30**	.06	.14	.11
17. Job Strain	0.93	0.22	–.56**	–.52**	–.56**	–.49**	–.50**	–.50**	–.74**	–.48**	–.24*	–.52**	–.53**	.23*	.05	.76**
18. ERI	2.79	0.71	–.55**	–.54**	–.53**	–.47**	–.46**	–.24*	–.51**	–.37**	–.27**	–.75**	–.54**	.26*	.08	.76**
19. Age	47.32	8.29	.06	.03	.05	.03	.11	.03	.07	–.16	–.16	.02	.12	–.04	.13	.02
20. Gender	1.47	0.43	–.12	–.06	–.16	–.06	–.16	–.33**	–.25*	–.10	–.13	–.14	–.02	–.06	–.01	.05
21. Education	4.97	1.51	.04	.04	.01	.05	.02	.39**	.11	.07	.26*	.02	.09	.02	.11	.10
22. Income	5.76	2.06	.13	.06	.15	.09	.20*	.49**	.37**	.15	.26*	.34**	.16	.02	.05	.08
23. Union	0.32	0.38	–.27**	–.34**	–.31**	–.23*	–.11	–.06	–.14	–.24*	–.11	–.19	–.33**	.08	.21*	.10
24. Organisational Size	3.61	0.62	–.03	–.10	–.11	–.09	.18	.01	–.05	–.04	–.03	–.07	–.15	.02	.12	.16
25. Days Lost ≥ 1†	82.89	90.44	–.26**	–.26**	–.22*	–.29**	–.22*	–.30**	–.23*	–.24*	–.12	–.30**	–.31**	.20*	.12	–.10
26. Expenditure '000‡	36.57	32.59	–.21*	–.23*	–.18	–.24*	–.14	–.17	–.09	–.17	–.02	–.17	–.29**	.20	.14	–.08

Note. Unit of analysis, n = 100 organisations. AWB reports from 287 employees; †12624 injury cases.

Table A3

continued: Means, standard deviation, and Pearson correlations for all study variables.

	15	16	17	18	19	20	21	22	23	24	25
15. Emotional Demands	–										
16. Physical demands	.24*	–									
17. Job Strain	.34**	.21*	–								
18. ERI	.49**	.32**	.84**	–							
19. Age	.13	-.28**	-.04	-.06	–						
20. Gender	.10	-.12	.23*	.13	.09	–					
21. Education	.20*	-.16	-.08	.07	-.12	-.10	–				
22. Income	-.10	-.21*	-.26**	-.16	.05	-.62**	.32**	–			
23. Union	.21*	.24*	.12	.12	-.07	-.03	.03	.08	–		
24. Organisation Size	.09	-.04	.10	.11	-.00	.07	.01	.15	.35**	–	
25. Days Lost ≥ 1†	-.03	.19	.14	.18	-.12	-.09	-.22*	-.09	-.17	.01	–
26. Expenditure‡	-.05	.21*	.06	.09	-.16	-.21*	-.12	.10	-.10	.11	.86**

Note. Unit of analysis, n = 100 organisations. AWB reports from 287 employees; †12624 injury cases.

Appendix B. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssci.2024.106602>.

References

- Afsharian, A., Dollard, M.F., Glozier, N., Morris, R.W., Bailey, T.S., Nguyen, Ha, and Crispin, C (2023) Work-related psychosocial and physical paths to future musculoskeletal disorders (MSDs), *Safety Science*, Volume 164, 106177.
- Australian Bureau of Statistics. Work-Related Injuries, Australia, Jul 2017 to Jun 2018. 2018. Available from <https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/work-related-injuries/jul2017-jun2018> (accessed Nov 1st, 2023).
- Bailey, T.S., Dollard, M.F., McLinton, S.S., Richards, P.A., 2015. Psychosocial safety climate, psychosocial and physical factors in the aetiology of musculoskeletal disorder symptoms and workplace injury compensation claims. *Work Stress*. 29 (2), 190–211.
- Brandt, M., Andersen, L.L., Kines, P., Ajslev, J.Z.N., 2023. Safety climate at work and risk of long-term sickness absence: Prospective cohort with register follow-up among 63,500 workers. *Saf. Sci.* 166, 106217.
- Collie, A., Sheehan, L., McKimmie, A., De Cieri, H., Newnam, S., Glass, D.C., Gray, S., 2022. Developing a leading indicators questionnaire to identify Victorian workers at risk of work-related harm: Summary report. Healthy Working Lives Research Group, School of Public Health and Preventive Medicine, Monash University 2022.
- Collie, A., Newnam, S., Keleher, H., Petersen, A., Kosny, A., Vogel, A.P., et al., 2019. Recovery within injury compensation schemes: A system mapping study. *J. Occ. Rehab.* 29 (1), 52–63.
- Cuschieri, S., 2019. The STROBE guidelines. *Saudi J of Anaesth* 2019; Apr 13(Suppl 1): S31.
- Dallner, M., Elo, A.-L., Gamberale, F., Hottinen, V., Knardahl, S., Lindström, K., et al. Validation of the general Nordic questionnaire (QPSNordic) for psychological and social factors at work. (No. Nord 2000:12). Copenhagen: Nordic Council of Ministers, 2000.
- Diez-Roux, A.V., 2000. Multilevel analysis in public health research. *Ann. Rev. Public Health* 21 (1), 171–192.
- Dollard, M.F., Bailey, T.S., 2014. *The Australian Workplace Barometer: Psychosocial safety climate and working conditions in Australia*. Australian Academic Press.
- Dollard, M.F., Dormann, C., Tuckey, M.R., Escartín, J., 2017. Psychosocial safety climate (PSC) and enacted PSC for workplace bullying and psychological health problem reduction. *Euro J. Work Org. Psych.* 26 (6), 844–857.
- Dollard, M.F., Dormann, C., Idris, A., Eds (2019). *Psychosocial Safety Climate: A new work stress theory*. Springer Nature Switzerland AG.
- Editorial, L., 2023. The future of work and health. *Lancet* 402 (10410), 1299.
- Elsler, D., Takala, J., Remes, J., 2017. International comparison of cost of work-related accidents and illnesses. 2017. European Agency for Safety and Health at Work. <https://osha.europa.eu/en/publications/international-comparison-cost-work-related-accidents-and-illnesses> (accessed Nov 1st, 2023).
- Franche, R.L., Cullen, K., Clarke, J., Irvin, E., Sinclair, S., Frank, J., 2005. Institute for Work & Health (IWH) Workplace-Based RTW Intervention Literature Review Research Team. Workplace-based return-to-work interventions: A systematic review of the quantitative literature. *J. Occ. Rehab.* 15, 607–631.
- Haas, A.D., Hunter, D.A., Howard, N.L., 2018. Bringing a structural perspective to work: Framing occupational safety and health disparities for nursing assistants with work-related musculoskeletal disorders. *Work* 59 (2), 211–229.
- Hall, G.B., Dollard, M.F., Coward, J., 2010. Psychosocial safety climate: Development of the PSC-12. *Intl. J. Stress Managt.* 17 (4), 353–383.
- Health and Safety Executive UK. Costs to Britain of workplace fatalities and self-reported injuries and ill health, 2020/21. 2020 <https://www.hse.gov.uk/statistics/cost.htm> (accessed Nov 1st, 2023).
- International Labour Organisation. Safety and health at the heart of the future of work: Building on 100 years of experience. 2019. Available from https://www.ilo.org/wcmsp5/groups/public/—ed_protect/—protrav/—safework/documents/publication/wcms687610.pdf (accessed Nov 1st, 2023).
- Jetha, A., LaMontagne, A.D., Lilley, R., Hogg-Johnson, S., Sim, M., Smith, P., 2018. Workplace social system and sustained return-to-work: a study of supervisor and co-worker supportiveness and injury reaction. *J. Occ. Reh.* 28, 486–494.
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., Amick, B., 1998. The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J. Occ. Health Psych.* 3 (4), 322–355.
- Nicholas, M.K., Costa, D.S., Linton, S.J., Main, C.J., Shaw, W.S., Pearce, R., Gleeson, M., Pinto, R.Z., Blyth, F.M., McCauley, J.H., Maher, C.G., 2019. Predicting return to work in a heterogeneous sample of recently injured workers using the brief ÖMPSQ-SF. *J. Occ. Rehab.* 29, 295–302.
- Parachute. The Cost of Injury in Canada. 2021. <https://parachute.ca/en/professional-re-source/cost-of-injury-in-canada/> (accessed Nov 1st, 2023).
- Richman, J.A., Flaherty, J.A., Rospenda, K.M., 1996. Perceived workplace harassment experiences and problem drinking among physicians: Broadening the stress/alienation paradigm. *Addiction* 91 (3), 391–403.
- Robichaud, M.M., Truchon, M., St-Arnaud, L., Nastasia, I., 2019. Insurers' perspective on barriers and facilitators for return to work after occupational injuries. *Work (reading, Mass)* 63 (1), 81–97.
- Rugulies, R., Aust, B., Greiner, B.A., Arensman, E., Kawakami, N., LaMontagne, A.D., Madsen, I.E., 2023. Work-related causes of mental health conditions and interventions for their improvement in workplaces. *Lancet* 2023; 14: 402(10410): 1368–81.
- Safe Work Australia. Safer, healthier, wealthier: The economic value of reducing work-related injuries and illnesses. 2022. https://www.safeworkaustralia.gov.au/sites/default/files/2022-10/final_safer_healthier_wealthier_theeconomic_value_of_reducing_work-relatedinjuries_and_illnesses_-_summary_report%2002.pdf (accessed Nov 1st, 2023).
- Siegrist, J., 1996. Adverse health effects of high-effort/low-reward conditions. *J. Occ. Health Psych.* 1 (1), 27–41.
- Villotti, P., Gragnano, A., Larivière, C., Negrini, A., Dionne, C.E., Corbière, M., 2021. Tools appraisal of organisational factors associated with return-to-work in workers on sick leave due to musculoskeletal and common mental disorders: a systematic search and review. *J. Occ. Rehab.* 31, 7–25.
- Warr, P., Cook, J., Wall, T., 1979. Scales for the measurement of some work attitudes and aspects of psychological well-being. *J. Occ. Psych.* 52 (2), 129–148.
- Wyatt, M., Lane, T.J., 2017. Return to work: A comparison of psychological and physical injury claims: Analysis of the return to work survey results. Safe Work Australia, Canberra.
- Young, A.E., 2014. An exploration of alternative methods for assessing return-to-work success following occupational injury. *Dis. Rehab.* 36 (11), 914–924.