Psychosocial safety climate: Measurement and relationship with well-being in a four-wave longitudinal study during remote work

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Abstract

To create healthy workplaces, organizations need tools for assessing factors contributing to employee well-being. Psychosocial safety climate (PSC) refers to shared perceptions regarding the extent to which psychological health and safety are prioritized in organizations; it is operationalized in the PSC scale. We evaluated the factor structure of the Finnish version of the PSC-4 scale, its invariance across time and concurrent and predictive relationships with perceived stress, job exhaustion and work engagement. Moreover, the mean-level changes in PSC and well-being during enforced remote work were studied. Participants were 442 higher education employees who completed a well-being survey four times between April 2020 and February 2021. The longitudinal factor structure of PSC-4 and well-being indicators were investigated using confirmatory factor analysis and structural equation modelling (SEM). The statistical analyses supported the one-factor structure of the PSC-4 and its measurement invariance across time. PSC was negatively associated with concurrent stress and job exhaustion and positively associated with concurrent work engagement at each measurement. Moreover, PSC predicted subsequent stress between each time point. Cross-lagged effects were also evident for job exhaustion at T2–T3 and T3–T4 and for work engagement at T1–T2. The mean level of PSC decreased during enforced remote work. To conclude, the Finnish PSC-4 is a valid tool for evaluating perceived psychosocial safety climate in organizations. PSC predicted well-being over time and showed subsequent relationships with job exhaustion and work engagement, which is a new contribution to PSC theory and literature. Organizations need to design interventions to improve it especially during stressful times.

Introduction

The costs of work-related stress are considerable to society (Hassard, Teoh, Visockaite, Dewe & Cox, 2018). According to a review, the costs ranged from US$221.13 million to $187 billion a year across identified studies. Most costs (70 to 90%) are due to loss of productivity with health care and medical costs making up the remaining 10 to 30%. It is therefore crucial to reduce work-related stress. One way is to get organizations to improve employees' working conditions through facilitating psychosocial safety climate, which is an aspect of organizational climate focusing on employee psychological health and safety (Dollard & Bakker, 2010). According to the original definition, psychosocial safety climate (PSC) refers to the "policies, practices, and procedures for the protection of psychological health and safety of workers" (Dollard & Bakker, 2010, p. 580). It comprises four content domains, with a PSC item developed to evaluate each of them: 1) management commitment: is management committed to preventing stress in the workplace? 2) management priority: does management prioritize psychological well-being over productivity? 3) communication: are the employees' concerns regarding psychological well-being listened to, and is information about psychological safety and well-being brought to their attention? and 4) participation: are all levels of the organization involved in preventing stress? (Hall, Dollard & Coward, 2010). The role of upper management in creating the psychosocial safety climate is crucial, not only because it holds the power to make practical decisions directly impacting on employee well-being but also – and perhaps even more importantly – because it sets the tone for what is valued in the organization.

Psychosocial safety climate is seen as an antecedent and moderator of work conditions: it fits in with and extends the Job Demands-Resources theory (JD-R; Bakker & Demerouti, 2017; Law, Dollard, Tuckey & Dormann, 2011) and other job stress theories (Dollard & Bakker, 2010). Stress is typically defined as an imbalance between environmental demands and individual abilities and resources, causing strain (Elo, Leppänen & Jahkola, 2003). In the JD-R theory, job resources are associated with positive employee outcomes such as work engagement, whereas high job demands are argued to be detrimental to health and well-being such as burnout (Bakker & Demerouti, 2017). PSC has a dual role for well-being as it creates an organizational climate where employees' health is cared for and prioritized, and consequently better working conditions with fewer stressors (i.e., fewer job demands and higher job resources) are created in collaboration between managers and employees (Yulita, Idris & Dollard, 2020). To take an example, PSC is associated with emotional exhaustion through workplace bullying (Dollard, Dormann, Tuckey & Escartín, 2017; Escartín, Dollard, Zapf & Kozlowski, 2021; Law et al., 2011). Bullying is not tolerated in an organization characterized by high PSC, thus, emotional exhaustion – a core symptom of burnout (Maslach, Jackson & Leiter, 1996) – is lower. In addition to negative outcomes, it has an established relationship with positive outcomes, such as work engagement (Hall et al., 2010; Idris, Dollard & Tuckey, 2015; Law et al., 2011) referring to a job-related positive affective-motivational state of well-being (Schaufeli, Salanova, González-Romá & Bakker, 2002). From a practical point of view, it is significant that PSC can be improved through interventions (Law et al., 2011), even in challenging times. In a quasi-experimental cohort control study, an organizational intervention aiming at increasing the level of PSC was successful although the COVID-19 pandemic started during the intervention (Dollard & Bailey, 2021). Targeting this upstream antecedent of psychosocial hazards and psychological health can therefore benefit several job-related well-being outcomes at once.

Psychosocial safety climate is empirically measured using the PSC scale, originally developed in Australia. So far, the most widely used version has been PSC-12 (Hall et al., 2010), but four-item versions have also been developed. The most recent PSC-4 assesses all four dimensions of PSC, and its reliability and validity are high (Dollard, 2019). PSC-12 may provide more detailed information on different aspects of the PSC, but in some studies participants have found some items redundant (Berthelsen, Ertel, Geisler & Muhonen, 2019). A shorter scale is also easier to incorporate in surveys. Therefore PSC-4 can be recommended for use. The PSC scale has been translated into several languages, including Dutch (Bronkhorst, 2015), French (Huyghebaert, Gillet, Fernet, Lahiani & Fouquereau, 2018), German (Berthelsen et al., 2019) and Swedish (Berthelsen et al., 2019), and benchmarks for PSC risk levels are being developed for example in Sweden (Berthelsen, Muhonen, Bergström, Westerlund & Dollard, 2020).

The aim of the research and hypotheses

The present study evaluates for the first time the Finnish PSC-4 in terms of its factor structure (i.e., construct validity) and invariance across time. We utilized a four-wave full panel design. Data collection began in April 2020, soon after the large-scale shift to COVID-induced remote work, and continued through February 2021 i.e., covering altogether a 10-month period. This enabled us to validate PSC-4 in a different context and in an exceptional time of the pandemic. Furthermore, we studied its concurrent and criterion validity through the relationship between PSC and well-being as indicated by both theoretically and empirically relevant negative and positive health-related outcomes (e.g., Dollard & Bakker, 2010; Hall et al., 2010; Idris et al., 2015; Law et al., 2011): perceived stress, job exhaustion and work engagement. In addition, we contribute to the occupational well-being research conducted during the COVID-19 pandemic by investigating mean-level changes in perceptions of PSC, stress, job exhaustion and work engagement during prolonged remote work, thereby testing the PSC theory in a unique setting. Previous studies have shown that enforced remote work poses a risk for well-being, although the individual experiences vary (e.g., Kaltiainen & Hakanen, 2023; Mäkikangas, Juutinen, Mäkiniemi, Sjöblom & Oksanen, 2022).

Based on previous studies and PSC theorizing, we expect that:

Hypothesis 1: The Finnish version of the PSC-4 scale consists of a one-factor structure

Hypothesis 2: The one-factor structure of PSC-4 is invariant across time.

Hypothesis 3: PSC-4 is negatively related to concurrent perceptions of stress and job exhaustion, and positively related to work engagement.

Hypothesis 4: PSC-4 is negatively related to subsequent perceptions of stress and job exhaustion, and positively related to work engagement.

Hypothesis 5: The PSC and work engagement decrease, and stress and job exhaustion increase during the enforced remote work.

Methods

Participants and procedure

The data for this study were collected as a part of the research project "Safely remotely – occupational well-being and its management in telework", which examined higher education employees' experiences of enforced remote work during the COVID-19 pandemic. The participants were employees of a university community in southwestern Finland and had been working remotely since March 2020 due to governmental recommendations. The data set was collected in accordance with the guidelines of the Finnish National Board on Research Integrity and of the Finnish Personal Data Act. The authors were granted permission to conduct the study by the rectors and directors of human resources of the university community.

The data set was collected with the electronic LimeSurvey tool at four measurement points: April 2020 (T1), June 2020 (T2), October 2020 (T3) and February 2021 (T4). At T1, the survey was sent to the work email addresses of 6,929 employees through the university's general mailing list. Participants were informed in advance about the survey and they were reminded about it a week after receiving the survey invitation. Of the eligible survey recipients (*n* = 6,929), 2,661 employees (including grant holders working under a resource agreement) responded to the first survey; hence the response rate was 38%. At T2, invitations to participate in a follow-up survey were sent to 1,443 employees who had expressed their willingness to participate and had given their email address for this purpose at T1. Altogether 909 employees completed the second survey, yielding a T1–T2 response rate of 63%. At T3 and T4, survey invitations were sent to those employees who had participated in earlier surveys and were willing to continue their participation. The response rate was 82% at T2–T3 (670 responses, 814 invited and available at the time of the survey) and 83% at T3–T4 (535 responses, 643 invited and available at the time of the survey).

The sample of the present study (*n* = 442) consists of those respondents who had employment contracts with the university at all measurement points and who responded to the Finnish version of the PSC scale in all four surveys. Students and grant holders working under resource agreement were excluded from the sample. Women accounted for 73% of the participants and the average age at the beginning of the study was 46.8 years (*SD* = 9.97). The most common educational background was a master's degree (46%), followed by a doctoral degree (31%). Of the participants, 54% were administrative and support staff and 46% were teaching and research staff at T1. At T1 all respondents worked remotely, at T2 96%, at T3 89% and at T4 91%. A third of the participants (33%) had worked remotely less than one day per week, and 27% had not worked remotely at all before March 2020.

Measures

Psychosocial safety climate was measured with the 4-item version of the Psychosocial Safety Climate scale (Dollard, 2019). The original English scale was translated into Finnish by an authorized translator, and the Finnish scale was reviewed by another translator. The scale was then adapted to the university context: 1) “There has been good communication within our university community about the psychological safety issues that affect me”, 2) “The management of the University considers employee psychological health to be as important as productivity”, 3) “The senior management is committed to preventing stress among staff”, 4) “The prevention of stress involves all levels of the organization (such as employees, supervisors, senior management)” The items were scored on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Cronbach’s alphas were consistently high, .88 or .89 across time points.

Perceived stress was measured using a single question, scored on a 5-point Likert scale (1 = not at all, 5 = very much): “Stress means you feel tense, restless, nervous or anxious or are unable to sleep because your mind is troubled. Have you been feeling stressed in the last two weeks?”. This single-item measure has been found to adequately capture the experience of perceived stress (Elo et al., 2003).

Job exhaustion was measured with three items from the Burnout Assessment Tool (BAT; Schaufeli, Desart & De Witte, 2020): 1) “I have felt mentally exhausted while working”, 2) “I have felt mentally exhausted and drained after a day of working”, 3) “I have quickly got tired after exerting myself while working”. The items were rated on a 5-point scale (1 = never, 5 = always). The Cronbach’s alphas for the scale varied between .86 and .90.

Work engagement was measured with the 3-item version of the Utrecht Work Engagement Scale (UWES-3; Schaufeli, Shimazu, Hakanen, Salanova & De Witte, 2019): 1)

“I have felt bursting with energy while working”, 2) “I have been enthusiastic about my work”, 3) “I have been immersed in my work”. The items were scored on a 5-point scale (1 = never, 5 = always). The Cronbach’s alphas for the scale varied between .81 and .85.

Background variables included gender, age, education, job position and remote work experience before COVID-19. There were some baseline differences between the longitudinal sample and those only participating at T1: women (proportion in the study sample 73%, proportion in the attrition group 61%, $p < .001$) and administrative and support staff (proportion in the study sample 54%, proportion in the attrition group 44%, $p < .01$) were overrepresented in the study sample and the study sample had a higher mean PSC (3.41 vs. 3.15, $p < .001$). No attrition bias was evident in the health-related indicators. Table 1 shows the means, standard deviations and correlations for the study variables.

- Insert Table 1 about here -

Statistical Analysis

The statistical analyses were performed in two phases. In the first phase, factor structure and temporal measurement invariance for each studied construct were tested. The longitudinal factor structure of the PSC and well-being indicators measured with several items (i.e., job exhaustion, work engagement) were investigated using confirmatory factor analysis (CFA) and structural equation modelling (SEM). After ensuring the configural invariance (i.e., that the same number of factors was identified across time), the invariance of the factor loadings across time was tested by constraining (a) the corresponding factor loadings (i.e., metric invariance) and (b) residual variances to be equal over time. The equality assumption is supported if the Satorra-Bentler scaled difference chi-square test (Satorra & Bentler, 2001) produces a non-significant loss of fit for the constrained stability model compared to the unconstrained model. In case of significant loss of fit, difference tests for CFI (ΔCFI) and RMSEA (ΔRMSEA) were also used (Chen, 2007). Perceived stress was measured with one item and was thus modelled as an autoregressive simplex model in which loadings of the observed variables on the latent factors were fixed at 1.

In the second phase, the cross-lagged SEM models were tested. The SEM containing equal factor loadings and measurement errors over time, autoregressive paths between the same measures at different waves and intercorrelations between the studied constructs estimated within each measurement wave was used as a baseline stability model. Next, the causal paths were estimated, i.e., PSC at T1, T2, T3 and T4 was set to predict subsequent stress, job exhaustion and work engagement. The goodness-of-fit of the cross-lagged models was compared to the stability model using the Satorra-Bentler scaled χ^2 difference test. In this case, if the difference test demonstrates a significant improvement for the cross-lagged model compared to the baseline stability model, the cross-lagged model is supported.

The analyses were performed using Mplus (version 8.5) (Muthén & Muthén, 1998–2017). The parameters of the models were estimated using the MLR estimator, which is robust to non-normality of the observed variables (Muthén & Muthén, 1998–2017). Goodness-of-fit of the estimated models was evaluated using the following five goodness-of fit indices: (1) χ^2 test, (2) Comparative Fit Index (CFI), (3) Tucker-Lewis Index (TLI), (4) root mean square error of approximation (RMSEA), and (5) Standardized Root Mean Square Residual (SRMR). A non-significant χ^2 test indicates a good fit. CFI and TLI values range between 0–1; values of ≥ 0.90 are considered to indicate an acceptable fit. For the RMSEA and SMRM values of ≤ 0.05 indicate a good fit, values of 0.06–0.09 a reasonable fit and values ≥ 0.10 a poor fit (see e.g., Hu & Bentler, 1999; Marsh, Hau & Wen, 2004).

At the final stage, the General Linear Model (GLM) for repeated measures was used as the principal method of analysis to test mean level changes over time for PSC, stress, job exhaustion and work engagement. It was conducted using IBM SPSS Statistics 28.

Results

Construct Validity

First, the factor structure of each construct at each time point was tested separately. For the factor structure of the PSC, it emerged that the RMSEA values did not meet the cut-off criteria in any of the time points analysed. In light of the information from the modification indices, the error covariances of the items “The senior management is committed to preventing stress among staff” and “The prevention of stress involves all levels of the organization” were strongly correlated (error covariances varied between 0.17 and 0.46, $p < .001$). Therefore, this association was estimated at each time point, which served to improve the fit of the model, which was also supported by the Satorra-Bentler scaled square test difference tests ($p < .001$). The goodness-of-fit statistics for the modified one-factor measurement models of the PSC are presented in Table 2. The standardized factor loadings for the items varied from .68 to .94 at each time point. Thus, our Hypothesis 1 was supported as the Finnish version of the PSC consisted of a one-factor structure in every measurement, thus also demonstrating its configural measurement invariance.

Both job exhaustion and work engagement were measured with three items, and thus they were saturated models with perfect fit. For job exhaustion, the standardized factor loadings varied between .74 and .91, and for work engagement between .66 and .89.

- Insert Table 2 about here -

Factorial Time Invariance

The stability model of the PSC, estimated using structural equations between the latent one-factor models at the four time points, fitted the data reasonably well (see Table 3). Next, the metric invariance was tested by constraining factor loadings to be equal across time. The result of the χ^2 difference test was statistically nonsignificant (see Table 3), demonstrating that the loading invariance assumption was supported. Next, the invariance of residual variances was tested. The χ^2-difference test was also nonsignificant in this case, thus supporting the invariance of the scale (see Table 3). The rank-order stability for PSC was .78 (T1–T2), .78 (T2–T3) and .80 (T3–T4). Altogether, these analyses showed that the measurement properties of the PSC scale remained similar across time thereby supporting our Hypothesis 2, and therefore further analyses were warranted.

Conversely, for the one-factor model of *job exhaustion*, the χ^2 difference test was significant for both factor loadings and measurement errors (see Table 3). However, no major difference was found between the baseline model and the constraint (i.e., invariant) models when compared using ΔCFI = 0.000 and ΔRMSEA = -0.003, thus lending support to the invariance over time. The standardized stability coefficients for exhaustion were .75 between T1 and T2, .83 between T2 and T3, and .82 between T3 and T4. For *work engagement*, autocovariances between item 3 (“I have been immersed in my work”) were estimated over time (i.e., referring to correlations between error variances of an item measured at all time points). The one-factor work engagement scale was invariant over time as indicated by the Satorra-Bentler scaled difference test for both factor loadings and measurement errors (see Table 2). The standardized stability coefficients for work engagement were .80 between T1 and T2, .81 between T2 and T3, and .88 between T3 and T4. The respective stability coefficients for *perceived stress* modelled via autoregressive simplex model were .62, .58 and .64.

- Insert Table 3 about here -

Longitudinal Associations: Cross-lagged Models

First, the cross-lagged associations between PSC and perceived stress were tested. In this model, both the time invariant stability model of PSC and the autoregressive simplex model of perceived stress were estimated simultaneously in the same model. In this model, intercorrelations between the latent factors at each measurement point were estimated. The combined stability model fitted the data well, $\chi^2(181) = 643.43$, scaling correction factor for MLR = 1.090, CFI = .92, TLI = .91, RMSEA = .076, SRMR = .087.

Next, in accordance with our assumptions, the cross-lagged paths (PSC T1 => perceived stress T2, PSC T2 => perceived stress T3 and PSC T3 => perceived stress T4) were added to the combined stability model. The Satorra-Bentler test showed that a cross-lagged model improved the model fit, $\Delta\chi^2(3) = 26.05$, $p < .001$. The apparent cross-lagged associations are shown in Figure 1. As can be seen, PSC was negatively associated with stress within each time point and also predicted subsequent stress at each time point.

- Insert Figure 1 about here -

Second, the longitudinal associations between PSC and job exhaustion were tested. Here, too, the combined stability model fitted the data well, $\chi^2(372) = 1034.65$, scaling correction factor for MLR = 1.053, CFI = .93, TLI = .93, RMSEA = .063, SRMR = .080, and was used as a baseline stability model in further model comparisons. Next, the assumed cross-lagged paths were added to the combined stability model. The cross-lagged model showed a significant improvement in fit, $\Delta\chi^2(3) = 12.259$, $p = .007$. The cross-lagged associations are presented in Figure 2. As shown, altogether two of three statistically significant cross-lagged effects were found. PSC T2 significantly and negatively predicted job exhaustion T3 (stand. est. = -.13, $p < .01$). Moreover, PSC T3 predicted job exhaustion T4 (stand. est. = -.25, $p < .001$).

- Insert Figure 2 about here -

Third, the cross-lagged associations between PSC and work engagement were similarly tested. The combined stability model fitted the data well, $\chi^2(372) = 1099.03$, scaling correction factor for MLR = 1.090, CFI = .91, TLI = .91, RMSEA = .066, SRMR = .069. However, the cross-lagged associations estimated from PSC to subsequent work engagement yielded a significant improvement in the fit, $\Delta\chi^2(3) = 15,16$, $p = .002$. The cross-lagged model is shown in Figure 3. As shown, only one cross-lagged path from PSC at T1 to work engagement at T2 was evident (stand. est. = .14, $p < .01$). That is, the higher PSC at T1 was evaluated, the more work engagement was reported at T2. The control variables tested (gender, age, occupational status and education) were integrated into the final SEM models regressing each of the focal constructs onto them. However, the covariates did not affect the cross-lagged associations described above. To summarize the results presented above, all concurrent correlations between PSC and studied well-being indicators were statistically significant (see Figures 1–3). Consequently, our Hypothesis 3 was supported. Furthermore, our Hypothesis 4 was partly supported as some subsequent relations from PSC to studied well-being indicators were evident, but not across all measurements[1].

- Insert Figure 3 about here -

Mean Level Changes in the Studied Constructs

The General Linear Model (GLM) for repeated measures was used to test mean level changes over time for PSC, stress, job exhaustion and work engagement. Because the assumption of sphericity was violated (PSC $\varepsilon = .928$, perceived stress $\varepsilon = .928$, job exhaustion $\varepsilon = .907$, work engagement $\varepsilon = .898$), Huynh-Feldt corrected results are reported. The Bonferroni correction was used for the pairwise comparisons. The means of the total PSC-4 score decreased at each measurement point, from 3.41 (T1), to 3.33 (T2), 2.87 (T3) and 2.80 (T4). There were differences between the means, $F(2.80, 1227.99) = 153.88$, $p < .001$, $\eta^2 = .26$. Statistically significant differences were found between T1 and T3, T1 and T4, T2 and T3, and T2 and T4, $p < .001$. *Perceived stress* means increased over time: 2.65 (T1), 2.71 (T2), 2.89 (T3), and 2.79 (T4), $F(2.80, 1230.31) = 8.10$, $p < .001$, $\eta^2 = .020$. Statistically significant differences were found between T1 and T3, $p < .001$, and between T2 and T3, $p < .01$. *Job exhaustion* increased over time: 2.76 (T1), 2.75 (T2), 2.88 (T3), and 2.84 (T4), $F(2.74, 1203.22) = 6.75$, $p < .001$, $\eta^2 = .02$. Statistically significant differences were found between T1 and T3, as well as between T2 and T4, $p < .05$, and between T2 and T3, $p < .001$. *Work engagement* decreased: 3.36 (T1), 3.39 (T2), 3.35 (T3), and 3.29 (T4), $F(2.71, 1190.83) = 5.45$, $p < .01$, $\eta^2 = .01$ being at the lowest level in February 2021. However, the only statistically significant difference was found between T2 and T4, $p < .001$. To conclude, these mean level changes supported our Hypothesis 5.

Discussion

This was the first study in the Finnish context to investigate PSC and the scale developed to evaluate it. The Finnish PSC-4 proved to be a psychometrically sound instrument for assessing psychosocial safety climate. Our results moreover showed the value of PSC during the exceptional time of the pandemic and theoretically meaningful concurrent but differing longitudinal associations with both negative (stress, job exhaustion) and positive (work engagement) well-being indicators thereby contributing to the current knowledge of the PSC theory.

The present study contributes to the literature supporting the international validity of the PSC-4 scale. According to our results, the Finnish version of the PSC-4 showed good construct validity and its structure was invariant over time. Thus, it validly captured the four dimensions of psychosocial safety climate and measured PSC in the same way in every measurement. Moreover, a high level of PSC was negatively associated with concurrent and subsequent stress across measurements. This result highlights the importance of PSC in perceived stress and its prevention. Although concurrent associations were evident regarding job exhaustion, high PSC predicted future lower exhaustion when enforced remote work was prolonged. Significantly, job exhaustion increased during follow-up, hence the role of PSC may be even more important when working conditions are stressful and job exhaustion higher. Furthermore, PSC was linked to work engagement in all measurements, and the causal association was evident between T1 and T2. This important finding is consistent with earlier reports, but in addition to lending further support to the relationship, this study also demonstrated that PSC has a longitudinal impact on positive well-being even during exceptional circumstances, but particularly during the early phase of remote work.

Our results furthermore showed that PSC declined over time. The steady decrease in PSC may imply a general lack of perceived support for psychological health as the remote work situation continued. It is also possible that the challenging situation only highlights issues – such as low PSC – that were there even before the pandemic and enforced remote work. In earlier research PSC has been found to increase in the first stages of the lockdown (Dollard & Bailey, 2021), but our study finds a deterioration across time. This implies that interventions to increase PSC are required during difficult times.

In a theoretical sense, these results imply that the effects of PSC may change across time due to chronic exposure to a stressor, in this case enforced remote work. This aligns with the idea that work needs to be done to create higher level controls in an organization, such as PSC, without which one could expect entropy in the organizational systems, and for workers, work related distress as they attempt to manage demands on an individual basis (Dollard & Karasek, 2010). Our research provides new insights into PSC and its changes over time, but further longitudinal research is needed to corroborate our findings.

Our four-wave research design, with good response rates, especially at T2–T4, is a significant strength of our study. However, there are also some limitations that are worth mentioning. All participants worked in higher education and remotely, and the data was female-dominated, thus the results may not be generalizable to different contexts. There was also some non-response bias: those who only participated at T1 evaluated the initial PSC at a lower level than did those included in our sample, and therefore the PSC means, albeit decreasing throughout the study, might have been even lower without the bias. In future research, it would be interesting to investigate the mechanisms through which PSC contributes to well-being and how it could be facilitated through various interventions. Testing the Finnish PSC-4 scale in a different occupational context would likely provide further support for the validity and reliability of the scale.

Conclusion

The Finnish PSC-4 is a valid tool for evaluating the perceived psychosocial safety climate in organizations and in all occupations. Moreover, the relationship between PSC and occupational well-being indicators showed that practices conducive to psychological health and safety are relevant in terms of employee well-being outcomes. A decent PSC requires both will and effort from management, and even more so in an exceptional situation such as that caused by the pandemic. Organizations should also pay attention to their PSC in turbulent times and when employees work remotely.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Footnote

[1] Reversed causal associations were also tested, that is, cross-lagged SEM models where perceived stress, job exhaustion and work engagement predicted subsequent perceptions of PSC. The results showed that there were no reverse causal associations, which supported the hypothesized associations. The results are available upon request.

Table 1

Descriptive Information on the Study Variables (*n* = 419–442)

	Variable	*M*/%	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Gender[1]	76%[a]	0.43																				
2	Age	46.80	9.97	-.06																			
3	Education[2]	3.01	0.87	-.24																			
4	Job position[3]	54%[c]	0.50	.17	-.01	-.51																	
5	Remote exp[4]	2.29	1.05	-.01	.03	.23	-.31																
6	PSC T1	3.41	0.88	.07	-.02	-.18	.20	-.01															
7	Stress T1	2.65	1.17	-.01	-.14	.18	-.16	.00	-.32														
8	Exhaustion T1	2.76	0.87	.01	-.08	.19	-.14	.00	-.28	.66													
9	Engagement T1	3.36	0.69	.15	.17	-.19	.11	.07	.28	-.41	-.47												
10	PSC T2	3.33	0.88	.00	.01	-.20	.22	.03	.69	-.35	-.29	.23											
11	Stress T2	2.71	1.16	-.03	-.14	.17	-.14	-.03	-.28	.64	.58	-.34	-.42										
12	Exhaustion T2	2.75	0.82	.01	-.10	.16	-.12	.07	-.25	.58	.69	-.38	-.34	.74									
13	Engagement T2	3.39	0.68	.14	.15	-.08	.07	.13	.32	-.36	-.38	.69	.33	-.45	-.48								
14	PSC T3	2.87	0.89	-.02	.04	-.19	.18	.01	.62	-.31	-.27	.22	.68	-.34	-.33	.30							
15	Stress T3	2.89	1.19	.02	-.10	.18	-.15	.07	-.29	.51	.54	-.27	-.38	.60	.60	-.30	-.42						
16	Exhaustion T3	2.88	0.86	.01	-.08	.17	-.18	.08	-.27	.45	.59	-.34	-.35	.52	.67	-.36	-.40	.74					
17	EngagementT3	3.35	0.64	.17	.15	-.08	.05	.10	.32	-.32	-.33	.57	.31	-.37	-.40	.67	.38	-.43	-.53				
18	PSC T4	2.80	0.88	-.08	.07	-.20	.14	.00	.53	-.28	-.27	.17	.62	-.32	-.33	.26	.70	-.34	-.32	.25			
19	Stress T4	2.79	1.22	-.05	-.08	.10	-.11	.01	-.23	.48	.44	-.20	-.32	.52	.55	-.28	-.34	.65	.61	-.37	-.37		
20	Exhaustion T4	2.84	0.85	.06	-.08	.10	-.12	.05	-.26	.42	.55	-.31	-.33	.50	.64	-.32	-.36	.62	.73	-.43	-.38	.73	
21	Engagement T4	3.29	0.70	.19	.18	-.08	.05	.14	.30	-.27	-.28	.57	.26	-.31	-.35	.66	.30	-.33	-.43	.75	.29	-.40	-.47

Note. [1]Gender (1 = man, 2 = woman[a]), [2]Education (1 = upper secondary school, 4 = doctoral degree), [3]job position (1 = teaching and research staff, 2 = administrative staff[c]), [4]remote work experience before COVID-19 (continuous variable; 1 = not at all, 5 = more than 90% of working time). If $r = |.09–.12|$, $p < .05$; if $r = |.13–.16|$, $p < .01$; if $r \geq .17$, $p < .001$.

Table 2

Goodness-of-fit Statistics for Measurement Models of the PSC-4 (n = 442)

Measurement model [a]	χ^2	*df*	*p-value*	CFI	TLI	RMSEA	SRMR
Time 1	0.722	1	.395	1.00	1.00	.000	.003
Time 2	8.861	1	.003	.99	.96	.074	.015
Time 3	1.554	1	.212	.99	.99	.035	.007
Time 4	2.343	1	.125	0.99	.98	.055	.009

Note. PSC = Psychosocial safety climate. [a] = covariances between items 3 (The senior management is committed to preventing stress among staff) and 4 (The prevention of stress involves all levels of the organization (such as employees, supervisors, senior management) were estimated in all measurements. The measurement models for job exhaustion and work engagement were each measured with three items and were thus saturated models with perfect goodness-of-fit.

Table 3 *Stability Models and Time Invariance Testing*

Stability models T1-T4	χ^2(df)	*p-value*	Scaling correction factor for MLR	CFI	TLI	RMSEA	SRMR	χ^2diff(df)
PSC								
Baseline stability model	452.81 (97)	< .001	1.119	.93	.91	.091	.060	
Factor loadings set to be equal across time	471.47 (106)	< .001	1.092	.92	.91	.088	.060	10.31(9), *p* = .325
Factor loading and residual variances set to be equal across time	489.51 (118)	< .001	1.105	.92	.92	.084	.063	21.17(12), *p* = .051
Job exhaustion								
Baseline stability model	207.66 (51)	< .001	1.076	.96	.94	.083	.003	
Factor loadings set to be equal across time	227.69 (57)	< .001	1.039	.96	.94	.082	.048	18.11(6), *p* = .006
Factor loading and residual variances set to be equal across time	253.82 (66)	< .001	1.027	.96	.95	.080	.050	25.34(9), *p* = .003
Work Engagement								
Baseline stability model	216.53 (48)	< .001	1.164	.94	.92	.089	.043	
Factor loadings set to be equal across time	229.15 (54)	< .001	1.127	.94	.92	.086	.050	7.47 (6), *p* = .279
Factor loading and residual variances set to be equal across time	240.91 (63)	< .001	1.132	.94	.93	.080	.064	12.44 (9), *p* = .189

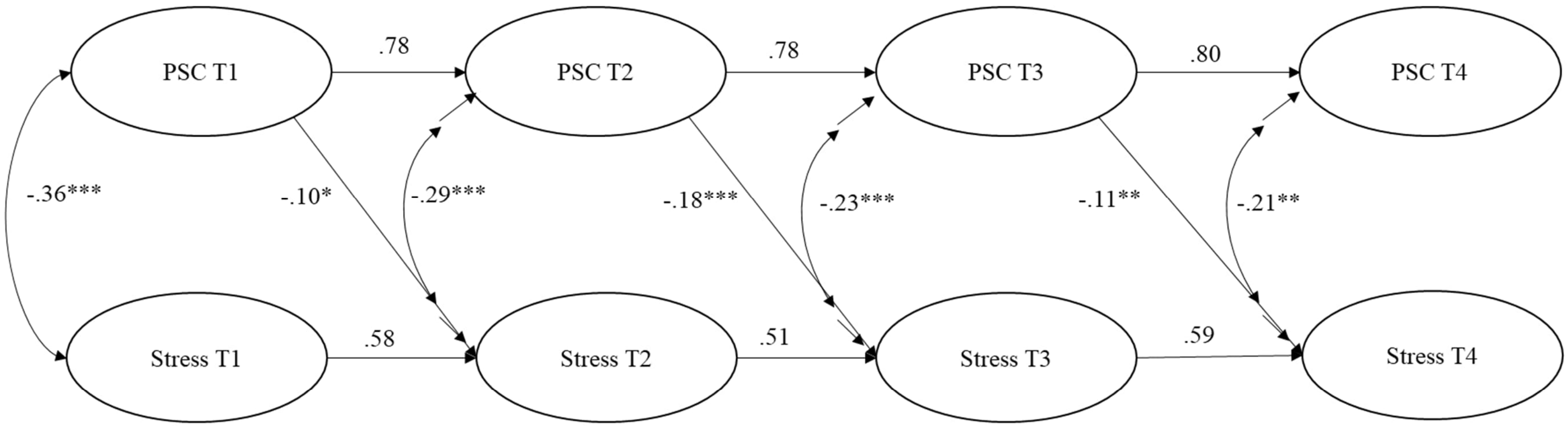

Figure 1. Cross-lagged associations between the PSC and perceived stress.

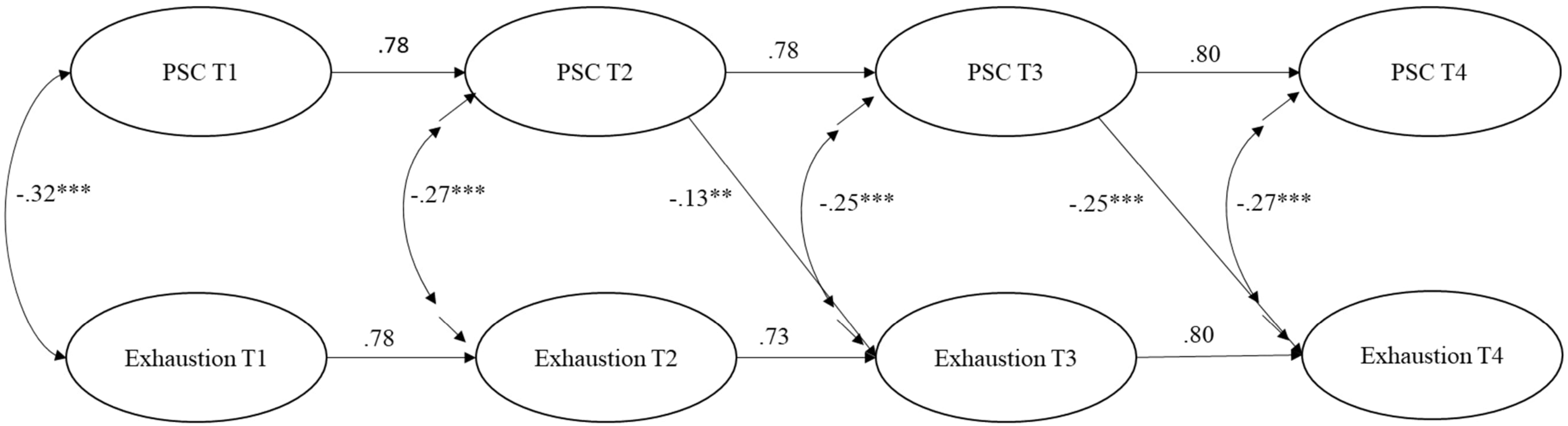

Figure 2. Cross-lagged associations between the PSC and exhaustion.

Note. All the predictive associations were estimated and included in the model, but only statistically significant associations are depicted in the figure.

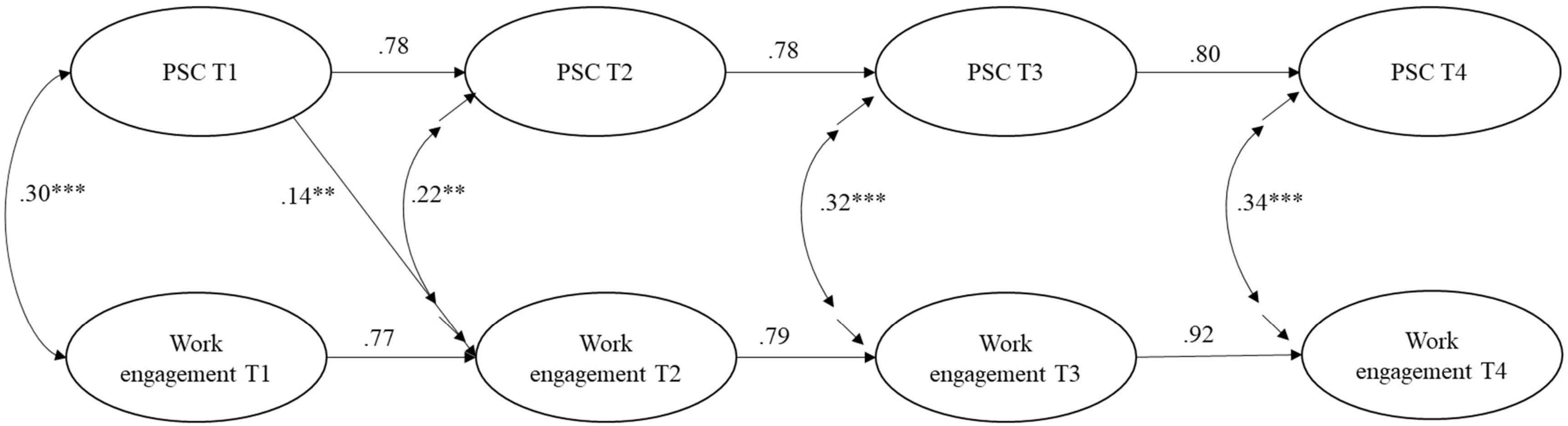

Figure 3. Cross-lagged associations between the PSC and work engagement.

Note. All the predictive associations were estimated and included in the model, but only statistically significant associations are depicted in the figure.