



Psychological caring climate at work, mental health, well-being, and work-related outcomes: Evidence from a longitudinal study and health insurance data

Dorota Weziak-Bialowolska^{a,b,c,*}, Matthew T. Lee^{d,b}, Richard G. Cowden^b,
Piotr Bialowolski^{a,b,e}, Ying Chen^{b,f}, Tyler J. VanderWeele^{b,f}, Eileen McNeely^a

^a Sustainability and Health Initiative (SHINE), Department of Environmental Health, Harvard T. H. Chan School of Public Health, 665 Huntington Avenue, Boston, MA, 02115, USA

^b Human Flourishing Program, Institute for Quantitative Social Science, Harvard University, 12 Arrow St, Cambridge, 02138, MA, USA

^c Centre for Evaluation and Analysis of Public Policies, Faculty of Philosophy, Jagiellonian University, Ul. Ingardena 3, 30-060, Cracow, Poland

^d Institute for Studies of Religion, Baylor University, One Bear Place #97236, Waco, 76798, TX, USA

^e Department of Economics, Kozminski University, Ul. Jagiellońska 57, 03-301, Warsaw, Poland

^f Department of Epidemiology, Harvard T. H. Chan School of Public Health, 677 Huntington Avenue, Boston, MA, USA

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ABSTRACT

Psychological climate for caring (PCC) is a psychosocial factor associated with individual work outcomes and employee well-being. Evidence on the impacts of various psychological climates at work is based mostly on self-reported health measures and cross-sectional data. We provide longitudinal evidence on the associations of PCC with subsequent diagnosed depression and anxiety, subjective well-being, and self-reported work outcomes. Employees of a US organization with a worker well-being program provided data for the analysis. Longitudinal survey data merged with data from personnel files and health insurance claims records comprising medical information on diagnosis of depression and anxiety were used to regress each outcome on PCC at baseline, adjusting for prior values of all outcomes and other covariates. PCC was found to be associated with lower odds of subsequent diagnosed depression, an increase in overall well-being, mental health, physical health, social connectedness, and financial security, as well as a decrease in distraction at work, an increase in productivity/engagement and possibly in job satisfaction. There was little evidence of associations between PCC and subsequent diagnosed anxiety, character strengths, and work-family conflict. Work policies focused on improving PCC may create a promising pathway to promoting employee health and well-being as well as improving work-related outcomes.

1. Introduction

Unprecedented changes in the landscape of work have been recently observed. Positive work impacts [e.g., flexibility and more frequent work from home, less commuting] seemed to be mixed with negative ones [e.g., decreased job security (Almeida and Santos, 2020; Osuna and García Pérez, 2021), reduced work-family reconciliation (Lonska et al., 2021; Tayal and Mehta, 2022), economic insecurity (Witteveen and Velthorst, 2020), and job strain (Newman et al., 2022)]. It has also been

accentuated that actions are needed to counterbalance these unfavorable work impacts and contribute to improving, optimizing, and maintaining worker psychological health and well-being (Dollard and Bailey, 2021; Hudson et al., 2019; Schulte et al., 2019). Unaddressed distress and conflict at work costs organizations billions of dollars annually through absences and low productivity and exerts an even deeper human toll that cannot be quantified in dollars (Greenberg et al., 2015). In other words, there is a strong business case, which is aligned with a persuasive humanitarian argument, for creating more caring

* Corresponding author. Centre for Evaluation and Analysis of Public Policies, Faculty of Philosophy, Jagiellonian University, Ul. Ingardena 3, 30-060, Cracow, Poland.

E-mail addresses: doweziak@iq.harvard.edu (D. Weziak-Bialowolska), Matthew_T_Lee@baylor.edu (M.T. Lee), rcowden@fas.harvard.edu (R.G. Cowden), pbialowolski@kozminski.edu.pl (P. Bialowolski), yingchen@fas.harvard.edu (Y. Chen), tvanderw@hsph.harvard.edu (T.J. VanderWeele), emcneely@hsph.harvard.edu (E. McNeely).

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organizations that meet fundamental human needs (Thibault Landry et al., 2017; Worline and Dutton, 2017). In fact, an emerging social movement in the business sector known as “humanistic management” has positioned ethical caring and the promotion of well-being as essential to healthy management practice (Von Kimakowitz et al., 2011), indicating concurrently that they are also necessary for talent recruitment and retention (Thibault Landry et al., 2017).

Recent calls for fostering an ethics of care (Corbera et al., 2020), a psychologically compassionate climate (Nolan et al., 2022), and psychologically safe climate (Dollard and Bailey, 2021) have taken on a special urgency during the COVID-19 pandemic. Despite apparent differences between the concepts, their commonality is found in the importance of building trustworthy relationships, sharing and caring for one another, recognizing positive contributions, and fair treatment in workplace settings. Caring for each other and creating contexts in which such care is supported and expanded, has been a perennial concern in philosophy, religion, and political theory. It has given rise to countless popular and scholarly works that envision caring as the “existential activity through which we most fully realize our humanity” (Kleinman, 2020, p. 4), and perhaps even as “the ultimate reality of life” (Noddings, 1992, p. 15). As perhaps the most fundamentally human act, caring behaviors and actions, if reinforced and promoted by an organization’s policies, practices, and systems, have been posited to be especially beneficial for worker psychological health (Dollard and Bailey, 2021). In light of such claims, in this study our aim is to provide more robust evidence on how such positive psychosocial work environment could reduce employees’ distress and work burden as well as positively contribute to their health and well-being.

2. Theoretical framework

Associations between positive psychosocial work environment and individual health, well-being, and work outcomes originate from the theories of psychological climate (Baltes et al., 2009) and psychosocial safety climate (Dollard and Bakker, 2010). These theories emphasize the role of perceptions of employees about their work environment (i.e., perceptions of the organization’s policies, practices, and systems), experiences of interaction with their environment, as well as the importance of these perceptions and experiences for employee psychological health. Drawing on these theories, we examine perceptions of psychosocial work environment to include also a larger social realm with respect to caring, trusting, fair, respectful, and recognizing relationships, and henceforth we refer to them as the psychological climate for caring (PCC) at work.

We recognize that various frameworks for psychological climate have been proposed so far (Brown and Leigh, 1996; Dollard and Bakker, 2010; James et al., 2008; Jones and James, 1979; Parker et al., 2003), among which some focused on broad conceptualizations of psychological climate and some adopted a specific focus within a given conceptualization. Within the former group of research, psychological climate for innovation (Hartnell et al., 2011), for trust (Albrecht et al., 2015), for safety (Edmondson, 2019), for justice (Moon, 2017), for ethical work (Arnaud and Schminke, 2012), for compassion (Nolan et al., 2022), and for caring (Fu and Deshpande, 2014; Weziak-Białowolska et al., 2020a) have been proposed and in some cases empirically linked with flourishing and other measures of well-being (e.g., Nolan et al., 2022). The current paper is positioned within the latter group, because our interest is in the prospective associations between psychological climate for caring and individual outcomes including mental health outcomes (i.e., diagnosis of depression and diagnosis of anxiety), well-being outcomes [including emotional health, physical health, meaning and purpose, character strengths, social connectedness, financial security, and overall well-being as conceptualized by VanderWeele (2017)], as well as work performance and work-related well-being outcomes (including work distraction, self-assessed productivity/work engagement, work-family conflict, and job satisfaction). Although some of these associations

have been examined previously, the focus has typically been on work outcomes and job attitudes. For example, positive associations between psychosocial safety climate and job engagement (Hall et al., 2013; Law et al., 2011), job satisfaction (Dollard and Bakker, 2010; Hall et al., 2013), workplace bullying and harassment (Law et al., 2011), job control (Dollard et al., 2012), and workload (Dollard et al., 2012) have been reported. Similarly, for psychological climate, favorable links with organizational commitment (Martin et al., 2005; Parker et al., 2003), job satisfaction (Parker et al., 2003; Schyns et al., 2009), job involvement (Parker et al., 2003), job efforts (Brown and Leigh, 1996), and job performance (Brown and Leigh, 1996) have been found. Regarding the association of psychological climate at work with health and well-being outcomes, even though some studies reported associations of various aspects of psychosocial work conditions (including psychological climate) with depression, psychological health, psychological strain (Dollard et al., 2012; Dollard and Bailey, 2021; Dollard and Bakker, 2010; Hall et al., 2013; Jensen et al., 2010; Law et al., 2011), evidence was usually based on self-reported health conditions and therefore, was subject to response bias.

Our study draws on two well-established and widely recognized theoretical models of psychosocial work environment, that is the Karasek’s job demand–control–support (JDCS) model (Karasek et al., 1998; Karasek, 1979) and the Siegrist’s effort–reward imbalance (ERI) model (Siegrist, 1996; Siegrist et al., 2004). These models link imbalances between psychosocial work factors, such as work demands, efforts, control, support, and rewards, with unfavorable health outcomes. The JDCS model assumes that health problems are consequential of work distress. Instead, the ERI model states that tension resulting from high work demand and insufficient or missing reward negatively affect health in general. Both models highlight negative health effects of work environment, which, when applied to PCC, implies that experience of lack of adequate psychosocial work environment may lead to prolonged stress and, subsequently, to strain reactions in the autonomic nervous system. This, in turn, may hamper self-regulation and consequently contribute to an increased predisposition to illness (Siegrist, 2000; Siegrist et al., 2004).

Although we recognize that both models highlight negative aspects of work, in this study we change the focus from work demands to positive work resources, that is to PCC in our case. We hypothesize that favorable PCC is associated with better subsequent mental health, greater well-being, and better work performance and work-related well-being.

To test this hypothesis, we used two waves of survey data together with health insurance claims data which included diagnostic information on mental health conditions and data derived from personnel files from a sample of employees of an organization that had launched a worker well-being program.

3. Materials and methods

3.1. Data and study participants

The sample consisted of employees working for a large U.S. national service organization. Three sources of data were used: survey data, personnel files, and health insurance claims records. Survey data were collected twice (T1, Wave 1: June 2018; T2, Wave 2: July 2019). A random sample of 15,000 employees were invited to participate in the Wave 1 survey, with 2364 responses received. Participants who completed the Wave 1 survey and remained employees of the organization were invited to complete the Wave 2 survey. Of those, 1209 completed Wave 2. Participants who completed both waves were included in the analytic sample. Those who dropped out tended to be younger, were more likely to be male, and were less likely to be married, own a house, and identify as non-Hispanic White in Wave 1, as compared to those who participated in both waves. However, the two groups evidenced negligible differences on the other Wave 1

characteristics (Chen et al., 2022; Lee et al., 2021).

Survey data for 1209 employees who completed both Wave 1 and Wave 2 surveys were merged with data extracted from the personnel files (i.e., gender, age, race/ethnicity, and salary mid-points for career level bands; T = 1, T = 2) and health insurance claims data (T = 0, T = 1 and T = 2), which comprised diagnostic information on 37 medical conditions classified according to the International Classification of Diseases (ICD-10; World Health Organization, 2004).

This study was approved by the Harvard Longwood Campus Institutional Review Board. Written informed consents were obtained from all participants.

3.2. Assessment of the independent variable

Psychological climate for caring (PCC). Participants reported the extent to which they agreed with the following statements: “People feel respected at work”, “Employees feel that they are treated fairly regardless of age, gender, or ethnicity”, “Employees trust senior leadership”, and “I feel recognized for my work”. This set of items includes both individual and organizational referents because prior research has shown that responses to items assessing psychological climate can vary based on the point of reference participants are prompted to consider (Baltes et al., 2009). Response categories ranged from 0 (strongly disagree) to 10 (strongly agree). A PCC score was calculated by averaging responses to all four items. Analyses examining the psychometric properties of the instrument (i.e., test-retest reliability, Cronbach’s alpha, good quality measurement in terms of goodness of fit and measurement invariance) indicated that the 4-item measure provides a psychometrically sound assessment of PCC (details are presented in [Supplementary Material 1](#)).

3.3. Assessment of dependent variables: Mental health outcomes

Diagnosed mental health conditions of depression (0 = no depression diagnosis, 1 = diagnosis of depression) and anxiety (0 = no anxiety diagnosis, 1 = diagnosis of anxiety) were derived from health insurance claims records.

3.4. Assessment of dependent variables: Well-being outcomes

The human flourishing concept proposed by VanderWeele (2017) was applied to conceptualize well-being. His definition of well-being goes beyond psychological well-being and states that people flourish when all aspects of their life are good. In this study, to measure complete well-being, seven composite measures from the Well-Being Assessment (WBA; Weziak-Bialowolska et al., 2021), being an extended version of the Secure Flourishing Index (SFI) originally proposed by VanderWeele (2017), were used to assess emotional health, physical health, meaning and purpose, character strengths, social connectedness, financial well-being, as well as the overall well-being. Compared to the SFI, the WBA comprises an expanded list of items more comprehensively describing six domains of the SFI, and thus provides more thorough and nuanced assessment of crucial aspects of flourishing. Additionally, since empirical research suggests separate assessment of mental and physical health outcomes, the WBA allows a separate assessment of mental and physical health domains, while the SFI combines them in a single domain (Weziak-Bialowolska et al., 2021). Prior research has shown that the WBA (including its subscales) are psychometrically sound and can be used in future research (Weziak-Bialowolska et al., 2021).

Participants responded to the 40 items using an 11-point response scale ranging from 0 to 10. Scores for each domain were calculated by averaging the responses to all items included in the domain. The overall well-being score was calculated by averaging the composite scores of all six well-being domains.

3.5. Assessment of dependent variables: Work outcomes

Work distraction. Participants responded to a single item assessing the extent to which they were distracted while at work: “Thinking about your last week of work, what percent of the time did you feel distracted or not as productive as you would like?” (Bialowolski et al., 2020). The response categories included 0% of time, 5–10% of time, 10–25% of time, 25–50% of time, and 50–100% of work time. The mid-point of the categories was used as the response value (i.e., 0%, 7.5%, 17.5%, 37.5%, 75%). Consequently, the variable entered the analysis as a continuous score.

3.5.1. Self-rated productivity/work engagement

Participants were requested to assess how much they agree with the following statement on work productivity/engagement: “The employees are productive and engaged”. Response options ranged from 0 (strongly disagree) to 10 (strongly agree). The response was considered as a continuous score.

3.5.2. Work-family conflict

Participants reported the extent to which they agreed with the following statement on work interference with family life: “Demands of my job interfere with my home life” (Netemeyer et al., 1996). Response options ranged from 0 (strongly disagree) to 10 (strongly agree). The response was considered as a continuous score.

3.5.3. Job satisfaction

Job satisfaction was measured with a single question: “How satisfied are you with your job?” (Wanous et al., 1997). Responses were coded on a 11-point response scale ranging from 0 (strongly disagree) to 10 (strongly agree) and were used as a continuous score.

3.6. Assessment of covariates

Previous research has shown that employee characteristics (e.g., demographic factors, socio-economic status, household caring responsibilities) and job characteristics (e.g., job demand, job control, support at work, job meaning) may be classified as predictors of health outcomes (Madsen et al., 2017; Trudel et al., 2020; von Bonsdorff et al., 2012), well-being (Allan et al., 2019; Pinquart and Sörensen, 2004), and work outcomes (Clark, 1997; Dengate, 2016). Therefore, Wave 1 values (T = 1) of these factors were included as covariates for the associations between PCC and subsequent outcomes.

3.6.1. Employee characteristics

We adjusted for participants’ gender (male, female), age (19–30, 31–40, 41–50, 51–74), race/ethnicity (Non-Hispanic White, African-American, other races/ethnicities), marital status (married vs. not), and educational attainment (high school diploma or equivalent, some college but no degree, associate degree, bachelor’s degree, graduate school). We also controlled for indicators of wealth, including house ownership (no, yes) and salary (measured using the mid-point salary bands for a specific career level). Additionally, we adjusted for family caring responsibilities: caregiving to children under the age of 18 (yes, no) and to elder persons (yes, no). Finally, we controlled for health status by using an indicator of number of health conditions recorded in health insurance claims data (at pre-Wave 1, T = 0).

3.6.2. Job characteristics

First, we controlled for workload (“During a typical work week, about how many hours per day do you usually work?”; “≤8 h”, “9–10 h”, or “>10 h”). Second, participants reported their frequency of work from home (“How many days per week do you regularly work from home?”; from 0 days/week to 5 days/week). Next, to assess psychological job demands respondents reported their agreeability with the statement “I have too much to do at work to do a good job” (Cammann et al., 1975).

Job control was assessed with the item “I have a lot of freedom to decide how to do my job” (Cammann et al., 1975); job fit was measured with the item “At work I am able to do what I am good at” (Bialowolski et al., 2021), and job meaning was examined with the statement “I find my work meaningful” (Cammann et al., 1975). The response options ranged from 0 (strongly disagree) to 10 (strongly agree).

Finally, to reduce potential reverse causation, prior values of all outcome variables were also controlled for. Specifically, for mental health outcomes we controlled for the pre-Wave 1 ($T = 0$) values and for other outcomes – for the Wave 1 ($T = 1$) values.

3.7. Statistical analyses

We applied an outcome-wide approach (VanderWeele et al., 2020) to examine the prospective associations between prior PCC and subsequent thirteen outcomes. This approach is helpful in (1) detecting configurations of associations that may not be identifiable if a single outcome was examined in distinct studies; (2) limiting the risk of cherry-picking of only significant results to be presented in a publication and thus reducing the publication bias against non-significant and negative results (Fanelli, 2012); (3) avoiding salami-slicing, that is publishing pieces of a study in numerous paper instead of presenting a complete story in a single one (Tolsgaard et al., 2019).

In the primary analyses, logistic regression was used to regress each of the two mental health outcome variables (one at a time) at follow-up on PCC at baseline, and linear regression was applied to regress each of well-being and work outcomes (one at a time) at follow-up on PCC at baseline. Models for outcomes related to mental health diagnoses, well-being domains, and work outcomes were adjusted for prior values of all outcomes. The model for overall well-being was adjusted for prior values of overall well-being, mental health diagnoses, and work outcomes. In the case of logistic regression, odds ratios were reported. In the case of linear regression, the dependent continuous variables were standardized (mean = 0, standard deviation = 1) and the effect estimates were reported in terms of standard deviations of dependent variables.

The supplementary analyses explored alternate specifications for the associations between PCC and the studied well-being and health outcomes. First, the regressions for the mental health diagnosis outcomes were repeated among participants without diagnosed depression or anxiety at prebaseline [i.e., on a restricted sample (Supplementary Material 2, Table S3)]. Second, we replicated the original models with excluded emotional health domain of well-being, as it comprises two self-reported questions about feeling depressed and anxious (Supplementary Material 2 Table S4). Third, the regressions for mental health diagnosis outcomes were reestimated using the robust Poisson regression (Chen et al., 2018) since prevalence of both depression and anxiety in the analytical sample was at the threshold for rare vs. non-rare outcome (Supplementary Material 2, Table S5)]. Next, since our set of controls might have contributed to overfitting the models, in order to evaluate robustness, the primary analyses were run after excluding some confounders (Supplementary Material 2, Table S6). Specifically, in model 1, we controlled solely for demographics (i.e., age, gender, race/ethnicity, marital status, educational attainment, caregiving to children at home, and caregiving to older persons at home). In model 2, beyond the demographics, we controlled for economic factors such as house ownership and salary. In model 1 and model 2, we also controlled for prior values of all outcome variables. Finally, using the same models as in primary analyses, each item of PCC was used as the independent variable separately to provide further insights into the role of PCC for subsequent mental health, well-being and work outcomes (Supplementary Material 2, Table S7). Specifically, separate models were used to regress each of the analyzed outcomes at follow-up on each of the four individual PCC items.

We also performed sensitivity analysis to evaluate the robustness of the observed associations to unmeasured confounding (Ding and VanderWeele, 2016). In particular, we calculated E-values (Mathur et al.,

2018), which measure the extent to which an unmeasured confounder would need to be associated with both the exposure and the outcome to explain away the observed association (VanderWeele and Ding, 2017). Since several outcomes were examined, a correction for multiple testing was considered. As there has been an ongoing discussion regarding the practices for multiple testing in the literature (Feise, 2022; VanderWeele and Mathur, 2019), we consider the results both with and without Bonferroni correction. However, we do not use this correction as the primary lens for interpreting the results.

Imputations using chained equations (with 20 sets of imputed data) (White et al., 2011) were applied to account for missing data on covariate and the exposure variables (only from the survey data as there was no missing observations in the data from health insurance claims and personnel files). The multiple imputation estimates were pooled using the Rubin’s rule (Rubin, 1987).

Statistical analyses were performed in Stata/SE 17.0.

4. Results

4.1. Characteristics of the study participants

In the baseline wave, participants were 43.5 (SD = 10.4) years old, on average (Table 1). Most of them were women (84.5%), married (62.5%), Caucasian (74.3), and had completed a bachelor’s degree (35.0%). The sample was rather healthy (mean number of health conditions amounted to 2.0, with the theoretical maximum of 37 conditions). Almost half (48.1%) of the participants declared being responsible for caregiving activities to children below 18, with 27.2% reporting that they were caring for an elderly person. More than 72% of the participants indicated that they owned home, and 52.5% of the participants reported working at least 8 h per day. The reports regarding job control, job demand, meaning of work and job fit were predominantly positive and well above the middle response category.

Most of the participants reported positively about the PCC at Wave 1 (mean = 6.98, SD = 2.12, median = 7.25, min = 0, max = 10). The most positive reports concerned fair treatment (mean = 7.41, SD = 2.46) and respect at work (mean = 7.20, SD = 2.29), while for feeling recognized for work and trust for leadership the scores were lower (mean = 6.98, SD = 2.58 and mean = 6.32, SD = 2.49, respectively).

4.2. Longitudinal associations between psychological climate for caring at work and subsequent mental health, well-being and work outcomes

There was evidence for an association between PCC and subsequent diagnosis of depression. Each one standard deviation increase in the PCC was associated with a 32% decreased odds of depression diagnosis (OR = 0.68; 95% confidence interval [CI] = 0.48; 0.97), adjusting for pre-baseline levels of health conditions including depression and other covariates at baseline (Table 2). There was no prospective association between PCC and diagnosed anxiety among all participants (Table 2; OR = 0.79; 95% CI = 0.58; 1.08) and also among respondents with no prior diagnosed anxiety. Robustness analysis conducted on a sample of respondents with no prior depression, with a modified set of controls, as well as using robust Poisson regression (to report risk ratios) yielded similar results (Supplementary Material 2, Table S3, S4 and S5).

Participants who scored higher on PCC reported substantially greater emotional health ($\beta = 0.09$, 95% CI = 0.03, 0.15), physical health ($\beta = 0.10$, 95% CI = 0.04, 0.16), social connectedness ($\beta = 0.11$, 95% CI = 0.04, 0.17), financial security ($\beta = 0.09$, 95% CI = 0.04, 0.14), and overall well-being ($\beta = 0.10$, 95% CI = 0.05, 0.15) at the follow-up, after adjusting for baseline levels of well-being dimensions. No such association was found for meaning and purpose ($\beta = 0.02$, 95% CI = -0.04 ; 0.09), or character strengths ($\beta = 0.06$, 95% CI = -0.01 ; 0.12).

PCC was prospectively associated with greater productivity/work engagement ($\beta = 0.22$, 95% CI = 0.15, 0.30) and lower work distraction ($\beta = -0.09$, 95% CI = -0.17 , -0.02), after adjusting for baseline levels

Table 1

Participant characteristics at study baseline (Wave 1, T = 1; N = 1209; Well-Being Survey, 2018–2019, personnel files 2018–2019 and health insurance claims data 2017–2019).

Baseline Characteristic	Statistic
Gender (women), %	84.45
Age – mean (SD)	43.52 (10.4)
Age, %	
19–30	11.27
31–40	28.49
41–50	29.91
51–74	30.33
Race/Ethnicity, %	
White	74.28
Black or African American	12.16
Other	13.56
Marital status (married), %	62.47
Education, %	
High school	7.78
Some college but no degree	22.58
Associate degree	13.96
Bachelor’s degree	34.95
Graduate school or higher	20.74
Having children under the age of 18 currently living in the household, %	48.11
Being a primary caregiver for a parent or an elderly currently living in the household, %	27.17
Home ownership, % of yes	72.36
Salary (USD) – mean (SD)	73,117 (34,259)
Work hours, %	
≤8 h	52.34
9–10 h	35.37
>10 h	12.29
I have too much to do at work to do a good job (0–10) – mean (SD)	3.18 (2.76)
I have a lot of freedom to decide how to do my job (0–10) – mean (SD)	7.03 (2.50)
I find my work meaningful (0–10) – mean (SD)	7.55 (2.10)
At work, I am able to do what I am good at (0–10) – mean (SD)	7.63 (2.12)
Number of health conditions (0–37) – mean (SD)	2.02 (2.25)
Outcomes	
Diagnosed depression, %	9.59
Diagnosed anxiety, %	12.66
Emotional health (0–10) – mean (SD)	7.56 (1.56)
Physical health (0–10) – mean (SD)	7.82 (1.66)
Meaning and purpose (0–10) – mean (SD)	7.98 (1.53)
Character Strengths (0–10) – mean (SD)	7.92 (1.17)
Social connectedness (0–10) – mean (SD)	7.36 (1.75)
Financial well-being (0–10) – mean (SD)	6.31 (2.64)
Overall well-being (0–10) – mean (SD)	7.48 (1.29)
Distraction at work (0%–100%) – mean (SD)	11.15 (12.16)
Self-rated productivity/work engagement (0–10) – mean (SD)	7.35 (1.86)
Work-family conflict (0–10) – mean (SD)	3.05 (2.89)
Job satisfaction (0–10) – mean (SD)	7.29 (2.05)

Note. Adapted from “Character strengths involving an orientation to promote good can help your health and well-being. Evidence from two longitudinal studies” by Weziak-Bialowolska D, Bialowolski P, VanderWeele TJ, McNeely E, American Journal of Health Promotion. (2021); 35(3); p.390 (<https://doi.org/10.1177/0890117120964083>). CC BY-NC-ND.

of these variables in addition to other covariates (Table 2). However, there was not substantial evidence for associations between PCC and subsequent job satisfaction ($\beta = 0.06$, 95% CI = -0.02 , 0.13) and self-reported work-family conflicts ($\beta = -0.04$, 95% CI = -0.11 , 0.05).

The supplementary analyses with the use of limited sets of controls (Supplementary Material 2, Table S6) showed that the pattern of significant associations remained similar with very comparable effect sizes. There were slight differences for the temporal association of PCC with character strength and for job satisfaction, for which models without work-related controls yielded significant estimates (model 1 and model 2), while in the model with the full set of covariates (model 3), the association was slightly attenuated. Overall, the effect sizes in the supplementary analyses with limited sets of controls were generally larger but substantially similar to the primary analyses, which indicated that

Table 2

Longitudinal associations between psychological climate for caring and subsequent outcomes (N = 1209; Well-Being Survey, 2018–2019, personnel files 2018–2019 and health insurance claims data 2017–2019).

Subsequent outcome	OR	β	95% CI	p-value
Subsequent mental health outcomes				
Diagnosed depression	0.682		0.481; 0.967	0.032
Diagnosed anxiety	0.788		0.577; 1.077	0.135
Subsequent well-being outcomes				
Emotional health		0.091	0.030; 0.153	0.004
Physical health		0.103	0.043; 0.164	0.001
Meaning and purpose		0.023	-0.041; 0.086	0.447
Character strengths		0.056	-0.011; 0.123	0.100
Social connectedness		0.106	0.043; 0.169	0.001
Financial security		0.085	0.035; 0.136	0.001
Overall well-being		0.101	0.047; 0.154	<0.001
Subsequent work outcomes				
Work distraction		-0.094	-0.174; -0.015	0.020
Productivity/work engagement		0.221	0.146; 0.297	<0.001
Work-family conflict		-0.035	-0.113; 0.045	0.392
Job satisfaction		0.056	-0.018; 0.130	0.136

Note: Logistic and linear regression models were used to examine the association between psychological climate for caring at baseline and each of the subsequent health, well-being and work outcomes at follow-up. All models controlled for age (ref. = 31–40), gender (ref. = female), race/ethnicity (ref. = White), marital status (ref. = married), educational attainment (ref. = bachelor’s degree), house ownership (ref. = yes), salary, health status (number of diagnosed health conditions), caregiving to children at home (ref. = no), caregiving to older persons at home (ref. = no), work hours, number of days working from home, meaning of work, job control, job demand, and job fit. Models for diagnosed mental health conditions, domains of well-being, and work outcomes adjusted for prior values of each outcome. The model for overall well-being adjusted for prior values of diagnosed mental health conditions, work outcomes, and overall well-being. All continuous dependent variables were standardized (mean = 0 and standard deviation = 1). The p value cutoff for Bonferroni correction is $p = 0.05/13$ outcomes = 0.0038. OR-odds ratio. CI-confidence interval.

the findings are rather robust.

E-values computed for the primary analyses suggested that the associations were modestly robust to unmeasured confounding (Supplementary Material 2, Table S8), with associations of diagnosed depression being more robust than the others.

4.3. Longitudinal associations between indicators of psychological climate for caring and subsequent mental health, well-being and work outcomes

When individual items of PCC were examined one at a time, for the outcomes prospectively associated with the composite PCC the pattern of two items being consistently favorably associated with these outcomes emerged (Supplementary Material 2, Table S6). These were indicators of fairness (“Employees feel that they are treated fairly regardless of age, gender, or ethnicity”) and respect (“People feel respected at work”). However, for work distraction evidence for a longitudinal association was found for only one item of PCC: “Employees trust senior leadership”, and for diagnosed depression – only for the indicator of fairness and not for respect. Instead, productivity/work engagement was found to be associated with all indicators of PCC, and job satisfaction with none. Additionally, two prospective associations were also found for outcomes not associated with the composite PCC. Diagnosed anxiety was found to be associated with the prior indicator of fairness (OR = 0.77, 95% CI 0.59, 0.98) and work-family conflict – with the prior indicator of recognition for work ($\beta = -0.08$, 95% CI = -0.15 , -0.02).

5. Discussion

In the pursuit of identifying work factors with a potential to alleviate unfavorable work outcomes and simultaneously to understand factors that promote positive employee outcomes, this study examined the links

between PCC and individual employee mental health, well-being, and work outcomes. The results suggest that working adults who perceive their workplace climate as caring have substantially lower odds of diagnosed depression, higher reports of overall well-being, as well as greater self-reports of mental health, physical health, social connectedness, and financial security, after one year. There was not substantial evidence for a protective role of PCC in mitigating anxiety or for a prospective association with character strengths. Regarding the work outcomes, the results were also indicative of prospective associations between PCC and increased productivity/work engagement, reduced distraction at work and possibly with job satisfaction. No associations with work-family conflict was found.

This study adds to the literature in the following ways. First, by using panel survey data and longitudinal data on mental health conditions from health insurance claims records, our findings extend prior evidence on associations between psychosocial safety climate or work climate in general and clinically diagnosed depression (Jensen et al., 2010), self-reported depression symptoms (Fong et al., 2016; Hall et al., 2013), and other self-reported psychological health outcomes such as psychological strain, psychological distress, and emotional exhaustion (Dollard et al., 2012; Dollard and Bailey, 2021; Dollard and Bakker, 2010; Law et al., 2011). This work is also consistent with prior research indicating that positive work climate plays a role in mitigating work anxiety and psychological strain (Dollard et al., 2012), while deficiency in this element of work environment can lead to substance abusive disorder (Jensen et al., 2010) and increased loneliness (Bevilacqua et al., 2021).

It is worth noting, however, that we did not find any association between PCC and diagnosed anxiety. It may sound intriguing because depression and anxiety are closely associated. Nevertheless, they may have distinct causes and consequences (Beuke et al., 2003). Additionally it has been known that primary care physicians, who are the first ones to diagnose mental health disorders, have been faced with challenges in recognizing anxiety (Bystritsky et al., 2013). Given the suboptimal accuracy of the health insurance claims data [e.g., insufficient documentation, inaccurate coding, dependence on the physician query process, and absences of validation and auditing processes (Konrad et al., 2020)], it might be that our results regarding depression and anxiety are not precise. Further research is needed – preferably using different data source on diagnosed depression and anxiety – to corroborate our findings.

We found no association between PCC and character strengths, even though prior studies for hospital physicians reported a prospective association between socio-moral climate and the applicability of signature character strengths 6 months later (Höge et al., 2020). This inconsistency might result from Höge and colleagues' (2020) focus on signature strengths, that is character strengths that are the most essential to one's selfhood (Peterson and Seligman, 2004), and their applicability at work (in our study no such reference was made). They also used a different time lag between the measurements of exposure and outcome.

By indicating prospective associations between PCC and subsequent self-reported financial well-being, independent of salary (objectively measured using personnel files from the organization's human resources department) and wealth (measured by self-reports on house ownership), and of other confounders, this study suggests that the role of PCC may be important for promoting financial well-being – the link scarcely investigated in the literature. Our approach recognizes that some workers might have a relatively high salary and own a home, but still worry about their ability to afford household expenses because of high levels of debt, as indicated by a response to survey items such as "I am able to meet my normal monthly living expenses without any difficulty." Other workers may inordinately worry about meeting such expenses, even if their financial position is sound. We found that psychological climate for caring is associated with less worry about these financial issues and such peace of mind can be quite beneficial, especially in light of financial challenges associated with the pandemic. Future work could build on our findings in order to better understand the mechanisms that account

for this relationship.

Regarding the work outcomes, our results corroborate the earlier evidence from a longitudinal observational study on temporal association between psychological climate for caring at work and self-reported productivity and job performance (Fu and Deshpande, 2014; Weziak-Bialowolska et al., 2020b). Findings of this study also corroborate earlier evidence that higher levels of recognition for work may play a beneficial role in promoting general well-being and quality of life (Weziak-Bialowolska and Bialowolski, 2022) and higher work engagement and stronger work motivation (Thibault Landry et al., 2017). Our findings on the associations with job satisfaction are not so unequivocal. Although prior evidence suggests a positive association (Hall et al., 2013; Schyns et al., 2009), our primary analysis indicates its lack. However, the secondary analyses, which tests for model overfitting, suggest its presence, when job-related confounding is properly accounted for. This inconclusive finding implies that further exploration of this association is needed.

This study did not find any support for the association between PCC and work-family conflict. Although previous evidence reported similar correlations [e.g., between workplace/organizational support and work-family conflict (Michel et al., 2011; Taylor et al., 2009), between family-supportive climate, and work-family conflict (Paustian-Underdahl and Halbesleben, 2014)], the data were mostly cross-sectional. Discrepancy between our findings and prior research in this respect might also result from the fact that the latter examined effects of a family-oriented work climate, while our research was on more general (and not specifically focused on the family life) work climate reflected in respectful, trusting, fair and recognizing relationships at work. Additionally, our use of longitudinal data might have provided a more accurate estimate compared to those obtained from cross-sectional data. Next, our results regarding prospective associations between PCC and reduced distraction as well as increased productivity and engagement strengthen prior cross-sectional evidence on the correlation between insufficiencies in the employee well-being and decreased efficiency [comprising both distraction at work and health related absenteeism (Bialowolski et al., 2020)].

Regarding strengths of this study, by using health outcomes derived from the diagnostic information included in the health insurance claims data, this study supplements subjective well-being outcomes with a more objective examination of the possible role of PCC for improving mental health. Additionally, the longitudinal design and the adjustment for an extensive range of covariates as well as for the prior values of the outcomes limited the risk of overestimating the strength of these temporal associations and strengthened evidence against reverse causation. We also explored the associations between each item in our PCC measure and outcomes and found that trust in senior leadership and recognition were generally unrelated to health and well-being at a one-year follow-up. Instead, recognition was found to be associated with lower work-family conflict, while trust – with decreased distraction and increased productivity/work engagement. This was slightly surprising, given that trust in the management has been priorly reported to be associated with well-being of employees (Helliwell and Huang, 2011). However, we examined temporal association [vs. a concurrent association in the study by Helliwell and Huang (2011)] and trust in senior management compared to trust in management as in the study by Helliwell and Huang (2011). Future research could explore this further, along with other patterns revealed by our single-item analyses. Finally, the secondary analyses provided further evidence for the robustness of the results.

Despite its strengths, this study has also several limitations. First, this study did not use an experimental design that is a gold standard in establishing causal relationships. Therefore, causal interpretation of the results should be made with caution. Second, most of data were self-reported, thus subject to social desirability bias, though this was not the case for depression and anxiety diagnosis which were obtained from the insurance claims data. However, the latter were not entirely free

from reporting bias (see Konrad et al., 2020 for details). Third, although the study was planned to rely on the random sampling design, the response rate was of concern and might have had some influence on the representativeness of the results. Fourth, our study did not control for emotions, health behaviors, and other lifestyle factors because they were not available in the current study, which constitutes another limitation. Next, work-outcomes (and work-related controls) were measured using single-item instruments, which might have influenced accuracy of our results. Finally, generalizability of our findings is limited to the population studied (i.e., mostly females, married and non-Hispanic, well-educated, mostly white-collar working adults from a large service company operating in the U.S.). Therefore, further research is required to provide more universal conclusions.

6. Conclusions

The study reinforced the previously presented arguments that in order to improve both work effectiveness and overall functioning of employees, it is important to go beyond salary and traditional cash rewards and focus on mechanisms related to improvement of work recognition and appreciation (Thibault Landry et al., 2017). These actions could not only help employees to feel more valued, and included, but also enhance their positive emotions and health.

Interventions targeting problematic aspects of psychosocial work environment, showed promising results in improving employee health, when conducted at the organizational level and with an active participation of all relevant participants such as managers, supervisors, and employees (Bambra et al., 2009; Lavoie-Tremblay et al., 2005; Trudel et al., 2021). Arrangements made to improve psychosocial work environment in general and climate for caring in particular, may constitute a promising pathway for promoting employee well-being in life and while-at work. However, more research is needed, preferably with controlled randomized designs, to examine mechanisms between PCC and specific outcomes. This research could examine the role of emotions, personality, and health behaviors in the associations between PCC and health, well-being, and work outcomes since these are well-recognized determinants of health. Regarding the last, given the ambiguity of our association between PCC and job satisfaction, additional work on the role of PCC for job satisfaction is especially needed.

Credit author statement

D.W.B, Y.C., M.T.L., R.G.C, P.B., E.M., and T.J.V. developed the study concept. D.W.B. had full access to the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis. D.W.B. drafted the manuscript. Y.C. M.T.L., P.B., R.G.C, T.J.V., E.M. revised the manuscript, provided critical content, and approved the final submitted version of the manuscript. E.M. monitored progress and integrity of data collection, including the confidentiality of data. E.M. and T.J.V. provided funding for the study and developed the study design.

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Ethical standards

All protocols for recruitment and participation were reviewed and approved by Harvard T.H. Chan School of Public Health Institutional Review Board.

Declaration of competing interest

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Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.socscimed.2023.115841>.

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