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Buffering effect of workplace social capital on the association of job insecurity with psychological distress in Japanese employees: a cross-sectional study

Akiomi Inoue[1], Norito Kawakami[2], Hisashi Eguchi[3] and Akizumi Tsutsumi[3]

[1]Department of Mental Health, Institute of Industrial Ecological Sciences, University of Occupational and Environmental Health, Japan, [2]Department of Mental Health, Graduate School of Medicine, The University of Tokyo, Japan and [3]Department of Public Health, Kitasato University School of Medicine, Japan

Abstract: Objectives: The present study aimed to examine the buffering effect of workplace social capital (WSC) on the association of job insecurity with psychological distress in Japanese employees. **Methods:** 2,971 employees from two factories of a manufacturing company in Japan completed a self-administered questionnaire including the scales on job insecurity, WSC, psychological distress, demographic and occupational characteristics, and quantitative workload. Using psychological distress (defined as a total score of the K6 scale ≥5) as a dependent variable, multiple logistic regression analyses were conducted. In a series of analyses, interaction term of job insecurity×WSC was included in the model. **Results:** After adjusting for demographic and occupational characteristics as well as for quantitative workload and interaction effect of quantitative workload× WSC, high job insecurity and low WSC were significantly associated with psychological distress. Furthermore, a significant interaction effect of job insecurity×WSC was observed. Specifically, the association of job insecurity with psychological distress was greater among those who perceived lower levels of WSC (prevalence odds ratio=3.79 [95% confidence interval=2.70-5.32] for high vs. low job insecurity subgroup) than among those who perceived higher levels of WSC (prevalence odds ratio=2.96 [95% confidence interval=2.19-4.01] for high vs. low job insecurity subgroup). These findings were replicated among permanent male employees in the gender-stratified analyses. **Conclusions:** The present study suggests that WSC has a buffering effect on the association of job insecurity with psychological distress at least among Japanese permanent male employees.

Introduction

In the postwar period, lifetime employment has been a distinctive characteristic of the Japanese labor system, which has provided secure employment to Japanese people. However, due to a prolonged economic recession and an increasingly aging workforce, the lifetime employment has started to weaken[1]. Even large Japanese companies, which have retained lifetime employment, have experienced serious financial troubles, and they have been moving toward less secure employment relationships[2]. "Job insecurity" is a social phenomenon, which is experienced as a subjective perception of a potential threat to the continuity of the current job. It reflects uncertainty, powerlessness, and helplessness that occur when individuals lack the assurances that their job will remain stable[3].

Several meta-analytic studies have reported the association of job insecurity with poor mental health. For example, Sverke et al.[4] analyzed 37 (mainly cross-sectional) studies on the association of job insecurity with mental health and revealed a negative medium effect size of job insecurity on mental health (r_c=-0.24). Cheng and Chan[5] replicated this finding with an updated larger database comprising 133 studies (r_c=-0.28). Furthermore, Stansfeld and Candy[6] analyzed three longitudinal studies and revealed that high job insecurity was associated with an approximately 1.3 times greater risk for common mental disorders. More recently, Theorell et al.[7] and Kim and

von dem Knesebeck[8] analyzed seven and six longitudinal studies, respectively, and found scientific evidence for the association of job insecurity with depressive symptoms.

In addition to job insecurity, workplace social capital (WSC) has also attracted attention as a psychosocial determinant of employee health[9]. Although social capital has been defined in many different ways, all of them share the notion that networks and norms are important dimensions of the concept. Generally, social capital entails three types: bonding, bridging, and linking[10,11]. In daily connections of the workplace, bonding refers to the relationships among members of a network who are similar in some form[12]. Bridging refers to the relationships between dissimilar persons at the same hierarchical level. Linking refers to the relationships across power gradients, such as relationships between employees and their managers or representatives. Among others, the bonding type of WSC is particularly important in Japanese society because Japanese workplaces comprise homogeneous employees, and the business culture in Japan stresses teamwork or collectivism[13].

To date, two cross-sectional[14,15] and five longitudinal studies[16-20] in European and Asian countries have reported that the lack of WSC was associated with poor mental health (e.g., doctor-diagnosed depression and psychological distress) as well as with poor self-rated health. However, recent research on WSC has focused not only on its main effect on health-related outcomes but also on its buffering (or moderating) effect on the association of adverse work characteristics, sometimes called "job demands" according to a theoretical framework of the Job Demands-Resources model[21], with health-related outcomes. To date, two cross-sectional studies reported the buffering effect of WSC on the association of quantitative workload (or extrinsic effort) with cigarette smoking[22] and psychological distress[23]. However, recent research has attempted to categorize job demands into two further types: "challenges" (i.e., work-related demands or circumstances that, although potentially stressful, have potential gains for individuals) and "hindrances" (i.e., work-related demands or circumstances that tend to constrain or interfere with an individual's work achievement)[24]. In the challenge-hindrance literature, quantitative workload is categorized as a challenge, whereas job insecurity is categorized as a hindrance[25]. Given the abovementioned findings[22,23], WSC may also have a buffering effect on the association of hindrance type of job demands, such as job insecurity, with poor mental health. To the best of our knowledge, however, such a buffering effect has not been examined.

The purpose of the present study was to examine the buffering effect of WSC on the association of job insecurity with psychological distress in Japanese employees. It was hypothesized that the association of job insecurity with psychological distress would be greater among those who perceived lower levels of WSC than among those who perceived higher levels of WSC. As mentioned earlier, we focused mainly on the bonding type of WSC in the present study since it is characteristic of the Japanese collectivist culture[13].

Methods

Study design

In the present study, we used a part of cross-sectional data collected from the baseline survey of an occupational cohort study on social class and health in Japan (Japanese Study of Health, Occupation, and Psychosocial Factors Related Equity: J-HOPE). Analyses were conducted with the J-HOPE first wave dataset as of August 22, 2014. Research Ethics Committee of the Graduate School of Medicine and Faculty of Medicine, The University of Tokyo (No. 2772), Kitasato University Medical Ethics Organization (No. B12-103), and Ethics Committee of the University of Occupational and Environmental Health, Japan (No. 10-004) reviewed and approved the aims and procedures of the present study. Prior to initiation of the study, written informed consents were obtained from all participants.

Participants

All employees from two factories of a manufacturing company in Japan (*n*=3,630) were recruited by means of an invitation letter from the authors in February 2011. All variables used in the present study, except employment status, which was obtained from the personnel records of the surveyed company, were measured using a self-administered questionnaire. The survey was conducted from March to June 2011. During the survey period, occupational health staff at the surveyed company distributed a non-anonymous self-administered questionnaire to each employee. After the employees completed the self-administered questionnaires, occupational health staff collected them in sealed envelopes and forwarded them to the authors. All employees were assured that their participation was voluntary and that supervisors and occupational health staff were not authorized to open the sealed envelopes. Finally, 3,461 employees completed the self-administered questionnaire (response rate=95.3%). The reasons for non-participation were not assessed in the present study. After excluding 490 employees who had at least one missing response on the questionnaire, the data from 2,971 employees (2,175 men and 796 women: valid response rate=81.8%) were analyzed. Detailed demographic and occupational characteristics and scale scores are shown in Table 1.

Measures
1) Exposure: job insecurity

Job insecurity was measured using the Japanese ver-

Table 1. Demographic and occupational characteristics, job insecurity, workplace social capital, psychological distress, and quantitative workload among employees who participated in the present study (*n*=2,971)

Demographic and occupational characteristics	Mean (SD)[†]	*n* (%)
Gender		
Men		2,175 (73.2)
Women		796 (26.8)
Age	38.8 (10.9)	
50 years or more		544 (18.3)
40-49 years		875 (29.5)
30-39 years		794 (26.7)
29 years or less		758 (25.5)
Education		
Graduate school		332 (11.2)
College		390 (13.1)
Junior college		548 (18.4)
High school or junior high school		1,701 (57.3)
Family size	3.14 (1.65)	
Occupation		
Managerial employee		279 (9.4)
Non-manual employee		862 (29.0)
Manual employee		1,830 (61.6)
Employment status		
Permanent employee		2,479 (83.4)
Non-permanent employee		492 (16.6)
Work shift		
Day shift		2,009 (67.6)
Shift work with night duty		698 (23.5)
Shift work without night duty		155 (5.2)
Night shift		109 (3.7)
Scale scores (range)	Mean (SD)[†]	*n* (%)
Job insecurity (JCQ)[‡] (4-17)	6.32 (1.81)	
Workplace social capital (NBJSQ)[§] (3-12)	8.44 (1.73)	
Psychological distress (K6) (0-24)	5.73 (4.66)	
With psychological distress (5-24)		1,582 (53.2)
Without psychological distress (0-4)		1,389 (46.8)
Quantitative workload (JCQ)[‡] (12-48)	33.1 (5.33)	

[†]SD: standard deviation. [‡]JCQ: Job Content Questionnaire. [§]NBJSQ: New Brief Job Stress Questionnaire.

sion of the Job Content Questionnaire (JCQ)[26,27]. The JCQ includes a four-item job insecurity scale. The total score, ranging from 4 to 17, was calculated according to the JCQ user's guide[26] with higher score indicating more insecure situation. The English version of the JCQ was translated into Japanese, and the internal consistency reliability and validity have been reported to be acceptable for this version[27]. In this sample, Cronbach's alpha coefficient was 0.50. According to a preceding study on the association of psychosocial work characteristics, including job insecurity, with poor mental health[28], participants were classified into tertiles (high, moderate, and low) based on their job insecurity scale score.

2) Buffering factor: workplace social capital (WSC)

The bonding type of WSC was measured using the New Brief Job Stress Questionnaire (NBJSQ)[29]. The NBJSQ includes a three-item WSC scale as follows: (i) "We have a 'we are together' attitude," (ii) "People feel understood and accepted by each other," and (iii) "People keep each other informed about work-related issues in the

work unit." These items were adapted from Kouvonen et al.'s eight-item WSC scale[30], which includes three items that can be used to measure the bonding type of WSC. We used a four-point scale ranging from 1=*Definitely*, 2=*Somewhat so*, 3=*Not exactly*, and 4=*Not at all*, whereas Kouvonen et al. used a five-point scale. The total WSC scale score, ranging from 3 to 12, was reversed so that higher score indicated higher levels of WSC. In this sample, Cronbach's alpha coefficient was 0.82. According to a preceding study on the buffering effect of WSC on the association of psychosocial work characteristics with health-related outcomes[22], participants were dichotomized into high and low WSC groups based on the mean score.

3) Outcome: psychological distress

Psychological distress was measured using the Japanese version of the K6 scale[31,32]. The K6 scale comprises six items measuring the levels of psychological distress on a five-point scale ranging from 0=*none of the time* to 4 =*all of the time* (the range of total score, 0-24). The K6 scale was translated into Japanese, and the internal consistency reliability and validity have been reported acceptable for this version[32]. In this sample, Cronbach's alpha coefficient was 0.88. According to a recommended cut-off point in Japanese population[33], participants were dichotomized into those with psychological distress (a total score of the K6 scale ≥5) and those without psychological distress (0-4 score).

4) Potential confounders

Potential confounders included demographic and occupational characteristics and quantitative workload. Demographic characteristics included gender, age, education, and family size, which were measured using the self-administered questionnaire. Age was classified into four groups: 50 years or more, 40-49 years, 30-39 years, and 29 years or less. Education was also classified into four groups: graduate school, college, junior college, and high school or junior high school. Family size was used as a continuous variable. Occupational characteristics included occupation, employment status, and work shift. While occupation and work shift were measured using the self-administered questionnaire, information on employment status was obtained from the personnel records of the surveyed company. Occupation was classified into three groups: managerial employee, non-manual employee, and manual employee. Employment status was dichotomized into permanent employee and non-permanent employee. Work shift was classified into four groups: day shift, shift work with night duty, shift work without night duty, and night shift. Quantitative workload was measured using the Japanese version of the JCQ[26,27] introduced above. The JCQ includes a five-item quantitative workload scale. The total score, ranging from 12 to 48, was calculated according to the JCQ user's guide[26] with higher score indicating higher levels of quantitative workload. In this sample, Cronbach's alpha coefficient was

0.67. As is the case with job insecurity, participants were classified into tertiles (high, moderate, and low) based on their quantitative workload scale score.

Statistical analysis

We conducted multiple logistic regression analyses to estimate the prevalence odds ratios (PORs) and 95% confidence intervals (CIs) of psychological distress (defined as having a total score of the K6 scale ≥5)[33]. We adopted multiple logistic regression analyses with categorical variables rather than multiple regression analyses with continuous variables because total scores of job insecurity and psychological distress were not normally distributed but positively-skewed (*p* for the Kolmogorov-Smirnov test <0.001), which can distort associations and significance tests[34]. However, as sensitivity analyses, we conducted multiple regression analyses to examine whether results from the multiple logistic regression analyses are replicated.

In the multiple logistic regression analyses, we first tested the main effects of job insecurity (the low job insecurity group as a reference) and WSC (the high WSC group as a reference) on psychological distress. We then tested the interaction effect of job insecurity×WSC to examine whether WSC buffers the association of job insecurity with psychological distress. When significant or marginally significant interaction effect was observed, we conducted post hoc stratified analyses according to the levels of WSC. In a series of analyses, we first calculated the crude PORs (i.e., without any adjustment) (Model 1). We then incrementally adjusted for demographic characteristics (i.e., gender, age, education, and family size) (Model 2), for occupational characteristics (i.e., occupation, employment status, and work shift) (Model 3), and finally for quantitative workload and interaction effect of quantitative workload×WSC (Model 4). For the association of job insecurity with psychological distress, linear trend tests were also conducted to examine its dose-response relationship.

In addition, to examine whether the interaction effect of job insecurity×WSC differs by gender or employment status, we also tested three-way interaction effects (i.e., the interaction effects of job insecurity×WSC×gender and job insecurity×WSC×employment status). However, because the number of non-permanent male employees was too small (*n*=30), the interaction effect of job insecurity× WSC×gender was tested only among permanent employees (2,145 men and 334 women); and the interaction effect of job insecurity×WSC×employment status was tested only among female employees (334 permanent employees and 462 non-permanent employees).

Furthermore, as mentioned above, we conducted multiple regression analyses with continuous variables as sensitivity analyses. In a series of analyses, we followed a similar procedure to the multiple logistic regression

Table 2. Main effects and interaction effect of job insecurity and workplace social capital and simple main effect of job insecurity according to the levels of workplace social capital on psychological distress among Japanese employees: multiple logistic regression analysis (2,175 men and 796 women)[†]

Main effects and interaction effect (job insecurity and workplace social capital)	n	Number of cases (%)	Prevalence odds ratio (95% confidence interval)			
			Model 1[‡]	Model 2[§]	Model 3[¶]	Model 4[‖]
Main effect						
Job insecurity						
High (8-17)	583	419 (71.9)	3.18 (2.56-3.94)	3.24 (2.61-4.04)	3.34 (2.68-4.17)	3.18 (2.54-3.98)
Moderate (6-7)	1,163	648 (55.7)	1.60 (1.35-1.88)	1.61 (1.36-1.90)	1.65 (1.39-1.95)	1.61 (1.36-1.91)
Low (4-5)	1,225	515 (42.0)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001
Workplace social capital						
High (9-12)	1,676	760 (45.3)	1.00	1.00	1.00	1.00
Low (3-8)	1,295	822 (63.5)	1.88 (1.62-2.19)	1.84 (1.58-2.15)	1.82 (1.56-2.12)	1.85 (1.44-2.39)
Interaction effect						
Job insecurity × workplace social capital (*p* for interaction)			*p*=0.003	*p*=0.001	*p*=0.002	*p*=0.002

Simple main effect (job insecurity)	n	Number of cases (%)	Prevalence odds ratio (95% confidence interval)			
			Model 1[‡]	Model 2[§]	Model 3[¶]	Model 4[††]
High workplace social capital group (9-12)						
Job insecurity						
High (8-17)	266	174 (65.4)	2.93 (2.19-3.91)	2.90 (2.16-3.89)	3.07 (2.27-4.14)	2.96 (2.19-4.01)
Moderate (6-7)	597	267 (44.7)	1.25 (1.01-1.55)	1.24 (0.99-1.54)	1.29 (1.03-1.60)	1.25 (1.00-1.57)
Low (4-5)	813	319 (39.2)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001
Low workplace social capital group (3-8)						
Job insecurity						
High (8-17)	317	245 (77.3)	3.75 (2.71-5.20)	4.01 (2.88-5.59)	4.04 (2.89-5.65)	3.79 (2.70-5.32)
Moderate (6-7)	566	381 (67.3)	2.27 (1.75-2.95)	2.36 (1.81-3.07)	2.37 (1.81-3.10)	2.33 (1.77-3.05)
Low (4-5)	412	196 (47.6)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001

[†]Psychological distress was defined as having a total score of the K6 scale ≥ 5. [‡]Crude (i.e., without any adjustment). [§]Adjusted for gender, age, education, and family size. [¶]Additionally adjusted for occupation, employment status, and work shift. [‖]Additionally adjusted for quantitative workload and interaction effect of quantitative workload × workplace social capital. [††]Additionally adjusted for quantitative workload.

analyses described above. When significant or marginally significant interaction effect of job insecurity×WSC was observed, we conducted post hoc simple slope analyses at one standard deviation (SD) above/below the mean score of WSC. Prior to the analyses, total scores of job insecurity, WSC, and quantitative workload were mean-centered.

The levels of significance and marginally significance were 0.05 and 0.10, respectively (two tailed). Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 19.0 (Armonk, NY: IBM Corporation).

Results

Table 2 shows the results of the multiple logistic regression analyses. For the main effect, high and moderate job insecurity groups had significantly higher PORs of psychological distress compared to the low job insecurity group. Furthermore, a significant dose-response relationship between job insecurity and psychological distress was observed (*p* for linear trend <0.001) (Model 1). In a similar way, the low WSC group had a significantly higher POR of psychological distress compared to the high WSC group (Model 1). These patterns were unchanged after adjusting for demographic and occupational characteristics and additionally for quantitative workload

Table 3. Main effects and interaction effect of job insecurity and workplace social capital and simple main effect of job insecurity according to the levels of workplace social capital on psychological distress among Japanese permanent male employees: multiple logistic regression analysis (2,145 men)[†]

Main effects and interaction effect (job insecurity and workplace social capital)	n	Number of cases (%)	Prevalence odds ratio (95% confidence interval)			
			Model 1[‡]	Model 2[§]	Model 3[¶]	Model 4[‖]
Main effect						
Job insecurity						
High (8-17)	442	318 (71.9)	3.11 (2.42-3.99)	3.09 (2.40-3.97)	3.10 (2.41-4.00)	2.94 (2.27-3.80)
Moderate (6-7)	816	457 (56.0)	1.56 (1.28-1.89)	1.53 (1.26-1.87)	1.54 (1.26-1.88)	1.49 (1.22-1.83)
Low (4-5)	887	380 (42.8)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001
Workplace social capital						
High (9-12)	1,214	564 (46.5)	1.00	1.00	1.00	1.00
Low (3-8)	931	591 (63.5)	1.80 (1.50-2.16)	1.76 (1.47-2.11)	1.74 (1.45-2.09)	1.84 (1.32-2.55)
Interaction effect						
Job insecurity × workplace social capital (*p* for interaction)			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001

Simple main effect (job insecurity)	n	Number of cases (%)	Prevalence odds ratio (95% confidence interval)			
			Model 1[‡]	Model 2[§]	Model 3[¶]	Model 4[††]
High workplace social capital group (9-12)						
Job insecurity						
High (8-17)	207	133 (64.3)	2.53 (1.82-3.50)	2.50 (1.79-3.47)	2.55 (1.82-3.56)	2.44 (1.73-3.42)
Moderate (6-7)	413	184 (44.6)	1.13 (0.88-1.46)	1.08 (0.84-1.40)	1.11 (0.85-1.43)	1.06 (0.82-1.38)
Low (4-5)	594	247 (41.6)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001
Low workplace social capital group (3-8)						
Job insecurity						
High (8-17)	235	185 (78.7)	4.45 (3.02-6.56)	4.50 (3.04-6.66)	4.47 (3.02-6.63)	4.20 (2.82-6.25)
Moderate (6-7)	403	273 (67.7)	2.53 (1.85-3.45)	2.52 (1.84-3.45)	2.51 (1.83-3.44)	2.45 (1.78-3.37)
Low (4-5)	293	133 (45.4)	1.00	1.00	1.00	1.00
p for linear trend			*p*<0.001	*p*<0.001	*p*<0.001	*p*<0.001

[†]Psychological distress was defined as having a total score of the K6 scale ≥ 5. [‡]Crude (i.e., without any adjustment). [§]Adjusted for age, education, and family size. [¶]Additionally adjusted for occupation and work shift. [‖]Additionally adjusted for quantitative workload and interaction effect of quantitative workload × workplace social capital. [††]Additionally adjusted for quantitative workload.

and interaction effect of quantitative workload × WSC (Models 2-4).

For the interaction effect, a significant interaction effect of job insecurity × WSC was observed in Models 1-4 (*p* for interaction ranged from 0.001-0.003). Therefore, we conducted post hoc stratified analyses according to the levels of WSC. The post hoc stratified analyses showed significant dose-response relationship between job insecurity and psychological distress, regardless of the levels of WSC (*p* for linear trend <0.001 for Models 1-4). However, the low WSC group had higher PORs of psychological distress for the moderate and high job insecurity subgroups compared to the high WSC group.

When we included the three-way interaction term of job insecurity × WSC × gender in the model among permanent employees, marginally significant interaction effect was observed (*p* for interaction ranged from 0.057-0.072

for Models 1-4). When we conducted the gender-stratified analyses, similar patterns as the main analyses were observed among permanent male employees (Table 3); however, significant or marginally significant interaction effect of job insecurity × WSC could not be observed among permanent female employees (*p* for interaction ranged from 0.240-0.352 for Models 1-4). On the other hand, the three-way interaction term of job insecurity × WSC × employment status among female employees was not significant or marginally significant (*p* for interaction ranged from 0.821-0.892 for Models 1-4).

When we conducted multiple regression analyses with continuous variables as sensitivity analyses, similar patterns as the multiple logistic regression analyses were observed (Tables 4 and 5). Specifically, main effects of job insecurity and WSC on psychological distress were significant in Models 1-4 (*p* for standardized partial regres-

Table 4. Main effects and interaction effect of job insecurity and workplace social capital and simple slope of job insecurity according to the levels of workplace social capital on psychological distress among Japanese employees: multiple regression analysis (2,175 men and 796 women)

Main effects and interaction effect (job insecurity and workplace social capital)	Standardized partial regression coefficient (β)			
	Model 1[†]	Model 2[‡]	Model 3[§]	Model 4[¶]
Main effect				
Job insecurity	0.248*	0.250*	0.256*	0.242*
Workplace social capital	–0.229*	–0.221*	–0.222*	–0.207*
Interaction effect				
Job insecurity × workplace social capital (*p* for interaction)	*p*=0.011	*p*=0.005	*p*=0.007	*p*=0.020

Simple slope (job insecurity)	Standardized partial regression coefficient (β)			
	Model 1[†]	Model 2[‡]	Model 3[§]	Model 4[¶]
High workplace social capital group (one SD above the mean)[‖]	0.211*	0.209*	0.218*	0.210*
Low workplace social capital group (one SD below the mean)[‖]	0.285*	0.290*	0.295*	0.275*

*p<0.001. [†]Crude (i.e., without any adjustment). [‡]Adjusted for gender, age, education, and family size. [§]Additionally adjusted for occupation, employment status, and work shift. [¶]Additionally adjusted for quantitative workload and interaction effect of quantitative workload × workplace social capital. [‖]SD: standard deviation.

Table 5. Main effects and interaction effect of job insecurity and workplace social capital and simple slope of job insecurity according to the levels of workplace social capital on psychological distress among Japanese permanent male employees: multiple regression analysis (2,145 men)

Main effects and interaction effect (job insecurity and workplace social capital)	Standardized partial regression coefficient (β)			
	Model 1[†]	Model 2[‡]	Model 3[§]	Model 4[¶]
Main effect				
Job insecurity	0.266*	0.262*	0.265*	0.248*
Workplace social capital	–0.206*	–0.198*	–0.198*	–0.181*
Interaction effect				
Job insecurity × workplace social capital (*p* for interaction)	*p*=0.002	*p*=0.001	*p*=0.002	*p*=0.009

Simple slope (job insecurity)	Standardized partial regression coefficient (β)			
	Model 1[†]	Model 2[‡]	Model 3[§]	Model 4[¶]
High workplace social capital group (one SD above the mean)[‖]	0.213*	0.209*	0.213*	0.205*
Low workplace social capital group (one SD below the mean)[‖]	0.318*	0.316*	0.317*	0.292*

*p<0.001. [†]Crude (i.e., without any adjustment). [‡]Adjusted for age, education, and family size. [§]Additionally adjusted for occupation and work shift. [¶]Additionally adjusted for quantitative workload and interaction effect of quantitative workload × workplace social capital. [‖]SD: standard deviation.

sion coefficient [β] <0.001). Furthermore, significant interaction effect of job insecurity×WSC was observed (*p* for interaction ranged from 0.005-0.020 for Models 1-4). The post hoc simple slope analyses showed that the low WSC group (i.e., one SD below the mean) had a greater simple slope of job insecurity compared to the high WSC group (i.e., one SD above the mean). When we included the three-way interaction term of job insecurity×WSC× gender in the model among permanent employees, marginally significant interaction effect was observed (*p* for interaction ranged from 0.083-0.093 for Models 1-4). Gender-stratified analyses showed significant interaction effect of job insecurity×WSC among permanent male em-

ployees (*p* for interaction ranged from 0.001-0.009 for Models 1-4) but not among permanent female employees (*p* for interaction ranged from 0.477-0.702 for Models 1-4). Among permanent male employees, the post hoc simple slope analyses showed that the low WSC group had a greater simple slope of job insecurity compared to the high WSC group. On the other hand, the three-way interaction term of job insecurity×WSC×employment status among female employees was not significant or marginally significant (*p* for interaction ranged from 0.524-0.784 for Models 1-4).

Discussion

The present study demonstrated significant main effects of job insecurity and WSC on psychological distress. Furthermore, the significant interaction effect of job insecurity×WSC on psychological distress (i.e., buffering effect of WSC on the association of job insecurity with psychological distress) was demonstrated. These findings were replicated among permanent male employees in the gender-stratified analyses.

The present study showed the significant main effect of job insecurity on psychological distress in the crude model (Model 1) and even after adjusting for potential confounders (i.e., demographic and occupational characteristics, quantitative workload, and interaction effect of quantitative workload×WSC) (Models 2-4). This is consistent with the preceding meta-analytic studies showing that the increased job insecurity was associated with poor mental health (e.g., common mental disorders and depressive symptoms)[4-8]. In a similar way, the present study showed the significant main effect of WSC on psychological distress before and after adjusting for potential confounders (Models 1-4). This is also consistent with the preceding cross-sectional and longitudinal studies conducted in European and Asian countries showing that the lack of WSC is associated with poor mental health (e.g., doctor-diagnosed depression and psychological distress)[14-17,19,20] as well as with poor self-rated health[18]. Although utilizing a cross-sectional design, the present study replicated the findings from the preceding meta-analytic and epidemiological studies in terms of psychological distress.

The present study also showed the significant buffering effect of WSC on the association of job insecurity with psychological distress before and after adjusting for potential confounders (Models 1-4). These findings were replicated among permanent male employees in the gender-stratified analyses. Based on the challenge-hindrance literature introduced earlier[24,25], the present study suggests that WSC has a buffering effect on hindrance type of job demands in terms of psychological distress, independently of challenge type of job demands, at least among permanent male employees. When permanent male employees perceive greater job insecurity, they may be more psychologically distressed. However, under the condition that employees acknowledge and trust each other, their distress may be reduced or alleviated. On the other hand, it should be noted that the sample size of non-permanent male employees, who are likely to be in more insecure situation, was too small to be included in the gender-stratified analyses. Therefore, further studies should examine whether the present findings can be replicated using an adequate sample size of non-permanent male employees.

Contrary to permanent male employees, the buffering effect of WSC was not replicated among permanent female employees. In the Japanese society, a traditional gender-role ideology that men are expected to be the primary breadwinners still remains[35]. Given such a social background, the issue of job insecurity may be of greater concern among male employees, and thus WSC may be strongly recognized as one of the important organizational resources, which can reduce psychological distress associated with job insecurity. In contrast, female employees generally tend to have lower organizational commitment[36] characterized by attachment, identification, and loyalty to the organization[37]; therefore, they may be more likely to keep emotional distance from their workplace or organization, which may lead to the insignificant buffering effect of WSC on the association of job insecurity with psychological distress among permanent female employees. However, it should be noted that the sample size of female employees was relatively small in the present study, which may lead to biased estimation of the interaction effect of job insecurity×WSC. To address this issue, larger-scale research on female employees should be conducted in the future.

Possible limitations of the present study should be considered. First, although the response rate in the present study was relatively high, those who perceived higher levels of job insecurity, lower levels of WSC, and higher levels of psychological distress may have been less likely to participate in the present study. Furthermore, about 14% of the participants were excluded from the analyses due to missing response (s) on the questionnaire. We reviewed our dataset and found that more than half of the excluded cases did not answer question about their education. Because education is sensitive personal information, a subsample of participants, especially those with lower levels of education, may have hesitated to provide an answer. These selection biases may have affected the findings. Second, the present sample was drawn from one particular manufacturing company with relatively stable business conditions in Japan. Although the present findings offer valuable insights to suggest that job insecurity has an important implication for mental health even among employees at such a blue-chip company, generalization of the present findings should be done with caution. Third, as discussed earlier, the sample size of non-permanent male employees was too small, which made it impossible to examine the difference in the interaction effect of job insecurity × WSC by gender among non-permanent employees or by employment status among male employees. Fourth, the present study focused only on the bonding type of WSC as a main type of WSC in the Japanese society. Furthermore, although some preceding studies on WSC utilized a multilevel approach to examine its contextual effect[15,17,18,22], the present study could not examine such effect due to lack of information on the

department of each participant. Future research should examine the buffering effects of other types of WSC, such as bridging and linking, at the contextual as well as individual levels. Fifth, the present study showed low reliability for the JCQ job insecurity scale, which may have affected our findings, though a preceding study displayed a similar level of reliability[38]. Furthermore, although the WSC scale in the NBJSQ has been reported to have a certain degree of reliability and validity, more detailed validity, such as convergent and discriminant validity, has not been fully examined[29]. Such insufficient validity of the WSC scale may also have affected our findings. Sixth, although we adjusted for family size as a potential confounder, information on marital status was not obtained because it is sensitive personal information. If married employees, especially Japanese male employees, are laid off, they would not be able to feed their family; therefore, they are likely to feel greater pressure and anxiety associated with job insecurity compared to single employees. The present study design could not eliminate such a confounding bias. Seventh, causal inferences are limited due to the cross-sectional nature of the study. The present findings seem to indicate that those who perceived lower levels of WSC and higher levels of psychological distress might assess job insecurity as high. Finally, although our main mental health outcome was psychological distress, it is not necessarily associated with clinical depression or anxiety disorder. Further longitudinal studies focusing on more severe mental health outcomes, such as major depressive disorders, are promising.

In conclusion, we found the buffering effect of WSC on the association of job insecurity with psychological distress at least among Japanese permanent male employees. Because job insecurity is the most stressful aspect of the process leading to unemployment with a worse effect on employees compared to unemployment itself[39], making effort to reduce job insecurity is a high priority for the maintenance and promotion of mental health among employees. In fact, some Organization for Economic Cooperation and Development (OECD) countries have put in place an unemployment protection system to address the issue of unemployment[40]. However, especially under the condition of economic recession in Japan, the present findings offer valuable insights to suggest that WSC has an effect on reducing psychological distress in relation to job insecurity. Based on the present findings, future workplace intervention studies should investigate the effect of job insecurity on psychological distress through improving WSC.

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