

Reliability and validity of the Japanese version of the psychological safety scale for workers

Yuko OCHIAI^{1*} and Yasumasa OTSUKA²

¹Graduate School of Comprehensive Human Sciences, University of Tsukuba, Japan

²Faculty of Human Sciences, University of Tsukuba, Japan

Received June 10, 2021 and accepted November 4, 2021

Published online in J-STAGE November 25, 2021

DOI <https://doi.org/10.2486/indhealth.2021-0130>

Abstract: Although an increasing number of studies on psychological safety at workplaces has been conducted in both western and eastern countries, there are few empirically validated measures in Japan. Our purpose was to investigate the validity and reliability of the Japanese version of the Psychological Safety Scale. Japanese workers were invited to participate in online surveys at baseline and at one-month follow-up (N=320). The Psychological Safety Scale was translated into Japanese according to international guidelines. Social support at workplace, work engagement, organization-based self-esteem, organizational justice, and job satisfaction were measured. Cronbach's alphas and intra-class correlation coefficient (ICC) were examined for reliability, and its validity was tested by confirmatory factor analysis and correlational analyses. The results of the survey showed that respondents were 287 at baseline and 236 at follow-up. Cronbach's alphas of the Psychological Safety Scale were 0.91 (baseline) and 0.88 (follow-up), and ICC was 0.87. Confirmatory factor analysis demonstrated a marginally acceptable fit. Overall, the Japanese Psychological Safety Scale had moderate to strong correlations with other scales. In conclusion, the Japanese version of the Psychological Safety Scale had acceptable levels of reliability and validity, and may be applicable for use in Japanese workers.

Key words: Psychological safety, Reliability, Validity, Workplace, Japan

Introduction

Psychological safety was first introduced to the organizational sciences in the context of organizational change by Schein and Bennis in 1965¹⁾. Psychological safety was described as the degree to which workers feel secure and confident in dealing with organizational learning and chang-

es¹⁾. Schein indicated that workers who feel psychological safety have cognition that they are at a safe place, will be treated equally with fair procedures, will be able to learn new things, and try new ways^{1, 2)}. In contrast, employees who have experienced traumatic events such as downsizing or reorganization would be anxious about trying new ideas¹⁾. In 1990, Kahn³⁾ introduced a new focus on psychological safety as a state of mind in which an individual worker can take interpersonal risks of self-expression and engage in their work roles. Kahn considered that workers are more likely to feel psychological safety in workplaces where social support and trust among workers exist. Kahn

*To whom correspondence should be addressed.
E-mail address: s2040452@s.tsukuba.ac.jp

©2022 National Institute of Occupational Safety and Health

proposed that four factors influenced psychological safety: interpersonal relationships, group and intergroup dynamics, management style and process, and organizational norms. Having supportive and trusting relationships at the person level allows people to create connections with one another to compensate for gaps between people with different gender or organizational position. Edmondson⁴⁾ introduced the concept of psychological safety at the team level, and that psychological safety promotes team learning behavior and team performance. Although Schein *et al.*^{1, 2)} and Kahn³⁾ focused on individual perceptions of psychological safety, Edmondson⁴⁾ casted psychological safety as a group level construct. Studies on psychological safety have increased since the 2000s in relation to a supportive work environment, workers' learning behaviors, leadership, speaking-up behavior, and work engagement⁵⁾.

Psychological safety has been defined in many ways. Kahn³⁾ defined psychological safety as "workers' feeling able to show and employ one's self without fear of negative consequences to self-image, status, or career". Detert & Buriss⁶⁾ defined psychological safety as "the extent to which individuals believe their colleagues (e.g., supervisors, coworkers) will not punish or misunderstand them for taking risks, such as speaking up with suggestions or concerns". Edmondson's definition⁴⁾ of team psychological safety was that it is a "shared belief held by members of a team that the team is safe for interpersonal risk taking". The common definition of psychological safety is that it is a state in which workers are able to speak out what they really think without worrying about their impression, position, or negative impact on the workplace. Taking these definitions into account, psychological safety in the workplace in the present study was defined as the degree to which workers feel that they can be themselves at work without fear of negative effects on their status, work, or impressions as a result of their voice and honest behaviors in the workplace. Frazier *et al.*⁵⁾ noted the difference between psychological safety and similar positive work attitudes such as work engagement and psychological empowerment. Work engagement and psychological empowerment refer to a worker's view of a particular job, while psychological safety focuses on their view of the work environment, and on their perception about how other people in the workplace will respond to one's risk-taking behavior.

A variety of variables have been demonstrated as antecedents and consequences of psychological safety. Social support from supervisors and coworkers at work^{3, 7-12)}, organizational justice^{13, 14)}, and organization-based self-esteem¹⁵⁻¹⁷⁾ are examples of the antecedents, while work en-

gagement^{3, 18)} and job satisfaction¹⁹⁾ are representative consequences. These variables have a positive relationship with psychological safety. Regarding social support, Frazier *et al.*⁵⁾ proved in a meta-analysis that psychological safety was positively related to supportive workplaces on the individual-level (with supportive work context, r [estimated mean correlation] = 0.40; with regard to peer support, r [estimated mean correlation] = 0.50). When a worker trusts that the worker will receive cooperation from supervisors and other workers, the worker feels psychological safety^{3, 7, 20-22)}. In other words, ethical leadership^{23, 24)} and inclusive leadership^{25, 26)} increase the psychological safety of employees because these leadership styles are characterized by supporting subordinates to express their opinions without fear of being rejected, and employees are more cooperative with each other when they can get help from their supervisors at work^{24, 26-28)}. In addition, Japanese workers tend to hesitate to speak up and ask someone for support because of their norm of reciprocity²⁹⁾, but when there is a high level of psychological safety in which others will understand even if the worker fails to fulfill his/her obligation to return the support, the worker can seek support.

Organizational justice is defined as perceived fairness of the organization that workers work for¹³⁾. Organizational justice includes a procedural component (the extent to which decision-making procedures are consistently applied, suppress bias, and are accurate, correctable, and ethical) and a relational component (polite, considerate, and fair treatment of individuals)¹⁴⁾. Japanese organizations are often hierarchical, and it is quite difficult to express an opinion contrary to the opinion of the supervisors³⁰⁾. When workers perceive their workplace as an environment of fairness and supportiveness, and feel the presence of truthful relationships between employees, their sense of psychological safety is assumed to be increased^{6, 19)}. We assume that psychological safety is positively related to organizational justice.

Organization-based self-esteem is defined as an individual's beliefs about his/her own capabilities and social worth in the workplace¹⁵⁾. Workers with high organization-based self-esteem feel that it is easy to access resources in their work environment¹⁵⁾, and that they can ask their supervisor or subordinates for help¹⁵⁻¹⁷⁾. Such behavior is considered to be possible when there is a high level of psychological safety. Moreover, Liang *et al.*³¹⁾ demonstrated that people with organization-based self-esteem have higher psychological safety and are able to make harsh remarks about the organization.

Many studies have indicated that work engagement is

one of the consequences of psychological safety^{5, 22}). Kahn argued that psychological safety, the belief that workers are safe in taking risks of self-expression, is mandatory for individuals' engagement in their work roles³. Engagement as defined by Kahn is not exactly the same as work engagement³²), but Schaufeli³³) agreed that Kahn's engagement includes physical-energetic (vigor), emotional (dedication), and cognitive (absorption) components which are elements of work engagement³²). When members of an organization perceive the workplace as a safe place to take personal risks, they can be involved in their work without fear of negative consequences^{3, 5, 10, 18, 34}). The meta-analysis indicated a positive correlation between psychological safety and work engagement (r [estimated mean correlation] =0.36). Thus, Japanese workers will engage fully in their roles if they perceive that their own thoughts or opinions would not be rejected but instead would be accepted.

With regard to job satisfaction, a meta-analysis showed a significant relationship between psychological safety and job satisfaction (r [estimated mean correlation] =0.42)⁵). Unler & Caliskan³⁵) found that there was a strong relationship between psychological safety and job satisfaction. Ahmad & Waheed¹⁹) demonstrated that psychological safety mediates ethical leadership and job satisfaction. The feeling of safety that workers would receive an ethically sensitive evaluation from upper management leads to greater involvement in their job, resulting in workers' job satisfaction^{34, 35}). On the contrary, if workers work in a punishable environment and are unable to make suggestions about new work processes or report errors, this situation would likely create an uncomfortable work environment, leading to greater job dissatisfaction³⁶).

There are several psychological safety scales. For example, May *et al.*⁷) measured psychological safety with three items based on Kahn's definition, and Brown & Leigh³⁷) measured psychological safety with three factors: supportive management, role clarity, and self-expression. Edmondson⁴) developed the team psychological safety scale, and it is widely used in the research field. The scale can be used not only at the team level but also at the individual and workplace levels. Newman *et al.*²²) suggested that cultural differences should be taken into consideration when exploring workers' psychological safety, because in western cultures, there is not much social cost to speaking up and expressing one's thoughts, whereas in eastern cultures including Japan, people maintain greater social distance and do not easily speak their own thoughts or feelings^{5, 22}). In Japanese workplace, the consequences of utterance are likely to have a negative impact on one's status, work, and

impression. For example, in Japanese collectivistic workplaces, human relations and harmony may be crucial, and some workers believe that expressing their own opinions is disruptive to one's image and relationship in the workplace³⁸). Also, there may exist an organizational hierarchical culture where workers practiced that expressing a different opinion to the supervisor could lead to exclusion from their status^{2, 39-41}). In this way, the risk-taking behavior assumed by psychological safety is almost always combined with speaking behavior⁴¹) especially in Japanese workplaces. However, when an individual worker feels that there is a problem in the workplace, keeping silent for fear of being excluded could be a real danger to the entire workplace⁴²). These may imply that the risk-taking behavior assumed by psychological safety is almost always combined with speaking behavior, and therefore, a psychological safety scale specific to speaking behavior is necessary in Japanese workplace. Liang, Farh, & Farh³¹) developed a Chinese language scale to measure workers' psychological safety at workplaces which reflects Kahn's concept, focusing on the workers' speaking out/ voice behaviors^{7, 37}). The scale was originally written in the Chinese language, and it has been reported that the scale had been confirmed to have sufficient reliability and validity among Chinese workers³¹). Thus, we translated Liang *et al.*'s Psychological Safety Scale from English into Japanese, and examined its reliability and validity in Japanese workers. We assumed that the Japanese version of the Psychological Safety Scale would have good internal consistency, test-retest reliability, and structural validity. For convergent validity, we hypothesized that psychological safety would have moderate-to-strong positive associations with social support, organization-based self-esteem, work engagement, organizational justice, and job satisfaction.

Methods

Participants

Online surveys were administered twice to Japanese workers at baseline (October 2020) and at one-month follow-up (November 2020). The internal consistency, structural validity, and convergent validity of the Japanese version of the Psychological Safety Scale were investigated using the cross-sectional data. Test-retest reliability was examined using the longitudinal data one month later, and we expected that the scores would be stable over some duration.

Participants were invited from workers registered as respondents of an Internet research company, Cross Market-

ing, Inc. Cross Marketing has 2,190,000 active respondents who answered a questionnaire within recent years. The inclusion criteria for participants in the present study were Japanese workers who were living in Japan and who were aged 20 to 65 years. In Japan, workers who belong to organizations retire from their active duty at the age of 65 years. Targeted workers were from all demographics, because it is essential to respect each other's diversity in the workplace, and psychological safety is an important perception in all workers⁴³. Managers also might have their own stressors at work, or be emotionally exhausted⁴⁴. If managers can speak about their policies openly to people inside the company without fear of being betrayed, they will be engaged in their work, and be able to listen to the opinions of various workers on the front lines⁴³. In some workplaces, not only full-time workers, but also freelance, contract, and part-time workers feel psychologically safe to express their opinions in the workplace without fear of being excluded from work-related relationships in their respective positions. This is because in such workplaces, workers can engage in their jobs, support each other, and find job satisfaction⁴⁵⁻⁴⁷. The research company recruited workers who met the criteria until the targeted number of participants was reached. After informed consent was obtained, participants answered the questionnaires. Participants received 150 points after completing the questionnaires, which was approximately equal to 150 Japanese yen. One month later, the company invited the same participants again to answer the questionnaire. The study protocol was approved by the research ethics committee of the Faculty of Human Sciences, University of Tsukuba (No. TOU 2020-52).

Measures

Psychological safety

Psychological safety was measured with five items on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). In each participant, the psychological safety score was calculated as the mean value of the scores on the 5 items. The items asked workers to what extent they feel free to speak out their own thoughts and feelings. We translated the scale developed by Liang *et al.*³¹ from English into Japanese, in line with the process of the International Society of Pharmacoeco⁴⁸ to ensure cross-linguistic equivalence. First, we asked the original author for permission to translate the scale from English into Japanese. After obtaining permission, two translators whose native language is Japanese and who are familiar with English, independently conducted translation from English to Japanese. Then, a

single Japanese version was created by comparing and integrating the sequential translations made by another two people. After that, a translator who was not involved in the forward translation and has experience in reverse translation translated the Japanese to English. Then, we asked the original author to review whether the original version and the back-translated version were considered to be equivalent. Prof. Liang checked the back-translated version and ensured the equivalence of the scale between the two versions, resulting in the final Japanese version (Appendix). After that, we conducted a small survey in Japanese workers to discover problems with the translation that went unnoticed during the Japanese translation stage, and to examine the understandability and cognitive equivalence of the Japanese version in actual users. The target participants were seven native Japanese speakers, and they said that they understood the contents and that the expressions were natural in Japanese. Scale score was calculated by averaging the items.

Social support from supervisors and coworkers

Social support from supervisors and coworkers was measured by the Brief Job Stress Questionnaire (BJSQ)⁴⁹. This scale asks workers to what extent their supervisors/coworkers help them when they face problems at work. Each subscale (supervisor or coworkers) consists of three items on a four-point Likert scale (1 = strongly disagree to 4 = strongly agree) with higher scores reflecting higher social support. Each factor was calculated by averaging the items. Cronbach's alpha for supervisor support was 0.89 and that for coworkers' support was 0.91.

Work engagement

The nine-item Japanese version of the Utrecht Work Engagement Scale (UWES) was used to assess work engagement⁵⁰. The UWES consists of three subscales: vigor, dedication, and absorption. Each subscale has three items. All items are rated on a seven-point Likert scale (1 = never to 7 = always). Each factor score was calculated by averaging the items. Cronbach's alphas were 0.93 for vigor, 0.91 for dedication, and 0.93 for absorption.

Organization-based self-esteem

Organization-based self-esteem was measured by the Japanese version of the Organization-based Self-Esteem scale⁵¹. This scale has eight items including "I can make a difference around here" on a five-point Likert scale. The scale score was calculated by averaging the items. Cronbach's alpha was 0.95.

Table 1. Demographic characteristics of the participants

	Baseline Survey (n=287)				Follow-up Survey (n=236)			
	<i>n</i>	(%)	Mean	(SD)	<i>n</i>	(%)	Mean	(SD)
Gender								
Men	159	(55.6)			137	(58.1)		
Women	127	(44.0)			98	(41.5)		
Other	1	(0.4)			1	(0.4)		
Age								
			42.3	(11.6)			43.7	(11.5)
Employment status								
Full-time	224	(78.0)			183	(76.9)		
Company management	21	(7.3)			17	(7.1)		
Part-time	4	(1.4)			3	(1.3)		
Contract/Dispatched	29	(10.1)			26	(10.9)		
Freelance	2	(0.7)			2	(0.8)		
Other	7	(2.4)			7	(2.9)		
Work style								
Fixed	197	(68.6)			162	(68.6)		
Modified time labor system	23	(8.0)			18	(7.6)		
Flextime system	43	(15.0)			37	(15.7)		
Discretionary system	9	(3.1)			8	(3.4)		
Rotation/night shift	11	(3.8)			8	(3.4)		
Other	4	(1.4)			3	(1.3)		
Job type								
Managerial	25	(8.7)			23	(9.7)		
Professional/Technical	61	(21.3)			49	(20.8)		
Clerical	96	(33.4)			80	(33.9)		
Sales	60	(20.9)			44	(18.6)		
Transport/Construction	4	(1.4)			4	(1.7)		
Production/Skilled	30	(10.5)			27	(11.4)		
Other	11	(3.8)			9	(3.8)		
Job category								
Services	66	(23.0)			53	(22.5)		
Manufacturing	72	(25.1)			60	(25.4)		
Medical /Welfare	28	(9.8)			24	(10.2)		
Retail	27	(9.4)			21	(8.9)		
Financial/Insurance	22	(7.7)			16	(6.8)		
Information	16	(5.6)			11	(4.7)		
Public service	13	(4.5)			10	(4.2)		
Education	11	(3.8)			10	(4.2)		
Construction	11	(3.8)			11	(4.7)		
Transport	6	(2.1)			5	(2.1)		
Real estate/goods rental	5	(1.7)			5	(2.1)		
Agriculture and forestry	2	(0.7)			2	(0.8)		

Table 1. Continued

	Baseline Survey (n=287)				Follow-up Survey (n=236)			
	n	(%)	Mean	(SD)	n	(%)	Mean	(SD)
Other	8	(2.8)			8	(3.4)		
Working hours								
1h – 34h /w	28	(9.8)			26	(11.0)		
35h – 40h /w	118	(41.1)			96	(40.7)		
41h – 50h /w	104	(36.2)			83	(35.2)		
51h – 60h /w	27	(9.4)			22	(9.3)		
61h – /w	10	(3.5)			9	(3.8)		

Figures do not always add up to 100% due to rounding data.

SD:standard deviation.

Organizational Justice

Organizational justice was measured by the Japanese version of the Organizational Justice Questionnaire (OJQ)⁵². The OJQ consists of two subscales: procedural justice and interactional justice. The procedural justice subscale has seven items, and the interactional justice subscale has six items. Procedural justice assesses the degree of provision of relevant information to workers and the consistency of the policy in decision-making at workplaces (e.g., “The concerns of all those affected by the decision are heard before decision making”), and interactional justice assesses the degree of fairness and consideration for subordinate workers in behavior at work of their supervisors (e.g., “Our supervisor treats us with kindness and consideration”). Participants rated the items in both subscales on a five-point Likert scale. Each factor score was calculated by averaging the items. Cronbach’s alphas were 0.95 for procedural justice and 0.96 for interactional justice.

Job satisfaction

Job satisfaction was measured by the Japanese version of the NIOSH Generic Job Stress Questionnaire (NIOSH-GJSQ)⁵³. This scale contains four items that measure workers’ job satisfaction with three (item No. 1-3) and four (item No. 4) response options. An example is, “All in all, how satisfied would you say you are with your job?” The response options range from “1 = I am very satisfied” to “4 = I am not at all satisfied”. The sum of the scores was used in the analysis. Cronbach’s alpha was 0.73.

Data analyses

To test reliability, Cronbach’s alphas and the intra-class correlation coefficient (ICC) of the Japanese version of the

Psychological Safety Scale were calculated. Then, confirmatory analysis was conducted to test structural validity. To examine convergent validity, Pearson’s correlation coefficients (*r*) between the psychological safety score and the scores for work engagement, social support (from peers and supervisors), organization-based self-esteem, organizational justice, and job satisfaction at baseline were examined. IBM SPSS Statistics® version 26 and IBM SPSS Amos® version 26 were used for the analyses.

Results

Characteristics of the participants

In the baseline survey, we obtained responses from 326 respondents, and excluded 39 respondents because there were inappropriate answers such as selection of the same options regardless of reversed-coded items. At the follow-up survey, 236 of the 287 participants responded to the questionnaire again (response rate = 83.8%). In the baseline survey, the gender distribution of the respondents was 159 men (55.6%), 127 women (44.0%) and 1 other gender (0.4%), and their mean age was 42.3 [standard deviation (*SD*)=11.6] years. Most participants were full-time workers (78.0%) or contract/ temporary workers (10.1%), and their work styles were fixed time (68.6%), flextime system (15.0%), or modified time labor system (8.0%). Industry types were manufacturing (25.1%), services (23.0%), and so on. Most participants worked 35–50h/w (77.3%). The demographic characteristics of the participants at baseline and at the follow-up survey are summarized in Table 1.

Structural validity

The results of confirmatory factor analyses were as follows: $\chi^2(5) = 39.851$, comparative fit index (CFI) = 0.967,

Table 2. Mean (SD), factor loadings in confirmatory factor analysis for each item of the psychological safety scale

No	Item	Min – Max	Mean (Base-line) ^a	(SD) ^b	factor loadings	Mean (Follow-up) ^c	(SD)
1	In my work unit, I can express my true feelings regarding my job.	1–5	3.14	(1.11)	0.92	3.07	(1.10)
2	In my work unit, I can freely express my thoughts.	1–5	3.25	(1.11)	0.93	3.17	(1.09)
3	In my work unit, expressing your true feeling is welcomed.	1–5	3.14	(1.04)	0.80	3.11	(1.01)
4	Nobody in my unit will pick on me even if I have different opinions.	1–5	3.10	(1.00)	0.75	3.14	(0.96)
5	I'm worried that expressing true thoughts in my workplace would do harm to myself (reversed-coded).	1–5	3.02	(1.11)	0.65	3.10	(1.12)

a. n=287
 b. SD: standard deviation
 c. n=236

Table 3. Internal consistency, test-retest reliability, and convergent validity of the Japanese version of the Psychological Safety Scale

Internal consistency and test-retest reliability	Min - Max	Baseline (n=287)		Follow-up (n=236)		Difference baseline-follow-up (n=236)		Test-retest reliability (n=236)		
		Mean (SD) ^a	Cronbach's alpha	Mean (SD)	Cronbach's alpha	Mean (SD)		ICC ^b	(95%CI)	
		1-5	3.13 (0.9)	0.91	3.12 (0.9)	0.88	0.04 (0.04)		0.87**	(0.83–0.90)
Convergent validity ^c	Min - Max	Social support (BJSQ)		Work engagement (UWES)			Organization-based self-esteem	Organizational justice		Job satisfaction
		Supervisor	Coworkers	Vigor	Dedication	Absorption		Procedural justice	Interactional justice	
	1-4	1-4	1-7	1-7	1-7	1-5	1-5	1-5	4-13	
	Mean(SD)	2.19 (0.77)	2.32 (0.76)	3.27 (1.34)	3.67 (1.36)	3.34 (1.41)	3.26 (0.87)	3.03 (0.86)	3.12 (0.96)	8.63 (1.88)
		0.59**	0.48**	0.54**	0.46**	0.46**	0.57**	0.70**	0.69**	0.47**

a. SD: standard deviation
 b: ICC: intra-class correlation coefficient
 c: n=287
 ** p<0.01

Tucker-Lewis index (TLI) = 0.933, root mean square error of approximation (RMSEA) = 0.156, standardized root mean square residual (SRMR) = 0.034, goodness of fit index (GFI) = 0.946, AIC (Akaike Information Criterion) = 59.851, and adjusted goodness of fit index (AGFI) = 0.839. The results showed that the goodness of fit was not very good with RMSEA and AGFI. Therefore, we examined the content of the questionnaire items and considered a higher-order factor analysis model^{54, 55}: that is, since the questionnaire items included both cognitive (Questions No. 3, 4, 5) and behavioral (Questions No. 1, 2) wording, the model was examined assuming that these were second-order factors. The results showed that the goodness of fit was $\chi^2(4) = 11.445$, CFI=0.993, TLI=0.981, RMSEA=0.081, SRMR=0.019, GFI=0.985, AIC=33.445, and AGFI=0.945. To use the AIC, the AICs for two or more competing models are compared, with the smaller AIC suggesting the better model⁵⁴. The mean (SD) and loadings for each item of

psychological safety are shown in Table 2.

Internal consistency and test-retest reliability

Table 3 shows the mean scores, Cronbach's alpha, and ICC of the Psychological Safety Scale. Cronbach's alphas were 0.91 (baseline) and 0.88 (follow-up). The ICC was 0.87 [95% confidence interval (CI), 0.83–0.90].

Convergent validity

Pearson's correlation coefficients between the psychological safety score and the scores for social support, work engagement, organization-based self-esteem, organizational justice, and job satisfaction are shown in Table 3. The psychological safety score was positively correlated with the scores for supervisor support ($r=0.59, p<0.01$), coworkers' support ($r=0.48, p<0.01$), work engagement ($r=0.46–0.54, p<0.01$), organization-based self-esteem ($r=0.57, p<0.01$), procedural justice ($r=0.70, p<0.01$), interactional

justice ($r=0.69$, $p<0.01$), and job satisfaction ($r=0.47$, $p<0.01$).

Discussion

In this study, we investigated the validity and reliability of the Japanese version of the Psychological Safety Scale. Our results demonstrated that the Japanese version of the Psychological Safety Scale has acceptable levels of reliability and validity, suggesting that the Scale may be applicable to measure psychological safety in Japanese workplaces.

The scale demonstrated strong internal consistency and was generally stable one month later. As for constructive validity, CFI, TLI, GFI, and SRMR indicated acceptable⁵⁴⁻⁵⁶) but RMSEA indicated that the model could be improved. Therefore, we considered psychological safety as a higher-order factor and two sub-factors were considered, resulting in a good fit⁵⁴⁻⁵⁶). The results may suggest that the five items are essential for measuring psychological safety, but being allowed to express their own opinions and actually expressing their thoughts may be slightly different experiences among Japanese workers. Taking these into account, internal consistency and constructive validity was marginally supported.

Convergent validity was also supported. Psychological safety as measured by the Japanese version of the Psychological Safety Scale was correlated with social support from supervisor and coworkers, as we expected. Many Japanese people place a high value on reciprocity in the workplace^{57, 58}). When workers receive support from their supervisors and coworkers, they feel a sense of trust, and in turn, they try their best to reciprocate. Through this process of giving and receiving support, a mutual relationship that is the underpinning of psychological safety could be fostered. Furthermore, it has been shown that when workers feel supported by their supervisors, they feel supported by the organization, which in turn leads to trust in the organization^{59, 60}). As a result, social support in the workplace is thought to have a positive effect on psychological safety in working for an organization.

Psychological safety had a positive relationship with work engagement, as we expected³²⁻³⁴). Ge⁶¹) proved that workers who felt psychological safety promoted work engagement through exhibiting their opinions. When Japanese workers are encouraged to express their opinions in the workplace, they are free from concerns about being excluded, resulting in increased level of psychological safety, and hence, a high level of job involvement, which in turn is

thought to increase work engagement.

Psychological safety had a strong relationship with organization-based self-esteem. A previous Chinese study⁶²) proved that psychological safety and organization-based self-esteem are positively correlated, and both variables mediate the relationship between authoritarian leadership and employees' silence behavior; that is, the results indicated that authoritarian leadership reduces organization-based self-esteem and psychological safety, and subsequently increases employee silence. Organization-based self-esteem is enhanced by perceived organizational support⁶³), and as discussed above, psychological safety is also enhanced by organizational support.

Psychological safety was strongly correlated with organizational justice in the current study. In Japan, since the mid-1990s, the practice of lifetime employment has collapsed, and workers sometimes have difficulty in envisioning a stable life course⁶⁴). The behavior of leaders has a great impact on the treatment of workers because leaders have the authority to determine rewards and punishment^{40, 41}). Thus, feeling that the leader's actions are fair is just as important as feeling that the organization is fair⁴⁴). When the work setting is perceived as reasonable and predictable, the workers' sense of psychological safety increases^{65, 66}).

Psychological safety was moderately correlated with job satisfaction. Psychological safety is based on interpersonal trust, and in Japan, person-oriented superior-subordinate relationships have long been seen as distinctive in managerial practices⁶⁷). When a worker perceives that their relationship with an immediate superior is going well, they would feel psychological safety and be able to engage in their work. As a result, workers' job satisfaction is assumed to increase, because the worker would be provided intrinsic and extrinsic rewards^{68, 69}).

There are several limitations in this study. First, we could not calculate the response rate, and therefore selection bias might have existed. Second, the generality of the results to Japanese workers could be questioned since the survey was administered to about 300 people who were registered with a single web survey company. Third, although this scale reflects the Western concept of psychological safety, the scale was originally designed primarily to measure speaking behavior in the Chinese workplace. Since Chinese workplaces are not representative of Eastern workplaces, we cannot be sure that this scale will measure the psychological safety of all countries in the East. However, since there are high barriers to speaking up in Japan, this scale may be suitable for measuring the psychological safety of workers in Japan. Fourth, AGFI and RMSEA did not indi-

cate good fit. The lack of good model fit could have occurred because of simplicity of model and small sample size: AGFI could be sensitive to small sample size, and RMSEA could be sensitive to less variables^{55, 70–72}. Additional research with larger sample size is needed in the future.

In conclusion, we developed the Japanese version of the Psychological Safety Scale through translation-back translation processes, and the scale indicated good reliability and validity. The scale would be useful for future research.

Acknowledgments

We thank Kanako Yoshida, Aki Isobe, & Yoshiko Kawaguchi for their cooperation.

Conflicts of Interest

None declared.

References

- 1) Shein EH, Bennis WG (1965) Personal and organizational change through group methods: The laboratory approach. New York, NY: Wiley.
- 2) Schein EH (1992) How can organizations learn faster? : the problem of entering the Green Room. *Mit Sloan*, WP#3409–92.
- 3) Kahn WA (1990) Psychological conditions of personal engagement and disengagement at work. *Acad Manage J* **33**, 692–724.
- 4) Edmondson A (1999) Psychological safety and learning behavior in work teams. *Adm Sci Q* **44**, 350–83.
- 5) Frazier ML, Fainshmidt S, Klinger RL, Pezeshken A, Vracheva V (2017) Psychological safety: a meta-analytic review and extension. *Person Psychol* **70**, 113–65.
- 6) Detert JR, Burris ER (2007) Leadership behavior and employee voice: is the door really open? *Acad Manage J* **50**, 869–84.
- 7) May DR, Gilson RL, Harter LM (2004) The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *J Occup Organ Psychol* **77**, 11–37.
- 8) Carmeli A (2007) Social capital, psychological safety and learning behaviours from failure in organizations. *LRP* **40**, 30–44.
- 9) Schepers J, de Jong A, Wetzels M, De Ruyter K (2008) Psychological safety and social support in groupware adoption: a multi-level assessment in education. *Comput Educ* **51**, 757–75.
- 10) Nembhard IM, Edmondson AC (2006) Making it safe: the effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *J Organiz Behav* **27**, 941–66.
- 11) Gu Q, Wang GG, Wnag L (2013) Social capital and innovation in R&D teams: the mediating roles of psychological safety and learning from mistakes. *R D Manag* **43**, 89–102.
- 12) Zhang Y, Fang Y, Wei KK, Chen H (2010) Exploring the role of psychological safety in promoting the intention to continue sharing knowledge in virtual communities. *Int J Inform Manag* **30**, 425–36.
- 13) Moorman RH. Relationship between organizational justice and organizational citizenship behaviors: do fairness perceptions influence employee citizenship? *J Appl Psychol* **76**, 845–55
- 14) Elovainio M, Kivimäki M, Vahtera J (2002) Organizational justice: evidence of a new psychosocial predictor of health. *Am J Public Health* **92**, 105–8
- 15) Pierce J, Gardner D, Cummings L, Dunham R (1989) Organization-based self-esteem: construct definition, measurement, and validation. *Acad Manage J* **32**, 622–48
- 16) Matsuda Y, Pierce JL, Ishikawa R (2011) Development and validation of the Japanese version of organization-based self-esteem scale. *J Occup Health Psychol* **53**, 188–96.
- 17) LePine JA, Van Dyne L (1998) Predicting voice behavior in work groups. *J Appl Psychol* **83**, 853–68.
- 18) Lyu X (2016) Effect of organizational justice on work engagement with psychological safety as a mediator: evidence from China. *SBP* **44**, 1359–70.
- 19) Ahmad I, Umarani WA (2019) The impact of ethical leadership style on job satisfaction. *Leadersh Organ Dev J* **40**, 534–47.
- 20) Carmeli A, Gittell JH (2009) High - quality relationships, psychological safety, and learning from failures in work organizations. *J Organ Behav* **30**, 709–29.
- 21) Carmeli A, Brueller D, Dutton JE (2009) Learning behaviours in the workplace: the role of high - quality interpersonal relationships and psychological safety. *Syst Res Behav Sci* **26**, 81–98.
- 22) Newman A, Donohue R, Eva N (2017) Psychological safety: a systematic review of the literature. *HRMR* **27**, 521–35.
- 23) Hu Y, Zhu L, Zhou M, Li J, Maguire P, Sun H, Wang D (2018) Exploring the influence of ethical leadership on voice behavior: how leader-member exchange, psychological safety and psychological empowerment influence employees' willingness to speak out. *Front Psychol* **9**, 1718.
- 24) Men C, Fong PSW, Huo W, Zhong J, Jia R, Luo J (2020) Ethical leadership and knowledge hiding: a moderated mediation model of psychological safety and mastery climate. *J Bus Ethics* **166**, 461–72.
- 25) Zeng H, Zhao L, Zhao Y (2020) Inclusive leadership and taking-charge behavior: roles of psychological safety and thriving at work. *Front Psychol* **11**, 62.
- 26) Qi L, Liu B, Wei X, Hu Y (2019) Impact of inclusive

- leadership on employee innovative behavior: perceived organizational support as a mediator. *PLoS One* **14**, e0212091.
- 27) Kacmar KM, Andrews MC, Harris KJ, Tepper BJ (2013) Ethical leadership and subordinate outcomes: the mediating role of organizational politics and the moderating role of political skill. *J Bus Ethics* **115**, 33–44.
 - 28) Tran TBH, Choi SB (2019) Effects of inclusive leadership on organizational citizenship behavior: the mediating roles of organizational justice and learning culture. *J Pacific Rim Psychol* **13**, e17.
 - 29) Lebra TS (1971) The social mechanism of guilt and shame: the Japanese case. *Anthropol Q* 241–55.
 - 30) Goldman A (1994) A briefing on cultural and communicative sources of Western-Japanese interorganizational conflict. *J Manage Psychol* **9**, 7–12.
 - 31) Liang J, Farh CIC, Farh JL (2012) Psychological antecedents of promotive and prohibitive voice: a two-wave examination. *Acad Manage J* **55**, 71–92.
 - 32) Schaufeli WB, Salanova M, Gonzalez-Roma V, Bakker AB (2002) The measurement of engagement and burnout: a two sample confirmatory factor analytic approach. *J Happiness Stud* **3**, 71–92.
 - 33) Schaufeli WB (2013) What is engagement? In: *Employee engagement in theory and practice*, Truss C, Alfes K, Delbridge R, Shantz A & Soane E (Eds.), Routledge, London.
 - 34) Kahn WA (1992) To be fully there: psychological presence at work. *Hum Relat* **45**, 321–49.
 - 35) Unler E, Caliskan S (2019) Individual and managerial predictors of the different forms of employee voice. *J Manag Dev* **38**, 582–603.
 - 36) Yanchus NJ, Periard D, Moore SC, Carle AC, Osatuke K (2015) Predictors of job satisfaction and turnover intention in VHA mental health employees: a comparison between psychiatrists, psychologists, social workers, and mental health nurses. *Hum Serv Organ Manag Leadersh Gov* **39**, 219–44.
 - 37) Brown SP, Leigh TW (1996) A new look at psychological climate and its relationship to job involvement, effort, and performance. *J Appl Psychol* **81**, 358–68.
 - 38) Iwata N, Mishima N, Shimizu T, Mizoue T, Fukuhara M, Hidano T, Spielberg CD (1998) The Japanese adaptation of the STAI form Y in Japanese working adults the presence or absence of anxiety. *Ind Health* **36**, 8–13.
 - 39) Lam LW, Xu AJ (2019) Power imbalance and employee silence: the role of abusive leadership, power distance orientation, and perceived organisational politics. *Appl Psychol* **68**, 513–46.
 - 40) Dyne LV, Ang S, Botero IC (2003) Conceptualizing employee silence and employee voice as multidimensional constructs. *J Manag Stud* **40**, 1359–92.
 - 41) Markus HR, Kitayama S (1991) Culture and the self: implications for cognition, emotion, and motivation. *Psychol Rev* **98**, 224–53.
 - 42) Cooper MD (2000) Towards a model of safety culture. *Saf Sci* **36**, 111–36.
 - 43) Ng ES, Sears GJ (2020) Walking the talk on diversity: CEO beliefs, moral values, and the implementation of workplace diversity practices. *J Bus Ethics* **164**, 437–50.
 - 44) Petrou P, Bakker AB, van den Heuvel M (2017) Weekly job crafting and leisure crafting: implications for meaning - making and work engagement. *J Occup Organ Psychol* **90**, 129–52.
 - 45) Edmondson AC (2018) *The fearless organization: creating psychological safety in the workplace for learning, innovation, and growth*, John Wiley & Sons, USA.
 - 46) Lee HW, Choi JN, Kim S (2018) Does gender diversity help teams constructively manage status conflict? An evolutionary perspective of status conflict, team psychological safety, and team creativity. *Organ Behav Hum Decis Process* **144**, 187–99.
 - 47) Mendelsohn DB (2021) *Inclusive leadership: Exploration of individual and situational antecedents*. [Order No. 28417263], Columbia University.
 - 48) Wild D, Grove A, Martin M, Eremenco M, McElroy S, Verjee-Lorenz A, Erikson P (2005) Principles of good practice for the translation and 7 cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. *Value Health* **8**, 94–104.
 - 49) Shimomitsu T, Haratani T, Nakamura K, Kawakami NH, Hiro H, Arai M, Miyazaki S, Furuki K, Otani Y, Odagiri Y (2000) Final development of the Brief Job Questionnaire mainly used for assessment of the individuals. In: *The Ministry of Labor sponsored grant for the prevention of work-related illness, FY 1999 report*, Kato (Ed.), 126–64, Ministry of Labour, Tokyo (in Japanese).
 - 50) Shimazu A, Schaufeli WB, Kosugi S, Suzuki A, Nashiwa H, Kato A, Sakamoto M, Irimajiri H, Amano S, Hirohata K, Goto R (2008) Work engagement in Japan; validation of the Japanese version of the Utrecht work engagement scale. *Appl Psychol* **57**, 510–23.
 - 51) Matsuda Y, Pierce JL, and Ishikawa R (2011) Development and validation of the Japanese version of organization-based self-esteem scale. *J Occup Health* **53**, 188–96.
 - 52) Inoue A, Kawakami N, Tsutsumi A, Shimazu A, Tsuchiya M, Ishizaki M, Tabata M, Akiyama M, Kitazume A, Kuroda A, Kivimaki M (2009) Reliability and validity of the Japanese version of the organizational justice questionnaire. *J Occup Health* **51**, 74–83.
 - 53) Haratani T, Kawakami N, Araki S, Hurrell JJ Jr, Sauter SI, Swanson NG (1996) Psychometric properties and stability of the Japanese version of the NIOSH job stress questionnaire. 25th International Congress on Occupational Health. *Book of Abstracts Pt 2*, 393.
 - 54) Brown TA, Moore MT (2012) Confirmatory factor analysis. *Handbook of structural equation modeling*, 361–79.
 - 55) Capraro R, Bicer A, Capraro MM (2015) A review of higher-order factor analysis interpretation strategies. *Journal of Measurement and Evaluation in Education and*

- Psychology (JMEEP). ISSN: 1309–6575.
- 56) Keith TZ, Fine JG, Taub GE, Reynolds MR, Kranzler JH (2006) Higher order, multisample, confirmatory factor analysis of the Wechsler Intelligence Scale for Children—Fourth Edition: what does it measure. *Sch Psychol Rev* **35**, 108–27.
 - 57) Jung Y, Hall J, Hong R, Goh T, Ong, Tan N (2014) Receiving payback: effects of relationship and cultural norms on reciprocity. *Asian J Soc Psychol* **17**, 160–72.
 - 58) Kuwabara K, Willer R, Macy MW, Mashima R, Terai S, Yamagishi T (2007) Culture, identity, and structure in social exchange: a web-based trust experiment in the United States and Japan. *Soc Psychol Q* **70**, 461–79.
 - 59) Tucker AL (2007) An empirical study of system improvement by frontline employees in hospital units. *Manuf Serv Oper Manag* **9**, 492–505.
 - 60) Carmeli A, Zisu M (2009) The relational underpinnings of quality internal auditing in medical clinics in Israel. *Soc Sci Med* **68**, 894–902.
 - 61) Ge Y (2020) Psychological safety, employee voice, and work engagement. *Soc Behav Pers* **48**, 1–7.
 - 62) Duan J, Bao C, Huang C, Brinsfield CT (2018) Authoritarian leadership and employee silence in China. *J Manag Organ* **24**, 62–80.
 - 63) Matsuda Y, Ishikawa R (2012) Organization-based self-esteem and employee well-being. *Stresskagakukenkyu* **27**, 40–8 (in Japanese).
 - 64) Cascio WF (2005) Strategies for responsible restructuring. *Acad Manag Perspect* **19**, 39–50.
 - 65) Jung Y, Takeuchi N (2014) Relationships among leader–member exchange, person–organization fit and work attitudes in Japanese and Korean organizations: testing a cross-cultural moderating effect. *Int J Hum Resour Manag* **25**, 23–46.
 - 66) Suzuki M, Ito M, Ishida M, Nihei N, Maruyama M (2010) Individualizing japan: searching for its origin in first modernity. *Br J Sociol* **61**, 513–38.
 - 67) Carr C, Pudelko M (2006) Convergence of management practices in strategy, finance and HRM between the USA, Japan and Germany. *Int J Cross Cult Manag* **6**, 75–100.
 - 68) Gerstner CR, Day DV (1997) Meta-analytic review of leader–member exchange theory: correlates and construct issues. *J Appl Psychol* **82**, 827–44.
 - 69) Sherony KM, Green SG (2002) Coworker exchange: relationships between coworkers, leader-member exchange, and work attitudes. *J Appl Psychol* **87**, 542–8.
 - 70) Rigdon EE (1996) CFI versus RMSEA: a comparison of two fit indexes for structural equation modeling. *Struct Equ Modeling* **3**, 369–79.
 - 71) Kenny DA, McCoach DB (2003) Effect of the number of variables on measure of fit in structural equation modeling. *Struct Equ Modeling* **10**, 333–51.
 - 72) Hu L, Bentler PM (1998) Fit indices in covariance structure. *Struct Equ Modeling* **5**, 344–64.

Appendix

心理的安全性尺度日本語版

以下の項目は、ここ数週間のあなたの職場での様子について尋ねるものです。1点を「全く当てはまらない」5点を「非常によく当てはまる」とするとあなたはどの程度当てはまりますか。それぞれの文章をよく読み、該当する点数を選んでください。

- 私の職場では、自分の仕事についての本音を話すことができる。
- 私の職場では、自分の考えを自由に話すことができる。
- 私の職場では、本音を話すことが推奨されている。
- 私の職場では、たとえ自分が他の人と異なる意見を持っていても、非難されることはない。
- 職場で本音を語ると、自分自身に害が及ぶのではないかと不安を感じる。(逆転項目)