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Development of the School Teachers Job Stressor Scale (STJSS)

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Abstract

Aim: Japanese teachers are not only responsible for students but also for tasks outside the classroom, including engagement with parents and the community, and maintaining safety. They work longer hours and have lower self-efficacy than teachers in other countries. Thus, we aimed to develop an assessment scale for job stress in teachers and to evaluate its psychometric properties.

Methods: We developed the "School Teachers Job Stressor Scale (STJSS) Draft" comprising 45 items, based on previous anonymous self-report questionnaires collected from 98 teachers in four elementary and middle schools in Miyazaki City, Japan. Subsequently, the scale draft and the previously validated Brief Job Stress Questionnaire (23-item abridged version) were distributed to 2276 teachers from 73 elementary and middle schools in Miyazaki City. Finally, we analyzed data from 1300 participants. After excluding inappropriate data based on ceiling and floor effect analysis, we carried out a good-poor, item-total correlation, and exploratory factor analyses. We then verified construct validity, criterion-related validity, and reliability using correlation analysis, confirmatory factor analysis, and Cronbach's alpha, respectively.

Results: After item-total correlation analysis, five items were excluded. Exploratory factor analysis extracted five factors: "Time spent outside of work," "Self-assessment of one's ability as a teacher," "Relationship with other teachers," "Social interactions outside of teaching," and "Duties outside of teaching." The final version of the STJSS comprised 23 items and five factors.

Conclusion: The 23-item STJSS developed to measure specific stressors in Japanese teachers to improve their mental health care could provide an accurate assessment tool with adequate reliability and validity.

KEYWORDS
factor analysis, job stress, mental health, questionnaire, school teachers

1 | INTRODUCTION

Teachers are involved in the personality development of students, and hence, their job is respectful and noble. However, teachers experience lower job satisfaction and poorer mental health[1] relative to other highly stressed occupational groups. Teachers report that they are burdened with job-related stressors such as "interactions with parents," "guiding students," and club activities.

Primary field: General topics in psychiatry and related fields; Secondary field: Social psychiatry and epidemiology

Moreover, research has suggested that the increased work volume of teachers becomes a form of emotional labor.[2] Compared to other occupational professionals, teachers work in a highly stressful environment.[3] In Japan, the number of teachers who take a leave of absence due to mental illness has been increasing[4] and teachers work longer hours, due to factors such as Bukatsudō (Japanese school clubs),[5] and have lower levels of self-efficacy,[6] compared to teachers in other countries.

Although research on work-life balance has been conducted in some countries,[7] this is not the case in Japan. Previous studies evaluating teachers' stress based on US burnout indices, such as the Maslach Burnout Inventory,[3] have assessed depressive symptomatology using instruments, such as the Center for Epidemiologic Studies Depression Scale,[8,9] and have evaluated mental health using screening tools such as the General Health Questionnaire.[10] Nonetheless, understanding the teachers' actual experiences that are associated with stress and analyzing stress—a necessary prerequisite to developing appropriate initiatives for teachers' work-life balance in the school setting—have still not been sufficiently clarified.[11] As mental health strategies for teachers also affect student education and development, carrying out this research in Japan has great social significance.

In the "Investigative Meeting on the Current State of Overwork and Mental Health" report by the Japanese Ministry of Health, Labor and Welfare,[12] it was stated that it is essential to understand workplace stressors and to improve them. Since December 2015, all workplaces with 50 or more employees have been required to perform stress checks. One drawback of the Brief Job Stress Questionnaire,[13] typically used for these stress checks, is that it does not assess the differences among occupation types, nor does it assess the specific stressors that may be associated with different occupations. The stress experienced differs substantially between different occupations and job roles.[14] Thus, separate scales with adequate reliability and validity that can assess specific stressors characteristic to different professions are necessary to improve employees' mental health care.

The objective of the current study was to develop a new job stress scale designed for teachers that could be used as the basis for conducting specific and effective interventions for Japanese teachers through the evaluation of their unique stressors. Additionally, we aimed to evaluate the psychometric properties of the newly designed scale, including its reliability and validity.

2 | METHODS

2.1 | Preliminary investigation

We performed this study based on the development method used for a new version of the Brief Job Stress Questionnaire.[15,16] With the objective of understanding workplace stress associated with the duties and responsibilities required for teaching, the authors of the present study distributed a self-report questionnaire and response envelope by mail to each school, to a total of 98 teachers in four elementary and middle schools in Miyazaki City, Japan. The respondents were 34 teachers (16 men, 18 women), who completed the questionnaire independently. The anonymous self-report questionnaire required respondents to provide information regarding basic characteristics (eg, age, sex, job position, work schedule, school type, school size, educational background, years of experience as a teacher) and on the stressors characteristic of their work as teachers. This investigation was performed between January and March 2017, and the preliminary investigation yielded 102 meaningful sentences (two to three sentences per individual), which were analyzed for content by three researchers.[17] The data collection was shared among the collaborating researchers, and to ensure consistency, the analysis process was recorded and examined by all collaborating researchers. To ensure applicability, the results of the analysis were confirmed by researchers in the fields of psychiatry, psychology, and psychiatric nursing, as well as two qualified teachers, all involved in the field of education. The final questionnaire included 45 items regarding the workplace stressors of teachers. We formatted these items to: (1) begin with "I think…"or "I feel…," (2) be uniformly in the present tense, and (3) be composed of one sentence. Responses were rated on a 4-point Likert scale, where 1 indicated "I don't think so," 2 "If I have to choose, I don't think so," 3 "If I have to choose, I think so," and 4 "I think so." Six of the 45 items were set to be reverse scored.

2.2 | Participants

We distributed by mail a form requesting individual consent from teachers, a questionnaire for measuring the participants' demographic characteristics (eg, age group, sex, job position, work schedule, school type, school size, educational background, years of experience as a teacher), the 45-item scale created from the preliminary investigation, and the 23-item abridged version of the Brief Job Stress Questionnaire.[15,16] In addition to the questionnaire, we included a sealable individual response envelope, which teachers could use for returning the questionnaire. This material was mailed in December 2017 to all 73 public elementary and middle schools in Miyazaki City, with sufficient questionnaires for the 2276 teachers employed. The investigation lasted from 14 December, 2017, to 31 January, 2018. The study objective, method, and ethical considerations were explained both orally and in writing to participants, and written consent was obtained from each school teacher.

2.3 | Brief Job Stress Questionnaire

The Stress Response subscale includes items for Quantitative Overload (items 1-3), Job Control (items 4-6), Exhaustion (items 7-9), Anxiety (items 10-12), Depression (items 13-15), Loss of Appetite (item 16), and Insomnia (item 17). The Support subscale includes items for Support from One's Boss (items 18-20) and Support from Co-workers (items 21-23). The Brief Job Stress Questionnaire has been demonstrated to have good reliability and validity.[16]

2.4 | Statistical analysis

Statistical analyses were completed using SPSS V. 25 (IBM Corp). For each item, a histogram was created to confirm data distribution, and we confirmed that the data were not bimodal. Also, an item was deleted if its corresponding histogram displayed an extremely distorted shape suggestive of a ceiling or floor effect. The scale was scored, and good-poor (G-P) analysis was performed. For the G-P analysis, respondents were divided into three groups nearly equal in number: a high-scoring group, a medium-scoring group, and a low-scoring group for each item. We then conducted a one-way analysis of variance with the three groups as factors and the scores for each item as dependent variables. Items that presented nonsignificant differences ($P > 0.05$) between groups were excluded from the analysis. We also performed an item-total correlation analysis; if the correlation coefficient between each item score and the sum of other items was less than the absolute value of 0.3, then the item was excluded as inconsistent with the scale.

We then analyzed the individual item characteristics (ie, mean ± standard deviation, kurtosis, skewness), performed factor extraction (ie, exploratory factor analysis: maximum likelihood, promax rotation), and calculated the internal consistency (ie, Cronbach's α coefficient). Next, to assess the criterion-related validity by confirming the scale's concurrent validity, we performed a correlation analysis using the Brief Job Stress Questionnaire.[15,16] Then, we used Amos V. 25 (IBM Corp) to conduct a confirmatory factor analysis to assess factor validity. Responses with missing data on any item from the newly created 45-item scale or the Brief Job Stress Questionnaire[15,16] resulted in the exclusion of the entire response from data analysis.[18] In all statistical analyses, a significance level of $P < 0.05$ was used.

2.5 | Ethical considerations

Both the preliminary and follow-up investigations were approved by the University of Miyazaki Medical Ethical Review Board. Each teacher was provided with a written explanation of the study, along with the information that there would be no negative consequences of choosing not to participate, prior to obtaining their consent to participate in writing. Responses to the questionnaires did not include the names of the participants.

This study conformed to the provisions of the Declaration of Helsinki (as revised in Fortaleza, Brazil, October 2013).

3 | RESULTS

3.1 | Participant characteristics

Respondents returning the questionnaire included 1721 elementary and middle school teachers; 124 teachers did not provide consent, and 1597 teachers provided consent and completed the questionnaire. The response rate was 75.6%. After removal of 297 participants who provided insufficient data, the final dataset included 1300 teachers (620 men, 970 women) who provided written consent for participation and who completed the questionnaire without any missing data.

3.2 | Item analysis

The mean, standard deviation, kurtosis, and skewness for each item are shown in Table 1. It proved appropriate to remove seven items based on the ceiling and floor effect analysis. Regarding kurtosis and skewness, we confirmed that no item exceeded the criteria of the absolute value two.

In the item-total correlation analysis, five items met the exclusion criteria, that is, had a correlation coefficient less than 0.3. Inter-item correlations were examined by calculating the correlation matrix for all items. When the absolute correlation value for a pair of items was greater than 0.8, one of the two items was excluded from further analysis; in this case, no item met the exclusion criteria.

3.3 | Factor analysis

Exploratory factor analysis was performed for the 45 items using maximum likelihood and promax rotation. The number of factors was determined using the scree test.[19] Factor analysis was repeated considering only factors that demonstrated single-factor loading of 0.4 or higher, indicating that they are affiliated with the factor.[20]

Table 2 displays the results of the exploratory factor analysis, including factor loadings for each item after factor rotation, reliability coefficient, and factor correlation. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.902, demonstrating adequacy.[21] Five factors and 23 items were extracted from the initial exploratory factor analysis: Factor 1 was named "Time spent outside of work" and included questions regarding teachers' work after business hours; factor 2 was named "Self-assessment of one's ability as a teacher" and included items regarding the teachers' self-assessment of their own ability; factor 3 was named "Relationships with other teachers" and included items regarding the teacher's interpersonal relationships with other teachers; factor 4 was named "Social interactions outside of teaching" and included items focused on the teacher's social interactions with parents and community members; and factor 5 was named "Duties outside of teaching" and included items rating required duties in addition to teaching, such as maintaining safety or taking care of the school environment.

3.4 | School teachers job stressor scale (STJSS) reliability

To assess the internal consistency of STJSS factors, Cronbach's α coefficient was calculated as a reliability coefficient (Table 2). Cronbach's α coefficient for the entire scale was 0.87, ranging from 0.7 to 0.87, which is considered acceptable, thus confirming adequate internal consistency for the five identified factors of the scale.

TABLE 1 Descriptive statistics for the school teacher stress scale

	N	Mean value	SD	Skewness	Kurtosis
Q_1	1300	2.82	0.98	−0.43	−0.82
Q_2	1300	3.22	0.79	−0.80	0.13
Q_3	1300	3.17	0.83	−0.76	−0.06
Q_4	1300	3.20	0.78	−0.74	0.03
Q_5	1300	3.01	0.82	−0.56	−0.15
Q_6	1300	2.87	0.87	−0.39	−0.52
Q_7	1300	3.54	0.59	−1.06	1.08
Q_8	1300	3.39	0.66	−0.78	0.21
Q_9	1300	2.62	0.86	0.12	−0.77
Q_10	1300	2.50	0.85	0.13	−0.61
Q_11	1300	2.71	0.77	0.07	−0.60
Q_12	1300	2.80	0.72	−0.15	−0.24
Q_13	1300	3.28	0.87	−0.99	0.06
Q_14	1300	2.52	0.91	0.03	−0.81
Q_15	1300	3.00	0.87	−0.51	−0.51
Q_16	1300	1.93	0.90	0.64	−0.45
Q_17	1300	2.76	0.98	−0.36	−0.86
Q_18	1300	2.95	0.98	−0.44	−0.96
Q_19	1300	2.38	0.84	0.23	−0.50
Q_20	1300	3.45	0.68	−1.19	1.47
Q_21	1300	3.23	0.69	−0.63	0.34
Q_22	1300	2.30	0.92	0.19	−0.82
Q_23	1300	2.87	0.81	−0.24	−0.57
Q_24	1300	1.69	0.79	0.91	0.11
Q_25	1300	2.24	0.88	0.27	−0.63
Q_26	1300	2.53	0.79	0.10	−0.44
Q_27	1300	2.80	1.07	−0.34	−1.18
Q_28	1300	2.98	0.87	−0.52	−0.43
Q_29	1300	3.24	0.72	−0.67	0.14
Q_30	1300	2.84	0.86	−0.34	−0.54
Q_31	1300	2.93	0.75	−0.27	−0.32
Q_32	1300	2.43	0.81	0.20	−0.43
Q_33	1300	1.89	0.74	0.73	0.68
Q_34	1300	2.19	0.69	0.61	0.66
Q_35	1300	1.99	0.80	0.60	0.08
Q_36	1300	2.64	0.70	0.20	−0.44
Q_37	1300	2.99	0.88	−0.57	−0.41
Q_38	1300	2.42	0.88	0.29	−0.62
Q_39	1300	3.30	0.82	−0.96	0.13
Q_40	1300	2.79	0.85	−0.36	−0.44
Q_41	1300	2.38	0.72	0.28	−0.11
Q_42	1300	2.97	0.80	−0.37	−0.44
Q_43	1300	2.51	0.95	0.05	−0.91
Q_44	1300	2.40	0.90	0.26	−0.68
Q_45	1300	3.24	0.76	−0.80	0.28

Abbreviation: Q, question; SD, standard deviation

3.5 | STJSS validity

To confirm the criterion-related validity (concurrent validity, predictive validity) of the STJSS, we compared the STJSS with the Brief Job Stress Questionnaire as an external, valid measure of job stress, by performing a correlation analysis. We also performed a correlation analysis to compare the STJSS with the three subscales from the Brief Job Stress Questionnaire, including Stressors, Stress Response, and Support. Table 3 displays the calculated correlation coefficients. The Stressors subscale of the Brief Job Stress Questionnaire and the Total Scale score of the STJSS showed a significant positive correlation ($r = 0.509$, $P < 0.01$), a moderate correlation. As the STJSS was designed to measure the stressors experienced by teachers, this significant correlation supports its concurrent validity.

The correlation coefficients between the total STJSS scale and the Stress Response and Support subscales were 0.542 ($P < 0.01$) and 0.358 ($P < 0.01$), respectively, demonstrating weak to moderate positive correlations. This confirmed a good predictive validity of the STJSS for Stress Response and Support.

To confirm the factors identified in the exploratory factor analysis, we performed a confirmatory factor analysis. Regarding factor validity, we observed weak to moderate correlations among the five identified factors (Table 2). As such, a secondary factor model was assumed in the confirmatory factor analysis, which was composed according to the index revised from the initial chi-square model where χ^2/df (675.836/197) ratio = 3.430 ($P < 0.01$), goodness of fit (GFI) = 0.958, adjusted GFI (AGFI) = 0.941, comparative fit index (CFI) = 0.949, root mean square error of approximation (RMSEA) = 0.043, and Akaike information criterion (AIC) = 833.836. Since the correlation coefficients were not significant, a final model was created that eliminated these. As the lowest value of AIC was 829.437, the final model was adopted. Regarding the GFI, we obtained the following results: χ^2/df (689.437/206) ratio = 3.347 ($P < 0.01$), GFI = 0.957, AGFI = 0.942, CFI = 0.949, RMSEA = 0.043, and AIC = 829.437, demonstrating favorable goodness of fit (Figure 1).

4 | DISCUSSION

4.1 | Extracted factors

Based on the results of the exploratory factor analysis of the STJSS, five factors were identified related to work stress for teachers: "Time spent outside of work," "Self-assessment of one's ability as a teacher," "Relationships with other teachers," "Social interactions outside of teaching," and "Duties outside of teaching." Based on the identification of these factors, we consider that the STJSS is a useful tool for assessing stressors in teachers.

Regarding factor 1, "Time spent outside of work," the 2013 Teaching and Learning International Survey (TALIS) revealed that the amount of time Japanese teachers spent in class is almost equal to the average time among the 34 participating countries, whereas the amount of time that Japanese teachers spent on general office work and guiding

TABLE 2 Factor analysis results

		F1: Time spent outside of work	F2: Self-assessment of ability as a teacher	F3: Relationships between teachers	F4: Social interactions outside of teaching	F5: Duties outside of teaching	
	Factors	**1**	**2**	**3**	**4**	**5**	**Commonality**
I	Time spent outside of work (α = 0.811)						
Q_8	I feel a burden from doing a lot of after-hours work	**0.84**	−0.01	0.01	0.00	−0.04	0.67
Q_2	I feel I do a lot of work aside from instructing children/students in my work as a teacher	**0.73**	−0.08	0.09	−0.06	−0.08	0.47
Q_7	I feel a burden from work I take home to do	**0.72**	0.08	−0.09	0.00	0.04	0.53
Q_3	I feel annoyed that my work as a teacher is complicated	**0.59**	0.03	0.04	0.00	0.10	0.46
Q_1	I feel a burden from the time constraints placed on me due to extracurricular and club activities after set work hours	**0.57**	−0.02	−0.04	0.08	−0.06	0.32
II	**Self-assessment ability as a teacher (α = 0.820)**						
Q_11	I feel that I lack the ability to guide children/students	−0.03	**0.87**	−0.03	−0.09	0.04	0.70
Q_12	I feel I have not done the studying required to advance my skills as a teacher	0.04	**0.73**	0.10	−0.23	0.05	0.48
Q_31	I feel I lack the ability to interact with special needs children/students	0.03	**0.62**	−0.04	0.15	−0.04	0.48
Q_36	I feel I am achieving the results expected of me as a teacher	−0.12	**0.59**	−0.13	0.05	0.01	0.35
Q_21	I feel I lack ability when I fail in my work	0.11	**0.58**	−0.07	0.09	−0.09	0.39
Q_26	I feel I cannot begin to approach the ideal I have for myself as a teacher	−0.04	**0.53**	0.18	0.15	−0.01	0.43
III	**Relationships between teachers (α = 0.700)**						
Q_44	I feel there is a difference in the workload between male and female teachers	0.06	−0.01	**0.60**	−0.18	−0.02	0.28
Q_35	I feel mental exhaustion from interacting with (instructing, etc) teachers with less experience than me	−0.07	−0.08	**0.53**	0.13	−0.05	0.29
Q_38	I feel dissatisfied by the difference in workload depending on years of experience as a teacher	0.09	−0.02	**0.52**	−0.12	0.08	0.29
Q_25	I feel mental exhaustion from my relationships with other teachers	−0.04	0.05	**0.50**	0.21	−0.13	0.34
Q_43	I feel constrained because there is no place to take a break in the school	0.06	0.05	**0.44**	0.12	0.08	0.39
Q_33	I am dissatisfied with my evaluation by my boss	−0.10	−0.04	**0.42**	0.14	0.08	0.26
IV	**Social interactions outside of teaching (α = 0.753)**						
Q_42	I feel mental exhaustion from interacting with parents	0.07	0.05	0.02	**0.64**	−0.04	0.48
Q_32	I feel mental exhaustion from my involvement with community members	−0.07	−0.01	0.07	**0.60**	0.06	0.40
Q_28	I feel a burden from after-hours duties that occur suddenly such as dealing with trouble	0.26	−0.06	−0.03	**0.51**	0.05	0.47
Q_15	I feel mental fatigue from interactions with diverse children/students	0.24	0.05	0.02	**0.42**	0.08	0.46

(Continues)

TABLE 2 (Continued)

	Factors	F1: Time spent outside of work	F2: Self-assessment of ability as a teacher	F3: Relationships between teachers	F4: Social interactions outside of teaching	F5: Duties outside of teaching	Commonality
		1	2	3	4	5	
V	**Duties outside of teaching (α = 0.7)**						
Q_19	I feel dissatisfied that duties for managing safety are included in my work as a teacher	−0.10	0.00	0.01	0.06	**0.77**	0.57
Q_9	I feel dissatisfied that duties for taking care of the school environment are included in my work as a teacher	0.18	−0.03	−0.01	0.01	**0.62**	0.55
	Factor contribution rate	24.45	34.63	39.21	41.62	43.61	
	Inter-factor correlation I	-	0.22	0.48	0.60	0.58	
	II		-	0.18	0.41	0.14	
	III			-	0.59	0.52	
	IV				-	0.55	
	V					-	

The bold values indicate single-factor loading in the items is 0.4 or higher.

extracurricular activities is above the average seen among the participating countries.[6] According to a survey on the working conditions of school teachers published by the Japanese Ministry of Education, Culture, Sports, Science and Technology,[22] approximately 30% of the licensed elementary school teachers and approximately 60% of middle school teachers exceeded the "limit for excessive overtime hours," with approximately 80 hours per month. Although the increased work volume of teachers is becoming a form of emotional labor,[2] few studies using questionnaires have assessed whether work-related time constraints feel like a burden to teachers. Our newly developed scale has the advantage of not only measuring the time spent working, but also surveying whether teachers experience time constraints as a burden.

Factor 2 included items related to the "Self-assessment of one's ability as a teacher." The 2013 TALIS also demonstrated that Japanese teachers tend to have lower levels of self-efficacy than those of other countries, although these differences varied across sex and years of experience.[6] Further, it was shown that factors other than one's objective degree of achievement (eg, a tendency for humble self-evaluation, high standards) may be related to low self-efficacy. A positive correlation was shown between self-efficacy and job satisfaction, while a negative relationship was reported between self-efficacy and burnout, with lower self-efficacy leading to higher burnout.[23,24] A number of scales have been developed to assess self-efficacy in teachers,[25,26] showing that self-efficacy is an easily influenced cultural factor associated with nationality.[27]

Factor 3 captures aspects of job stress associated with the "Relationships with other teachers," including the support experienced from co-workers, which has been shown to be an essential factor related to general workplace stress.[28,29] When teachers cope with workplace stress, support from co-workers, including their boss, is essential in managing anxiety and depression.[8,30] A survey of teachers demonstrated that the foundation of "becoming cooperative" with other teachers is based on the positive feeling of "appreciation for the support given by co-workers when one is faced with doubts or

TABLE 3 Correlation coefficients between the STJSS and the Brief Job Stress Questionnaire (23-item abridged version)

	Brief Job Stress Questionnaire		
	Stressors	Stress response	Support
I. Time spent outside of work	0.475**	0.413**	0.190**
II. Self-assessment of one's ability as a teacher	0.319**	0.348**	0.106**
III. Relationships with other teachers	0.323**	0.422**	0.488**
IV. Social interactions outside of teaching	0.394**	0.470**	0.278**
V. Duties outside of teaching	0.294**	0.286**	0.226**
Scale total, 23 items	0.509**	0.542**	0.358**

Abbreviation: STJSS, School Teachers Job Stressor Scale.
**$P < 0.01$.

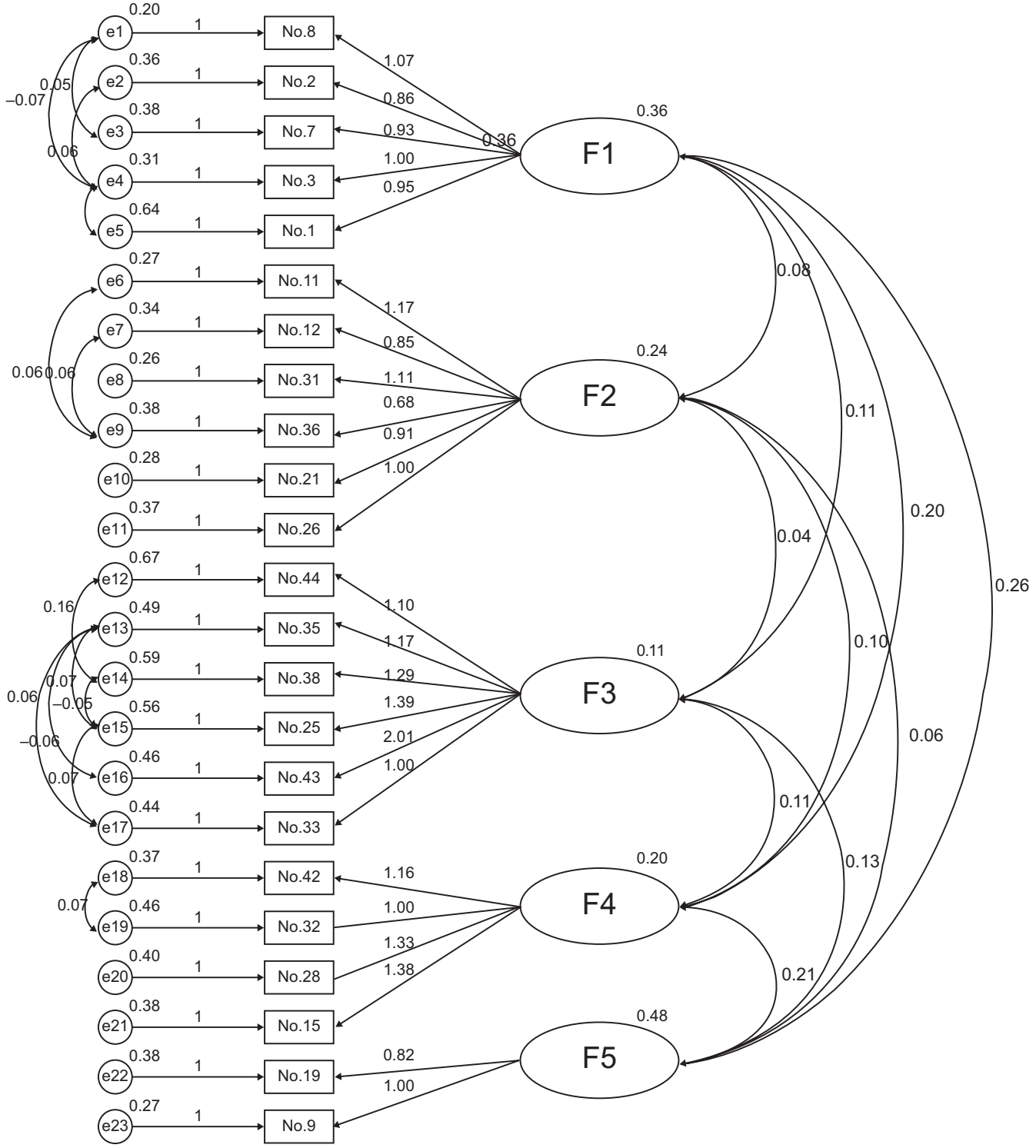

FIGURE 1 The School Teachers Job Stressor Scale is composed of five factors and includes 23 items. Goodness of fit (GFI) was sufficiently demonstrated with the following fit indices: χ^2/df (689.437/206) ratio = 3.347 ($P < 0.01$), GFI = 0.957, adjusted GFI (AGFI) = 0.942, comparative fit index (CFI) = 0.949, root mean square error of approximation (RMSEA) = 0.043, and Akaike information criterion (AIC) = 829.437.

problems."[31] Thus, we believe that the present scale may provide the means to better assess the support system provided to teachers.

Factor 4, "Social interactions outside of teaching," focused on social interactions with other individuals, such as parents and community members. The item with the highest factor loading was "I feel mental fatigue from interacting with parents," followed by "I feel mental fatigue from interacting with community members." Similarly, it was previously reported that interactions with parents and community

members can become a stressor for teachers.[32] According to Osugi,[33] Japanese teachers are sometimes responsible for "collaborating, coordinating, and managing community events," and compared to teachers from other countries, they are more deeply involved in their community. We consider that the scale we present here can comprehensively assess this kind of social stress faced by Japanese teachers.

Concerning factor 5, "Duties outside of teaching," the highest factor loadings were the items "work maintaining safety" and "work taking care of the school environment." Due to an incident in Japan in 2001 in which elementary school students were injured or even killed by an individual attacking the school, the maintenance of school safety has become a major priority.[34] In 2009, the School Health Act was revised by adding a new regulation regarding safety and was renamed as the School Health and Safety Act, which clearly outlined the responsibilities of the school itself.[35] Thus, the responsibility for maintaining school safety entered a new phase, potentially increasing the stress of school teachers. Osugi[33] notes that, in contrast to teachers from other countries, Japanese teachers are sometimes made responsible for "supervising of coming and going to school" and "taking care of the school environment," such as cleaning, patrolling within the school, and assuming safety inspections. Moreover, Osugi recently proposed revisions regarding the labor system for teachers.[33] Thus, since Japanese teachers have become responsible for a wide range of duties besides teaching, we believe that the present scale can be used to assess the full range of stressors they now face.

4.2 | STJSS reliability and validity

The scale created in this study contains a total of 23 items, comprising five factors. Generally, when creating a scale, Cronbach's α coefficient greater than 0.60 is desirable to demonstrate sufficient internal consistency.[36] The STJSS demonstrated good reliability with an overall Cronbach's α coefficient of 0.87, ranging from 0.70 to 0.87 for the five factors.

A higher score on the Brief Job Stress Questionnaire indicates higher work stress; hence, we anticipated that this scale would positively correlate with the STJSS. Among the three subscales of the Brief Job Stress Questionnaire, Stressors and Stress Response demonstrated moderate positive correlations, while Support demonstrated a weak positive correlation with the STJSS. The weak correlation suggests that support to teachers would be insufficient by general support alone. Job stress in teachers would have special characteristics, and it would be necessary to support according to the job status of teachers. As the Brief Job Stress Questionnaire is an established and validated instrument, the moderate correlation between the Stressors subscale and the STJSS demonstrates the criterion-related validity (concurrent validity) of the present scale, and therefore the ability of the STJSS to fully measure job stressors in teachers.

4.3 | Limitations and future directions

This study used a cross-sectional survey to assess job stress in teachers, focusing on school teachers in public elementary and middle schools in Miyazaki City, Japan. As such, one limitation is that we could not verify the causal relationship between job stressors and nonjob stressors. Further, the survey period was from December to January, a period surrounding the beginning and end of school holidays. As this is not a busy period, it is possible that the survey does not reflect the stress experienced by teachers during the busy periods. Although a high collection rate was easy to obtain during this period, this may have caused a selection bias.

In the future, we intend to standardize the scale using a larger sample and identify possible cutoff values. Further, we would like to verify measures for reducing challenges to teachers' mental health through providing feedback to schools aimed at reducing stressors.

In the present study, we analyzed the data from 1300 teachers in Japan, thus creating a scale which is unique to Japanese school teachers. We developed the STJSS to measure and assess stressors characteristic to school teachers in Japan and verified its reliability and validity. Five factors and 23 items were extracted through factor analysis. In conclusion, the STJSS has sufficient reliability and validity to serve as a useful tool for evaluation of school teachers' job stressors.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

K.N-N., HA, and HY participated in study conceptualization and design. K.N-N., HA, HY, KH, MN, and YI participated in data acquisition and analysis. K.N-N., HA, HY, and RT drafted the manuscript and prepared the figures. K.N-N., HA, HY, and YI contributed to the final approval of the paper.

DATA REPOSITORY

The raw data associated with the study cannot be made publicly available as the disclosure of personal data was not planned in the research protocol approved by the Institutional Review Board.

APPROVAL OF THE RESEARCH PROTOCOL BY AN INSTITUTIONAL REVIEWER BOARD

The protocol for this research project has been approved by the University of Miyazaki Medical Ethical Review Board, and it conforms to the provisions of the Declaration of Helsinki. Committee of clinical ethnics, Approval No. 2015-156.

INFORMED CONSENT

The study objective, method, and ethical considerations were explained both orally and in writing to participants, and written consent was obtained from each school teacher.

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REFERENCES

1. Travers CJ, Cooper CL. Mental health, job satisfaction and occupational stress among UK teachers. Work Stress. 1993;7(3):203-19.
2. Chang ML. An appraisal perspective of teacher burnout: Examining the emotional work of teachers. Educ Psychol Rev. 2009;21(3):193-218.
3. Kokkinos CM. Job stressors, personality, and burnout in primary school teachers. Br J Edu Psychol. 2007;77(Pt 1):229-43.
4. MEXT. On the publication of the 2013 basic school survey (fixed value). [Cited 8 June 2018.] Available from http://www.mext.go.jp/component/b_menu/other/__icsFiles/afieldfile/2014/01/29/1342607_1_1.pdf (in Japanese).
5. Cave P. Bukatsudō: the educational role of Japanese school clubs. J Jpn Stud. 2004;30(2):383-415.
6. Yada A, Savolainen H. Japanese in-service teachers' attitudes toward inclusive education and self-efficacy for inclusive practices. Teaching Teacher Educ. 2017;64:222-9.
7. Noor KM. Work-Life balance and intention to leave among academics in Malaysian public higher education institutions. Int J Bus Soc Sci. 2011;2(11):240-8.
8. Mahan PL, Mahan MP, Park NJ, Shelton C, Brown KC, Weaver MT. Work environment stressors, social support, anxiety, and depression among secondary school teachers. AAOHN J. 2010;58(5):197-205.
9. Schonfeld IS. Psychological distress in a sample of teachers. J Psychol. 1990;124(3):321-38.
10. Bannai A, Ukawa S, Tamakoshi A. Long working hours and psychological distress among school teachers in Japan. J Occup Health. 2015;57(1):20-7.
11. Tanoi M, Mizumoto N, Okubo I. Work-life balance of junior high school teachers in Japan- In terms of time-use and role conflict. J Home Eco Japan. 2012;63(11):725-36.
12. Ministry of Health, Labor and Welfare. Report from the investigative meeting on the current state of overwork and mental health strategy. 2004. [Cited 8 June 2018.] Available from: http://www.mhlw.go.jp/shingi/2004/08/dl/s0823-3a.pdfm (in Japanese).
13. Shimomitsu T, Odagiri Y. Brief job stress questionnaire (explanation/special report). Occup Ment Health. 2004;12:25-36.
14. Johnson S, Cooper C, Cartwright S, Donald I, Taylor P, Millet C. The experience of work-related stress across occupations. J Manage Psychol. 2005;20(2):178-87.
15. Inoue A, Kawakami N, Shimomitsu T, Tsutsumi A, Haratani T, Yoshikawa T, et al. Development of a short questionnaire to measure an extended set of job demands, job resources, and positive health outcomes: the new brief job stress questionnaire. Ind Health. 2014;52(3):175-89.
16. Inoue A, Kawakami N, Shimomitsu T, Tsutsumi A, Haratani T, Yoshikawa T, et al. Development of a short version of the new brief job stress questionnaire. Ind Health. 2014;52(6):535-40.
17. Krippendorff K. Reliability in content analysis. Hum Commun Res. 2004;30(3):411-33.
18. Allison PD (ed). Missing data. Los Angeles, CA: SAGE Publishing; 2001.
19. Cattell RB. The scree test for the number of factors. Multi-variate Behav Res. 1966;1(2):245-76.
20. Matsunaga M. How to factor-analyze your data right: do's don'ts, and how-to's. Int J Psychol Res. 2010;3(1):198-211.
21. Williams B, Onsman A, Brown T. Exploratory factor analysis: a five-step guide for novices. J Emerg Prim Health Care. 2010;8(3):1-13.
22. MEXT.On the survey of school teacher working conditions (2016) aggregates (preliminary figures). [Cited 8 June 2018.] Available from: http://www.mext.go.jp/b_menu/houdou/29/04/__icsFiles/afieldfile/2017/04/28/1385174_002.pdf (in Japanese).
23. Skaalvik EM, Skaalvik S. Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. J Educ Psychol. 2007;99(3):611-25.
24. Evers WJ, Brouwers A, Tomic W. Burnout and self- efficacy: A study on teachers' beliefs when implementing an innovative educational system in the Netherlands. Br J Educ Psychol. 2002;72(Pt 2):227-43.
25. Gibson S, Dembo MH. Teacher efficacy: a construct validation. J Educ Psychol. 1984;76(4):569-82.
26. Emmer ET, Hickman J. Teacher efficacy in classroom management and discipline. Educ Psychol Meas. 1991;51(3):755-65.
27. Oettingen G. Cross-cultural perspectives on self-efficacy. In: Bandura A, editor. Self-efficacy in changing societies. Cambridge, UK: Cambridge University Press, 1995; p. 149-76.
28. Baruch-Feldman C, Brondolo E, Ben-Dayan D, Schwartz J. Sources of social support and burnout, job satisfaction, and productivity. J Occup Health Psychol. 2002;7(1):84-93.
29. Nakata A, Haratani T, Takahashi M, Kawakami N, Arito H, Fujioka Y, et al. Job stress, social support at work, and insomnia in Japanese shift workers. J Human Ergol (Tokyo). 2001;30(1–2):203-9.
30. Komatsu Y, Kai Y, Nagamatsu T, Shiwa T, Suyama Y, Sugimoto M. Buffering effect of social support in the workplace on job strain and depressive symptoms. Sangyo Eiseigaku Zasshi. 2010;52(3):140-8.
31. Shibuya T. Problems in collaboration between school teachers: Focusing on interactions outside of working hours. Bull Joetsu Assoc Study Educ Admin. 2004;10:39-49.
32. Troman G. Teacher stress in the low-trust society. Br J Sociol Educ. 2000;21(3):331-53.
33. Osugi A. Report on the 2016 research project survey regarding school faculty placement and management to improve the overall ability of the school organization as a whole (Comprehensive study of the education, placement, and training of teachers who nurture student character and ability). National Institute for Educational Policy Research. [Cited 8 June 2018.] Available from: https://www.nier.go.jp/05_kenkyu_seika/pdf_seika/h28a/kyosyoku-1-8_a.pdf (in Japanese).
34. Horii H. A study of the relation between open system school and safety control of school. Bulletin of Faculty of Human and Social Services Yamanashi Prefectural University. 2006;1:81-94.
35. MEXT. Outline of the law partially revising the School Health Act. 2009. [Cited 8 June 2018.] Available from: www.mext.go.jp/component/b_menu/other/__icsFiles/afieldfile/2009/04/01/1236264_001.pdf (in Japanese).
36. George D, Mallery P. SPSS for Windows step by step: a simple guide and reference, 11.0 update, 4th ed. Boston, MA: Allyn and Bacon; 2003.

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