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Japanese cultural adaptation and validation of the social emotional health survey-secondary for junior high school students

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The Social Emotional Health Survey–Secondary (SEHS-S) assesses adolescents' psychological dispositions associated with positive psychosocial development. The present study extended SEHS–S research by validating the SEHS-S with a nonwestern sample of Japanese junior high school students (Grades 7–9; $N = 1{,}181$) and investigating sex and grade level difference in Covitality and four domains of positive psychological dispositions (Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living). The confirmatory factor analyses supported the internal validity of the SEHS-S with a second-order model. Higher Covitality scores predicted higher life satisfaction, school connectedness, and prosocial behavior and lower emotional symptoms, conduct problems, inattention/hyperactivity, and peer problems, evidence of concurrent validity. Analyses supported the factorial invariance for different sex and grade level. Females reported higher Belief-in-Others and Emotional Competence and lower Belief-in-Self and Engaged Living than males. Grade 9 students reported higher Covitality, Belief-in-Self, Emotional Competence, and Belief-in-Others than Grade 8 students. These results support expanding the use of the SEHS–S as a universal wellness screener in Japanese junior high schools to identify the social–emotional strengths of all students. Further study needs to establish how to use the SEHS–S most effectively with Japanese junior high school students in a culturally sensitive manner.

KEYWORDS

social emotional health survey, Japanese junior high school students, scale validation, mental health promotion, mental health screening

1 Introduction

Japanese adolescents report having the leading physical health among 38 The Organization for Economic Cooperation and Development (OECD) countries, yet they have the second worst psychological well-being, with poor life satisfaction and frequent incidents of suicide [The United Nations International Children's Emergency Fund (UNICEF), 2020]. In 2021, Japanese junior high schools had the highest incidence of violence (6.5 per 1,000 students) and school refusals (4.1% of total students) among primary and high schools. The number of suicide in junior high schools ($n = 136$) was higher than in primary schools ($n = 14$) while lower than in

senior high schools ($n = 329$) [Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT), 2021a]. As a result, there is an increasing realization that Japanese junior high school students' mental health needs are unmet. For the last 20 years, the reports of child abuse have reached a record high every year (National Police Agency, 2021), and the decline in family parenting skills and deterioration of the family environment has severely impacted children's mental health.

Despite the high mental health needs of Japanese junior high school students, schools struggle to provide adequate mental health intervention partly due to the limited government expenditure on education [approximately 4% of gross domestic product (GDP) in 2021; OECD, 2021]. Japan is among the bottom quarter countries with the lowest education expenditure as a share of GDP across OECD countries (OECD, 2021). Due to limited government education expenditures, there is an insufficient number of school counselors to provide regular mental health prevention and intervention services to Japanese junior high students. For example, in 2020, 17.3% of junior high schools had a school counselor allocation of fewer than four hours a week, and 15.8% of junior high schools had no regular allocation of a school counselor [Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT), 2021b]. Consequently, teachers who teach academic subjects also have primary responsibility for providing psychological assessment and support to students in many Japanese junior high schools. To effectively prevent mental health problems, suicides, school refusals, and violence under these difficult circumstances, Japanese junior high school teachers need to identify high-risk students more effectively by implementing comprehensive screening based on the Dual Factor Mental Health Model (Greenspoon and Saklofske, 2001).

As in Western cultural contexts, mental health care in the Japanese educational systems traditionally adopted a unidimensional mental health model. That is, it provides mental health interventions assuming that optimum mental health is the absence of mental health symptoms and their associated problems (Xiao et al., 2021). In contrast, growing international evidence supports the Dual-Factor Model of mental health (Greenspoon and Saklofske, 2001). This model considers mental health symptoms (negative aspects of mental health) and subjective wellbeing (positive aspects of mental health) and sees these two interrelated constructs as separate, correlated continua. Optimum mental health incorporates the combination of positive subjective wellbeing and minimal mental health symptoms. Subjective wellbeing may involve the perception of life satisfaction and the experience of frequent positive emotions (e.g., happiness, enjoyment, and pleasure; Furlong et al., 2014).

Studies identified that positive psychological dispositions of students, such as optimism, hope, curiosity, prudence, zest, forgiveness, and gratitude, can promote their subjective wellbeing and boost resilience against mental health problems (Azañedo et al., 2021). Similar to the symptoms of mental health problems, students' subjective wellbeing predicts the risk of suicide (Hsu et al., 2019), lower academic achievement (Bücker et al., 2018), and future socioeconomic status (Luhmann et al., 2011). Students with poor subjective wellbeing also require extra support from educators even if they do not have existing mental health problems because they are vulnerable and more likely than others to develop mental health problems (Lombardo et al., 2018).

Accordingly, both Western and non-Western contexts increasingly acknowledge that educators must screen students' psychological dispositions, subjective wellbeing, and mental health problems to identify at-risk students effectively. In Japan, various screening tools are available for evaluating subjective wellbeing and mental health problems among junior high school students. However, practical, comprehensive screening tools are limited for assessing positive psychological dispositions among Japanese junior high school students.

The most common screening tools adopted across Japanese junior high schools are the measures of school adjustment, such as Questionnaire-Utility (Q-U; Kawamura and Tagami, 1997) and Adaptation Scale for School Environments on Six Spheres (ASSESS; Kurihara and Inoue, 2010). There are also screening tools available for evaluating the mental health problems of Japanese junior high school students, such as the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Children's Depression Inventory (Kovacs, 1978). There are also measures for evaluating the subjective wellbeing of Japanese junior high school students, such as the Satisfaction with Life Scale (Diener et al., 1985) and the Warwick-Edinburgh Mental Well-being Scale (Suganuma et al., 2016). However, the practical and comprehensive measure of psychological disposition that Japanese educators and mental health professionals can use with Japanese junior high school students is limited.

For example, the Japanese version of the Values in Action Inventory of Strengths (VIA-IS; Otake et al., 2005) is a comprehensive measure that evaluates 24 psychological dispositions related to subjective wellbeing (e.g., bravery, creativity, and gratitude). However, the VIA-IS has limited practical utility as it has 240 items and takes excessive time to complete in a Japanese educational setting. The Character Strengths Scale (Imura et al., 2013) with 24 items is another measure of psychological dispositions that is more practical than the VIA-IS. However, the Character Strengths Scale is limited to four positive psychological disposition constructs (patience/honesty, bravery/creativity, generosity/appreciation, and fairness/caringness). It does not measure other vital psychological dispositions contributing to students' subjective wellbeing, such as optimism and zest.

Other psychological dispositions measures that could be used with Japanese junior high school students (e.g., Resilience Scale, Ishige and Muto, 2005; Emotional Awareness Questionnaire for Junior High School Students, EAQ, Ishizu and Shimoda, 2013; Profile of Emotional Competence, Nozaki and Koyasu, 2015) also measure a limited range of psychological dispositions. These circumstances mean that the Social–Emotional Health Survey-Secondary (SEHS-S; Furlong et al., 2014), with 36 items measuring 12 positive psychological dispositions, could provide a practical, comprehensive measure of Japanese junior high school students' positive psychological dispositions.

The Social and Emotional Health Survey–Secondary (SEHS-S) is a measure currently integrated as a module of the California Healthy Kids Survey System (CHKS), the largest state-adopted survey of positive youth development in the United States (see https://www.wested.org/project/california-healthy-kids-survey-chks/). The SEHS-S is a school survey that assesses four general domains of positive psychological dispositions with three core constructs in each domain:

1. Belief-in-self (self-awareness, persistence, self-efficacy),
2. Belief-in-others (support, school support, family support),
3. Emotional competence (empathy, emotional regulation, behavioral self-control), and
4. Life engagement (gratitude, zest, optimism).

Conceptually, these four domains contribute to the higher-order meta-construct, Covitality (Figure 1). As a counterpart of comorbidity, Covitality is the synergistic asset of individuals resulting from the accumulating effects of multiple positive psychological dispositions that contribute to positive mental health (Furlong et al., 2014; You et al., 2014, 2015).

To date, over 20 studies have validated versions of the SEHS-S across Western and non-western countries, such as the United States (You et al., 2015), Spain (Piqueras et al., 2019), Turkey (Telef and Furlong, 2017), Iran (Taheri et al., 2021), and South Korea (Lee et al., 2016). These studies consistently supported the measure's construct validity of the measure—the second-order Covitality model is appropriate model across different sex, grade levels, and racial/ethnic groups. Studies also consistently found the high internal reliability of items and test–retest reliability of the SEHS-S. Studies also supported the concurrent validity of the measure that a higher level of Covitality predicts higher subjective wellbeing with life satisfaction, the frequent experience of positive affect, and higher school belongingness across different sex, grade level, and racial/ethnic groups (Lee et al., 2016; Moffa et al., 2016). Higher Covitality scores also predicted higher academic achievement, higher perceptions of school safety, lower substance use, lower suicide ideation, and lower depressive symptoms (Furlong et al., 2014, 2020). Studies also supported the factorial invariance of the model across different sex, grade, and racial/ethnic subgroups (You et al., 2015).

Ito et al. (2015) previously validated the SEHS-S (Furlong et al., 2014) with 975 Japanese junior high school students in Grades 7 to 9. Consistent with the results in other countries (Furlong et al., 2014; Lee et al., 2016), Ito et al. (2015) found support for the construct validity of the SEHS-S that the hypothesized second-order model has adequate model fit with a sample of junior high school students. The SEHS-S has reasonable concurrent validity ($r = 0.94$ between Covitality and wellbeing scores) and reasonable internal reliability of items ($\alpha = 0.78$ to 0.88 for four domains; $\alpha = 0.93$ for Covitality). Studies also

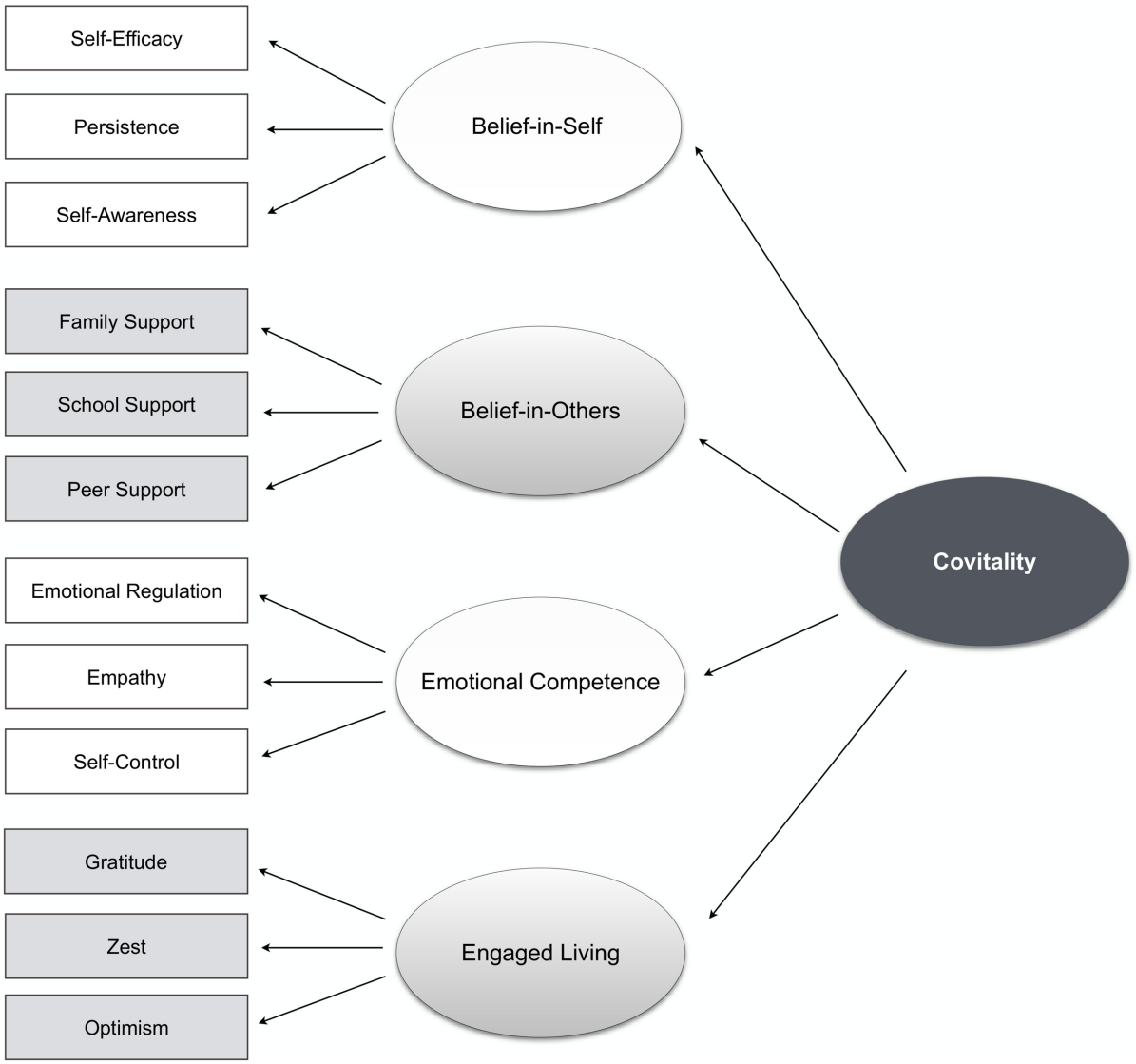

FIGURE 1
Social and emotional health survey conceptual and measurement model.

supported the factorial invariance of the model across different sex. The latent mean difference analysis found that females have Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living scores more than males (Cohen $d = 0.13$ to 40). Females may have higher Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living scores may be partly attributed to cultural norms for females in Asian culture that value social cohesion and interdependence (You et al., 2015). While Ito et al. (2015) validated the SEHS-S with Japanese junior high school students, there is a need to address some application limitations.

A first consideration is that the adapted SEHS-S has not been validated with a geographically diverse sample of Japanese junior high school students. A previous study by Ito et al. (2015) adapted the SEHS-S (Furlong et al., 2014; You et al., 2015) and employed a sample of junior high school students from a single rural district in Japan. Another study by Iida et al. (2019) validated the adapted SEHS-S with high school students in Grades 10–12. Extending the adapted SEHS-S for junior high school students requires its validation with geographically diverse Japanese junior high school students. It is essential to confirm the factorial structure and invariance among different sex and grade level groups and verify that the SEHS-S constructs predict students' subjective wellbeing and mental health.

A second consideration is that no studies have investigated grade level differences in Covitality and four domains of positive psychological dispositions (Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living) among Japanese junior high school students. Developmental studies found that adolescents generally become more independent and develop more robust psychological dispositions related to Covitality, Belief-in-Self, Emotional Competence, and Belief-in-Others, such as self-awareness, empathy, self-regulation, and relationship skills, with age (Ross et al., 2019). Hence, Japanese junior high school students in higher grade levels may also have higher Covitality, Belief-in-Self, Emotional Competence, and Belief-in-Others. A study is needed to confirm such grade level differences among Japanese junior high school students. Such investigation would provide valuable insights for educators and mental health professionals to plan interventions tailored to the unique needs of students in different grade levels.

A third consideration is that no studies have investigated sex differences in Covitality and four domains of positive psychological dispositions among Japanese junior high school students from the general population. Ito et al. (2015) found that female junior high school students may have higher Covitality and four domains of positive psychological dispositions. However, this study employed a unique sample from a single rural district. The sex difference Ito et al. (2015) found may not necessarily apply to a diverse Japanese sample. A new study employing junior high school students from multiple regions of Japan needs to confirm the sex difference in Covitality and four domains of psychological dispositions that apply to the broader Japanese population.

Validating updated SEHS-S in a sample of geographically diverse Japanese junior high school students is essential to providing Japanese educators and mental health professionals with a valuable tool for social–emotional screening to promote students' mental health. The main goals of this study were to (a) examine the internal and concurrent validities and reliability of the updated SEHS-S with Japanese junior high school students and (b) examine latent mean differences across sex and grade levels. Based on the consistent support of the SEHS-S measurement model in different cultural groups (You et al., 2015; Lee et al., 2016), the present study tested the five hypotheses:

1 The Japanese adapted SEHS-S internal validity will be replicated—a factor structure with 12 first-order factors, four second-order factors (Belief-in-self, Belief-in-others, Emotional Competence, and Engaged Living), and a higher-order factor (Covitality), matching the SEHS-S-2020 factor structure found for Japanese high school students (Iida et al., 2019) and other countries (Furlong et al., 2023).
2 The factor structure of the second-order model would be statistically equivalent across sex and grade levels at configural, factor loading, and intercept levels.
3 Japanese female junior high school students will have higher Covitality and four domains than male students.
4 Older Japanese junior high school students will have higher Covitality and four domains than younger students.
5 The second-order constructs and the higher-order Covitality factor will have significant positive correlations with the indicators of subjective wellbeing (life satisfaction, school connectedness, and prosocial behaviors) and negative correlations with the indicators of mental health problems (emotional symptoms, conduct problems, hyperactivity/inattention, and peer problems).

2 Methods

2.1 Participants

The participants were 1,181 Japanese junior high school students ages 12–15 (Male = 550; Female = 553; not identified = 78) from three public junior high schools in the Kanto region (Eastern part of Japan) and one public junior high school in Chugoku region Western part of Japan (Table 1). The participants were in Grade 7 ($n = 411$; Male = 203, Female = 186, not identified = 22), Grade 8 ($n = 384$; Male = 173, Female = 192, not identified = 19), and Grade 9 ($n = 385$; Male = 174, Female = 175, not identified = 36).

2.2 Measures

The student questionnaires asked about demographic variables (grade, classroom, and sex). They also encompassed self-report measures rated by students, including the Japanese version of Social

TABLE 1 Demographics of sample.

Demographics	*n*	%
Grade		
Grade 7	411	34.8
Grade 8	384	32.5
Grade 9	385	32.6
Sex		
Male	550	46.6
Female	553	46.8
Not specified	78	6.6

Emotional Health Survey-Secondary (SEHS-S; Iida et al., 2019), the School Connectedness Scale (Anderman, 2002; Furlong et al., 2011), the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; Seligson et al., 2003), and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997).

2.2.1 Social emotional health survey (SEHS-S)

The SEHS-S (Furlong et al., 2014) is a 36-item self-report measure of social-emotional health with a six-point Likert-type scale (1 = *not at all true of me*… 6 = *very much true of me*) targeted at high school students. The SEHS-S has 12 subscales (three items per subscale) that assess four domains: Belief-in-Self (self-awareness, persistence, self-efficacy), Belief-in-Others (school support, family coherence, peer support), Emotional Competence (empathy, self-control, emotion regulation), and Engaged Living (gratitude, zest, optimism). Previous studies presented evidence supporting the factorial structure that includes a single higher-order latent trait that four domains load onto, called Covitality (Furlong et al., 2014; You et al., 2015). The present study employed a Japanese version of the SEHS-S translated by Iida et al. (2019). Iida et al. (2019) found reasonable internal reliability of subscales ($\alpha = 0.64$ to 0.96), reasonable test–retest reliability of subscales ($r = 0.64$ to 0.70), and moderate concurrent validity of the Japanese version of SEHS-S with Japanese high school students (e.g., $r = -0.24$ between the Covitality score of SEHS-S and psychological distress).

2.2.2 School connectedness scale

The school connectedness scale (Anderman, 2002; Furlong et al., 2011) measures high school students' feelings of school connectedness with a six-point Likert scale (1 = *strongly disagree*… 6 = *strongly agree*). The items are: (a) I feel close to people at this school, (b) I am happy to be at this school, (c) I feel like I am a part of the school, (d) The teachers at this school treat students fairly, and (e) I feel safe in my school. Anderman (2002) found reasonable internal consistency ($\alpha = 0.78$) and convergency validity of the scale with optimism ($r = 0.28$) and depression ($r = -0.28$) with high school students. Similarly, a previous study found that the Japanese version of the School Connectedness Scale has reasonable internal consistency ($\alpha = 0.75$) and concurrent validity of the scale with the Covitality SEHS total score ($r = 0.67$) among Japanese high school students (Iida et al., 2019).

2.2.3 The brief multidimensional students' life satisfaction scale

The BMSLSS (Seligson et al., 2003) is a self-report measure of life satisfaction indicator of subjective wellbeing. The BMSLSS has five items with a six-point Likert-type scale (1 = terrible… 6 = delighted). Its five life satisfaction domains include family (I would describe my satisfaction with my family life as…), school (I would describe my satisfaction with my school experience as…), friends (I would describe my satisfaction with my friendship as…), self (I would describe my satisfaction with myself as…), and living environment (I would describe my satisfaction with where I live as…). Seligson et al. (2003) found reasonable internal consistency ($\alpha = 0.92$) and convergent validity of the scale with positive affect ($r = 0.43$) and negative affect ($r = -0.27$) with high school students. The present study employed a Japanese version of the BMSLSS. Iida et al. (2019) tested the Japanese version of BMSLSS. They found reasonable internal consistency ($\alpha = 0.75$) and moderate convergent validity ($r = 0.37$ to 47 between the five items of BMSLSS and Covitality score of the SEHS-S) among Japanese high school students. This study employed the total score of five items of the BMSLSS as an indicator of subjective wellbeing for testing the concurrent validity of the SEHS-S.

2.2.4 Strengths and difficulties questionnaire

The SDQ (Goodman, 1997) has 25 items rated on a 3-point scale (0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*) that screens the emotions and behaviors of young people. The SDQ consists of five subscales: emotional symptoms, conduct problems, inattention/hyperactivity, peer problems, and prosocial behaviors. A total score of all subscales, excluding the prosocial behavior subscale, represents the total difficulties score. The present study employed the Japanese self-report version of the SDQ for children aged 9–17 validated by Noda et al. (2013). Previous studies found that the Japanese self-report version of the SDQ has adequate convergent validity (e.g., $r = 0.55$ between emotional problem scores of the SDQ and Child behaviour checklist anxiety and depression subscale and $r = -0.60$ between emotional symptoms subscale and the quality of life) with Japanese junior high school students (Noda et al., 2013; Saito, 2015; Ikeda, 2021). The present study used the prosocial behavior subscale score to indicate subjective wellbeing. It used emotional symptoms, conduct problems, inattention/hyperactivity, and peer problems subscale scores as indicators of mental health problems for testing the concurrent validity of the SEHS-S.

2.3 Procedure

After obtaining ethical approval from the Ethics Committee of the researcher's University, the researcher contacted and described the purpose of the study to the principals of public junior high schools in the researchers' contact list. In this study, we implemented an opt-out arrangement to obtain parental consent for students' participation. School principals disseminated detailed information about the study's purpose and the involvement of students to parents, requesting them to contact the researchers if unwilling to provide consent for their children's participation. The opt-out procedure was deemed acceptable for this study because the students' involvement merely entailed the completion of questionnaires, posing no or minimal psychological and physical risks (Vellinga et al., 2011). Additionally, this methodology was determined to yield a more representative population, better reflecting real-life situations when compared to an opt-in arrangement (Junghans et al., 2005). The researcher provided instructions to homeroom teachers for administering student questionnaires. Before administering the questionnaires, an information sheet attached to them informed students about the purpose and details of the study. It clarified that their responses would be kept confidential, only their de-identified data would be used for research purposes, and participation in the study was voluntary, allowing withdrawal at any time without penalty. The information sheet also informed students that they could return blank questionnaires if they chose not to participate and that completing the questionnaires is considered as providing consent for participation. Students who agreed to participate responded to the questionnaires during school hours, and teachers collected the completed questionnaires. The estimated time required for completion was approximately 10–15 min.

2.4 Data analysis

Confirmatory factor analysis (CFA) examined the internal validity of the SEHS-S in Japanese junior high schools. Following the previous validation studies that rigorously tested the model (Furlong et al., 2014; Lee et al., 2016), the researcher randomly divided the total sample into two samples (S1 = 580; S2 = 600). The researcher performed CFA to compare the model fit of the second-order model (hypothesized model) and alternative four-factor models with S1 and S2, as previous SEHS studies reiterated (Furlong et al., 2014; Lee et al., 2016). In the present study, the researchers calculated and reported three different model fit indices, including the Satorra-Bentler scaled statistic (S-B χ2), comparative fit index (CFI), and Root Mean Square Error of Approximation (RMSEA). A failure to reject the null hypothesis on S-B χ2 at $p < 0.05$ is considered indicative of reasonable model fit. However, the χ2 likelihood ratio test is known to be sensitive to sample size and is not considered a reliable indicator (Alavi et al., 2020). Consequently, following the practice of previous validation studies, CFI and RMSEA were utilized as the primary indices for evaluating individual model fit, with CFI values ≥0.90 and RMSEA values <0.06 indicating reasonable model fit (MacCallum et al., 1996).

After identifying the most suitable model from the four models tested with S1 and S2, the researcher tested the model fit with the total sample (N = 1,181) and subgroups with different sex and grade level. Then, this study tested the measurement invariance for different sex and grade level groups by following the analysis steps suggested by Chen et al. (2005) that were also used in previous validation studies in other countries (Furlong et al., 2014). Five levels of measurement invariance tested in order are (a) configural equivalence, (b) first-order factor coefficient equivalence, (c) first- and second-order factor coefficient equivalence, (d) first- and second-order factor coefficient and intercepts of measured variables equivalence, and (E) first- and second-order factor coefficient, intercepts of measured variables, and first-order factors equivalence.

In reporting on evidence of invariance, the multigroup model needed to exhibit an adequate fit to the data, and the differences in CFI values between models need to be equal to or less than −0.01 (Cheung and Rensvold, 2002). In addition, this study explored the latent mean differences among student subgroups with different sex and grade level.

This study tested concurrent validity by correlating the SEHS-S Covitality score with measures of school connectedness, life satisfaction SDQ total difficulties, and the SDQ subscale scores. In addition, a path model examined the relationship of Covitality with the indicators of subjective wellbeing (life satisfaction, school connectedness, and prosocial behaviors) and mental health problems (emotional symptoms, conduct problems, inattention/hyperactivity, and peer problems). This study performed all the analysis using SPSS28 and AMOS24 (IBM Corp, 2021).

3 Results

3.1 Overview

Tables 2, 3 present the descriptive statistics of measures and correlations between study variables. Scores for each study variable were calculated using syntax in SPSS 28 (IBM Corp, 2021). The first author conducted data screening by visually observing scoring data on SPSS28 (IBM Corp, 2021). There was no corrupt data entry that required cleaning or correction. The response rate for the student questionnaires was 100% (n = 1,181). Data screening revealed that scores were missing at random from less than 0.5% of participants for each study variable. The skewness of scoring distributions for study variables ranged between −1.16 and 0.08, with all variables having skewness within the range of ±1, except for four variables (family coherence, peer-support, empathy, and school connectedness). The scoring distribution was within ±2 for all study variables. To maximize the utilization of available data, pairwise deletion was applied for handling missing data. The measures used in the present study exhibited reasonable internal reliability (α = 0.72–0.95).

3.2 Confirmatory factor analysis

The results supported Hypothesis 1. The updated SEHS-S based on the Japanese junior high school student sample would be supported by a second-order structure with 12 first-order factors, four second-order factors (Belief-in-self, Belief-in-others, Emotional Competence, and Engaged Living), and one higher-order factor (Covitality). Using S1 (n = 580), the second-order model (hypothesized model) adequately fit the data: S-Bχ2 = 1397.20, df = 578, $p < 0.05$, RMSEA = 0.049, 90%CI [0.046,0.053], CFI = 0.943, and so does the four-factor model (Table 4). However, the second-order model is more consistent with both the theories of Covitality (Weiss and Luciano, 2015) and the factor structure of SEHS-S supported by previous studies in other countries, such as the United States (Furlong et al., 2020), Spain (Piqueras et al., 2019), Turkey (Telef and Furlong, 2017), and South Korea (Lee et al., 2016). Therefore, we decided based on statistical criteria and conceptual grounding, and the second-order model was used for the subsequent analysis.

There were no appreciable differences in the fit indices or factor loadings between the second-order model conducted with S1 and S2. Hence, all subsequent analyses employed the entire sample. Table 5 summarizes the fit statistics for the second-order model with the entire sample and subgroups with different sex and grade level. Table 6 displays the standardized factor loadings for the second-order model with the entire sample.

3.3 SEHS-S internal reliability

Using the total sample of 1,181 students, Table 2 presents the raw mean scores and psychometric properties for each subscale, domain, and Covitality total scores. SEHS-S had reasonable internal reliability across each subscale, domain, and full measure (α = 0.72–0.95).

3.4 SEHS-S concurrent validity

The results supported Hypothesis 2. Table 3 shows the correlations among all the study measures. The second-order constructs and the higher-order Covitality factor have significant positive correlations with the indicators of subjective wellbeing (life satisfaction, school connectedness, and prosocial behaviors) and negative correlations

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TABLE 2 Psychometric characteristics of the SEHS-S for full validation sample.

SEHS-S subscales	Range	*M*	SD	Skewness	Kurtosis	α
Covitality	36–216	161.72	28.00	−0.52	0.61	0.95
Belief-in-Self	9–54	38.45	7.37	−0.32	0.25	0.84
Self-efficacy	3–18	12.89	2.76	−0.45	0.25	0.76
Self-awareness	3–18	13.57	3.16	−0.64	0.10	0.72
Persistence	3–18	12.02	3.14	−0.23	−0.16	0.74
Belief-in-others	9–54	42.42	8.52	−0.87	0.89	0.92
School support	3–18	13.32	3.41	−0.67	0.36	0.92
Family coherence	3–18	14.42	3.52	−1.16	1.09	0.93
Peer-support	3–18	14.67	3.36	−1.11	1.08	0.93
Emotional competence	9–54	43.03	7.10	−0.78	1.41	0.90
Emotional regulation	3–18	14.55	2.61	−0.85	1.15	0.81
Empathy	3–18	14.68	2.73	−1.06	1.78	0.84
Behavioral self-control	3–18	13.79	2.83	−0.62	0.49	0.77
Engaged living	9–54	37.64	10.31	−0.43	−0.22	0.92
Optimism	3–18	12.48	3.93	−0.51	−0.38	0.86
Zest	3–18	11.79	4.13	−0.23	−0.72	0.95
Gratitude	3–18	13.37	3.89	−0.80	0.19	0.88
School connectedness	5–30	23.89	5.13	−1.01	1.06	0.87
Life satisfaction	5–25	20.06	3.80	−0.66	−0.03	0.78
SDQ total difficulties	0–40	16.41	5.01	−0.07	0.24	0.94
Emotional symptoms	0–10	4.08	2.24	0.35	−0.27	0.78
Conduct problems	0–10	4.16	2.11	−0.24	−0.74	0.84
Hyperactivity/inattention	0–10	4.20	1.92	0.08	−0.14	0.78
Peer problems	0–10	3.98	1.45	0.69	0.49	0.82
Prosocial behavior	0–10	6.37	2.17	−0.24	−0.40	0.83

TABLE 3 Correlations among study variables.

		1	2	3	4	5	6	7	8	9	10	11	12
1.	CoVi	—											
2.	BIS	0.83**	—										
3.	BIO	0.86**	0.59**	—									
4.	EC	0.77**	0.57**	0.57**	—								
5.	EL	0.89**	0.67**	0.68**	0.53**	—							
6.	SC	0.68**	0.48**	0.65**	0.49**	0.63**	—						
7.	LS	0.68**	0.50**	0.66**	0.40**	0.66**	0.68**	—					
8.	TD	−0.44**	−0.38**	−0.37**	−0.32**	−0.40**	−0.35**	−0.39**	—				
9.	ES	−0.23**	−0.26**	−0.21**	−0.04	−0.25**	−0.22**	−0.30**	0.72**	—			
10.	CP	−0.20**	−0.14**	−0.17**	−0.18**	−0.19**	−0.13**	−0.14**	0.63**	0.18**	—		
11.	HI	−0.46**	−0.41**	−0.34**	−0.48**	−0.36**	−0.29**	−0.28**	0.66**	0.27**	0.25**	—	
12.	PP	−0.27**	−0.19**	−0.27**	−0.12**	−0.27**	−0.30**	−0.32**	0.55**	0.32**	0.11**	0.17**	—
13.	PS	0.57**	0.41**	0.44**	0.58**	0.46**	0.38**	0.32**	−0.15**	0.11**	−0.14**	−0.31**	−0.06**

CoVi = Covitality, BIS = belief-in-self, BIO = belief-in-others, EC = emotional competence, EL = engaged living, SC = school connectedness, LS = life satisfaction, TD = total difficulties, ES = emotional symptoms, CP = conduct problems, HI = hyperactivity/inattention, PP = peer problems, and PS = prosocial behavior. ** $p < 0.01$.

with the indicators of mental health problems (emotional symptoms, conduct problems, inattention/hyperactivity, and peer problems). Covitality had a significant positive relationship with school connectedness ($r = 68$, $p < 0.01$), life satisfaction ($r = 0.68$, $p < 0.01$), and prosocial behavior ($r = 0.57$, $p < 0.01$) and a significant negative relationship with the total difficulties score ($r = -0.44$, $p < 0.01$),

TABLE 4 SEHS-secondary model fit statistics with S1 and S2 sample.

Sample	Model	S-B $\chi 2$	*df*	RMSEA	CI (90%)	CFI
S1	Second-order model	1397.20***	578	0.049	0.046, 0.053	0.943
S1	Four-factor model	1363.45***	576	0.049	0.045, 0.052	0.946
S2	Second-order model	1522.86***	578	0.052	0.049, 0.055	0.940
S2	Four-factor model	1468.75***	576	0.051	0.048, 0.054	0.943

S1 = Sample 1 ($n = 580$). S2 = Sample 2 ($n = 600$). ***$p < 0.001$.

TABLE 5 SEHS-secondary model fit statistics with the full sample and subgroups.

Model	S-B $\chi 2$	*df*	RMSEA	CI (90%)	CFI
Full sample	2034.00***	578	0.046	0.044, 0.048	0.951
Male	1392.57***	578	0.051	0.047, 0.054	0.939
Female	1329.85***	578	0.049	0.045, 0.052	0.949
Grade 7	1278.17***	578	0.054	0.050, 0.058	0.930
Grade 8	1237.64***	578	0.055	0.050, 0.059	0.934
Grade 9	1271.44***	578	0.056	0.052, 0.060	0.934

***$p < 0.001$.

emotional symptoms ($r = -0.23$, $p < 0.01$), conduct problems ($r = -0.20$, $p < 0.01$), hyperactivity/inattention ($r = -0.46$, $p < 0.01$), and peer problems ($r = -0.27$, $p < 0.01$).

The structured equation analysis revealed significant positive relationships between the four positive psychological disposition domains and Covitality (Figure 1). The results of the path model also revealed a significant positive relationship between Covitality and the indicators of subjective wellbeing (life satisfaction, school connectedness, and prosocial behavior) and a significant negative relationship with the indicators of mental health problems (emotional symptoms, conduct problems, inattention/hyperactivity, and peer problems). The overall structural model had a reasonable model fit to the data, S-B$\chi 2 = 3319.93$, $df = 823$, $p < 0.05$; NNFI = 0.905; CFI = 0.926; RMSEA = 0.051, 90% CI [0.049, 0.053].

3.5 Invariance testing for sex and grade subgroups

The results supported Hypothesis 3. The factor structure of the second-order model was statistically equivalent across sex and grade levels at configural, factor loading, and intercept levels. Measurement invariance testing revealed no significant difference between models for sex groups; ΔCFI was less than 0.01 (Table 7). There was also no significant difference between models for students in Grades 7–9. These results suggested that the second-order factor model has sufficient invariance across male, female, and Grade 7–9 groups. Therefore, conducting additional analyses to compare latent means across groups was appropriate.

3.6 Sex difference in latent means

The results partly supported Hypothesis 3. Japanese females had higher Belief-in-Others and Emotional Competence and lower Belief-in-Self and Engaged Living than males. There was no significant sex difference in latent means of Covitality (Table 8).

3.7 Grade level difference in latent means

The results partly supported Hypothesis 4. Grade 9 students had higher Covitality, Belief-in-Self, and Emotional Competence than Grade 8 students (Table 9). There was no difference in Covitality and four domains (Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living) between Grades 7 and 8 students.

4 Discussion

Research supporting the same constructs of the SEHS-S across diverse samples of youths is an essential prerequisite for its use across diverse cultural contexts and for comparative research (Chen, 2008). The present study built on previous studies of the SEHS-S's hierarchical factor structure that employed Western and non-Western country youth samples (United States, You et al., 2015; Spain, Piqueras et al., 2019; and South Korea, Lee et al., 2016). It also extended previous research showing that the SEHS–S measurement model was replicated with Japanese junior high school students. The present study provided evidence supporting its use in cross-national comparative research and as a strength-based assessment of Japanese junior high school students.

4.1 SEHS-S validity and reliability with Japanese junior high school students

As consistent with previous studies across different countries (You et al., 2015) and the previous study that validated the updated SEHS-S with Japanese high school students (Iida et al., 2019), confirmatory

factor analyses indicated that all 36 items adequately loaded onto their respective 12 subscales. Item loadings ranged from 0.51 to 0.92, similar to previous findings (0.51–0.95 with Japanese high school students in Iida et al., 2019; 0.58–0.94 with high school students in the United States in Furlong et al., 2014). Supporting Hypothesis 1, the CFA supported the internal validity model of the SEHS–S—12 subscales loading onto the four first-order latent traits (Belief-in-Self, Belief-in-Others, Emotional Competence, and Engaged Living). These, in turn, contributed to Covitality, a second-order latent construct. As consistent with previous studies, the present study found reasonable internal reliability of the updated SEHS-S.

In support of Hypothesis 5, the concurrent validity analyses supported the higher-order structural model, including Covitality significantly predicting subjective wellbeing and the indicators of mental health problems. These findings were consistent with the results of previous studies (Furlong et al., 2014; Lee et al., 2016), which supported the use of Covitality as a general indicator for youths' positive social–emotional development.

Overall, the present study's findings supported the validity and reliability of the SEHS–S as a strength-based instrument that provides information on core psychological dispositions along with the Covitality score as an overall indicator of psychological dispositions that predict subjective wellbeing and mental health problems. The introduction of the updated SEHS–S to Japanese junior high schools could be beneficial for educators to identify at-risk students who require extra social–emotional support effectively. As described earlier, in Japan, few comprehensive strength-based assessments with robust statistical qualities that is practical for universal mental health screening. The updated SEHS–S could be a strength-based measure with a comprehensive theoretical background, robust statistical qualities, and practicality for universal school-based screening (Furlong et al., 2020).

4.2 Sex difference in Covitality and four domains

In support of Hypothesis 2, measurement invariance testing indicated that the second-order latent factor model applies equally to males and females. Such measurement invariance allows meaningful comparisons of latent means across sex and grade-level groups. This finding means the SEHS–S can be utilized as a viable measure of Covitality for Japanese junior high school students.

In support of Hypothesis 3 and consistent with the previous studies testing the SEHS-S with Japanese junior high school students (Ito et al., 2015), the present study found that females reported higher Belief-in-Others and Emotional Competence. Higher Belief-in-Others and Emotional Competence may be partly attributed to cultural norms for females in Asian culture that value social cohesion and interdependence (You et al., 2015). Internationally, studies also consistently reported that social–emotional skills, such as empathy, develop with age. However, females reach a plateau around 12–13 years old, while males tend to experience a decline into late adolescence (Van der Graaff et al., 2013). However, unlike the previous study conducted by Ito et al. (2015), the present study found that males, rather than females, have a higher Belief-in-Self and Engaged Living. The discrepancy in findings may be partly attributed to the difference in samples and measures.

TABLE 6 Standardized factor loadings for the Covitality scales with the full-sample.

Items and scales	Loadings
Belief-in-self	
Self-efficacy	
I can work out my problems	0.64
I can do most things if I try	0.73
There are many things that I do well	0.71
Self-awareness	
There is a purpose to my life	0.70
I understand why I do what I do	0.89
I understand my moods and feelings	0.51
Persistence	
When I do not understand something, I ask the teacher again and again until I understand	0.70
I try to answer all the questions asked in class	0.76
When I try to solve a math problem, I will not stop until I find a final solution	0.66
Belief-in-others	
School support	
At my school, there is a teacher or some other adult who always wants me to do my best	0.90
At my school, there is a teacher or some other adult who listens to me when I have something to say	0.82
At my school, there is a teacher or some other adult who believes that I will be a success	0.92
Family coherence	
My family members really help and support one another	0.88
There is a feeling of togetherness in my family	0.93
My family really gets along well with each other	0.86
Peer support	
I have a friend my age who really cares about me	0.88
I have a friend my age who talks with me about my problems	0.88
I have a friend my age who helps me when I'm having a hard time	0.94
Emotional competence	
Emotional regulation	
I accept responsibility for my actions	0.80
When I make a mistake, I admit it	0.82
I can deal with being told no	0.75
Empathy	
I feel bad when someone gets their feelings hurt	0.66
I try to understand what other people go through	0.87
I try to understand how other people feel and think	0.88

(Continued)

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TABLE 6 (Continued)

Items and scales	Loadings
Behavioral self-control	
I can wait for what I want	0.77
I do not bother others when they are busy	0.75
I think before I act	0.67
Engaged living	
Optimism	
Each day I look forward to having a lot of fun	0.80
I usually expect to have a good day	0.92
Overall, I expect more good things to happen to me than bad things	0.75
Gratitude	
Since yesterday, I have felt grateful	0.92
Since yesterday, I have felt thankful	0.94
Since yesterday, I have felt appreciative	0.94
Zest	
I feel energetic right now	0.72
I feel active right now	0.93
I am enthusiastic right now	0.91

The past study by Ito et al. (2015) employed a unique sample from junior high schools in a single rural district in Japan that could distort the study results. In contrast, the present study employed a more general sample from multiple urban and regional cities in Japan. The findings from the present study may be a more accurate representation of the sex difference among junior high school students compared to the previous study. However, further investigations must confirm the sex difference in Japanese junior high school students.

4.3 Grade level difference in Covitality and four domains

In support of Hypothesis 2, the present study showed that the second-order latent factor model applies equally to Japanese junior high school students in Grades 7 to 9. It means the updated SEHS–S can be utilized as a measure of Covitality for Japanese junior high school students with different grade levels. Such measurement invariance allows meaningful comparisons of latent means across students in different grade levels.

The present study found no difference in Covitality and four domain scores between Grades 7 and 8. However, in support of Hypothesis 4, grade 9 students had higher Covitality, Belief-in-Self, and Emotional Competence than Grade 8 students. Adolescence is a period of rapid social–emotional development with pubertal

TABLE 7 Invariance test model fit indices for the second-order factor model.

	S-B $\chi 2$	*df*	RMSEA	CI (90%)	CFI	CFI (Δ)
Sex (2 levels)						
Model 1	2722.42	1,156	0.035	0.033, 0.037	0.944	—
Model 2	2755.22	1,180	0.035	0.033, 0.037	0.944	0.000
Model 3	2784.26	1,191	0.035	0.033, 0.037	0.943	0.001
Model 4	2828.90	1,215	0.035	0.033, 0.036	0.942	0.001
Model 5	2877.03	1,223	0.035	0.033, 0.037	0.941	0.001
Grade level (3 levels)						
Model 1	3786.86	1734	0.032	0.030, 0.033	0.933	—
Model 2	3857.39	1782	0.031	0.030, 0.033	0.932	0.001
Model 3	3898.12	1804	0.031	0.030, 0.033	0.931	0.001
Model 4	3973.00	1852	0.031	0.030, 0.033	0.931	0.000
Model 5	3989.23	1868	0.031	0.030, 0.032	0.931	0.000

Model 1 = (baseline model) configure invariance. Model 2 = Model 1+ metric invariance first order factors. Model 3 = Model 2+ metric invariance second order factor. Model 4 = Model 3+ scalar invariance (observed variable intercepts). Model 5 = M4+ full scalar invariance (latent factors intercepts).

TABLE 8 Results of structured means analyses with male group as the reference group.

	Factor intercept	*z* value	Effect size (d)
Belief-in-self	−0.17	−3.96	0.24**
Belief-in-others	0.12	2.08	0.16*
Emotional competence	0.24	5.16	0.30**
Engaged living	−0.21	−3.06	0.12**
Covitality (highest-order latent trait)	−0.36	0.20	0.01

The latent mean values for male group were set to zero. * $p < 0.05$. ** $p < 0.01$.

TABLE 9 Results of structured means analyses between grade levels.

	Reference group	Compared group	Intercept	*z* value	Effect size (*d*)
Belief-in-self	Grade 7	Grade 8	−0.08	1.67	0.13
Belief-in-others	Grade 7	Grade 8	−0.11	−1.59	0.12
Emotional competence	Grade 7	Grade 8	−0.03	−0.47	0.04
Engaged living	Grade 7	Grade 8	−0.07	−0.91	0.06
Covitality	Grade 7	Grade 8	−0.07	−1.51	0.12
Belief-in-self	Grade 7	Grade 9	0.05	0.94	0.05
Belief-in-others	Grade 7	Grade 9	0.03	0.41	0.02
Emotional competence	Grade 7	Grade 9	0.10	1.81	0.14
Engaged living	Grade 7	Grade 9	0.00	0.04	0.02
Covitality	Grade 7	Grade 9	0.04	0.77	0.05
BELIEF-IN-self	Grade 8	Grade 9	0.13	2.55	0.18*
Belief-in-others	Grade 8	Grade 9	0.14	1.86	0.12
Emotional competence	Grade 8	Grade 9	0.13	2.24	0.17*
Engaged living	Grade 8	Grade 9	0.07	0.91	0.08
Covitality	Grade 8	Grade 9	0.10	2.16	0.15*

The latent mean values for reference group were set to zero. * $p < 0.05$.

biological changes both in males and females (Ross et al., 2019). Past studies found that youth generally become more independent with age and develop better emotional competence (e.g., self-awareness, empathy, self-regulation, and relationship skills; Ross et al., 2019). These developmental trends may partially explain why Grade 9 students exhibit higher Covitality, Belief-in-Self, and Emotional Competence levels than Grade 8 students. However, further research with a larger sample of Japanese junior high school students from more diverse locations would be required to confirm the grade level difference in Covitality and its four psychological disposition domains.

4.4 Limitations and future research direction

The results of this study were a first step in establishing and refining the validity and reliability of the SEHS–S within the Japanese educational context. While the present study employed a sample from multiple junior high schools in Japan, the results cannot be generalized to all Japanese youth aged 12–15. Furthermore, although the present study found evidence for the internal reliability of the SEHS-S, it did not investigate the test–retest reliability. Hence, the stability of the SEHS-S scores is not yet confirmed. However, the primary purpose of this investigation was to evaluate if an adaptation of the SEHS-S for Japanese junior high schools had sufficient construct, concurrent validity, and internal reliability to warrant further investigation.

Correlation and path analysis results showed that Covitality scores were more strongly associated with subjective wellbeing measures (life satisfaction and school connectedness) and less strongly associated with mental health problems. This relationship may support the validity of considering children's mental health needs using the dual-factor model (Greenspoon and Saklofske, 2001) that wellbeing and mental health problems such as distress are somewhat independent. Therefore, it is necessary to assess indicators of wellbeing (including positive assets) and mental health problems when understanding children's global mental health needs. As a direction for future research, it is crucial to examine further the clinical validity of these two complete mental health dimensions with actual school attendance of children and teacher and parent ratings. In addition, to investigating how each element of Covitality works as a protective factor for children, conducting a longitudinal study would be clinically meaningful.

5 Conclusion

The current study provided preliminary internal validity, concurrent validity, and internal reliability evidence for the SEHS–S social–emotional health Covitality model for Japanese junior high school students. Further study is needed to confirm the findings from the present study with other nationally representative samples and to explore further how to use the SEHS–S most effectively with Japanese junior high school students in a culturally sensitive manner.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the University of Tsukuba Department of Human Studies Ethics Committee, Tokyo Area Committee. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants and/

or their legal guardians/next of kin because the researcher obtained approval from the principals for the schools' participation. The principals described the purpose of the study to caregivers and received consent for students' participation.

Author contributions

JI: Conceptualization, Funding acquisition, Investigation, Writing – original draft, Writing – review & editing. YT: Writing – original draft, Writing – review & editing. TO: Conceptualization, Investigation, Writing – review & editing. MF: Conceptualization, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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