Chapter #24

RELIABILITY AND CONSTRUCT VALIDITY OF A NEW JAPANESE TRANSLATION OF THE SUBJECTIVE VITALITY SCALE

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ABSTRACT
The trait scale of the Subjective Vitality Scale (Ryan & Frederick, 1997) is a widely used self-report measure of subjective vitality as a characteristic of the individual. However, certain problems with two items included in the measure have been pointed out. Therefore, three versions with different items are currently used in research (i.e., the 7-item, 6-item, and 5-item versions). This study aimed to develop and validate a new Japanese translation (SVS-J) of these versions using a sample of 424 Japanese college students. Exploratory and confirmatory factor analyses supported the unidimensionality of the three versions. However, the one-factor structure provided a better fit to the data for the 5-item version than for the other versions. All the versions showed good internal consistency reliability (Cronbach's alphas = .87 to .91) and test-retest reliability (*r*s = .79 to .80). The expected correlations with scores on the hedonic and eudaimonic well-being, self-esteem, and mental illness measures were found to be common to the versions, confirming the convergent validity of the SVS-J. These findings show little evidence of problems with items, indicating that the choice of version may be insignificant. The versions were shown to be reliable and valid trait scales of subjective vitality and to have almost the same utility.

Keywords: subjective vitality, trait scale, Japanese translation, reliability, construct validity.

1. INTRODUCTION

1.1. Vitality

Vitality is classically defined as having physical and mental energy (Ryan & Deci, 2008; Ryan & Frederick, 1997). The concept of vitality reflects both organismic and psychological wellness and not simply a physical state (Ryan & Deci, 2017; Ryan & Frederick, 1997). Moreover, vitality is distinct from forms of activation, such as anger and anxiety, and non-activated positive states, such as happiness and satisfaction (Nix, Ryan, Manly, & Deci, 1999; Ryan & Deci, 2008). Individuals with vitality experience a sense of enthusiasm, aliveness, and energy that is available to the self (Ryan & Frederick, 1997).

Vitality is an aspect of eudaimonic well-being (Ryan & Deci, 2001, 2017) and a main component of character strengths (Dubreuil, Forest, & Courcy, 2014; Ryan & Deci, 2001; Toner, Haslam, Robinson, & Williams, 2012). As an indicator of organismic and psychological wellness, vitality is related to experiences of volition, effectance, and integration of the self at the psychological level, and good physical health and bodily functioning at the somatic level (Ryan & Bernstein, 2004; Ryan & Deci, 2008; Ryan & Frederick, 1997).

Because vitality is a complex construct reflecting physical and mental aspects of an individual's well-being (Ryan & Deci, 2008, 2017; Ryan & Frederick, 1997), researchers have proposed various definitions and measures for it with different emphases (Ryan & Bernstein, 2004). Among them, a construct that emphasizes an individual's subjective feeling is called subjective vitality, which is defined as the subjective experience of feeling aliveness, vigor, and energy available to the self (Ryan & Bernstein, 2004; Ryan & Frederick, 1997). Subjective vitality has two aspects: trait as a characteristic of the individual and state as a temporary condition (Ryan & Deci, 2008, 2017; Ryan & Frederick, 1997).

1.2. The subjective vitality scale

The Subjective Vitality Scale (SVS; Ryan & Frederick, 1997) is the standard measure for assessing subjective vitality. It refers to two types of scale corresponding to the aspects of subjective vitality: the trait scale, which measures individual difference levels of subjective vitality, and the state scale, which assesses the current state level of subjective vitality. The present study used a trait scale. The trait scale is a brief self-report measure that has been widely used in research (Ryan & Bernstein, 2004). Appropriate psychometric properties have been supported across different age groups and populations (Kawabata, Yamazaki, Guo, & Chatzisarantis, 2017; Liu & Chung, 2019; Ryan & Frederick, 1997). Moreover, translations are available in many languages, including Arabic (Fayad & Kazarian, 2013), Chinese (Liu & Chung, 2019), French (Salama-Younes, Montazeri, Ismail, & Roncin, 2009), German (Bertrams, Dyllick, Englert, & Krispenz, 2020), and Japanese (Kawabata et al., 2017).

Numerous previous studies using the trait scale have supported that subjective vitality as a marker of wellness was significantly related to a wide variety of psychological and physical variables. These values include well-being, e.g., life satisfaction, self-actualization, and satisfaction with basic psychological needs; self-esteem; personality traits; affect; mental illness, e.g., depression, anxiety, and general psychopathology; physical illness, e.g., the experience of pain and physical symptoms; and somatic factor, e.g., physical self-efficacy and body functioning (Kasser & Ryan, 1999; Ryan & Bernstein, 2004; Ryan & Deci, 2008; Ryan & Frederick, 1997; Yu, Zhang, Nunes, Deng, & Levesque-Bristol, 2020).

Three versions with different items have been used as the trait scale: the 7-item, 6-item, and 5-item versions. Recent studies have used one of the three versions (e.g., Jackson & DiPlacido, 2019; Wu & Buchanan, 2019; Yu et al., 2020). The original English measure (the 7-item version) developed by Ryan and Frederick (1997) consists of seven items and has adequate internal consistency reliability and test-retest reliability over 8 weeks. Moreover, a series of studies showed that the construct validity of the 7-item version was extensively supported based on correlations with various variables (Ryan & Frederick, 1997).

However, thereafter, Bostic, Rubio, and Hood (2000) found in a U.S. college student sample that of the seven items, the negatively worded Item 2 ("I don't feel very energetic") showed a lower factor loading and decreased the internal consistency of the measure. Therefore, the 6-item version, with Item 2 removed, was recommended as a unidimensional measure of vitality. Furthermore, Kawabata et al. (2017) pointed out that Item 5 ("I look forward to each new day") is a poor indicator of vitality, as it is more about optimism than energy. They compared the English versions and Japanese translations of the 7-item, 6-item, and 5-item versions in Singaporean and Japanese college student samples. As a result, in both the English and Japanese translations, the 5-item version showed higher unidimensionality and was preferable to the other versions from a methodological and content validity perspective. Likewise, in the Chinese version, the 5-item version was also more reliable and valid than the 7-item and 6-item versions (Liu & Chung, 2019).

The researchers who reexamined the SVS mainly presented problems regarding the wording of Item 2 and the content of Item 5. However, the authors who developed and validated the original 7-item scale (i.e., Ryan & Frederick, 1997) closely examined the scale items and then concluded that all seven items reflected "an adequate definition of a phenomenological sense of aliveness and energy" (p. 540). Although Kawabata et al. (2017) has already developed a Japanese translation of the SVS, research and understanding of subjective vitality in Japan should be promoted by developing a new Japanese translation and examining its versions with different items.

1.3. Purpose of the study

This study newly translated the SVS trait scale into Japanese (SVS-J) and examined the reliability and construct validity of the 7-item, 6-item (removing Item 2), and 5-item (removing Items 2 and 5) versions of the translation (SVS-J-7, SVS-J-6, and SVS-J-5, respectively). First, the hypothesized unidimensionality of the three versions was assessed. Then, the internal consistency and temporal stability were examined. Because a test-retest correlation of .64 for an eight-week interval was found for the original SVS (Ryan & Frederick, 1997), a high to very high test-retest correlations was expected for shorter intervals. Finally, convergent validity was assessed through correlations with scores on hedonic and eudaimonic well-being, self-esteem, and mental illness measures. Hedonic well-being was assessed using the three components of the tripartite model (Diener, 1984): life satisfaction, positive affect, and negative affect. Based on previous studies (Kawabata et al., 2017; Ryan & Frederick, 1997), it was expected that the SVS-J scores would be positively and moderately to highly correlated with life satisfaction scores, positively and moderately correlated with positive affect scores, and negatively and moderately correlated with negative affect scores. Because vitality is within eudaimonic well-being (Ryan & Deci, 2001, 2017), the SVS-J scores would be more highly correlated with scores on eudaimonic well-being measures. Based on the findings of Ryan and Frederick (1997), the SVS-J scores would be positively and highly correlated with scores on self-esteem measure and negatively and moderately to highly correlated with scores on depression and anxiety measures.

2. METHOD

2.1. Participants

The participants were 424 Japanese undergraduate students (54.5% female), with a mean age of 20.64 years (*SD* = 1.41; age range = 17 to 27). They were from two colleges in Japan and studied engineering or cross-cultural studies. All participants voluntarily participated in this study independently of their courses.

2.2. Measures

2.2.1. Japanese translation of the trait scale of the subjective vitality scale

The original trait scale of the SVS was translated into Japanese using a translational process conceived by referring to several guidelines (e.g., Beaton, Bombardier, Guillemin, & Ferraz, 2000; Sousa & Rojjanasrirat, 2011) with permission from Dr. Richard M. Ryan (personal communication, April 12, 2013). This translational process was based on a translation and back-translation procedure (Brislin, 1970). The items of the original English measure were translated into Japanese by a bilingual professor and translated back into English by another bilingual professor. They fully understood the concept of vitality and self-determination theory. Then, the consistency between the translation and back translation

was checked by two researchers. This procedure was repeated until an acceptable degree of consistency was achieved. Because each original item was a brief and plain expression of experiences familiar to Japanese people, cultural relevance and item difficulty should have little influence on the translation procedure. As a result, consistency between them was satisfactorily achieved. The outcomes of this procedure, confirmed by seven graduate and undergraduate students, showed they had no problem understanding and responding to the items.

The original SVS consists of seven items rated on a 7-point Likert scale ranging from 1 (*not at all true*) to 7 (*very true*). The items of the Japanese translation were also rated on the same Likert scale as the original measure was.

2.2.2. Other measures

(1) Life satisfaction

Life satisfaction was measured using the Japanese version of the 5-item Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985; Sumi, 2020). The items are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Japanese version had good internal consistency reliability (Cronbach's alphas = .78 and .82), test-retest reliability over a 4-week period (r = .73), factorial validity of the single factor structure, and convergent validity based on acceptable correlations with scores on well-being measures.

(2) Positive and negative affect

The Japanese version of the 12-item Scale of Positive and Negative Experience (Diener, Wirtz, Tov, Kim-Prieto, Choi, Oishi, Biswas-Diener, 2010; Sumi, 2013, 2014) was used to measure positive and negative affect. This measure comprises a 6-item positive affect subscale and a 6-item negative affect subscale with a 5-point response format ranging from 1 (*very rarely or never*) to 5 (*very often or always*). Both subscales of the Japanese version showed good internal consistency reliability (Cronbach's alphas = .86 to .93) and test-retest reliability over one month (rs = .60 and .57, respectively). The subscales were loaded into two separate factors. Convergent validity was supported by correlations with scores on several well-being measures.

(3) Eudaimonic well-being

Eudaimonic well-being was assessed using the Japanese version of the Flourishing Scale (Diener et al., 2010; Sumi, 2013, 2014), which consists of eight items describing broad and important aspects of psychological functioning. These items are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Japanese version showed good internal consistency reliability (Cronbach's alphas = .94 to .95) and test-retest reliability over one month (r = .87), and as expected, a single factor structure. Convergent validity was supported by correlations with scores on several well-being measures.

(4) Self-esteem

Self-esteem was measured using the Japanese version of the 10-item Self-Esteem Scale (Rosenberg, 1965; Yamamoto, Matsui, & Yamanari, 1982). Each item has a 5-point response format ranging from 1 (*disagree*) to 5 (*agree*). The Japanese version showed factorial validity supporting the hypothesized one-factor structure.

(5) Depression and anxiety

The Japanese version of the two subscales taken from the Hopkins Symptom Checklist (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Sumi, 1997) was used to measure depression and anxiety. Each subscale contains 11 and seven items, respectively, and assesses the frequency of symptoms during the past seven days on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). Acceptable internal consistency reliability (Cronbach's alphas = .84 to .91), a factor structure similar to that of the original scales, and positive correlations with perceived stress were found (Sumi, 1997, 2007; Sumi & Kanda, 2002).

2.3. Procedure of questionnaire administration

The participants completed all questionnaires in the first session (Time 1). Four weeks after the session, 385 participants completed only the SVS-J in the second session (Time 2). All questionnaires were administered after informed consent was obtained. Ethical clearance for the study was obtained from the relevant ethical committee.

2.4. Data analysis

All the data analyses were conducted for the three versions of the SVS-J. First, to examine the one-factor structure of the versions, an exploratory factor analysis using principal axis factoring was used to explore the underlying factor structure of the versions. Then, a confirmatory factor analysis was performed to test the factor structure. Second, Cronbach's alphas were calculated to examine the internal consistency reliability. In addition, test-retest reliability was assessed using correlations calculated from the data at Time 1 and Time 2. Finally, convergent validity was examined by assessing correlations between scores on the versions and other measures.

3. RESULTS

3.1. Factor structure

For factor analysis, participants at Time 1 were randomly and equally divided into samples A and B (*n*s= 212). There were no significant differences between the two samples with respect to sex, $\chi^2(1, N = 424) = .25$, and age, $t(422) = .51$. In addition, no significant differences in mean scores for the three versions were found between the two samples, *t*s(422) = .03 to .22.

The exploratory factor analysis of each version was conducted on the data from Sample A. For the SVS-J-7, SVS-J-6, and SVS-J-5, the Kaiser-Meyer-Olkin measures of sampling adequacy were .90, 89, and .84, respectively, and the Bartlett's tests of sphericity were 971.70, 753.33, and 600.84 (*p*s < .01), respectively. These results supported that the collected data were appropriate for factor analysis. As shown in Table 1, the exploratory factor analysis yielded one factor with eigenvalues greater than 1.0, accounting for 60.40%, 59.81%, and 60.44% of the total variance for SVS-J-7, SVS-J-6, and SVS-J-5, respectively. In each version, the factor loadings of the items were greater than .56.

Table 1.
Factor Loadings for Exploratory Factor Analysis in Sample 1.

Item	SVS-J-7	SVS-J-6	SVS-J-5
1	.86	.87	.86
2	-.80	–	–
3	.62	.62	.60
4	.87	.88	.89
5	.74	.76	–
6	.56	.56	.57
7	.92	.90	.90
Eigenvalue	4.23	3.59	3.02
% of variance	60.40	59.81	60.44

As shown in Table 2, results from subsequent confirmatory factor analysis showed an acceptable fit of the one-factor model of each version to the data from Sample B (GFI > .95, AGFI > .90, NFI > .96, CFI > .98, and SRMR < .04). Table 3 shows the four types of information criteria (AIC, BCC, BIC, and CAIC). When comparing their values, SVS-J-5 was the smallest in all the information criteria. Table 4 shows the standardized factor loadings for each version. In all the versions, the factor loadings were all significant (*p*s < .01) and greater than .61, with coefficients of determination greater than .37.

Table 2.
Goodness of Fit Indices for Confirmatory Factor Analysis in Sample 2.

Measure	χ^2	*df*	GFI	AGFI	NFI	CFI	SRMR
SVS-J-7	37.88**	14	.95	.91	.96	.98	.03
SVS-J-6	24.83**	9	.96	.92	.97	.98	.03
SVS-J-5	20.34**	5	.96	.90	.97	.98	.03

** p < .01.

Table 3.
Information Criteria for Confirmatory Factor Analysis in Sample 2.

Measure	AIC	BCC	BIC	CAIC
SVS-J-7	65.88	66.99	112.87	126.87
SVS-J-6	48.83	49.65	89.11	101.11
SVS-J-5	40.34	40.93	73.91	83.91

Table 4.
Standardized Factor Loadings for Confirmatory Factor Analysis in Sample 2.

Item	SVS-J-7	SVS-J-6	SVS-J-5
1	.85 (.72)	.85 (.72)	.85 (.73)
2	-.79 (.62)	–	–
3	.61 (.37)	.61 (.37)	.62 (.39)
4	.89 (.79)	.89 (.79)	.89 (.79)
5	.73 (.54)	.75 (.56)	–
6	.64 (.41)	.63 (.40)	.62 (.38)
7	.90 (.81)	.89 (.80)	.89 (.79)

Note. All factor loadings are significant, *p*s < .01. Values in parentheses are coefficients of determination.

3.2. Internal consistency and test-retest reliability

Table 5 shows the means, standard deviations, range of scores, Cronbach's alphas, test-retest correlations, and corrected item-total correlations for the three versions. Both Cronbach's alphas (.87 to .91) and test-retest correlations (.79 to .80) did not differ significantly between the three versions. Corrected item-total correlations (absolute values) for the SVS-J-7, ranging from .56 to .86, were .75 for Item 2 and .70 for Item 5. Those for SVS-J-6, ranging from .56 to .83, were .71 for Item 5. In addition, intercorrelations between scores on the versions were all near-perfect correlations (*r*s = .99).

3.3. Convergent validity

The correlations between the scores on the versions and other measures are presented in Table 6. In general, the correlations were in the expected direction and magnitude, which is regarded as supporting convergent validity, and quite similar among the versions as well. The scores on each version were moderately positively correlated with the scores on the Satisfaction With Life Scale and Positive Affect scale (*r*s = .37 to .52) and moderately negatively correlated with scores on the Negative Affect scale (*r*s = -.37 to -.34). Compared with the hedonic well-being measures, scores on the Flourishing Scale were highly correlated with scores on the versions (*r*s = .63 to .66). High correlations were also found between the scores on the versions and the Self-Esteem Scale (*r*s = .53 to .56). Correlations between the scores on the versions, Depression scale, and Anxiety scale were found to be low to moderate (*r*s = -.40 to -.22).

Table 5.
Means, Standard Deviations, Range of Scores, Cronbach's αs, Test-Retest Correlations, and Corrected Item-Total Correlations for Three Versions of the SVS-J at Time 1.

Measure	*M*	*SD*	Range of Scores	Cronbach's α	Test-retest *r*	Range of CITC
SVS-J-7	30.63	7.85	7 – 49	.91	.80	.56 – .86
SVS-J-6	26.42	6.65	6 – 42	.89	.79	.56 – .83
SVS-J-5	21.80	5.64	5 – 35	.87	.79	.54 – .82

Note: Range of CITC = absolute values of range of corrected item–total correlations

Table 6.
Correlations between Scores on Three Versions of the SVS-J and Other Measures.

Measure	*r*			*M*	*SD*	Cronbach's α
	SVS-J-7	SVS-J-6	SVS-J-5			
Satisfaction With Life Scale	.40	.40	.37	18.70	5.89	.80
Positive affect scale	.51	.52	.50	22.12	4.69	.95
Negative affect scale	-.37	-.37	-.34	16.77	4.97	.88
Flourishing Scale	.65	.66	.63	37.12	6.91	.83
Self-Esteem Scale	.56	.55	.53	31.73	7.29	.87
Depression scale	-.40	-.39	-.37	24.73	8.26	.89
Anxiety scale	-.24	-.22	-.22	14.69	5.41	.85

Note: All correlations are significant at $p < .01$.

4. DISCUSSION

This study aimed to develop and validate a new Japanese translation of the SVS. It has been noted that some problems with Items 2 and 5 of the SVS impaired the psychometric properties, such as unidimensionality, in particular, of the 7-item SVS (Bostic et al., 2000; Kawabata et al., 2017; Liu & Chung, 2019). In contrast, as a result of the present study, such shortcomings were not found in the new Japanese translation.

The hypothesized unidimensionality was well supported for the SVS-J-7, SVS-J-6, and SVS-J-5. Both the exploratory and confirmatory factor analyses revealed satisfactory factor loadings for the items, including Items 2 and 5. For each version, the first factor accounted for a substantial portion of the total variance. The goodness-of-fit indices were acceptable and very similar among the versions. However, the SVS-J-5 showed the lowest value of the information criteria (Table 2) and had a better fit of the one-factor model to the data than the other versions.

Internal consistency reliability was also good and similar among the three versions. Although there may be a slightly worsening internal consistency due to a decrease in items, the Cronbach's αs of all the versions were appropriate values (Nunnally & Bernstein, 1994). Temporal stability over a 4-week period was very high for each version, as expected. Moreover, the corrected item-total correlations of Items 2 and 5 were not lower than those of the other items. Even in terms of the reliability of the SVS-J, there were few problems with Items 2 and 5.

Correlations with scores for hedonic well-being, eudaimonic well-being, self-esteem, depression, and anxiety were also as expected, confirming the convergent validity of the SVS-J. Indeed, the results indicate that vitality is an indicator of wellness (Ryan & Bernstein, 2004). These correlations were very similar among the three versions. In addition, there were near-perfect correlations between scores on the versions. The findings suggest homogeneity as a measure between the versions, regardless of Items 2 and 5.

Based on the fit to the hypothesized factor model, the present findings show that the SVS-J-5 may be a better measure for assessing subjective vitality. However, the other psychometric properties were adequate and comparable among the three versions. Therefore, each version of the new Japanese translation has almost the same utility. These findings contrast with those of previous studies (Bostic et al., 2000; Kawabata et al., 2017; Liu & Chung, 2019), which found the superiority of the 6-item or 5-item version and pointed out the problem with Item 2 or 5. Although the reason for this inconsistency is not clear, one explanation could be that nuances exist in the English and Japanese formulations of the items. While this issue should be examined in future research, the present results indicate no serious problems with Items 2 and 5.

The findings of this study generally support that all versions of the SVS-J are a useful measure to assess subjective vitality with good reliability and construct validity. However, this study has several limitations. First, the sample of this study was limited to college students. Future studies should use other populations such as working people or clinical samples. Second, the interval to assess temporal stability was only 4 weeks. It is necessary to ascertain the temporal stability at various intervals. Third, construct validity was examined through relationship with the psychological variables. Future studies should examine the relationship between physical health and functioning. Finally, additional validity studies of the SVS-J, including predictive and concurrent validity, are needed.

REFERENCES

Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine, 25*(24), 3186-3191. doi: 10.1097/00007632-200012150-00014

Bertrams, A., Dyllick, T. H., Englert, C., & Krispenz, A. (2020). German adaptation of the Subjective Vitality Scales (SVS-G). *Open psychology, 2*(1), 57-75. doi: 10.1515/psych-2020-0005

Bostic, T. J., Rubio, D. M., & Hood, M. (2000). A validation of the Subjective Vitality Scale using structural equation modeling. *Social Indicators Research, 52*, 313-324. doi: 10.1023/A:1007136110218

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 185-216. doi: 10.1177/135910457000100301

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom inventory. *Behavioral Science, 19*(1), 1-15. doi: 10.1002/bs.3830190102

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542-575. doi: 10.1037/0033-2909.95.3.542

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49*(1), 71–75. doi: 10.1207/s15327752jpa4901_13

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143–156. doi: 10.1007/s11205-009-9493-y

Dubreuil, P., Forest, J., & Courcy, F. (2014). From strengths use to work performance: The role of harmonious passion, subjective vitality, and concentration. *Journal of Positive Psychology, 9*(4), 335-349. doi: 10.1080/17439760.2014.898318

Fayad, Y. I., & Kazarian, S. S. (2013). Subjective vitality of Lebanese adults in Lebanon: Validation of the Arabic version of the Subjective Vitality Scale. *Social Indicators Research, 114*(2), 465-478. doi: 10.1007/s11205-012-0156-z

Jackson, C. E., & DiPlacido, J. (2019). Vitality as a mediator between diet quality and subjective wellbeing among college students. *Journal of Happiness Studies, 21*(5), 1617-1639. doi: 10.1007/s10902-019-00150-6

Kasser, V. G., & Ryan, R. M. (1999). The relation of psychological needs for autonomy and relatedness to vitality, well-being, and mortality in a nursing home. *Journal of Applied Social Psychology, 29*(5), 935-954. doi: 10.1111/j.1559-1816.1999.tb00133.x

Kawabata, M., Yamazaki, F., Guo, D. W., & Chatzisarantis, N. L. D. (2017). Advancement of the Subjective Vitality Scale: Examining alternative measurement models for Japanese and Singaporeans. *Scandinavian Journal of Medicine & Science in Sports, 27*(12), 1793-1800. doi: 10.1111/sms.12760

Liu, J. D., & Chung, P. K. (2019). Factor structure and measurement invariance of the Subjective Vitality Scale: Evidence from Chinese adolescents in Hong Kong. *Quality of Life Research, 28*(1), 233-239. doi: 10.1007/s11136-018-1990-5

Nix, G. A., Ryan, R. M., Manly, J. B., & Deci, E. L. (1999). Revitalization through self-regulation: The effects of autonomous and controlled motivation on happiness and vitality. *Journal of Experimental Social Psychology, 35*(3), 266-284. doi: 10.1006/jesp.1999.1382

Nunnally, J. C., & Bernstein, I. H. (1994) *Psychometric theory* (3rd Ed.). New York: McGraw-Hill.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Ryan, R. M., & Bernstein, J. (2004). Vitality [zest, enthusiasm, vigor, energy]. In C. Peterson & M. E. P. Seligman (Eds.), *Character strengths and virtues: A handbook and classification* (pp. 273-289). New York: Oxford University Press/Washington, DC: American Psychological Association.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141-166. doi: 10.1146/annurev.psych.52.1.141

Ryan R. M, & Deci E. L. (2008). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass, 2*(2), 702-717. doi: 10.1111/j.1751-9004.2008.00098.x

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York: Guilford Press.

Ryan, R. M., & Frederick, C. M. (1997). On energy, personality and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*(3), 529-565. doi: 10.1111/j.1467-6494.1997.tb00326.x

Salama-Younes, M., Montazeri, A., Ismail, A., & Roncin, C. (2009). Factor structure and internal consistency of the 12-item General Health Questionnaire (GHQ-12) and the Subjective Vitality Scale (VS), and the relationship between them: A study from France. *Health and Quality of Life Outcomes, 7*(1), 1-6. doi: 10.1186/1477-7525-7-22

Sousa, V. D., & Rojjanasrirat, W. (2011). Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: A clear and user-friendly guideline. *Journal of Evaluation in Clinical Practice, 17*(2), 268-274. doi: 10.1111/j.1365-2753.2010.01434.x

Sumi, K. (1997). Optimism, social support, stress and physical and psychological well-being in Japanese women. *Psychological Reports, 81*(1), 299-306. doi: 10.2466/pr0.1997.81.1.299

Sumi, K. (2007). Reliability and validity of the Japanese version of the Perceived Stress Scale. *Japanese Journal of Health Psychology, 19*(2), 44-53. doi: 10.11560/jahp.19.2_44 [in Japanese]

Sumi, K. (2013). Reliability and validity of Japanese versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *Social Indicators Research, 118*(2), 601-615. doi: 10.1007/s11205-013-0432-6

Sumi, K. (2014). Temporal stability of the Japanese versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *Journal of Psychology and Psychotherapy, 4*(2). https://doi.org/10.4172/2161-0487.1000140

Sumi, K. (2020). The reciprocal influence of well-being and social problem-solving abilities: An analysis of longitudinal data from college students. *Journal of Educational and Health Science, 66*(1), 37-46. doi: 10.32311/jsehs.66.1_41 [in Japanese]

Sumi, K., & Kanda, K. (2002) Relationship between neurotic perfectionism, depression, anxiety, and psychosomatic symptoms: A prospective study among Japanese men. *Personality and Individual Differences, 32*(5), 817-826. doi: 10.1016/S0191-8869(01)00088-5

Toner, E., Haslam, N., Robinson, J., & Williams, P. (2012). Character strengths and wellbeing in adolescence: Structure and correlates of the Values in Action Inventory of Strengths for Children. *Personality and Individual Differences, 52*(5), 637-642. doi: 10.1016/j.paid.2011.12.014

Wu, I. H., & Buchanan, N. T. (2019). Pathways to vitality: The role of mindfulness and coping. *Mindfulness, 10*(3), 481-491. doi: 10.1007/s12671-018-0989-x

Yamamoto, M., Matsui, Y., & Yamanari, Y. (1982). The structure of perceived aspects of self. *Japanese Journal of Educational Psychology, 30*(1), 64-68. doi: 10.5926/jjep1953.30.1_64 [in Japanese]

Yu, S., Zhang, F., Nunes, L. D., Deng, Y., & Levesque-Bristol, C. (2020). Basic psychological needs as a predictor of positive affects: A look at peace of mind and vitality in Chinese and American college students. *Journal of Positive Psychology, 15*(4), 488-499. doi: 10.1080/17439760.2019.1627398

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