Chapter # 24

JAPANESE TRANSLATION AND VALIDATION OF THE SHORT GRIT SCALE (GRIT-S)

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ABSTRACT
Grit has recently attracted the attention of researchers and practitioners. However, studies have reported inconsistent findings regarding its dimensionality and association with success outcomes. This study examined the reliability and construct validity of a new Japanese translation of the Short Grit Scale (Grit-S-J), a brief self-report measure of grit, in a sample of 276 Japanese college students (88 women, 188 men; mean age = 20.81 years, *SD* = 0.89). Exploratory and confirmatory factor analyses supported the two-factor structure comprising perseverance of effort and consistency of interests. The total Grit-S-J and its two subscales showed adequate internal consistency and 4-week test–retest reliability. Construct validity was supported by expected correlations with scores for personality traits (self-control, Big-Five personality traits, and vitality), hedonic and eudaimonic well-being, and mental health (psychological stress, depression, and anxiety). Meanwhile, discriminant validity of the Grit-S-J was suggested by partial correlations between scores on the Grit-S-J, well-being measures, and mental health measures, after controlling for scores for either self-control or conscientiousness. Overall, the findings preliminarily support the usefulness of the Grit-S-J in grit research in the Japanese population.

Keywords: grit, Grit-S, measure, Japanese version, reliability, construct validity.

1. INTRODUCTION

1.1. Grit: Definition and Research Findings

Grit is a personality trait that has received extensive attention over the last decade because of its potential association with optimal performance (Credé, Tynan, & Harms, 2017; Datu, 2021; Fernández-Martín, Arco-Tirado, & Hervás-Torres, 2020). This personality trait was originally defined as trait-level perseverance and passion for long-term goals. It was conceptualized to comprise two facets: perseverance of effort and consistency of interests (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Quinn, 2009; Duckworth, Quinn, & Tsukayama, 2021). Perseverance of effort refers to the tendency to sustain effort toward long-term goals. Meanwhile, consistency of interests involves the tendency to maintain focus on and interest in the same goal for a long period (Eskreis-Winkler, Gross, & Duckworth, 2016). Grittier individuals persevere with challenging goals, maintaining effort and interest over the years despite obstacles, setbacks, and plateaus in progress (Duckworth et al., 2007; Duckworth & Gross, 2014). Although self-control and conscientiousness (one of the Big-Five personality traits) are described as traits similar to grit, some have argued that they are distinct from grit in stamina to sustain both effort and interest toward goals over the years despite setbacks (Duckworth et al., 2007; Duckworth & Gross, 2014; Duckworth & Seligman, 2017). Grit-related interventions have also received attention, because personality traits may be easier to enhance than intelligence or other

cognitive abilities (Gonzalez, Canning, Smyth, & MacKinnon, 2019; Duckworth & Gross, 2014; Eskreis-Winkler et al., 2016).

Early research found that grit predicted achievement outcomes in diverse contexts (Datu, 2021; Duckworth & Eskreis-Winkler, 2015; Eskreis-Winkler et al., 2016). For example, grit is associated with educational attainment (Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014), professional success (Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler, Shulman, & Duckworth, 2014; Eskreis-Winkler, Shulman, Beal et al., 2014; Robertson-Kraft & Duckworth, 2014), goal achievement (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011; Eskreis-Winkler, Shulman, Beal et al., 2014), and positive personal outcomes (Eskreis-Winkler, Shulman, Beal et al., 2014). Grit also predicted life outcomes above and beyond talent, including general intelligence, physical aptitude, and conscientiousness (Duckworth et al., 2007; Duckworth & Eskreis-Winkler, 2015; Eskreis-Winkler, Shulman, Beal et al., 2014). It accounted for an average of 4% of the variance in individual success (Duckworth et al., 2007). Moreover, grit is considered a character or personality strength (Clark & Plano Clark, 2019; Kashdan, McKnight, & Goodman, 2022; Lam & Zhou, 2022). A study comparing 10 personality strengths (Sheldon, Jose, Kashdan, & Jarden, 2015) showed that grit was the only predictor of 6-month increases in goal attainment among these strengths, including gratitude, curiosity, and control beliefs.

Although grit has mainly been studied in the context of achievement and performance outcomes, research also suggests positive associations with well-being and mental health (Eskreis-Winkler et al., 2016; Datu, 2021; Fernández-Martín et al., 2020; Schimschal, Visentin, Kornhaber, & Cleary, 2021). For example, many studies have indicated its positive relationships with hedonic and eudaimonic well-being (Datu, McInerney, Żemojtel-Piotrowska, Hitokoto, & Datu, 2021; Disabato, Goodman, & Kashdan, 2019; Disabato, Goodman, Kashdan, Short, & Jarden, 2016; Hou et al., 2022; Vainio & Daukantaitė, 2016), physical health (Gray, Fettes, Woltering, Mawjee, & Tannock, 2016; Moore et al., 2018), and mental health, including reduced stress, depression, and anxiety (Disabato et al., 2019; Knauft, Holt, & Kalia, 2024; Musumari et al., 2018; Sharkey et al., 2018).

Furthermore, numerous studies suggest that grit plays an advantageous role in performance, success, and well-being (Allen, Kannangara, & Carson, 2021; Datu, 2021; Fernández-Martín et al., 2020; Schimschal et al., 2021). However, research on grit has been notable for its controversy and progress. Recent meta-analytic reviews (Credé et al., 2017; Lam & Zhou, 2019) and systematic reviews (Allen et al., 2021; Datu, 2021; Credé, 2018) have highlighted several theoretical and empirical challenges. A major debate has to do with construct redundancy with similar traits, such as conscientiousness and self-control (Berk, 2018; Gonzalez et al., 2019; Liang, 2021). Moreover, although the proponents (Duckworth & Quinn, 2009; Duckworth et al., 2021) presented a two-factor model or second-order factor model of grit, which is mathematically equivalent (Credé et al., 2017; Muenks, Wigfield, Yang, & O'Neal, 2017), the dimensionality of grit has been criticized owing to inconsistencies across studies (Duckworth et al., 2021). Some studies have found a one-factor model (e.g., Arco-Tirado, Fernandez-Martin, & Hoyle, 2018; Gonzalez et al., 2019; Stephen Lenz, Watson, Luo, Norris, & Nkyi, 2018) or a bifactor model (e.g., Disabato et al., 2019; Muenks et al., 2017; Li, Fan, & Leong, 2023). Additionally, the dimensionality differs between cultural groups (Bae, Kim, Park, Lee, & Park, 2024; Disabato et al., 2019; Li et al., 2023), including individualist and collectivist ones (Abu Hasan, Munawar, & Abdul Khaiyom, 2020; Datu, Yuen, & Chen, 2017; Li et al., 2023; Morell et al., 2021). Still, several studies support the two-factor model (e.g., Bae et al., 2024; Datu, Valdez, & King, 2016;

Nishikawa, Okugami, & Amemiya, 2015; Wyszyńska, Ponikiewska, Karaś, Najderska, & Rogoza, 2017). As such, the conceptualization and measurement of grit need careful consideration (Allen et al., 2021; Credé, 2018; Credé et al., 2017; Datu, 2021).

1.2. Grit Measures

Self-reported questionnaires are typically used to measure grit (Abu Hasan et al., 2020; Eskreis-Winkler et al., 2016). Proponents of grit first developed a 12-item self-report measure, the Grit Scale (Duckworth et al, 2007), followed by its short form, the eight-item Short Grit Scale (Grit-S; Duckworth & Quinn, 2009). Both measures were designed to evaluate trait-level perseverance and passion for long-term goals. Although other measures have been developed (Clark & Malecki, 2019; Datu et al., 2017; Morell et al., 2021; Postigo et al., 2021; Singh, Chukkali, & Prete, 2021), most research has used either the Grit Scale or Grit-S (Abu Hasan et al., 2020; Disabato et al., 2019). Compared to the Grit Scale, Grit-S has better psychometric properties and fewer items that provide practical advantages, such as minimal respondent burden and easy administration. Translations of the Grit-S have been developed in various languages such as Spanish (Arco-Tirado et al., 2018), Polish (Wyszyńska et al., 2017), Turkish (Haktanir, Lenz, Can, & Watson, 2016), Korean (Bae et al., 2024), and Japanese (Nishikawa et al., 2015).

Essentially, Grit-S removed two items from each subscale of the Grit Scale to eliminate its shortcomings. In initial validation study (Duckworth & Quinn, 2009), the Grit-S has shown adequate psychometric properties with different samples, including internal consistency reliability, test–retest reliability, predictive validity, and consensual validity with informant (friend and family member) report versions (Duckworth & Eskreis-Winkler, 2015). Furthermore, internal consistency reliability (αs = .73 to .84) and test–retest reliability over a 1-year period (r = .68) have been adequate. Factor analysis identified two factors reflecting perseverance of effort and consistency of interest. This two-factor structure, identical to that of the original Grit scale, is consistent with the theory that grit is a compound trait comprising stamina in effort and interest (Duckworth et al., 2007; Duckworth & Quinn, 2009). These two factors represent the subscales, Perseverance of Effort (e.g., "I am diligent") and Consistency of Interest (e.g., "I often set a goal but later choose to pursue a different one") subscales, comprising four items. The subscales have exhibited acceptable internal consistency reliability (αs = .60 to .78 and .73 to .79, respectively) and high intercorrelation (r = .59). Although the correlation between Grit-S and conscientiousness scores was high (rs = .70 and .77), Grit-S scores predicted educational attainment and career changes after controlling for scores for conscientiousness and other Big-Five personality traits. There were also high correlations between scores on the Perseverance of Effort, Consistency of Interest and conscientiousness scales (rs = .64 and .74, respectively). The Grit-S has shown predictive validity for various success outcomes, including educational attainment, grade point average, fewer career changes, military retention, and competitive attainment.

The Japanese version of the Grit-S (Nishikawa et al., 2015) comprises the same two factors as the original Grit-S, Perseverance of Effort and Consistency of Interest. The Japanese version and its subscales corresponding to these factors have shown adequate internal consistency reliability (αs = .74, .78, and .73, respectively). Scores on the version and subscales had moderate to high correlations with scores on the conscientiousness scale (rs = .60, .53, and .39, respectively) and self-control scale (rs = .54, .53, and .35, respectively). Results from the extant literature has provided preliminary support for the psychometric properties of the Japanese version. However, evidence supporting its reliability and validity, including test–retest reliability and construct validity has been insufficient. Finally, the Japanese wording of the items seems to be, in some parts, rigid, literary, outdated, and unclear.

1.3. Purpose of the Study

This study aimed to translate the Grit-S into Japanese and examined the reliability and construct validity of the translation (Grit-S-J). A more valid Japanese version of the Grit-S, which is a brief and efficient grit measure, can contribute to the development of grit research in Japan and cross-cultural comparisons of grit. The Grit-S-J was expected to have a two-factor structure similar to that of the Grit-S. A reliability and validity assessment was conducted for the total Grit-S-J and its subscales based on the confirmed factor structure. This study evaluated test–retest reliability over 1-month period due to the limitations of the survey conditions. Therefore, the test–retest correlation was expected to be above .70, which is higher than the 1-year test–retest reliability (Duckworth & Quinn, 2009).

To evaluate construct validity, correlations between scores on the Grit-S-J and related personality trait measures were examined based on previous findings. The Grit-S-J total and subscales scores were predicted to be highly correlated with scores for self-control and conscientiousness, which are closely related (Duckworth & Eskreis-Winkler, 2015; Roberts, Chernyshenko, Stark, Goldberg, 2005), because they have exhibited high correlations exceeding .60 (Credé, 2018; Credé et al., 2017; Duckworth & Quinn, 2009). Considering the previous findings (Duckworth et al., 2007; Duckworth & Quinn, 2009) of low to moderate correlations between scores for grit and the four Big-Five personality traits except conscientiousness (i.e., extraversion, agreeableness, neuroticism, and openness), this study would have similar correlations. In addition, the Grit-S-J scores were expected to positively correlate with scores for trait vitality, which refers to the tendency to have physical and mental energy, as a personality strength similar to grit (Ryan & Deci, 2008; Ryan & Frederick, 1997). This is because passion and perseverance for long-term goals require such energy.

Relationships with scores on outcome measures, including well-being and mental health measures, would also effectively support the construct validity of the Grit-S-J (Eskreis-Winkler et al., 2016; Datu, 2021; Fernández-Martín et al., 2020; Schimschal et al., 2021). The Grit-S-J scores were expected to moderately correlate with the scores for life satisfaction, positive affect, and negative affect, which are the three components of hedonic well-being (Deci & Ryan, 2008; Ryan & Deci, 2001). Scores for eudaimonic well-being and self-esteem, which are closely linked to well-being (Diener, Oishi, & Ryan, 2013; Michalos, 2004), were predicted to positively correlate with the Grit-S-J scores. Moreover, psychological stress, depression, and anxiety scores were expected to be negatively correlated with the Grit-S-J scores. Furthermore, considering the potential construct redundancy between grit, self-control, and conscientiousness (Berk, 2018; Datu, 2021; Duckworth & Seligman, 2017; Liang, 2021), partial correlations between scores on the Grit-S-J and outcome measures controlling for either self-control or conscientiousness scores were evaluated for discriminant validity of the Grit-S-J. Discriminant validity suggest a unique role of grit in well-being and mental health. The author declares no conflicts of interest for this study.

2. METHOD

2.1. Participants

A total of 276 Japanese college students participated in this study, comprising 88 women and 188 men, with a mean age of 20.81 (SD = 0.89) ranging from 20 to 23. All participants agreed to voluntarily participate in two test sessions with one month interval (Times 1 and 2) and complete the measures. The questionnaire at Time 2 comprised only the Grit-S-J. Ethical approval for the survey was obtained from the ethics committee of the author's institution.

2.2. Measures

(1) Japanese translation of the Short Grit Scale

The Grit-S was translated into Japanese based on the translational process conceived by referring to several guidelines (e.g., Beaton, Bombardier, Guillemin, & Ferraz, 2000; Brislin, 1986; Sousa & Rojjanasrirat, 2011) with permission from its author, Dr. Angela L. Duckworth (personal communication, October 2, 2021). During translation, special care was taken to ensure that the Japanese expressions were plain and natural. A bilingual professor translated the items from English to Japanese and the other back-translated them from Japanese to English. Two researchers compared the translation and back-translation in detail. This procedure was repeated until an acceptable degree of consistency was achieved. Six Japanese graduate and undergraduate students confirmed the final translation.

As in the original Grit-S, each item in the Japanese translation was rated using the same 5-point scale ranging from 1 (*not like me at all*) to 5 (*very much like me*). The Consistency of Interest subscale items were reverse scored. Scale or subscale scores were calculated as the average of the scores for all corresponding items. Higher scores indicated higher levels of grit.

(2) Self-control

The Japanese version of the Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004; Ozaki, Goto, Kobayashi, & Kutsuzawa, 2016) was used to assess self-control. This scale is a widely used 13-item measure to assess individual differences in self-control ability (e.g., "I refuse things that are bad for me"). Each item was rated on a 5-point scale ranging from 1 (*not at all like me*) to 5 (*very much like me*). The Japanese version showed good internal consistency reliability (αs = .75 to 83), test–retest reliability over a 2-week period (r = .73), and unidimensionality. Convergent validity was confirmed by the expected correlations with scores for trait self-control, daily experience of ego-depletion, time spent on independent study, and performance on a stop-signal task.

(3) Big-Five personality traits

The Japanese version of the Ten-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003; Oshio, Abe, & Cutrone, 2012) was used as a brief measure of the Big-Five personality traits. This scale consists of 10 items divided into five subscales to measure the Big-Five personality dimensions: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. Responses to the items were scored on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Rather than directly translating the words of the original version, the Japanese version was produced to accurately convey the personality traits as expressed in the English original. The Japanese version showed adequate test–retest reliability over a 2-week period (rs = .64 to .86). Convergent and discriminant validity were supported by correlations with scores on the other five Big-Five measures.

(4) Vitality

Vitality was assessed using the Japanese version of the seven-item trait scale of the Subjective Vitality Scale (Ryan & Frederick, 1997; Sumi, 2021), which is the standard measure of this trait (e.g., "I feel energized"). Items were rated on a 7-point scale ranging from 1 (*not at all true*) to 7 (*very true*). The Japanese version had good internal consistency reliability (α = .91), test-retest reliability over a 4-week period (r = .80), factorial validity of the single-factor structure, and construct validity based on acceptable correlations with scores for life satisfaction, positive and negative affect, eudaimonic well-being, self-esteem, depression, and anxiety.

(5) Hedonic well-being

Life satisfaction, a component of hedonic well-being, was measured using the Japanese version of the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985; Sumi,

2020). The brief scale consisted of five items (e.g., “I am satisfied with my life”) rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Japanese version showed good internal consistency reliability (αs = .94 to .95), test-retest reliability over a 1-month period (*r* = .87), and unidimensionality. Construct validity was indicated by the expected correlations with scores for positive and negative affect, and eudaimonic well-being (Sumi, 2020).

Positive and negative affect were measured using the Japanese version of the Scale of Positive and Negative Experience (Diener et al., 2010; Sumi, 2013, 2014). This measure assesses recent experiences of affect and comprises the positive and negative affect scales, which consist of six items worded as adjectives expressing affect (e.g., happy and sad). The items were rated on a 5-point scale ranging from 1 (*very rarely or never*) to 5 (*very often or always*). The Japanese versions showed good internal consistency reliability (αs = .86 to .93) and test–retest reliability over a 1-month period (*r*s = .60 and .57). The two subscales loaded on a separate factor, supporting factorial validity. Construct validity was supported based on acceptable correlations with scores for positive and negative feelings, life satisfaction, subjective happiness, dispositional optimism and pessimism, perceived stress, depression, and anxiety.

(6) Eudaimonic well-being

Eudaimonic well-being was assessed using the Japanese version of the Flourishing Scale (Diener et al., 2010; Sumi, 2013, 2014). The scale consists of eight items that tap into the broad and important aspects of psychological functioning (e.g., “I lead a purposeful and meaningful life”). These items were rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Japanese version had good internal consistency reliability (αs = .94 to .95), test–retest reliability over a 1-month period (*r* = .87), and unidimensionality. Construct validity was supported based on correlations with scores for measures of positive and negative feelings, life satisfaction, subjective happiness, dispositional optimism and pessimism, perceived stress, depression, and anxiety.

(7) Self-esteem

Self-esteem was measured using a Japanese scale, the Two-Item Self-Esteem scale (Minoura & Narita, 2013). This scale includes items that assess two aspects of self-esteem: self-acceptance and self-evaluation (e.g., “I feel that I have various good qualities” in Japanese). Each item was rated on a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*). The initial findings indicated that the scale had acceptable internal consistency reliability (α = .77) and unidimensionality. Good test-retest reliability was observed over both 3-week and 4-month periods (*r*s = .77 and .78, respectively). Convergent validity was indicated by the high correlations with other self-esteem scales scores. Additionally, construct validity was supported by reasonable correlations with scores for life satisfaction, positive and negative affect, depressive affect, and competence.

(8) Psychological stress

Psychological stress was assessed using the Japanese version of the 10-item form of the Perceived Stress Scale (Cohen, Kamarack, & Mermelstein, 1983; Cohen & Williamson, 1988; Sumi, 2007). The items were designed to assess the perception of psychological stress over the past month (e.g., “In the last month, how often have you felt that you were on top of things?”) and scored on a 5-point scale ranging from 0 (*never*) to 4 (*very often*). The Japanese version indicated acceptable internal consistency reliability (α = .71), test–retest reliability over a 3-week period (*r* = .72), and the same factor structure as the original version. Discriminant and predictive validity were supported by expected correlations with scores for daily hassles, depression, anxiety, and psychosomatic symptoms using longitudinal data over a 3-week interval.

(9) Depression and anxiety

Depression and anxiety were assessed using the Japanese versions of the two subscales of the Hopkins Symptom Checklist (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974; Sumi, 1997). The subscales contain 11 items (e.g., "Feeling no interest in things") and seven items (e.g., "Feeling tense or keyed up"), respectively. They assess the frequency of symptoms during the past seven days on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The Japanese versions indicated good internal consistency reliability (α = .84 for both), test–retest reliability over a 4-week period (*r*s = .83 and .75, respectively), separate factor structure, and construct validity through expected correlations with scores for perceived stress (Sumi, 1997, 2007).

3. RESULTS

3.1. Factor Structure

For the factor analysis of the Grit-S-J, participants were first randomly divided into two equal-sized samples at Time 1 (*n*s = 138), Samples A and B. The samples had no significant differences by sex, $\chi^2(1, N = 276) = 0.02$, and age, $t(274) = 1.17$. For Samples A and B, the results of the Kaiser-Meyer-Olkin test of sampling adequacy were .76 and .79, respectively, and the Bartlett's test of sphericity was 471.21 and 488.75, *df*s = 28, *p*s < .01, respectively. These results indicated that the data collected were appropriate for factor analysis.

Exploratory factor analysis using principal axis factoring was performed on Sample A. The eigenvalues for the first four factors were 3.64, 1.62, 0.70, and 0.58, respectively. Based on eigenvalues greater than 1.0, scree test and factor interpretability, two factors were retained, accounting for 55.62% of the total variance. The promax rotation method was applied to the two extracted factors, which were expected to be interrelated. As shown in Table 1, all items had absolute factor loadings of .40 or higher on a single factor and .26 or lower on the other factor. The items loading highly on the first and second factors were the same as those previously hypothesized to constitute the corresponding subscales: the Perseverance of Effort and Consistency of Interest subscales, respectively.

Confirmatory factor analysis was conducted on Sample B to confirm the two-factor structure of the Grit-S-J. The results indicated acceptable goodness-of-fit indices, $\chi^2(19, n = 138) = 33.99$, $p < .05$, GFI = .942, AGFI = .890, CFI = .984, SRMR = .046, and RMSEA = .076. The correlation between factors was .57 ($p < .01$). As shown in Table 1, all standardized factor loadings exceeded .79 and significant (*p*s < .01). Therefore, the two-factor structure comprising perseverance of effort and consistency of interests was supported.

3.2. Reliability and Intercorrelations

Table 2 shows the means, standard deviations, range of scores, Cronbach's alphas, and test–retest correlations for the Grit-S-J and its subscales (hereafter, "Grit scales"). No substantial differences were observed between Times 1 and 2. High Cronbach's alphas (.80 or over) and test–retest correlations (*r*s > .66, *p*s > .01) were observed. In addition, the Grit-S-J scores at Time 1 were correlated with scores on the Persistence of Effort and Consistency of Interest subscales at Time 1 (*r*s = .82 and .83, *p*s < .01, respectively). The correlation between the subscales scores at Time 1 was .35 ($p < .01$).

3.3. Construct Validity

Tables 3 and 4 show the correlations between scores on the Grit scales and related constructs measures at Time 1 to assess construct validity, means, standard deviations, and

αs of related constructs measures. All related constructs measures except the Big-Five personality traits subscales indicated acceptable Cronbach's alphas (.77 to .93). Although the Big-Five personality traits subscales showed low Cronbach's alphas (.53 to .65) in Table 3, those of the original English measure were also low to the same degree (Gosling et al., 2003) partly because each subscale comprises only two items (DeVellis & Thorpe, 2021; Nunnally & Bernstein, 1994).

Table 1.
Factor Loadings for Exploratory and Confirmatory Factor Analyses.

Item	Exploratory Factor Analysis of Sample A		Confirmatory Factor Analysis of Sample B	
	Factor 1	Factor 2	Factor 1	Factor 2
Perseverance of Efforts				
2	.74	-.01	.86	
4	.94	-.14	.93	
7	.49	.20	.80	
8	.83	.01	.91	
Consistency of Interest				
1	-.08	.79		.90
3	.01	.76		85
5	.01	.70		.90
6	.26	.40		.87

Note. Standardized factor loadings are shown for confirmatory factor analysis. All standardized factor loadings are significant at $p < .01$.

Table 2.
*Means, Standard Deviations, Rang*es*, Cronbach's Alphas, and Test–Retest Correlations.*

Grit Scale	*M*	*SD*	Range	α	Test-retest *r*
Time 1					
Grit-S-J	2.98	.66	1.25–4.63	.82	.77
Grit-S-J-PE	3.15	.79	1.00–5.00	.84	.70
Grit-S-J-CI	2.81	.81	1.00–5.00	.80	.67
Time 2					
Grit-S-J	2.99	.69	1.00–5.00	.89	
Grit-S-J-PE	3.16	.89	1.00–5.00	.89	
Grit-S-J-CI	2.82	.79	1.00–5.00	.87	

Note. Grit-S-J-PE = Persistence of Effort subscale. Grit-S-J-CI = Consistency of Interest subscale. All test-retest correlations are significant at $p < .01$.

The results in Tables 3 and 4 support the expected magnitude and direction of the correlations with some exceptions. The Grit-S-J scores were significantly correlated with the scores on related construct measures, except for self-esteem. Both the Grit-S-J and Persistence of Effort subscale scores showed similar correlations with most related construct measure scores. The Consistency of Interest subscale scores showed low correlations ($|r|$s < .24), including no significant ones, with scores for related constructs except for self-control and conscientiousness. Both self-control and conscientiousness scores had moderate to high correlations with scores on the Grit scales (rs = .33 to .52). There were weaker correlations than expected between the Persistence of Effort subscale scores and

self-control scores, and between Consistency of Interest subscale scores, self-control scores, and conscientiousness scores (*r*s = .34, .44, and .33, respectively). The Grit-S-J and Persistence of Effort subscale scores showed low to moderate correlations with scores for the Big-Five personality traits, except for conscientiousness (|*r*|s = .15 to .34), and moderate correlation with scores for vitality (*r*s = .32 and .42). The Consistency of Interest subscale scores were not significantly correlated with scores for extraversion, agreeableness, openness, and vitality (*r*s < .09). Although the Grit-S-J and Persistence of Effort subscale scores also presented low to moderate correlations with well-being scores (|*r*|s = .10 to .46), the Consistency of Interest subscale scores showed low correlations with well-being scores (|*r*|s = .06 to .22). Scores on all three Grit scales had significant but low negative correlations with mental health scores (*r*s = -30 to -17).

Table 3.
Correlations between Scores on the Grit Scales and Other Trait Measures.

Grit Scale	Trait Measure						
	Self-control	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Openness	Vitality
Grit-S-J	.49**	.52**	.24**	.15*	-.24**	.24**	.32**
Grit-S-J-PE	.34**	.52**	.34**	.18**	-.19**	.31**	.42**
Grit-S-J-CI	.44**	.33**	.05	.07	-.20**	.09	.07
M	35.93	6.66	7.33	10.09	8.65	7.82	30.99
SD	8.70	2.26	2.77	2.13	2.42	2.51	8.26
α	.84	.55	.65	.52	.54	.53	.89

Note. Grit-S-J-PE = Persistence of Effort subscale. Grit-S-J-CI = Consistency of Interest subscale.
* $p < .05$. ** $p < .01$.

Table 4.
Correlations between Scores on the Grit Scales and Well-Being and Mental Health Measures.

Grit Scale	Well-Being and Mental Health Measure							
	Life Satisfaction	Positive Affect	Negative Affect	Eudaimonic Well-Being	Self-Esteem	Psychological Stress	Depression	Anxiety
Grit-S-J	.37**	.26**	-.20**	.38**	.10	-.30**	-.25**	-.26**
	.32**	.24**	-.14*	.31**	.08	-.22**	-.20**	-.22**
	.30**	.23**	-.15**	.29**	.09	-.19**	-.18**	-.23**
Grit-S-J-PE	.40**	.37**	-.21**	.46**	.20**	-.26**	-.25**	-.24**
	.35**	.32**	-.16**	.40**	.19**	-.19**	-.19**	-.20**
	.33**	.36**	-.17**	.39**	.19**	-.14*	-.18**	-.20**
Grit-S-J-CI	.22**	.06	-.12*	.16**	-.06	-.23**	-.17**	-.19**
	.16**	.08	-.09	.13*	-.06	-.17**	-.13*	-.18**
	.15*	.02	-.08	.08	-.05	-.15*	-.11	-.16**
M	19.46	22.25	15.50	36.94	7.08	19.64	26.33	14.24
SD	5.69	4.59	4.83	7.45	1.98	6.47	9.08	6.05
α	.77	.93	.84	.82	.89	.79	.88	.86

Note. Grit-S-J-PE = Persistence of Effort subscale. Grit-S-J-CI = Consistency of Interest subscale. For each Grit scale, the upper, middle, and bottom rows present a simple correlation coefficient, partial correlation coefficient controlling for scores on the Brief Self-Control Scale, and partial correlation coefficient controlling for scores on the conscientiousness scale, respectively.
* $p < .05$. ** $p < .01$.

Table 4 also shows partial correlations between scores on the Grit scales and outcome measures controlling for either self-control or conscientiousness scores. Overall, compared to the simple correlations, most correlations between them decline only slightly even after controlling for self-control or conscientiousness scores. The overall pattern of these partial correlations was largely consistent with the simple correlations. Therefore, self-control and conscientiousness scores may only have a weak influence on the correlations between scores on the Grit scales, well-being measures, and mental health measures, supporting discriminant validity of the Grit-S-J.

4. DISCUSSION

This study examined the reliability and construct validity of the Grit-S-J, which was the Japanese translation of the Grit-S, using data from a Japanese college student sample. The results provide preliminary support for the psychometric properties of the Grit-S-J. Moreover, the findings supporting the discriminant validity of the Grit-S-J suggest that some part of grit's role in well-being and mental health was independent of the role of self-control and conscientiousness.

The two-factor structure with Persistence of Effort and Consistency of Interest factors underlying the Grit-S-J was supported by exploratory and confirmatory factor analyses. Previous research has identified distinct factor structures for the Grit-S (Duckworth et al., 2021). The results of this study supported the two-factor model, which has been supported by other studies (e.g., Bae et al., 2024; Datu et al., 2016; Li et al., 2023). In addition, the influence of culture on the distinction between factor structures was discussed (e.g., Datu et al., 2017; Morell et al., 2021). The present results are consistent with previous findings on Japanese people (Nishikawa et al., 2015), who typically value collectivism (Hirota, Nakashima, & Tsutsui, 2023; Matsuo & Brown, 2022; Sugimura, 2020).

Good internal consistency reliability was obtained for the two subscales as well as the Grit-S-J with Cronbach's alphas exceeding .80 (DeVellis & Thorpe, 2021; Nunnally & Bernstein, 1994). As expected, test–retest reliability of the total Grit-S-J during the 1-month period exceeded that of the original Grit-S during the 1-year period (Duckworth & Quinn, 2009). Correlations between scores on each subscale at Times 1 and 2 were high, and only slightly weaker than test–retest correlation of the total Grit-S-J. Therefore, the two subscales, as well as the Grit-S-J, have acceptable temporal stability over a shorter period.

The Grit-S-J scores showed adequate construct validity through expected correlations with personality trait, well-being, and mental health measures scores, aside from self-esteem measure scores. High correlations of approximately .50 with scores for self-control and conscientiousness provide support for a close relationship with grit (Duckworth & Eskreis-Winkler, 2015; Duckworth & Quinn, 2009). Correlations with trait measures scores suggest that individuals with high scores on the Grit-S-J tend to have greater self-control, conscientiousness, extraversion, agreeableness, emotional stability, openness to experience, and trait vitality. Based on the correlations between scores on the Grit-S-J, well-being measures, and mental health measures, gritter individuals may tend to have better hedonic and eudaimonic well-being, and less psychological stress, depression, and anxiety.

Both the Grit-S-J and Persistence of Effort subscale scores showed similar correlations with the scores on related construct measures. Moreover, the Persistence of Effort subscale scores seemed to be more highly correlated with scores for some related constructs, such as vitality, positive affect, and self-esteem, than with the Grit-S-J scores. Compared to the Grit-S-J and Persistence of Effort subscale scores, the Consistency of Interest subscale scores exhibited somewhat weaker correlations with scores on most related construct measures.

These results suggest that although grit is understood as a compound trait comprising perseverance of effort and consistency of interests (Duckworth et al., 2007; Duckworth & Quinn, 2009), consistency of interests may more weakly contribute to the relationships between grit and related constructs than persistence of effort (Credé et al., 2017; Datu, 2021).

The correlations results suggest that the Grit-S-J is distinct from the self-control and conscientiousness measures despite their close relationships. Correlations between scores for self-control and grit, and scores for conscientiousness, grit, and persistence of effort were high, but not greater than .60 (Duckworth et al., 2007; Duckworth & Gross, 2014). Additionally, correlations between scores for self-control and the two facets of grit, and between scores for conscientiousness and consistency of interests were moderate. Furthermore, even after controlling for self-control or conscientiousness scores, the correlations between Grit scales and outcome measure scores did not change much. These results support the discriminant validity of the Grit-S-J, suggesting that construct redundancy between grit, self-control, and conscientiousness may not be a major problem among the Japanese population. Grit may indeed have a unique role with respect to well-being and mental health beyond self-control and conscientiousness in the Japanese population.

Some limitations of this study and suggestions for future research are discussed. First, only college students were recruited as the participants of this study. Future studies should examine the psychometric properties of the Grit-S-J in other populations, such as working people and older adults. Second, the test–retest reliability should be examined at longer and different intervals. Third, to further examine the construct validity of the Grit-S-J, its associations with various objective outcomes, such as academic and work performance, need to be clarified. In addition, the validity of the Grit-S-J, including its predictive and concurrent validity, needs further investigation. Finally, the cross-sectional design of this study did not allow for causal inferences regarding the associations between grit and outcome constructs. These associations should be examined longitudinally. Still, the results of this study preliminarily support the use of the Grit-S-J as a brief and efficient measure for assessing grit in the Japanese population. The Grit-S-J is expected to advance grit research in Japan.

REFERENCES

Abu Hasan, H. E., Munawar, K., & Abdul Khaiyom, J. H. (2020). Psychometric properties of developed and transadapted grit measures across cultures: A systematic review. *Current Psychology, 41*, 6894-6912. https://doi.org/10.1007/s12144-020-01137-w

Allen, R. E., Kannangara, C. & Carson, J. (2021). True grit: How important is the concept of grit for education? A narrative literature review. *International Journal of Educational Psychology, 10*(1), 73-87. https://doi.org/10.17583/ijep.2021.4578

Arco-Tirado, J. L., Fernandez-Martin, F. D., & Hoyle, R. H. (2018). Development and validation of a Spanish version of the Grit-S scale. *Frontiers in Psychology, 9*, Article 96. https://doi.org/10.3389/fpsyg.2018.00096

Bae, S. -W., Kim J. G., Park, B. -S., Lee, K., & Park, J. (2024). Psychometric properties and measurement invariance of the short form of grit scale in Korean adolescents. *PLoS ONE, 19*(1), Article e0296795. https://doi.org/10.1371/journal.pone.0296795

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. https://doi.org/10.1097/00007632-200012150-00014

Berk, R. A. (2018). Grit 2.0: A review with strategies to deal with disappointment, rejection, and failure. *Journal of Faculty Development, 32*(2), 91-104. https://doi.org/10.1016/j.paid.2017.04.012

Brislin, R. W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural research* (pp. 137-164). Beverly Hills, CA: Sage.

Clark, K. N., & Malecki, C. K. (2019). Academic Grit Scale: Psychometric properties and associations with achievement and life satisfaction. *Journal of School Psychology, 72*, 49-66. https://doi.org/10.1016/j.jsp.2018.12.001

Clark, R. S., & Plano Clark, V. L. (2019). Grit within the context of career success: A mixed methods study. *International Journal of Applied Positive Psychology, 4*(3), 91-111. https://doi.org/10.1007/s41042-019-00020-9

Cohen, S., Kamarack, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396. https://doi.org/10.2307/2136404

Cohen, S., & Williamson, G. M. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan, & S. Oskamp (Eds.), *The social psychology of health* (pp. 31-67). Newbury Park, CA: Sage.

Credé, M. (2018). What shall we do about grit? A critical review of what we know and what we don't know. *Educational Researcher, 47*(9), 606-611. https://doi.org/10.3102/0013189X18801322

Credé, M., Tynan, M. C., & Harms, P. D. (2017). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and Social Psychology, 113*(3), 492-511. https:// doi.org/10.1037/pspp0000102

Datu, J. A. D. (2021). Beyond passion and perseverance: Review and future research initiatives on the science of grit. *Frontiers in Psychology, 11*, Article 545526. https://doi.org/10.3389/fpsyg.2020.545526

Datu, J. A. D., McInerney, D. M., Żemojtel-Piotrowska, M., Hitokoto, H. & Datu, N. D. (2021). Is Grittiness Next to Happiness? Examining the Association of Triarchic Model of Grit Dimensions with Well-Being Outcomes. *Journal of Happiness Studies, 22*(2), 981-1009. https://doi.org/10.1007/s10902-020-00260-6

Datu, J. A. D., Valdez, J. P. M., & King, R. B. (2016). Perseverance counts but consistency does not! Validating the short grit scale in a collectivist setting. *Current Psychology, 35*(1), 121-130. https://doi.org/10.1007/s12144-015-9374-2

Datu, J. A. D., Yuen, M., & Chen, G. (2017). Development and validation of the triarchic model of grit scale (TMGS): Evidence from Filipino undergraduate students. *Personality and Individual Differences, 114*, 198–205.

Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies, 9*(1), 1-11. https://doi.org/10.1007/s10902-006-9018-1

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. https://doi.org/10.1002/bs.3830190102

DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications* (5th ed.). Thousand Oaks, CA: Sage.

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

Diener, E., Oishi, S., & Ryan, K. L. (2013). Universals and cultural differences in the causes and structure of happiness: A multilevel review. In: C. L. M. Keyes (Ed.) *Mental well-being: International contributions to the study of positive mental health* (pp. 153-176). Dordrecht, Netherlands: Springer. https://doi.org/10.1007/978-94-007-5195-8_8

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. https://doi.org/10.1007/s11205-009-9493-y

Disabato, D. J., Goodman, F. R., & Kashdan, T. B. (2019). Is grit relevant to well-being and strengths? Evidence across the globe for separating perseverance of effort and consistency of interests. *Journal of Personality, 87*(2), 194-211. https://doi.org/10.1111/jopy.12382

Disabato, D. J., Goodman, F. R., Kashdan, T. B., Short, J. L., & Jarden, A. (2016). Different types of well-being? A cross-cultural examination of hedonic and eudaimonic well-being. *Psychological Assessment, 28*(5), 471-482. https://doi.org/10.1037/pas0000209

Duckworth, A. L., & Eskreis-Winkler, L. (2015). Grit. In J. D. Wright (Ed.), *International encyclopedia of the social and behavioral sciences* (2nd ed., pp. 397-401). New York, NY: Elsevier.

Duckworth, A., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current directions in psychological science, 23*(5), 319-325. https://doi.org/10.1177/0963721414541462

Duckworth, A. L., Kirby, T., Tsukayama, E., Berstein, H., & Ericsson, K. (2011). Deliberate practice spells success: Why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science, 2*(2), 174-181. https://doi.org/10.1177/1948550610385872

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 92*(6), 1087-1101. https:// doi.org/10.1037/0022-3514.92.6.1087

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (GRIT-S). *Journal of Personality Assessment, 91*(2), 166-174. https://doi.org/10.1080/00223890802634290

Duckworth, A. L., Quinn, P. D., & Tsukayama, E. (2021). Revisiting the factor structure of grit: A commentary on Duckworth and Quinn (2009). *Journal of Personality Assessment, 103*(5), 573-575. https://doi.org/10.1080/00223891.2021.1942022

Duckworth, A. L., & Seligman, M. E. P. (2017). The science and practice of self-control. *Perspectives on Psychological Science, 12*(5), 715-718. https://doi.org/10.1177/1745691617690880

Eskreis-Winkler, L., Gross, J. J., & Duckworth, A. L. (2016). Grit: Sustained self-regulation in the service of superordinate goals. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory and applications* (3rd ed., pp. 380-395). New York, NY: Guilford.

Eskreis-Winkler, L., Shulman, E. P., Beal, S. A., & Duckworth, A. L. (2014). The grit effect: Predicting retention in the military, the workplace, school and marriage. *Frontiers in Psychology, 5*, Article 36. https://doi.org/10.3389/fpsyg.2014.00036

Eskreis-Winkler, L., Shulman, E. P., & Duckworth, A. L. (2014). Survivor mission: Do those who survive have a drive to thrive at work?. *The Journal of Positive Psychology, 9*(3), 209-218. https://doi.org/10.1080/17439760.2014.888579

Fernández-Martín, F. D., Arco-Tirado, J. L., & Hervás-Torres, M. (2020). Grit as a predictor and outcome of educational, professional and personal success: A systematic review. *Psicología Educativa, 26*(2), 163-173. https://doi.org/10.5093/psed2020a11

Gray, S. A., Fettes, P., Woltering, S., Mawjee, K., & Tannock, R. (2016). Symptom manifestation and impairments in college students with ADHD. *Journal of Learning Disabilities, 49*(6), 616-630. https://doi.org/10.1177/0022219415576523

Gonzalez, O., Canning, J. R., Smyth, H., & MacKinnon, D. P. (2019). A psychometric evaluation of the Short Grit Scale. *European Journal of Psychological Assessment. 36*(4): 646-657. https://doi.org/10.1027/1015-5759/a000535

Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504-528. https://doi.org/10.1016/s0092-6566(03)00046-1

Haktanir, A., Lenz, A. S., Can, N., & Watson, J. C. (2016). Development and evaluation of Turkish language versions of three positive psychology assessments. *International Journal for the Advancement of Counselling, 38*(4), 286-297. https://doi.org/10.1007/s10447-016-9272-9

Hirota, S., Nakashima, K., & Tsutsui, Y. (2023). Psychological motivations for collectivist behavior: comparison between Japan and the US. *Mind & Society, 22*(1), 103-128. https://doi.org/10.1007/s11299-023-00298-y

Hou, X. -L., Becker, N., Hu, T. -Q., Koch, M., Xi, J. -Z., & Mõttus, R. (2022). Do grittier people have greater subjective well-being? A meta-analysis. *Personality and Social Psychology Bulletin, 48*(12), 1701-1716. https://doi.org/10.1177/01461672211053453

Kashdan, T. B., McKnight, P. E., & Goodman, F. R. (2022). Evolving positive psychology: A blueprint for advancing the study of purpose in life, psychological strengths, and resilience. *The Journal of Positive Psychology, 17*(2), 210-218. https://doi.org/10.1080/17439760.2021.2016906

Knauft, K. M., Holt, C. A., & Kalia, V. (2024). Perceived stress mediates associations between grit and health-related quality of life. *Psychological Reports*. Advance online publication. https://doi.org/10.1177/00332941241248607

Lam, K. K. L., & Zhou, M. (2019). Examining the relationship between grit and academic achievement within K-12 and higher education: A systematic review. *Psychology in the Schools, 56*(10), 1654-1686. https://doi.org/10.1002/pits.22302

Lam, K. K. L., & Zhou, M. (2022). Grit and academic achievement: A comparative cross-cultural meta-analysis. *Journal of Educational Psychology, 114*(3), 597-621. https://doi.org/10.1037/edu0000699

Li, M., Fan, W., & Leong, F. T. L. (2023). Psychometric assessment of the Grit Scale: Evidence from US and Chinese samples. *Journal of Pacific Rim Psychology, 17*, 1-18. https://doi.org/10.1177/18344909221147108

Liang, Q. (2021). Lift the grit's veil: The literature review and prospects of grit. *Psychology, 12*(4), 580-594. https://doi.org/10.4236/psych.2021.124036

Matsuo, A., & Brown, C. M. (2022). Culture points the moral compass: Shared basis of culture and morality. *Culture and Brain*, *10*(2), 113-139. https://doi.org/10.1007/s40167-022-00106-3

Michalos, A. C. (2004). Social indicators research and health-related quality of life research. *Social Indicators Research, 65*(1), 27-72. https://doi.org/10.1023/A:1025592219390

Minoura, Y., & Narita, K. (2013). 2-koumoku jisonkanjo shakudo no kaihatsu oyobi shinrai-sei datou-sei no kentou [The development of the Two-Item Self-Esteem scale (TISE): Reliability and validity]. *Kanjo Shinrigaku Kenkyu*, *21*(1), 37-45. https://doi.org/10.4092/jsre.21.37

Moore, R. C., Hussain, M. A., Watson, C. W.-M., Fazeli, P. L., Marquine, M. J., Yarns, B. C., Jeste, D. V., & Moore, D. J. (2018). Grit and ambition are associated with better neurocognitive and everyday functioning among adults living with HIV. *AIDS and Behavior, 22*(10), 3214-3225. https://doi.org/10.1007/s10461-018-2061-1

Morell, M., Yang, J. S., Gladstone, J. R., Turci Faust, L., Ponnock, A. R., Lim, H. J., & Wigfield, A. (2021). Grit: The long and short of it. *Journal of Educational Psychology, 113*(5), 1038-1058. https://doi.org/10.1037/edu0000594

Muenks, K., Wigfield, A., Yang, J. S., & O'Neal, C. R. (2017). How true is grit? Assessing its relations to high school and college students' personality characteristics, self-regulation, engagement, and achievement. *Journal of Educational Psychology*, *109*(5), 599–620. https://doi.org/10.1037/edu0000153

Musumari, P. M., Tangmunkongvorakul, A., Srithanaviboonchai, K., Techasrivichien, T., Suguimoto, S. P., Ono-Kihara, M., & Kihara, M. (2018). Grit is associated with lower level of depression and anxiety among university students in Chiang Mai, Thailand: A cross-sectional study. *PloS ONE, 13*(12), Article e0209121. https://doi.org/10.1371/journal.pone.0209121

Nishikawa, K., Okugami, S., & Amemiya, T. (2015). Nihon-go ban Short Grit (Grit-S) syakudo no sakusei [Development of the Japanese Short Grit Scale (Grit-S). *Pasonariti Kenkyu, 24*(2), 167-169. https://doi.org/10.2132/personality.24.167

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

Oshio, A., Abe, S., & Cutrone, P. (2012). Nihongo-ban Ten Item Personality Inventory (TIPI-J) sakusei no kokoromi [Development, reliability, and validity of the Japanese version of Ten Item Personality Inventory (TIPI-J)]. *Shinrigaku Kenkyu, 21*(1), 40-52. https://doi.org/10.2132/personality.21.40

Ozaki, Y., Goto, T., Kobayashi, M., & Kutsuzawa, G. (2016). Serufu-kontororu shakudo tansyuku-ban no houyaku oyobi shinrai-sei datou-sei no kentou [Reliability and validity of the Japanese translation of Brief Self-Control Scale (BSCS-J)]. *Shinrigaku Kenkyu, 87*(2), 144-154. https://doi.org/10.4992/jjpsy.87.14222

Postigo, Á., Cuesta, M., García-Cueto, E., Menéndez-Aller, Á., González-Nuevo, C., & Muñiz, J. (2021). Grit assessment: Is one dimension enough?. *Journal of Personality Assessment, 103*(6), 786-796. https://doi.org/10.1080/00223891.2020.1848853

Roberts, B. W., Chernyshenko, O. S., Stark, S., Goldberg, L. R., (2005). The structure of conscientiousness: an empirical investigation based on seven major personality questionnaires. *Personnel Psychology, 58*(1), 103–139. https://doi.org/10.1111/j.1744-6570.2005.00301.x

Robertson-Kraft, C., & Duckworth, A. L. (2014). True grit: Trait-level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record, 116*(3), 1-27. https://doi.org/10.1177/016146811411600306

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. https://doi.org/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. https://doi.org/10.1111/j.1751-9004.2008.00098.x

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. https://doi.org/10.1111/j.1467-6494.1997.tb00326.x

Schimschal, S. E., Visentin, D., Kornhaber, R., & Cleary, M. (2021). Grit: A concept analysis. *Issues in Mental Health Nursing, 42*(5), 495-505. https://doi.org/10.1080/01612840.2020.1814913

Sharkey, C. M., Bakula, D. M., Baraldi, A. N., Perez, M. N., Suorsa, K. I., Chaney, J. M., & Mullins, (2018). Grit, illness-related distress, and psychosocial outcomes in college students with a chronic medical condition: A path analysis. *Journal of Pediatric Psychology, 43*(5), 552–560. https://doi.org/10.1093/jpepsy/jsx145

Sheldon, K. M., Jose, P. E., Kashdan, T. B., & Jarden, A. (2015). Personality, effective goal-striving, and enhanced well-being: Comparing 10 candidate personality strengths. *Personality and Social Psychology Bulletin, 41*(4), 575-585. https://doi.org/10.1177/0146167215573211

Singh, S., Chukkali, S., & Prete, G. (2021). Development and validation of multi-dimensional scale of grit. *Cogent Psychology, 8*(1), Article 1923166. https://doi.org/10.1080/23311908.2021.1923166

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. https://doi.org/10.1111/j.1365-2753.2010.01434.x

Stephen Lenz, A., Watson, J. C., Luo, Y., Norris, C., & Nkyi, A. (2018). Cross-cultural validation of four positive psychology assessments for use with a Ghanaian population. *International Journal for the Advancement of Counselling, 40*, 148-161. https://doi.org/10.1007/s10447-017-9317-8

Sugimura, K. (2020). Adolescent identity development in Japan. *Child Development Perspectives*, *14*(2), 71-77. https://doi.org/10.1111/cdep.12359

Sumi, K. (1997). Optimism, social support, stress and physical and psychological well-being in Japanese women. *Psychological Reports, 81*(1), 299-306. https://doi.org/10.2466/pr0.81.5.299-306

Sumi, K. (2007). Chikaku-sareta sutoresu shakudo (Perceived Stress Scale) Nihongo-ban ni okeru shinrai-sei to datou-sei no kentou [Reliability and validity of the Japanese version of the Perceived Stress Scale]. *Kenkou Shinrigaku Kenkyu, 19*(2), 44-53. https://doi.org/10.11560/jahp.19.2_44

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. https://doi.org/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), 140. https://doi.org/10.4172/2161-0487.1000140

Sumi, K. (2020). Uerubiingu to shakai-teki mondai kaiketsu nouryoku ni okeru sogo eikyo-sei: Daigaku-sei no judan deta wo mochiita kento [The reciprocal influence of well-being and social problem-solving abilities: An analysis of longitudinal data from college students]. *Kyouiku Igaku, 66*(1), 37-46. https://doi.org/10.32311/jsehs.66.1_41

Sumi, K. (2021). Reliability and construct validity of a new Japanese translation of the Subjective Vitality Scale. In C. Pracana, & M. Wang (Eds.), *Psychology Applications & Developments VII* (pp. 282-292). Lisbon, Portugal: inScience Press. https://doi.org/10.36315/2021padVII24

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*(2), 271–324. https://doi.org/10.1111/j.0022-3506.2004.00263.x

Vainio, M. M., & Daukantaitė, D. (2016). Grit and different aspects of well-being: Direct and indirect relationships via sense of coherence and authenticity. *Journal of Happiness Studies, 17*, 2119-2147. https://doi.org/10.1007/s10902-015-9688-7

Wyszyńska, P., Ponikiewska, K., Karaś, D., Najderska, M., & Rogoza, R. (2017). Psychometric properties of the Polish version of the Short Grit Scale. *Polish Psychological Bulletin, 48*(2), 229-236. https://doi.org/10.1515/ppb-2017-0026

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