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An Exploratory Study to Test the Psychometric Properties of Character Strengths-Semantic Differential Scale (CS-SDS) Among Singaporean Adults

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Abstract: Character strengths encompass a set of positive traits that can be manifested through thoughts, feelings, and behaviors. To measure the 24 character strengths, the Character Strengths–Semantic Differential Scale (CS-SDS) was used. The aim of the study was to (a) test the factor structure of CS-CDS and (b) test the convergent validity of CS-CDS with life satisfaction and positive affect, and the divergent validity of CS-SDS with negative affect. In total, 283 Singaporean students (96 males, 35.3%), with a median age of 24–26 years old (42.9%), participated in this study. Exploratory (EFA) and confirmatory factor analyses (CFA) showed the multi-dimensional nature of CS-SDS. Specifically, EFA demonstrated a four-factor model, while CFA identified a five-factor model, showing the dimensions of interpersonal, emotional, restraint, theological, and intellectual. All factors were significantly related to life satisfaction, positive affect, and negative affect. It was concluded that CS-SDS is a psychometrically sound instrument for measuring character strengths in the Asian context. This tool can be used for designing strength-based interventions aimed at promoting well-being and character among students in higher education.

Keywords: character strengths; factor analysis; Character Strengths-Semantic Differential Scale (CS-SDS); Values in Action (VIA); Singaporean

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1. Introduction

Character strength refers to a set of positive traits that significantly influence the way we think, feel, and behave [1]. They are considered as key determinants of optimal human functioning, flourishing, and leading to a good life [2,3]. To measure character strengths, Peterson and Seligman [1] developed the Values in Action Inventory of Strengths (VIA-IS), which encompasses 24 strengths under six higher order virtues: wisdom, courage, humanity, justice, temperance, and transcendence. Despite the acknowledgement of the importance of character strengths, the inventory's length of 240 items poses a major challenge. Moreover, the generalizability of this assessment tool across non-Western populations remains unclear. In response to these gaps, researchers have begun to develop shorter scales, such as the Character Strengths-Semantic Differential Scale (CS-SDS), which offers a more practical approach for administration and research while supporting character education initiatives. Therefore, the purpose of the present study aims to test the factor structure of CS-SDS and explores its relationships with life satisfaction and both positive and negative affects, thereby attempting to address the research gap in character strength measurement.

Peterson and Seligman [1] defined character strengths as individual capacities which can be cultivated and contributes to positive developmental outcomes. To understand

these character strengths, Peterson and Seligman [1] proposed the Values in Action (VIA) classification, encompassing 24 character strengths (see Table 1). These strengths were assigned to one of six culturally universal core virtues: (a) *wisdom and knowledge* (including curiosity, creativity, love of learning, judgment, and perspective), (b) *justice* (including fairness, leadership, and citizenship), (c) *temperance* (including self-regulation, prudence, forgiveness, and modesty) (d) *courage* (including zest, honesty, perseverance, and bravery), (e) *transcendence* (including hope, humor, spirituality, gratitude and appreciation of beauty and excellence), and (f) *humanity* (including love, social intelligence, and kindness). These six virtues were identified through an extensive review of classic texts on human virtues from various distinct cultural traditions [4,5].

Table 1. Values in Action (VIA) classification: 24 character strengths and 6 virtues based on the Peterson and Seligman framework [1].

Virtues	Character Strengths
Wisdom and Knowledge (5)	Creativity Love of Learning Judgment Curiosity Perspective
Justice (3)	Fairness Leadership Citizenship
Temperance (4)	Self-Regulation Prudence Forgiveness Modesty
Courage (4)	Zest Honesty Perseverance Bravery
Transcendence (5)	Hope Humor Spirituality Gratitude Appreciation of beauty and excellence
Humanity (4)	Love Social intelligence Kindness

Empirical findings showed that the endorsement of character strengths is associated with certain outcomes, such as better physical health [6], greater well-being [7–9], and better behavioral outcomes [10–12]. This was further supported based on character education research by showing the positive impacts of character education among adolescents from various backgrounds [7,9,13–15].

1.1. The Values in Action Inventory of Strengths (VIA-IS)

To measure the 24 character strengths for adults, the VIA Inventory of Strengths (VIA-IS) [1] was developed. Based on the hierarchical framework of the VIA classification, Peterson and Seligman [15] developed the 240-item self-administered VIA-IS assessing 24 specific character strengths, with each strength represented by 10 items. Using a 5-point Likert scale (1 '*very much unlike me*' to 5 '*very much like me*'), respondents are asked to rate the degree of their endorsement regarding the 24 character strengths. This scale has been completed by more than 21 million people around the world [16–21].

Using this scale, character strengths are positively related to various indicators of well-being, such as life satisfaction [21,22], positive and negative affects [23], happiness [24],

and psychological resilience [25]. Additionally, they are negatively linked to lower emotion distress [26,27].

Although VIA-IS is assumed to be multi-dimensional, some studies proposed a unidimensional nature [17,28]. Indeed, the original hierarchical model based on VIA-IS remains debatable [29]. For example, Khmumalo et al. [30] assessed the factor structure of VIA-IS among African university students. Contrary to the original six-virtue model, they proposed a two-factor model, "*intra-personal and relationship strengths*" and "*integrity in group context*", showing how the theoretical model may not be universal. Shryack and colleagues [31] found a three-factor model, suggesting strengths associated with interpersonal issues such as *sociability* (e.g., kindness, leadership, and forgiveness), strengths related to cognitive abilities such as *self-assuredness* (e.g., love of learning, curiosity, and judgment), and strengths linked to behavioral components such as *conscientiousness* (e.g., perseverance, self-regulation, and modesty). Similar results have been found in other studies [16,19]. Based on a national sample from the United States of America, McGrath [32] found a five-factor model, which is aligned with the theoretical VIA classification model [1], with two virtues (i.e., *justice* and *temperance*) combining to form one factor. Similar results were found in Ruch's work, in which the five-factor model was shown [18].

In general, the mixed results of the factor structure of VIA-IS may reflect the limitations of past research studies. First, the hierarchical model of the VIA classification was tested via principal component analysis (PCA) using varimax rotation [12,19]. Researchers argued that the use of both practices may lead to inappropriate factor solutions when exploring the dimensionality of a self-reported psychological measure [28,33–35]. Therefore, principal axis factoring (PAF) with oblique rotation is recommended before evaluating the latent structure of a scale via confirmatory factor analysis (CFA) [36,37]. Furthermore, recent methodological reviews [38] have emphasized a prevalence of PCA over the factor extraction methods like PAF. To enhance methodological rigor, our study incorporates PAF to investigate the factor structure of the scale, thus building upon this methodological advancement.

Second, the failure of prior research to generate the original VIA classification model may be related to the length of the scale [39,40]. A major drawback associated with a long questionnaire is the cognitive burden on respondents who might lose their patience, thereby jeopardizing the validity of the scale [41]. This is especially among young adults [42]. Therefore, based on the framework of the VIA classification system, researchers proposed that the existing measurement tools for measuring character strengths and virtues be shortened.

1.2. Short Form for Assessing Character Strengths and Virtues

Based on the full 240-item of VIA-IS, a 120-item short version (VIA-IS-R) [43] was designed (5 items on each strength scale). Littman-Ovadia et al. [44] tested the validity of VIA-IS-R by comparing correlations with subjective well-being (i.e., life satisfaction, positive affect, and negative affect) based on a sample of over one million (1.19 m). In addition, they compared the factor structure of VIA-IS-R with the results of McGrath's version [43] using the standard VIA-IS [16]. The results of the short form are comparable with the findings of McGrath's study. Similarly, the validity of the short form of VIA (VIA-IS-R) is supported among Italian [17] and Japanese samples [24].

Other researchers have developed other short forms, such as the Chinese Virtues Questionnaire (90 items) [19,20], The Strengths Inventory (72 items) [45], and the Global Assessment of Character Strengths (72 items) [42]. Using factor analysis, different factor structure models, such as three-factor [31,46,47], four-factor [16,31,48–50], five-factor [8,16,18], and six-factor models [18,51], were found. The short form is generally equivalent to the original version in terms of reliability and validity.

Even with the revision, the shortened version of VIA is still relatively lengthy, which might impose mental burden and increase the chance of boredom among participants, thereby affecting the quality of data [42]. Researchers have noted the benefits of using

a short form survey for large-scale studies [52] and as a screening assessment tool in intervention research [53]. Sharma [54] argued that using a short form with approximately 25–30 questions reduces the risk of missing data, maintains participant engagement, and thereby enhances data quality and response rates. Ruch et al. [53] noted that a shorter version can be used for meeting specific research purposes, especially in large-scale studies. To resolve this issue, researchers began to develop a modified scale which uses a single item to measure each character.

Based on McGrath's study [16], Duan and Bu [47] developed the Three-dimensional Inventory of Character Strengths (TICS) which consists of 15 items. Factor analysis showed a three-factor model of character strengths, including *self-control*, *caring*, and *inquisitiveness* (five items per scale), based on community and surgical inpatients. Although TICS demonstrated satisfactory internal consistency and construct validity, only 15 strengths were measured. Ruch et al. [53] developed the 24-item Character Strengths Rating Form (CSRF), indicating good convergence with VIA-IS among German adults. Yet, the factor analysis of CSRF showed a five-factor model that does not align with the VIA-classification of 24 character strengths and six virtues. Clearly, more work is warranted to determine whether the 24 character strengths can be captured using a shorter assessment tool.

Lastly, while these 24 positive attributes are "valued by moral philosophers and religious thinkers" ([1], p. 13), the generalizability of the six-factor VIA classification remains controversial. Ruch et al. [55] suggested that employing a comprehensive array of methodological approaches to support the revision of the existing model in empirical research is warranted.

Snow [56] highlighted that future research in the field of character strengths should take cross-cultural factors into consideration. To date, most studies on character strengths conducted are based on the Western context. Researchers noted that westernized conceptualizations of the nature of character strengths and virtues might not be applicable in non-Western cultures [57]. Berger and McGrath [32,58] argued that the latent nature of virtues and character strengths might be perceived differently across cultures and contexts [2,16,56]. For example, the interpretation of temperance and transcendence could differ between Chinese and Western cultures [4,46]. The deep-rooted notion of temperance in collectivistic societies may have a more profound meaning in non-Western cultures [49]. Hence, the Western-derived framework might not be appliable in East Asian contexts [14,50,59–61]. This is supported by Duan et al. [19], who conducted a study with a sample of 839 Chinese university students using the Chinese version of VIA-IS. Based on the factor analysis, a three-factor model, rather than the original six-factor model, was proposed. To address this limitation, researchers have proposed the use of a shortened version with singular measures to assess character strengths in studying long-term character development, thereby promoting the dissemination of the evidence-based findings in character strength research [8,21].

1.3. Character Strengths-Semantic Differential Scale (CS-SDS)

Chan and his colleagues [62] developed the Character Strengths-Semantic Differential Scale (CS-SDS) to measure the 24 character strengths that are based on the VIA classification among university students. Adopting semantic differential scaling [63], this scale comprises 24 items listed as bipolar pairs of adjectives (e.g., *creative–unimaginative*; *hope–pessimism*). Kaya [64] assessed the factor structure of CS-SDS among Turkish college students. The results of factor analysis showed a four-factor structure of CS-SDS (*leadership*, *humanity*, *wisdom*, and *vitality*). Furthermore, high levels of character strengths were negatively related to perceived stress and depression [65]. A similar factor structure was found in a recent study by Chou et al. [66], who tested the factor structure of CS-SDS among Singaporean college students. The first factor "*humanity*" comprises kindness, humility, gratitude, integrity, forgiveness, and fairness. The second factor "*optimism*" consists of social intelligence, hope, humor, love, zest, spirituality, and persistence. The third factor "*leadership*" consists of self-regulation (discipline), judgment (critical thinking), persistence, bravery,

social responsibility, leadership, and wisdom. The last factor "*creativity*" is composed of prudence, beauty, humor, curiosity, and creativity. CS-SDS showed satisfactory reliability in terms of internal consistency coefficients (overall: 0.90; the mean of four subscales: 0.80; ranging from 0.67 to 0.88). In terms of validity, CS-SDS yielded a high convergence with subjective well-being in the areas of life satisfaction, positive affect, and negative affect. The 24 character strengths, except humanity, were related to positive affect (happiness: $r = 0.23$; $p < 0.01$) and mental health (depression: $r = -0.17$; $p < 0.01$) and aligned with the findings of past research [39]. Yet, two limitations are noteworthy. First, while prior research has generally supported a four-factor or five-factor structure, certain items were eliminated due to low factor loadings [65,67], a step that may not always be advisable [67]. Following recommendations from researchers [68,69], we conducted EFA to explore the data. This method guided us in selecting a specific model for further evaluation via confirmatory factor analysis (CFA).

Second, only exploratory factor analysis (EFA), specifically PCA, was performed. Feraco et al. [17] argued that the use of EFA, a data-driven approach, to assess the factor structure of VIA-IS might hinder the generalizability of results across cultural contexts, and recommended other theoretical drive approaches, such as CFA, to study the factorial structure of VIA-IS.

The purpose of the current study was to (a) assess the factor structure of VIA-IS and (b) test the convergent validity of CS-CDS with life satisfaction and positive affect, and the divergent validity of CS-SDS with negative affect. We hypothesized that character strengths were positively related to life satisfaction and positive affect and inversely associated with negative affect.

2. Materials and Methods

A total of 283 participants (male: $n = 96$; female: $n = 176$; missing: $n = 11$) completed the survey. The participants were recruited from the teacher education programs at the National Institute of Education, Nanyang Technological University, Singapore. The trained teachers were recruited when they attended professional development courses.

The median age group was 24–26 years old (42.9%). This sample consists of Chinese (79.9%), Malay (9.2%), Indian (8.1%), and other nationalities (2.9%). Most of the sample were freshmen ($n = 235$, 86.4%) and lived off-campus ($n = 193$, 71%).

2.1. Participants

The sample for this study consisted of individuals who met the following criteria: (a) they were 21 years old or older, (b) were student teachers, and (c) had provided informed consent to participate. Detailed demographic characteristics of the sample are presented in Table 2.

Table 2. Demographic characteristics of the participants.

Variables		*n* (%)
Gender	Male	96 (35.3%)
	Female	176 (64.7%)
	Missing	11 (3.9%)
Age	21–23	25 (9.2%)
	24–26	117 (42.9%)
	27–29	62 (22.7%)
	Above 30	69 (25.3%)
	Missing	10 (3.5%)

Table 2. *Cont.*

Variables		*n* (%)
Ethnicity	Chinese	218 (79.9%)
	Malay	25 (9.2%)
	Indian	22 (8.1%)
	Others	8 (2.9%)
	Missing	10 (3.5%)
Place of Birth	Singapore	229 (83.9%)
	Malaysia	13 (4.8%)
	Others	31 (11.4%)
	Missing	10 (3.5%)
Program	Diploma/post-diploma	239 (88.2%)
	Undergraduate	27 (10%)
	Postgraduate	5 (1.8%)
	Missing	12 (4.2%)
Year of Study	1	235(86.4%)
	2	3 (1.1%)
	3	2 (0.7%)
	4	1 (0.4%)
	5 or above	31 (11.4%)
	Missing	11 (3.9%)
cGPA	Less than 2.0	9 (4.3%)
	2.01–3.0	21 (10.1%)
	Above 3.0	177 (85.5%)
	Missing	76 (26.9%)
Residence Status	On-campus	69 (25.4%)
	Off-campus	193 (71%)
	Others	10 (3.7%)
	Missing	11 (3.9%)

2.2. Procedure

After obtaining IRB approval (IRB-2023-753), the research team collected the data with the help of the lecturers. Data were collected between February and May 2024. All participants were informed of the purpose of the study and that their participation was voluntary. They were also informed that no course credit would be received for completing the study. All participants were fluent in English and answered all scales in English. On average, the participants spent about 15 min completing the questionnaire via the Qualtrics platform.

2.3. Measures

2.3.1. Character Strengths

Based on the Values in Action (VIA) classification system [2], character strengths were measured using the Character Strengths-Semantic Differential Scale (CS-SDS) [62]. The participants responded to 24 pairs of bipolar adjectives, assessing the extent to which they possess each character strength (e.g., *biased* vs. *fairness*, *reckless* vs. *careful*, *indifference* vs. *enthusiasm*) (see Appendix A). Adopting semantic differential scaling, participants were asked to rate a seven-point continuum scale (e.g., *biased* = 1 to *fairness* = 7). A higher score on the scale indicates a higher level of character strength. In the present study, the internal consistency was acceptable (above 0.65) [70]. CS-SDS showed good reliability and validity among university students in Turkey [64] and Singapore [66].

2.3.2. Subject Well-Being: Positive and Negative Affect

The 20-item Positive and Negative Affect Scales (PANAS) [71] measure the positive affectivity (10 items) and negative affectivity (10 items) on a 5-point Likert scale (1 = *not at all*

or *very slightly* to 5 = *extremely*). Participants were asked to rate how frequently they encountered each emotional state (e.g., positive affect "*excited*"; negative affect "*afraid*") over the previous week. In the current study, the internal consistency for positive and negative affects was 0.88 and 0.89, respectively. The psychometric properties of PANAS have been supported using multiple confirmatory factor analyses among university students in Singapore and the United States of America [65]. A higher score suggests a greater intensity of the corresponding affective state.

2.3.3. Subject Well-Being: Life Satisfaction

The 5-item Satisfaction with Life Scale (SWLS) [72] measures an individual's general self-evaluation of life satisfaction. Participants were asked to respond on a 7-point Likert scale (1 "Strongly disagree" to 7 "Strongly agree"). An example item is "*In most ways, my life is close to my ideal*". A higher score indicates a higher level of life satisfaction. The validity of the SWLS has been tested among adults in Singapore [73]. In the present study, the internal consistency was 0.89.

2.4. Data Analysis

Principal axis factoring (PAF) with promax rotation (power = 4) was carried out using SPSS 29.0 to explore the number of factors presented in the data. A factor loading cut-off point of 0.30 was adopted to evaluate whether an item was loaded onto a specific strength [74,75]. Parallel analysis was performed to compare eigenvalues extracted from the data and randomly generated from the simulated data [76]. To test the factor structure of CS-SDS, a series of CFAs (confirmatory factor analyses) were tested via Mplus v.8. Lastly, convergent and divergent validity were assessed by testing the relationship between character strengths, life satisfaction, positive affect, and negative affect via SPSS 29.0. Cronbach's alpha α and McDonald's omega ω were computed to assess reliability, with values greater than 0.70 being acceptable [77].

To test the factor structure of CS-SDS, the whole data set was randomly split into two sub-data sets [78]. Sub-sample 1 (S1) was used to test and explore the factor structure of CS-SDS via SPSS (S1: n = 142; male: n = 45, 32.8%; female: n = 92, 62.2%; 5 participants did not provide information). To assess whether the proposed VIA classification was supported, CFA was employed using sub-sample 2 (S2: n = 141; male: n = 51, 37.8%; female: n = 84, 62.2%; 6 participants did not provide information). The median age group was 24–26 years old in both sub-samples (S1: n = 59, 43.1%; S2: n = 58, 42.6%).

Maximum likelihood was performed as all data were normally distributed (skewness < 2.0; kurtosis < 7.0) [79]. Goodness of fit to the data was assessed based on comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SMRM). Following the researchers' recommendation [79], values for CFI > 0.90, RMSEA < 0.06, and SRMR < 0.08 suggest an acceptable model fit to the data. Modification indices were inspected to explore how to improve the model fit.

Given that the present study focuses on the short form of character strengths, we tested the factor structure of CS-SDS based on past findings using the short form of assessing character strengths. A total of six hypothesized models were tested via CFA: (1) a unidimensional model comprising all character strengths loaded on a single factor of global character strength; (2) a two-factor model based on Khumalo et al.'s study [30]; (3) a three-factor model based on Duan et al.'s study [19]; (4a) a four-factor model based on Kaya's study [64]; (4b) a four-factor model based on Chou et al.'s study [66]; (4c) a four-factor model based on the model earlier generated through EFA results using S1 data; (5) a five-factor model based on Littman-Ovadia's [40] and McGrath's studies [16]; and (6) a six-factor model based on the original VIA-IS classification [1].

3. Results

Table 3 presents the descriptive statistics of CS-SDS. The mean scores of all 24 character strengths ranged from 4.00 for creativity to 5.87 for honesty. Table 4 shows the EFA results

of CS-SDS. Four factors were extracted and accounted for 46.7% of the variance. The results of KMO statistics (0.87) and Barlette's Test of Sphericity (χ^2 = 1322.59, df = 276, $p < 0.01$) support this solution. The eigenvalues were 7.43, 1.70, 2.27, and 0.81 for the four factors. The results of PA and scree plot indicated that a four-factor solution was appropriate. The first factor, "*temperance*", includes fairness, judgment, perseverance, wisdom, and prudence. The second factor, "*fortitude*", encompasses creativity, bravery, humor, leadership, social intelligence, spirituality, and zest. The third factor, "interpersonal", consists of gratitude, humility, team orientation, honesty, and love. The last factor, "*vitality*", comprises hope, curiosity, forgiveness, love of learning, and appreciation of learning. These strengths had communalities that ranged from 0.23 to 0.67. The four-component solution has also been found in past research [23,46]. This model was tested to determine if the results obtained through exploratory factor analysis (EFA) can be reproduced using confirmatory factor analysis (CFA) on sub-sample 2. This approach has been employed in previous studies [17,23]. In addition, we compared our EFA with the results obtained from other models using factor analysis [17,19,30,40,44,64,66].

The goodness of fit indices of the five-factor model yielded the best fit with the highest CFI value (0.92) and lowest values of RMSEA (0.06) and SRMR (0.07) when compared to other models (Table 5). Aligned with past findings [16,39], the five factors can be labeled as interpersonal, emotional, restraint, theological, and intellectual. The internal consistency of all factors was acceptable, ranging from 0.82 to 0.89. Standardized loadings are shown in Table 6.

Based on the data of the whole sample from the present study, CS-SDS was tested with convergent measures (life satisfaction and positive affect) and divergent measures (negative affect). The correlations among the five sub-scales of CS-SDS and SWB are shown in Table 7. All relationships were significant ($p < 0.05$, ranging from 0.16 to 0.53), and aligned with past findings [39,40].

Table 3. Descriptive statistics of the variables.

		Overall			Sub-Sample 1 (S1)			Sub-Sample 2 (S2)		
		M (SD)	**Skewness**	**Kurtosis**	**M (SD)**	**Skewness**	**Kurtosis**	**M (SD)**	**Skewness**	**Kurtosis**
1.	Creativity	4.10 (1.434)	0.022	−0.709	4.00 (1.384)	0.049	−0.445	4.21 (1.481)	−0.026	−0.910
2.	Bravery	4.56 (1.238)	−0.258	−0.042	4.50 (1.246)	−0.109	−0.216	4.62 (1.232)	−0.413	0.243
3.	Hope	4.98 (1.404)	−0.545	−0.292	4.88 (1.445)	−0.498	−0.225	5.07 (1.360)	−0.588	−0.373
4.	Humor	5.26 (1.208)	−0.690	0.527	5.19 (1.236)	−0.053	0.316	5.34 (1.179)	−0.868	0.908
5.	Curiosity	5.56 (1.058)	−0.146	−0.409	5.39 (1.043)	−0.251	−0.411	5.39 (1.001)	−0.027	−0.388
6.	Fairness	5.67 (1.113)	−604	0.236	5.21 (1.278)	−0.522	0.140	5.31 (1.203)	−0.695	0.405
7.	Forgiveness	5.56 (1.058)	−0.676	0.409	5.47 (1.102)	−0.499	−0.275	5.65 (1.007)	−0.873	1.480
8.	Gratitude	5.67 (1.113)	−0.547	−0.415	5.75 (1.077)	−0.645	−0.050	5.60 (1.146)	−0.455	−0.673
9.	Modesty	5.35 (1.184)	−0.434	−0.445	5.36 (1.219)	−0.466	−0.461	5.35 (1.153)	−0.401	−0.412
10.	Team-oriented	4.26 (1.408)	−0.156	−0.454	4.38 (1.332)	−0.320	−0.091	4.14 (1.475)	0.008	−0.646
11.	Honesty	5.82 (0.969)	−0.701	0.489	5.76 (1.040)	−0.804	0.674	5.87 (0.893)	−0.477	−0.172
12.	Judgment	5.12 (1.194)	−0.427	−0.143	5.09 (1.164)	−0.254	−0.318	5.16 (1.226)	−0.586	0.060
13.	Kindness	5.63 (1.101)	−0.713	0.158	5.59 (1.046)	−0.595	0.359	5.67 (1.156)	−0.827	0.074
14.	Leadership	4.47 (1.422)	−0.329	−0.398	4.37 (1.446)	−0.340	−0.51	4.57 (1.395)	−0.309	−0.274
15.	Love	5.39 (1.287)	−0.896	1.068	5.33 (1.288)	−0.993	1.509	5.44 (1.288)	−0.815	0.691
16.	Love of learning	5.48 (1.153)	−0.339	−0.52	5.41 (1.181)	−0.350	−0.423	5.55 (1.124)	−0.315	−0.653
17.	Appreciation of beauty and excellence	5.61 (1.142)	−0.857	1.355	5.53 (1.162)	−0.729	1.073	5.69 (1.119)	−1.007	1.853
18.	Perseverance	5.35 (1.199)	−0.662	0.122	5.27 (1.219)	−0.598	0.085	5.44 (1.177)	−0.734	−0.232
19.	Perspective	5.14 (1.088)	−0.371	0.289	5.12 (1.104)	−0.592	0.983	5.17 (1.075)	−0.136	−0.470
20.	Prudence	5.16 (1.270)	−0.662	0.105	5.19 (1.185)	−0.604	0.446	5.13 (1.353)	−0.687	−0.164
21.	Self-regulation	4.94 (1.305)	−0.544	−0.066	4.86 (1.289)	−0.676	0.147	5.01 (1.320)	−0.442	−0.267
22.	Social intelligence	4.68 (1.460)	−0.538	−0.055	4.60 (1.498)	−0.485	−0.169	4.77 (1.421)	−0.590	0.119
23.	Spirituality	5.55 (1.109)	−0.537	0.457	5.54 (1.160)	−0.777	1.293	5.56 (1.061)	−0.226	−0.744
24.	Zest	5.22 (1.203)	−0.530	0.221	5.13 (1.275)	−0.578	0.261	5.31 (1.122)	−0.396	−0.064

Table 4. Results of exploratory factor analysis based on sub-sample 1 (n = 142).

			Temperance		Fortitude		Interpersonal		Vitality		
		Mean (SD)	**Pattern**	**Structure**	**Pattern**	**Structure**	**Pattern**	**Structure**	**Pattern**	**Structure**	h^2
1.	Creativity	3.94 (1.30)	0.20	0.31	**0.38**	0.42	−0.19	0.18	0.14	0.27	0.23
2.	Bravery	4.45 (1.21)	0.16	0.43	**0.64**	0.70	−0.11	0.36	0.14	0.38	0.54
3.	Hope	4.83 (1.47)	−0.17	0.26	0.20	0.35	0.07	0.37	**0.58**	0.59	0.39
4.	Humor	5.17 (1.25)	−0.21	0.02	**0.65**	0.53	−0.13	0.09	0.08	0.11	0.34
5.	Curiosity	5.36 (1.07)	−0.03	0.40	0.41	0.56	0.03	0.45	**0.47**	0.60	0.51
6.	Fairness	5.18 (1.25)	**0.52**	0.52	−0.01	0.19	−0.22	0.24	0.25	0.40	0.32
7.	Forgiveness	5.45 (1.06)	−0.06	0.23	−0.18	0.02	0.03	0.27	**0.65**	0.58	0.38
8.	Gratitude	5.71 (1.08)	0.24	0.61	−0.08	0.29	**0.40**	0.67	0.30	0.62	0.57
9.	Modesty	5.40 (1.17)	0.31	0.53	−0.46	−0.04	**0.43**	0.56	0.26	0.51	0.56
10.	Team-oriented	4.41 (1.28)	−0.13	0.21	−0.02	0.19	**0.61**	0.49	−0.05	0.21	0.26
11.	Honesty	5.70 (1.03)	0.21	0.51	−0.05	0.26	**0.44**	0.59	0.09	0.42	0.39
12.	Judgment	5.06 (1.13)	**0.58**	0.59	0.07	0.29	−0.13	0.32	0.11	0.37	0.36
13.	Kindness	5.55 (1.02)	0.02	0.48	−0.02	0.32	**0.52**	0.68	0.28	0.57	0.52
14.	Leadership	4.37 (1.40)	0.11	0.31	**0.60**	0.63	0.17	0.36	−0.28	0.07	0.45
15.	Love	5.27 (1.30)	−0.13	0.38	0.06	0.36	**0.75**	0.72	0.04	0.41	0.53
16.	Love of learning	5.37 (1.18)	0.27	0.63	0.38	0.61	−0.03	0.54	**0.43**	0.67	0.67
17.	Appreciation of beauty	5.49 (1.09)	0.12	0.38	0.15	0.32	0.05	0.37	**0.31**	0.46	0.26
18.	Perseverance	5.21 (1.22)	**0.78**	0.82	0.04	0.37	0.02	0.53	0.03	0.46	0.67
19.	Perspective	5.07 (1.10)	**0.62**	0.63	0.32	0.49	−0.04	0.39	−0.19	0.22	0.49
20.	Prudence	5.13 (1.18)	**0.90**	0.82	−0.11	0.24	0.00	0.46	−0.08	0.36	0.68
21.	Self-regulation	4.80 (1.27)	**0.79**	0.69	−0.01	0.26	0.02	0.39	−0.21	0.22	0.51
22.	Social intelligence	4.54 (1.45)	0.13	0.41	**0.46**	0.60	0.40	0.53	−0.30	0.14	0.50
23.	Spirituality	5.52 (1.10)	0.02	0.48	**0.38**	0.60	0.33	0.62	0.20	0.51	0.54
24.	Zest	5.09 (1.24)	−0.17	0.34	**0.49**	0.65	0.48	0.62	0.03	0.36	0.57
	Eigenvalues		7.43		1.70		1.27		0.81		Total
	Variance (%)		30.97%		7.07%		5.30%		3.37%		variance:
	M (SD)		5.08 (0.86)		4.76 (0.88)		5.35 (0.82)		5.33 (0.81)		46.7%
	α		0.81		0.79		0.79		0.73		
	ω		0.81		0.79		0.79		0.72		

Note: h^2: communality. Values in bold represent the largest loadings onto their respective factor.

Table 5. Fit indices for all models.

Model	Description	χ^2	df	CFI	RMSEA	SRMR
1	Unidimensional model (1-factor)	692.844	252	0.65	0.11 (0.102–0.121)	0.095
2	2-factor [a]	662.788	251	0.673	0.108 (0.098–0.118)	0.097
3	3-factor [b]	617.276	249	0.708	0.102 (0.092–0.113)	0.096
4a	4-factor [c]	509.242	224	0.764	0.095 (0.084–0.106)	0.091
4b	4-factor [d]	495.939	224	0.754	0.093 (0.082–0.104)	0.090
4c	Current EFA results	582.398	246	0.733	0.098 (0.088–0.109)	0.091
4c.1	Modified Model 4c	514.415	242	0.784	0.089 (0.079–0.100)	0.091
5	5-factor [e]	570.937	242	0.739	0.098 (0.088–0.109)	0.094
5a	Modified Model 5	348.504	227	0.904	0.062 (0.048–0.074)	0.077
6	6-factor [f]	612.973	236	0.701	0.106 (0.096–0.117)	0.096

Note: df: degrees of freedom; CFI: comparative fit index; RMSEA: root mean square error of approximation; SMRM: standardized root mean square residual. [a] Based on the findings from Khumalo et al.'s study [30]. [b] Based on the findings from Duan et al.'s study [19]. [c] Based on the findings from Kaya's study [64]. [d] Based on the findings from Chou et al.'s study [66]. [e] Based on the findings from Littman-Ovadia's study [44]. [f] Based on the VIA classification [1].

Table 6. Standardized loadings based on CFA results.

		Model 5a					
Item		**Interpersonal**	**Emotional**	**Restraint**	**Theological**	**Intellectual**	**R^2**
6	Fairness	0.667					0.445
7	Forgiveness	0.644					0.415
9	Modesty	0.642					0.412
10	Team-oriented	0.180 *					0.032
13	Kindness	0.793					0.629
14	Leadership	0.213 ^					0.210
1	Creativity		0.418				0.175
2	Bravery		0.508				0.258
4	Humor		0.458				0.210
19	Perspective		0.465				0.422
22	Social Intelligence		0.726				0.527
24	Zest		0.542				0.491
11	Honesty			0.584			0.341
12	Judgment			0.436			0.366
18	Perseverance			0.529			0.455
20	Prudence			0.689			0.474
21	Self-regulation			0.863			0.636
3	Hope				0.418		0.175
8	Gratitude				0.792		0.627
15	Love				0.382		0.146
23	Spirituality				0.266		0.520
5	Curiosity					0.760	0.577
16	Love of Learning					0.829	0.687
17	Appreciation of Beauty					0.536	0.288
M (SD)		5.11 (0.77)	4.90 (0.81)	5.32 (0.88)	5.39 (0.81)	5.54 (0.87)	
α		0.70	0.72	0.78	0.68	0.74	
ω		0.70	0.73	0.78	0.68	0.77	

Note: All standardized factor loadings were significant ($p < 0.05$). * $p = 0.05$; ^ $p > 0.05$.

Table 7. Relationships among variables based on whole sample (N = 283).

	Interpersonal	Emotional	Restraint	Theological	Intellectual	α	ω
Positive affect	0.33 **	0.44 **	0.38 **	0.49 **	0.46 **	0.88	0.88
Negative affect	−0.22 **	−0.21 **	−0.32 **	−0.26 **	−0.16 **	0.89	0.89
Life satisfaction	0.30 **	0.39 **	0.33 **	0.40 **	0.36 **	0.89	0.89

** $p < 0.01$.

4. Discussion

The purpose of the study was to investigate the psychometric properties of CS-SDS among Singaporean pre-service and in-service teachers. In general, the findings of this study demonstrate that CS-SDS has satisfactory psychometric properties in terms of construct validity and reliability. Specifically, our findings suggested a five-factor model of CS-SDS, which aligns with past research indicating the multidimensionality of the VIA classification as found among samples in America [16,44], Austria [80], Israel [40,44], India [81], Switzerland [18,53], and Spain [39]. As shown in Table 7, the composition of our five factors was mostly similar to the results reported in past research using a short form of VIA-IS [39,49,50]. This provides empirical evidence of CS-SDS, which can be considered an alternative measure when assessing 24 strengths in non-Western contexts.

The findings of this study indicated that CS-SDS is a valid instrument in terms of both convergent and divergent validity. As hypothesized, character strengths were significantly related to life satisfaction, positive affect, and negative affect, consistent with past studies using the original VIA-IS [18] and its short form [40,64].

This aligns with a recent study by Weziak-Bialowolska et al. [82], which found that character strengths were significantly related to psychological well-being and healthy behaviors, such as maintaining a healthy diet and being physically active. The present findings extend the literature in positive psychology by demonstrating the psychometric properties of the short form of a 24-character strength assessment tool among a sample of Singaporean students, thereby improving the generalizability of results in non-Western contexts.

It is noteworthy that our findings do not completely align with past studies. While the multi-dimensionality of the VIA classification is supported, our results suggest a five-factor model. This contradicts previous studies using the same assessment tool [64,66]. Also, we found that several strengths (i.e., humor, curiosity, humility, team orientation, love, and appreciation of beauty) were not associated with negative affect ($p > 0.05$). More specifically, forgiveness was only related to life satisfaction, but not related to either positive or negative affect. Therefore, more research is warranted to understand these inconsistencies.

In light of recent advancements in positive psychology, particularly in character development, the short form of the character strength assessment tool, CS-SDS, emerges as a promising option based on the empirical findings. Although character strengths are relatively stable, they can be nurtured and shaped through environmental contexts and experiences [5,17]. These positive traits can be fostered through strength-based interventions, which contribute to higher positive outcomes, life satisfaction, and well-being, and lower negative affect and depressive symptoms. The protective effect of character strengths against unhealthy behaviors (e.g., smoking or drinking) was further supported by a recent international study with a large sample of over 60,000 participants from nearly 160 countries [61]. Friborg et al. [83] compared the Likert scale and semantic differential method when measuring positive psychological constructs and found that the latter approach performed better with lower error variance and a better fit to the model. The present study further supported the use of semantic differential-based items to measure character strengths in non-Western societies, indicating that CS-SDS possesses satisfactory psychometric properties in terms of the internal consistency and construct validity of the short form.

5. Conclusions

The present study contributes to the literature by adopting exploratory and confirmatory factor analyses to test the factorial validity of CS-SDS. However, several limitations should be noted. First, although the general sample size requirements were met, including the minimum sample size of 100 or 200 [84,85] and 5–10 participants per item [86], a larger sample size (above 400) is recommended for enhancing the generalizability of the factor structure [75,84]. Additionally, using a sample size calculator to ensure adequacy [87], our study met the recommended sample size criteria for factor analysis, demonstrating adequate power for the analysis. Also, future studies should adopt a cross-sectional or longitudinal design to examine the associations and/or causal mechanisms between character strengths and health-related outcomes. This information provides valuable insights for designing strength-based interventions or programs to enhance university students' health and well-being.

Despite these limitations, the present study explored the factor structure of the character strength assessment tools by using both exploratory and confirmatory factor analysis. Future studies should broaden the analysis by using other advanced statistics, such as exploratory structural equation modeling, to improve the generalizability of our findings.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available at the request of the corresponding author due to privacy and ethical restrictions.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Character Strengths-Semantic Differential Scale (CS-SDS).

	"7"	"1"
1.	Creativity	Unimaginative
2.	Bravery	Cowardice
3.	Hope	Pessimism
4.	Humor	Humorless
5.	Curiosity	Disinterested
6.	Fairness	Biased
7.	Forgiveness	Cruel
8.	Gratitude	Entitled
9.	Modesty	Arrogant
10.	Team-oriented	Individualistic
11.	Honesty	Dishonest
12.	Judgment	Hasty decisions
13.	Kindness	Selfishness
14.	Leadership	Passiveness
15.	Love	Emotionally detached
16.	Love of learning	Disengagement from learning
17.	Appreciation of beauty and excellence	Disregard for beauty and excellence
18.	Perseverance	Give up easily

Table A1. *Cont.*

	"7"	"1"
19.	Perspective	Naïve
20.	Prudence	Reckless
21.	Self-regulation	Little self-discipline
22.	Social intelligence	Social awkwardness
23.	Spirituality	Not interested in life
24.	Zest (Enthusiasm)	Indifference

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