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Emotional and psychological well-being in early adolescence: psychometric properties of the Stirling children's well-being scale in a sample of Iranian adolescents



Asgar Alimohamadi^{1*}, Karim Abdolmohamadi², Mahdi Ghasemzadeh³ and Violeta J. Rodriguez⁴

Abstract

Background Despite the existence of comprehensive well-being frameworks, there are notable gaps in measuring and understanding well-being in adolescents. the study examines the psychometric properties of the Sterling Children's Well-Being Scale (SCWBS) in a large sample of Iranian adolescents.

Methods This study conducted a cross-sectional investigation method on 2362 school-aged adolescents (1365 girls and 997 boys) aged 12 to 15 years, selected from a community sample in Iran (October 2023-May 2024). After a forward-backward translation, the SCWBS was adapted to the Farsi language. The SCWBS, WHO-five well-being index (WHO-5), and the Pediatric Symptom Checklist (PSC-17) were used for data collection. Assessment of reliability was conducted using internal consistency and test-retest reliability evaluations.

Results The factor structure of the SCWBS was evaluated using confirmatory factor analysis (CFA), where a Cronbach's alpha of 0.88 was obtained for the global scale, while 0.87 was obtained for the retest. According to the fit indices, the initial correlated two-factor model of SCWBS was deemed sufficient: $\chi 2 = 646.60$; df = 53; RMSEA = 0.069; CFI = 0.98; TLI = 0.98; IFI = 0.98; SRMR = 0.04.

Conclusions Based on these results, the construct validity and reliability of the SCWBS are initially supported as a measurement instrument to assess the psychological well-being of Iranian adolescents.

Keywords SCWBS, Validity, Reliability, Emotional well-being, Psychological well-being, Adolescents, Iran

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Background

Many different definitions and survey instruments for measuring well-being have been proposed. In its broadest sense, well-being encompasses an individual's perception of how well their life is progressing. Historically, in theoretical frameworks of well-being, two fundamental components have been identified: hedonia and eudaimonia [1]. Hedonia, which refers to momentary states of pleasure and happiness, is associated with short-term enjoyment, gratification, and positive emotional experiences. In contrast, eudaimonia, defined as the actualization of human potential, is linked to long-term self-development, encompassing personal growth, self-improvement, and fulfillment derived from leading a meaningful life [2]. On the one hand, some researchers define hedonia as subjective psychological well-being. The term "subjective well-being" was introduced by E Diener, EM Suh, RE Lucas and HL Smith [3] as a concept that encompasses life satisfaction, the absence of negative emotions, and the experience of positive emotions. E Diener, SJ Heintzelman, K Kushlev, L Tay, D Wirtz, LD Lutes and S Oishi [4] further described hedonic well-being—also referred to as subjective well-being-as comprising two components: a cognitive component, linked to life satisfaction, and an emotional component, defined by positive emotions and limited negative emotions.

Conversely, certain scholars have proposed an alternative perspective on well-being, namely eudaimonic well-being, in response to criticisms regarding the limitations of hedonic definitions. Eudaimonic well-being emphasizes living a life of meaning, purpose, and personal growth [5]. This perspective incorporates the psychological well-being framework proposed by CD Ryff [6], which outlines six key dimensions of personal and social functioning: autonomy, personal growth, purpose in life, environmental mastery, positive relationships, and self-acceptance.

Nevertheless, several prominent researchers argue that genuine well-being is not solely defined by happiness but also by leading a purposeful and fulfilling life. These scholars assert that both hedonic and eudaimonic wellbeing are integral components of overall well-being [7, 8]. Indeed, studies suggest a positive correlation between these two forms of well-being, indicating that individuals with high levels of one type of well-being often exhibit elevated levels of the other [9, 10].

Since children's psychological well-being is considered an indicator of social welfare and a measure of the effectiveness of the educational system [11], there has been growing academic interest in researching, evaluating, and measuring adolescent well-being in recent years [12–14]. Additionally, given that the onset of most mental health disorders occurs during this critical developmental stage, assessing adolescent well-being in community settings is essential [15–17]. Specifically, adolescents aged 13 to 18 are at the highest risk of developing mental health disorders and subclinical symptoms [18, 19]. Clinical and subclinical mental health symptoms in early adolescence can hinder the transition to adulthood, making effective psychological functioning crucial for overcoming challenges such as education, employment, avoiding risky behaviors, and establishing social support networks [20, 21].

In Western populations, adolescent mental well-being is commonly assessed using various standardized measures, including the Personal Wellbeing Index [14], the Warwick-Edinburgh Mental Well-Being Scale [22], the EPOCH Measure of Adolescent Well-Being [23], the Brief Adolescents' Subjective Well-Being in School Scale [24], and the Stirling Children's Well-Being Scale [25]. Among these, the SCWBS is particularly noteworthy for its incorporation of both hedonic and eudaimonic perspectives on well-being, making it a valuable tool for rapid assessments [26, 27]. Developed by I Liddle and GFA Carter [25] or children aged 8 to 15, the SCWBS comprises 15 items divided into two subscales: Positive Emotional State and Positive Outlook, each containing six questions. The scale is widely used due to its strong psychometric properties, ease of administration, and ability to efficiently assess well-being in individuals under the age of 18 [26].

The two-factor structure of the SCWBS was confirmed in an Indonesian sample of 375 students, as examined by H Wahyuningsih, R Novitasari and FA Kusumaningrum [27] after they examined it on a sample of 375 students from Indonesia. Cronbach's alpha coefficients were reported as 0.73 and 0.91 for the Positive Outlook and Positive Emotion subscales, respectively. Similarly, after adapting the scale for use in Bangladesh, M Haque and M Imran [28] demonstrated that the internal consistency of the SCWBS was strong, with a reliability coefficient of 0.78 (using the binomial approach), a Cronbach's alpha of 0.75, and a test-retest reliability coefficient of 0.79, confirming the scale's stability over time. In a Japanese validation study, C Nishida, Y Ishimoto, Y Takizawa, T Katayama and Y Matsumoto [26] translated and examined the SCWBS in a sample of Japanese adolescents, assessing its internal consistency and test-retest reliability. However, the study did not investigate concurrent validity through confirmatory factor analysis (CFA).

The SCWBS has been recognized as a valid and reliable questionnaire, particularly in light of the significant need for adolescent well-being assessments in Iran. However, its psychometric properties and applicability require further validation within this cultural context. Given that culture plays a significant role in shaping adolescents' mental health, cognitive development, emotional regulation, and social behaviors, cross-cultural research is essential to gain a more comprehensive understanding of adolescent well-being. To address this need, our study examines the validity of the SCWBS, assessing its concurrent, convergent, divergent, and structural validity, as well as its reliability (including internal consistency and test-retest reliability).

Despite the availability of comprehensive well-being frameworks, notable gaps persist in measuring and understanding adolescent well-being. This study highlights the importance of examining the dynamic interplay between hedonic and eudaimonic well-being, which is often overlooked in adolescent research. Compared to adults, adolescents have less-developed self-regulation capacities [29, 30], which may make it more challenging for them to forgo immediate pleasures in favor of longterm meaningful pursuits. Furthermore, some aspects of eudaimonic well-being may be less developmentally relevant during adolescence, as they involve abstract goals, such as striving to live in alignment with one's values.

Overall, understanding adolescent well-being is crucial, as the choices young people make regarding well-being can have lasting consequences on their lives—such as whether they habitually prioritize short-term enjoyment over responsibilities like academic success. A deeper understanding of how adolescents balance the desire to feel good with the pursuit of a meaningful life can inform prevention and intervention programs aimed at fostering positive youth development [31].

Furthermore, existing well-being measures and definitions may not fully capture the complexities of adolescent well-being outside Western contexts. This gap is particularly evident during early adolescence, which RW Blum, NM Astone, MR Decker and VC Mouli [32] identify as a critical yet frequently overlooked developmental phase, marked by substantial physical, cognitive, and social changes. As a result, this study seeks to address these gaps by exploring both hedonic and eudaimonic well-being in Iranian adolescents using updated and culturally inclusive measurement tools. By integrating multiple theoretical perspectives, we aim to provide a more nuanced understanding of adolescent psychological wellbeing and its broader implications for social welfare and developmental outcomes in Iran.

Research questions

This study aims to evaluate the psychometric properties of the SCWBS in Iranian adolescents. The specific research questions are:

- (a) What is the factor structure of the SCWBS in a sample of Iranian adolescents?
- (b)Does the SCWBS demonstrate convergent validity?
- (c) How does the SCWBS correlate with the Pediatric Symptom Checklist-Y (PSC-17) in assessing discriminant validity?

- (d) How stable is the SCWBS over time, as indicated by its test-retest reliability?
- (e) What is the internal consistency (reliability) of the SCWBS in measuring emotional and psychological well-being in Iranian adolescents?

Methods

Setting and study population

The study employed a convenience sampling method, involving 2362 school-aged students aged 12 to 15 years (M = 13.75; SD = 1.10), with 57.8% being female, from 7th to 10th grade in urban northeastern Iran. The criteria for including participants are as follows: Participants must be aged 12 to 15 years and free from any specific mental disorders, as confirmed by teacher reports and school health case records. They should be enrolled in regular classes and capable of completing the study questionnaires. Additionally, written informed consent must be provided by the parents or guardians of the adolescents for their participation in the study. Participants must also be willing to voluntarily participate, with the understanding that they can withdraw from the study at any time. Failure to meet any of these inclusion criteria resulted in exclusion from the study.

The research utilized cross-sectional data gathered through survey tools. Data was gathered between October 2023 and May 2024. Because this research was conducted in school, the school manager made contact to inform parents about the purpose of the research. Both parents and children were told that using students' information for research would not change any educational services they received. A survey package (paper and pencil) was then distributed to a chosen group of students. The package included a survey booklet with the study measures and a cover letter outlining the goal of the investigation. A gratitude message was also included in the survey booklet. The goal of the study, the fact that participation was optional, and the confidentiality of the replies were all underlined in the cover letter. Teachers were in charge of giving the survey packets to each student. After the students finished the questionnaires, they returned them to the teacher. Completing the survey packet takes about ten to fifteen minutes. To be included in the study, students needed to have a consent form signed by their parents and must have finished the questionnaires completely.

Procedure

There were two stages to this investigation. Beaton's intercultural debugging guidelines [33] were followed in phase 1 of the cross-cultural adaptation process, as illustrated in Supplementary Fig. 1. This included forward and reverse translation, consulting with experts, and pilot tests. In Phase 2 involved evaluating the reliability

and validity of the Farsi translation of the SCWBS by a cross-sectional survey. Forward Translation (Step 1): This required the translation of the SCWBS into Farsi by two Farsi-English bilingual experts (one with a PhD in psychology and the other with a Ph.D. in English language translation), producing T1 and T2. The translations were subsequently synthesized by a linguist and a review board of experts (ten Iranian psychologists) to guarantee accuracy. A draft translation known as "Version 1 forward translation Farsi-SCWBS" was created after all inquiries and conflicts were resolved.

Backward Translation (Step 2): An English teacher and a Ph.D. in psychology, neither of whom had ever been familiar with the original SCWBS, performed this phase. To determine accuracy, two researchers created "Version 2.0 backward translation Farsi—SCWBS," which was compared to the original English version of the PCMC after translating the SCWBS's original Farsi language version into English.

Expert Consultation (Step 3): The pre-final Version 3.0 of the Farsi-SCWBS was developed with input from a group of eight specialists who were asked to evaluate the cultural adaptation of Version 2.0.

Pilot Testing (Step 4): The content was pilot-tested on thirty adolescents through a convenience sample preliminary survey. The findings revealed that not one of the respondents reported vagueness.

Measures

The following instruments were used to evaluate the data in addition to sociodemographic variables:

The Stirling Children's Well-being Scale (SCWBS): the SCWBS was developed as a comprehensive measure of children's emotional and psychological well-being, integrating both hedonic and eudaimonic dimensions. Hedonic well-being is primarily concerned with the presence of positive emotions and life satisfaction, while eudaimonic well-being focuses on personal growth, selfacceptance, and a sense of purpose. Within the SCWBS framework, these two perspectives are represented through two sub-components: Positive Emotional State and Positive Outlook. Positive Emotional State, which aligns with hedonic well-being, includes items that assess calmness, cheerfulness, relaxation, and positive mood: (1) "I've been feeling calm." (2) "I've been feeling cheerful about things." (3) "I've been feeling relaxed." (4) "I've been in a good mood." (5) "I've been getting on well with people." (6) "I enjoy what each new day brings." Positive Outlook, reflecting eudaimonic well-being, captures self-efficacy, optimism, perceived competence, and social connectedness: (1) "I think there are many things that I can be proud of." (2) "I feel that I am good at some things." (3) "I think good things will happen in my life." (4) "I can find lots of fun things to do." (5) "I think lots of people care for me." (6) "I've been able to make choices easily". Therefore, the SCWBS is a tool with 12 items that helps to measure the emotional and mental health of children between the ages of 8 and 15 [25]. The questionnaire is rated on a Likert scale (never = one, very little = two, sometimes = three, very much = four, and always = five). The two subscales' sums are used to produce the overall SCWBS score, which has a range of 12 to 60. Higher scores indicate better levels of well-being. To check for biased responses, three more items were included in the SCWBS. Although these questions were part of the data collection, their scores were not taken into account for the final results. According to C Nishida, Y Ishimoto, Y Takizawa, T Katayama and Y Matsumoto [26], the validity and reliability of the SCWBS have been established, demonstrating its efficacy in evaluating children's well-being in Japanese societies. Strong validity and reliability from this study [26] are adequate to justify using this Japanese version. With a rating of 0.88, the SCWBS scale's internal consistency was likewise high in our investigation.

The WHO-five well-being index (WHO-5): Derived from the WHO-10, the WHO's Five Well-Being Index (WHO-5) is a general worldwide short measure of subjective well-being [34]. This 5-item measure of well-being employs a 6-point Likert-type style, with 0 representing "at no time" and 5 representing "all the time." A higher score indicates a higher state of wellbeing. The WHO-5 is unidimensional in nature, as demonstrated by the findings of SF Fung, CYW Kong, YM Liu, Q Huang, Z Xiong, Z Jiang, F Zhu, Z Chen, K Sun, H Zhao, et al. [35]. With a Cronbach's alpha of 0.85, it also has good internal consistency. According to J Balázs, M Miklósi, A Keresztény, CW Hoven, V Carli, C Wasserman, G Hadlaczky, A Apter, J Bobes, R Brunner, et al. [36] and MV Martins, A Formiga, C Santos, D Sousa, C Resende, R Campos, N Nogueira, P Carvalho and S Ferreira [37], the WHO-5 has been translated into more than thirty different languages and is appropriate for children who are nine years old or older. Cronbach's alpha yields a value of 0.74, indicating that the present sample of the WHO-5 has a high level of internal consistency across all items. Additionally, M Dadfar, N Momeni Safarabad, AA Asgharnejad Farid, M Nemati Shirzy and F Ghazie pour Abarghouie [38] reported that the Cronbach's α for the WHO-5 was 0.91, further supporting its strong internal consistency.

Pediatric Symptom Checklist-Y: The PSC-17 was created by W Gardner, M Murphy, G Childs, K Kelleher, M Pagano, M Jellinek, T McInerny, RC Wasserman, P Nutting and L Chiappetta [39] and consists of 17 items as well as three components to assess three different types of problems: attention problems, externalizing symptoms (like disruptive conduct), internalizing symptoms (like depression and anxiety), and an overall score. The PSC-17's total score is meant to evaluate a child's overall psychosocial functioning (e.g. 'Feel sad, unhappy' or 'Feel hopeless'). All items on the scale are positively framed. Points are allocated to each item in the following order: not true/never = 0, sometimes or a little true = 1, and very often or often = 2. On the scale, 0 is the lowest possible score and 34 is the maximum. The Cronbach's alpha coefficient for the PSC-17 Youth Self-Report form is above 0.70, according to JA Piqueras, V Vidal-Arenas, R Falcó, B Moreno-Amador, JC Marzo, JM Holcomb and M Murphy [40]. With a value of 0.70, the PSC-17 scale's internal consistency was determined to be satisfactory in this investigation.

Construct validity

Construct validity refers to the degree to that a scale's items accurately measure the intended characteristics, and it is empirically assessed through convergent and discriminant validity [41]. Convergent validity is assessed for the SCWBS by examining its empirical similarity to the WHO-five well-being index, a conceptually related measure of well-being. LJ Cronbach and PE Meehl [42] argue that convergent validity in psychological tests is assessed by calculating Pearson's correlation coefficients between scales that are theoretically related. In this study, Pearson's correlation coefficients were computed between the SCWBS and the WHO-five well-being index, as they are conceptually related measures. According to D Westen and R Rosenthal [43], following Cohen's criteria for effect size, convergent validity is supported if the correlation with the theoretically related variable demonstrates at least a medium effect size. Correlation coefficients of 0.29 or lower were regarded as weak, those between 0.30 and 0.49 as low, 0.50 to 0.69 as moderate, and values of 0.70 or higher as indicating a strong correlation [44]. Discriminant validity, on the other hand, is used to confirm that the constructs in the study are distinct from one another [45]. It ensures that the scores derived from measuring a specific construct remain independent and are not affected by other constructs [46]. We selected the Pediatric Symptom variable to assess discriminant validity because JA Piqueras, V Vidal-Arenas, R Falcó, B Moreno-Amador, JC Marzo, JM Holcomb and M Murphy [47] demonstrated that the PSC-17-Y has a negative relationship with well-being in adolescents. Pearson's correlation coefficients were computed between the SCWBS and the PSC-17 to assess discriminant validity. We hypothesized a statistically significant negative relationship between well-being scores and pediatric symptoms in adolescents. Additionally, we computed the Average Variance Extracted (AVE) and Maximum Shared Variance (MSV) to further evaluate the constructs.

Exploratory Factor Analysis (EFA)

EFA is a statistical technique used to make inferences about the underlying structures in a dataset. In this study, EFA was employed to identify latent variables. According to J Osborne, A Costello and J Kellow [48] and AG Yong and S Pearce [49], three key steps were involved: (i) determining the sample size, (ii) performing Bartlett's Test of Sphericity, and (iii) assessing communalities. The adequacy of the sample size can be evaluated statistically. The Kaiser-Meyer-Olkin (KMO) test was performed to assess the sampling adequacy for both individual items and overall factors, with a value greater than 0.6 deemed acceptable [50]. Additionally, Bartlett's Test of Sphericity was applied to test the significance of correlations among all items in the scale, helping to determine whether the correlation matrix represents an identity matrix. A significant *p*-value of 0.05 implies that the data do not form an identity matrix, suggesting the presence of a multivariate normal distribution, which makes EFA appropriate [48]. Communality refers to the proportion of shared variance in an observed variable, and a value below 0.3 suggests that the item is not strongly related to the other items in its factor. The number of factors to retain in the model was decided based on Kaiser's criterion and the Scree plot. Based on Comrey and Lee's guidelines [51], factors with eigenvalues greater than one and those positioned above the elbow on the Scree plot were retained, with item loadings above 0.3 considered acceptable. Following Field's recommendations [50], factor loadings below 0.3 were suppressed. After extracting the factors, their interpretation was performed using factor rotation. Upon comparing principal axis factoring models using both Varimax (orthogonal) and Promax (oblique) rotations, the Promax model was selected. This model was considered more realistic, as it revealed significant correlations between many of the factors, providing a better representation of the underlying relationships in the data [52].

Confirmatory Factor Analysis (CFA)

CFA is a psychometric method used to evaluate a preestablished factor model of a specific measurement tool, enabling the estimation of latent constructs while adjusting for any measurement errors [45]. After conducting the EFA, we performed CFA, focusing on three key aspects: parameter estimates, fit indices, and modification indices. A factor loading was considered acceptable if it exceeded 0.5 [53]. The overall model fit was assessed using various fit indices. The chi-square (χ 2), incremental fit index (IFI), non-normed fit index (NNFI), Tucker-Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) were used to assess the model fit. An appropriate model fit is defined as having a TLI of 0.90, a CFI of 0.90, an RMSEA of \leq 0.08, and an SRMR of < 0.08 [54, 55].

Reliability test

The reliability of the scale was assessed after conducting the EFA using two different methods: (i) the Cronbach's alpha coefficient; and (ii) test-retest. D George and P Mallery [56] propose the following cutoff values for interpreting Cronbach's alpha: an alpha of 0.9 or higher is considered excellent, 0.8 or higher is good, 0.7 or higher is acceptable, 0.6 or higher is questionable, 0.5 or higher is poor, and any value below 0.5 is considered unacceptable [45]. The 2-week test-retest reliability of the scale was assessed using the intraclass correlation coefficient (ICC). For this evaluation, 250 participants from the validity phase were selected two weeks later. ICC values below 0.4 were considered indicative of poor reliability, values above 0.7 were deemed excellent, and values between 0.4 and 0.7 were categorized as showing fair to good reliability [57].

Statistical analyses

For data analysis, LISREL 8.80 and SPSS Version 25 were used to assess the psychometric properties of the

Table 1 Demographic characteristics of the adolescents (n-2,362)

Variables	Count (n)	Percentage
Gender		
Female	1365	57.8
male	997	42.2
Age		
12 (years)	442	18.7
13 (years)	482	20.4
14 (years)	646	27.3
15 (years)	792	33.5
Class level		
7th grade	439	18.6
8th grade	483	20.4
9th grade	647	27.4
10th grade	793	33.6
Mother's education level		
High school	157	6.6
Bachelor	1331	56.4
Master	842	35.6
High than master	32	1.4
Father's education level		
High school	362	15.3
Bachelor	1204	51.0
Master	730	30.9
High than master	65	2.8
Mother's Employment Status	S	
Working	551	23.3
Not working	1811	76.7
Father's Employment Status		
Working	2018	85.4
Not working	344	14.6

items, including calculating the mean, standard deviation, skewness, and kurtosis. These analyses were performed to ensure the robustness of the data. Indicators of data normality, specifically skewness and kurtosis, were examined before conducting factor analysis. Skewness and kurtosis values between -2 and +2 are considered acceptable, while values outside this range indicate significant non-normality in the data [58]. During the process of determining the content validity of the SCWBS, both the scale-Content Validity Index (SCVI) and the item-Content Validity Index (I-CVI) were computed.

Missing data

A total of 2596 participants completed the research scales, with 234 questionnaires excluded due to being incomplete or ineligible, resulting in a response rate of 90.99%. To determine whether a questionnaire should be included or excluded, the following criteria were applied: For questionnaires with minimal missing data, imputation techniques were used, provided the missing data was random and did not surpass the defined threshold. Questionnaires with a significant amount of missing responses (e.g., over 10% of items left unanswered) were excluded to avoid potential bias and maintain the integrity of the data. Furthermore, responses with suspicious patterns, such as consistently selecting the same option for all items (e.g., choosing "sometimes" for each question) or unusually fast completion times suggesting inattentiveness (e.g., selecting two options instead of one for a question), were excluded. These measures ensured that the data remained reliable and the analysis was conducted using valid and high-quality responses.

Results

The data analysis results indicated that out of the participants, 1,365 (57.8%) were female, 1,438 (60.8%) were aged 14 to 15 years, and 1,440 (61%) were in the 9th and 10th grades. Additionally, 1,331 (56.4%) had mothers with a bachelor's degree, while 1,204 (51.9%) had fathers with a graduate degree. Furthermore, 551 (23.3%) had working mothers, and 2,018 (85.4%) had working fathers (see Table 1).

The means, standard deviations (SD), skewness, and kurtosis were computed to run a descriptive analysis of the SCWBS items. Based on the standards established by D George and M Mallery [59], which indicate that acceptable skewness and kurtosis values fall between -1 and +1 within the normal distribution range, items displaying a normal distribution were recognized (Table 2).

Content validity

Following consultation with 10 specialists, it was established that the item-level content validity index (I-CVI) was more than 0.75, while the scale-level content validity

Items	Μ	SD	Skewness	Kurtosis
Item 1	3.71	1.17	-0.76	-0.19
Item 2	3.27	1.24	-0.25	-0.86
Item 3	3.24	1.19	-0.16	-0.76
Item 4	3.54	1.14	-0.45	-0.51
Item 5	3.40	1.21	-0.36	-0.74
ltem 6	3.43	1.26	-0.45	-0.80
Item 7	3.28	1.24	-0.29	-0.88
Item 8	3.28	1.22	-0.26	-0.85
Item 9	3.21	1.18	-0.15	-0.75
Item 10	3.40	1.19	-0.35	-0.75
Item 11	3.50	1.25	-0.46	-0.77
ltem 12	3.33	1.24	-0.30	-0.86

Table 2	Descriptive	statistics	for the	SCWBS
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M=Mean; SD=Standard Deviations

Table 3	Factor	loadings	of the	pattern	matrix o	of a	princip	bal com	ponent	analy	/sis	extraction

Items	Factor 1	Factor 2	h²
1. I think good things will happen in my life.	0.82		0.50
2. I can find lots of fun things to do.	0.70		0.53
3. I feel that I am good at some things.	0.65		0.44
4. I've been able to make choices easily.	0.72		0.53
5. I think lots of people care for me.	0.43		0.43
6. I think there are many things that I can be proud of.	0.49		0.52
7. I've been feeling calm.		0.82	0.60
8. l enjoy what each new day brings.		0.84	0.64
9. I've been getting on well with people.		0.78	0.58
10. I've been in a good mood.		0.66	0.53
11. I've been feeling cheerful about things.		0.55	0.50
12. I've been feeling relaxed.		0.82	0.61
Eigenvalue	5.23	1.22	
% of variance	43.64	10.21	
Explained total variance	53.85		

Note: Factor 1: Positive outlook; Factor 2: Positive emotional state; h² = communalities

index (S-CVI) showed a value of 0.88. Following the presentation of these findings, the specialists affirmed that the SCWBS is both pertinent and clear.

Exploratory and confirmatory factor analyses

For the purpose of this investigation, a two-stage analytical strategy was adopted. In the beginning, an EFA was carried out in order to investigate the core factor structure of the questionnaire. Following that, a CFA was carried out in order to validate the structure that was established beforehand. In addition, the KMO test and Bartlett's test of sphericity were utilized in order to assess the proportion of the sample that was suitable for the study. According to the data that was acquired, KMO value was 0.933, which indicates that the sample size was suitable. This is because the KMO value is greater than the minimal value of 0.60 that was proposed by A Field [50]. Furthermore, the Bartlett test yielded a significant result (Chi-Square = 9977.59; df = 66; p < 0.0001). After that, the EFA was subjected to promax rotation and

principal component analysis. The analysis identified two components with Eigenvalues over one, explaining 53.85% of the variation (see Table 3). The first factor included items related to participants' optimistic perspective on life and future events; therefore, it was interpreted by the experts as *Positive Outlook*. The second factor contained items that refer to a mental and emotional condition characterized by feelings of happiness and contentment, and it was interpreted as *Positive Emotional State*.

The construct validity of the SCWBS was examined via CFA. A CFA was performed using robust maximum likelihood estimation to evaluate the adequacy of the correlated two-factor structure of the SCWBS. According to Table 4, the fit indices for the correlated two-factor model were as follows: $\chi^2 = 646.60$; df = 53; RMSEA = 0.069; CFI = 0.98; NNFI = 0.98; TLI = 0.98; IFI = 0.98, and SRMR = 0.04 (see Table 4). All standardized factor loadings were statistically significant, indicating that the model was validated. The CFA model, which

Table 4 The fitting index of the SCWBS

Fit index	χ2	df	RMSEA	CFI	NNFI	TLI	IFI	SRMR
Model result	646.60	53	0.069	0.98	0.98	0.98	0.98	0.04
Reference value	-	-	< 0.08	> 0.90	> 0.90	>0.90	> 0.90	< 0.08

Table 5 Correlations between SCWBS dimensions and two criterion variables

SCWBS	criterion variables							
	WHO-5	PSC-17	AVE	MSV				
Positive outlook	0.59**	-0.15**	0.42	0.33				
Positive emotions	0.61**	-0.16**	0.57					

Abbreviations: SCWBS: Stirling Children's Well-being Scale; WHO-5: The WHO's Five Well-Being Index; PSC: Pediatric Symptom Checklist; AVE: Average Variance Extracted; MSV: Maximum Shared Variance **P<0.01

includes factor loadings, is displayed in a graphical exposition in Supplementary Fig. 2.

Convergent and discrepant validity

The data from the three scales-SCWBS, WHO-5, and PSC-17-were subjected to Pearson correlation coefficient calculations to assess the convergent and discriminant validity of the SCWBS. The two particular components of the SCWBS, namely WHO-5 and PSC-17, are correlated with one another in Table 5, which provides the results of this association in the adolescent. When comparing the SCWBS with the WHO-5, it was observed that there was a positive correlation that was statistically significant. Strong correlations were discovered to provide evidence for the convergent validity between the two components of the SCWBS and WHO-5. These correlations were determined to be statistically significant (p < 0.01) between the two components. A further evaluation of the discriminant validity of the SCWBS was carried out with the PSC-17 serving as the measurement tool. More evidence for the discriminant validity of the SCWBS was revealed when a substantial negative correlation was observed between the two components and the sum scores of the PSC-17. To assess the discriminant validity of the scale, we also calculated both the AVE and MSV. Discriminant validity is considered acceptable if the AVE exceeds 0.50 and the MSV is lower than the AVE for all constructs [60]. The results indicated that for the first component, Positive Outlook, the AVE was less than 0.50, meaning it did not meet the required threshold. However, for the second component, Positive Emotions, the AVE exceeded 0.50, confirming its validity. The MSV was examined and found to be lower than the AVE for both dimensions of the constructs, thus supporting discriminant validity for the Scale.

Reliability

Regarding the reliability of the data that was acquired, two methods, namely internal consistency and retest, were utilized. With a Cronbach's α coefficient of 0.88,

the total scores of the SCWBS demonstrate a high level of internal consistency, indicating that the results are quite reliable. Furthermore, the two components demonstrated satisfactory and good internal consistency, with values ranging from 0.78 to 0.85. Over the course of three weeks, the reliability of the retest was computed twice for a total of 250 participants. The correlation coefficient r=0.88 from the two implementations of the SCWBS was found to be statistically significant at the p<0.001 level, suggesting a high level of retest reliability for the questionnaire.

Discussion

The objective of the present study was to investigate the psychometric properties of the SCWBS among Iranian adolescents. In doing so, this study involved the translation and cultural adaptation of the instrument from English into Farsi, adhering to the highest quality standards to ensure its accuracy and appropriateness for formal Farsi speakers.

During the forward translation phase, one item-"I think lots of people care for me"-led to differing interpretations. One translator emphasized recognition and appreciation with "I think many people value me," while another focused on nurturing and support with "I feel that many people look after me." After a thorough discussion, the former translation was selected as it was deemed to align more broadly with the intended meaning of the scale and resonate more effectively with adolescents' perspectives. During the back-translation process, the conceptual meaning of the items remained consistent, but certain word choices differed. For example, "feeling cheerful" was translated as "feeling happy," and "I've been able to make choices easily" was rendered as "I've had no trouble deciding on things." These differences reflected linguistic habits rather than substantive changes in meaning.

Additionally, the findings revealed that the SCWBS demonstrated highly satisfactory psychometric properties, providing evidence for its reliability and validity within this population. In conducting the EFA, the SCWBS was used for factor extraction. Following the Kaiser criterion [51], two factors were identified, each with eigenvalues greater than 1, accounting for a cumulative variance of 53.85%. The factor loadings indicated the extent to which each item contributed to a specific factor. For example, Factor One, labeled as "Positive Outlook," demonstrated high loadings and was interpreted as reflecting an optimistic perspective on life and future

events. Adolescents with a positive outlook are likely to believe they can avoid problems, prevent negative occurrences, and cope more effectively with stressful situations compared to pessimists [61]. Notably, the Positive Outlook component had an eigenvalue of 5.23, accounting for 43% of the variance in SCWBS. This component is interpreted as Eudaimonic Well-Being, aligning with the findings of AL Gentzler, KL DeLong, CA Palmer and V Huta [31], who demonstrated that eudaimonic motives are solely linked to positive psychological outcomes, such as increased well-being.

In CFA, evaluating the model fit requires considering the criteria for various fit indices. According to recommendations, an RMSEA between 0.05 and 0.08 is considered indicative of an acceptable model fit [62]. Additionally, values above 0.90 for the GFI, CFI, TLI, and IFI are widely accepted as evidence of a good model fit, while an SRMR value below 0.08 is deemed acceptable [54]. The SCWBS demonstrated a well-fitting twofactor model (RMSEA = 0.069; CFI = 0.98; NNFI = 0.98; TLI = 0.98; IFI = 0.98; SRMR = 0.04), comprising two subscales: Positive Outlook and Positive Emotional State. These findings are consistent with previous research conducted by I Liddle and GFA Carter [25], C Nishida, Y Ishimoto, Y Takizawa, T Katayama and Y Matsumoto [26], and H Wahyuningsih, R Novitasari and FA Kusumaningrum [27], indicating a strong fit between the two-factor model and the observed data. Thus, this investigation validated the outcomes of prior studies, enhancing confidence in the reliability of previous conclusions. This finding highlights the cross-cultural robustness of the SCWBS, as its factor structure has been replicated across diverse cultural settings, including Japan, Indonesia, and now Iran.

Convergent and discriminant validity

The convergent validity of the SCWBS was confirmed through significant correlations between the total SCWBS scores and the WHO-5 Well-Being Index (ranging from 0.59 to 0.66). Additionally, our analysis revealed that the PSC-17 had strong negative correlations with the WHO-5 Well-Being Scale, supporting the discriminant validity of the SCWBS. Furthermore, the MSV was found to be lower than the AVE for both components, which further strengthens the evidence for the discriminant validity of the scale. This aspect of the study reinforces the SCWBS's utility in distinguishing between positive well-being and mental health challenges, which is essential for early intervention and prevention programs aimed at fostering adolescent mental health.

Reliability and stability

The internal consistency of the SCWBS was assessed using Cronbach's alpha (α), a widely recognized measure

of reliability for summated rating scales [63]. In this study, the overall Cronbach's alpha was 0.88, indicating excellent internal consistency in assessing adolescent well-being, aligning with prior findings. Furthermore, the test-retest reliability coefficient (r=0.88) demonstrated the SCWBS's stability over time, supporting its applicability for longitudinal studies on adolescent well-being. Previous research [26] has reported Cronbach's alpha values for the SCWBS ranging from 0.81 to 0.93 in children's surveys. Additionally, the high test-retest reliability coefficient (r=0.88) further supports its stability over time, reinforcing its utility for tracking changes in adolescent well-being.

Constraints on generality

This study has several limitations that should be addressed in future research. First, the sample was limited to adolescents in Iran, which may restrict the generalizability of the findings to other cultural or socioeconomic contexts. While the SCWBS has been validated in various countries, further research should assess its applicability across diverse cultural settings to ensure cross-cultural relevance. Second, key factors such as socioeconomic status, family dynamics, and mental health history were not directly accounted for, despite their potential influence on adolescent well-being. Future studies should control for these variables to better isolate the effects measured by the SCWBS. Additionally, the use of convenience sampling may introduce selection bias, potentially limiting the representativeness of the sample and, consequently, the broader applicability of the results. Third, the study's cross-sectional design prevents us from drawing conclusions about how well-being changes over time. Longitudinal research is needed to explore the stability of well-being across adolescence and to assess the SCWBS's long-term predictive validity. Additionally, our sample was restricted to early adolescents (ages 12–15); future research should examine the scale's utility among younger children and older adolescents to determine its developmental sensitivity.

Implications for research and practice

This study validates the SCWBS in an Iranian adolescent sample, contributing to the global literature on well-being by assessing its applicability beyond Western contexts. Furthermore, the study examined its suitability in northeastern Iran, a region with linguistic differences from the majority population, ensuring that the assessment captures culturally relevant aspects of adolescent well-being. Our findings demonstrate that the SCWBS is an effective tool for assessing positive psychological functioning across different cultural settings. Moreover, they suggest that concepts such as positive outlook and positive emotions are interpreted similarly by Iranian adolescents and

Conclusions

Overall, the findings of this study confirm that the SCWBS is a reliable and valid tool for assessing adolescent well-being. Its strong psychometric properties, ease of administration, and concise structure make it an efficient instrument for large-scale screenings in both research and clinical settings. The SCWBS's clarity, brevity, and ease of scoring further enhance its practicality, allowing for quick and effective evaluations of psychological well-being in adolescents. However, while this study provides compelling evidence supporting the scale's reliability and validity, further research-particularly longitudinal studies-is needed to assess its applicability across different age groups and its long-term effectiveness in capturing changes in adolescent well-being over time. Additionally, future studies should explore the impact of psychological and mental well-being on broader mental health outcomes, ensuring that the SCWBS remains a comprehensive and culturally adaptable measure for diverse adolescent populations.

Abbreviations

CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
EFA	Exploratory Factor Analysis
IFI	Incremental Fit Index
КМО	Kaiser-Meyer-Olkin
NNFI	Non-Normed Fit Index
PSC	Pediatric Symptom Checklist
RMSEA	Root Mean Square Error of Approximation
SD	Standard Deviations
SCWBS	Sterling Children's Well-Being Scale
S-CVI	Scale-Content Validity Index
I-CVI	Item-Content Validity Index
SPSS	Statistical Package for the Social Sciences
TLI	Tucker-Lewis Index
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1

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Author contributions

Asgar Alimohamadi and Mahdi Ghasemzadeh contributed to the conceptualization and design of the study. Asgar Alimohamadi was responsible for the methodology, data analysis, and original draft preparation. Karim Abdolmohamadi collected the data and contributed to the review and editing of the manuscript. Mahdi Ghasemzadeh also contributed to writing, data collection, and editing. Violeta J. Rodriguez provided supervision, review, and feedback on the final manuscript. All authors approved the submitted version.

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Data availability

The datasets analyzed during the current study are not publicly accessible due to confidentiality concerns, as they include information that could compromise the privacy of the research participants. However, they can be obtained from the corresponding author, Asgar Alimohamadi (Email: asgar. alimohamadi@yahoo.com), upon reasonable request.

Declarations

Ethics approval and consent to participate

The study is part of a research project that was approved by the Ethics Committee of Azarbaijan Shahid Madani University (Approval Code: IR.AZARUNIV.REC.1403.003). All procedures involving human participants were conducted in accordance with the ethical standards of the institutional and/ or national research committee and the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. Written informed consent was obtained from all study participants prior to their inclusion in the study.

Consent for publication Not applicable.

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Competing interests

The authors declare no competing interests.

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