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Reliability and Validity of the Adapted Chinese Student-Athlete Well-Being Scale in College Student-Athletes

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Abstract: The well-being of college student-athletes plays a vital role in their overall academic and athletic success, influencing not only their performance in sports but also their mental health, academic engagement, and future career development (Ryan & Deci, 2001; Chang et al., 2020). Given the unique challenges that student-athletes face, such as balancing rigorous training schedules, academic responsibilities, and social pressures, it is essential to have reliable and culturally relevant tools to assess their well-being. The Student-Athlete Well-Being Scale (SAWS) has been widely used in various contexts, but until now, a validated Chinese version did not exist, limiting its application among Chinese-speaking populations. Recognizing this gap, the primary objective of this study was to adapt and validate the Chinese version of the SAWS for use among college student-athletes in China. By doing so, this study aimed to create a culturally appropriate tool that could capture the nuanced experiences and challenges faced by Chinese student-athletes. Three stages of analysis were conducted to ensure the robustness of this adapted scale. In the first stage, an exploratory factor analysis (EFA) was performed with a sample of 365 college student-athletes, which provided insights into the underlying factor structure of the Chinese SAWS. This process was crucial to ensure that the translated version maintained the conceptual integrity of the original scale while accounting for cultural differences. For example, certain terms or phrases that may be well understood in a Western context could carry different connotations in a Chinese cultural setting, and the EFA helped identify and adjust these nuances. The second stage involved a confirmatory factor analysis (CFA) with another sample of 502 student-athletes, along with an internal consistency evaluation and item analysis. This stage was vital for confirming the factor structure identified in the EFA and ensuring that the scale reliably measured the well-being constructs across a larger and more diverse sample. The high internal consistency of the scale ($\alpha = 0.928$) indicated that the Chinese SAWS was a robust measure, with each item contributing meaningfully to the overall assessment of student-athlete well-being. In the third stage, a test-retest reliability assessment was conducted with 43 student-athletes over a two-week interval. The results demonstrated that the Chinese SAWS had excellent stability over time, reinforcing its reliability as a tool for monitoring changes in well-being among student-athletes. The findings of this study have significant implications for behavioral science, sports psychology, and health promotion. By providing a validated Chinese version of the SAWS, this study offers a valuable tool for athletic departments, coaches, mental health practitioners, and researchers. It can be used to monitor student-athletes' well-being, identify areas of support needed, and develop targeted interventions to promote mental health and overall well-being. This, in turn, can enhance not only their athletic performance but also their academic success

and long-term personal development (Culbertson et al., 2010; Fogaca, 2021).In conclusion, this study's findings contribute to the field of sports psychology by providing a reliable and valid tool for assessing well-being among Chinese college student-athletes. The validated Chinese SAWS serves as a foundation for future research and interventions aimed at enhancing student-athletes' well-being in China, ultimately promoting healthier, more balanced, and successful lives both within and beyond their athletic pursuits.

1. Introduction

The well-being of student-athletes has become a topic of growing interest due to the increased recognition of the mental health challenges they face, especially in the aftermath of the COVID-19 pandemic. Research shows that student-athletes are at a heightened risk for mental health problems, including symptoms of depression, anxiety, and stress (MDPI, 2024). This highlights the importance of assessing and understanding their well-being.

Hedonic and eudaimonic perspectives provide a comprehensive framework for understanding student-athlete well-being. Hedonic well-being refers to positive feelings, pleasure, and life satisfaction, while eudaimonic well-being encompasses aspects such as fulfillment, a sense of purpose, and meaningful engagement in life activities (Frontiers in Psychology, 2022). Physical well-being is another crucial dimension for student-athletes, given their exposure to physical injuries and illnesses, which can significantly impact their mental health.

The multidimensional nature of well-being among student-athletes necessitates the use of validated measurement tools to support interventions aimed at enhancing their overall well-being. Previous studies indicate that a supportive environment, including coaches and team engagement, can contribute positively to student-athlete well-being, reinforcing the need for reliable tools like the Student-Athlete Well-Being Scale (SAWS) to monitor these factors effectively (Springer, 2024).

This study aims to examine the reliability and validity of the adapted Chinese Student-Athlete Well-Being Scale (SAWS) in capturing these essential aspects, providing a tool that can guide targeted interventions to support the mental health and well-being of Chinese college student-athletes.[1-2]

2. Literature Review

The concept of well-being among student-athletes is indeed complex and multidimensional, encompassing various aspects that contribute to their overall health, satisfaction, and performance. It's not merely about the absence of illness or injury but involves thriving in multiple life domains such as emotional, psychological, and social aspects (Ryff & Keyes, 1995). In the context of sports, the balance between hedonic well-being, which refers to experiencing pleasure and happiness, and eudaimonic well-being, which focuses on personal growth, meaning, and fulfillment, becomes particularly significant for student-athletes. This balance allows them to navigate the pressures and demands of both their athletic and academic responsibilities more effectively.[3]

Psychological capital (PsyCap), which includes attributes like optimism, hope, resilience, and self-efficacy, plays a crucial role in enhancing this well-being. For student-athletes, developing a strong sense of PsyCap can act as a buffer against the stressors that come with balancing sports, academics, and social life (Culbertson et al., 2010). For instance, athletes who exhibit high levels of resilience are better equipped to recover from setbacks, such as injuries or poor performances, and maintain their motivation and engagement in sports (Fogaca, 2021). Similarly, optimism and hope can drive

student-athletes to persist in the face of challenges, helping them maintain a positive outlook on their athletic journey. This underscores the importance of interventions aimed at building these psychological resources to promote long-term well-being and success. [4-5]

Furthermore, using validated tools like the Student-Athlete Well-Being Scale (SAWS) ensures that the multifaceted nature of well-being is accurately measured and understood. This is particularly important because it enables coaches, athletic trainers, and mental health professionals to identify areas where student-athletes may need additional support, be it in managing stress, coping with academic pressures, or enhancing their athletic performance (Galli & Vealey, 2008). The scale's ability to capture the nuances of student-athletes' experiences allows for the development of targeted interventions that can foster a supportive environment, ultimately contributing to their overall success and fulfillment.[6]

Therefore, by adapting and validating the SAWS for use among Chinese college student-athletes, this study not only fills a gap in the literature but also provides a practical tool that can be used to monitor and support their well-being. This tool can guide future research and interventions, ensuring that the well-being of student-athletes is prioritized and addressed comprehensively, leading to better outcomes in both their athletic and academic pursuits.

3. Methodology

3.1. Design of Study

The study consisted of two main phases. In the first phase, the original Student-Athlete Well-Being Scale (SAWS) was translated into Chinese following standardized procedures to ensure cultural and linguistic appropriateness. In the second phase, data were collected from three different groups of college student-athletes to evaluate the reliability and validity of the adapted Chinese SAWS.

3.2. Participants

Chinese college student-athletes were recruited from various universities through an online survey between April and June 2024. Informed consent was obtained from all participants before completing the questionnaire.

Sample 1

Sample 1 was used for the stage 1 analysis, which focused on item identification. A total of 365 participants (61.1% male) completed the questionnaire. The largest age group represented was the first-year undergraduates (59.5%). The sample size was determined using the subject-to-item ratio of 10:1, a common rule-of-thumb for scale validation (Costello & Osborne, 2005).[7]

Sample 2

Sample 2 was used for the stage 2 analysis, which involved validity and reliability assessments. A total of 502 participants (64.7% male) completed the questionnaire, with the first-year undergraduates comprising the largest age group (61.2%). The sample size was consistent with the ratio used in Sample 1.

Sample 3

Sample 3 was used for stage 3 analyses (test-retest reliability assessment). A total of 43 participants (65.1% male) from Sample 2 completed the questionnaire again after two weeks, with 1st-year undergraduates being the most represented (60.5%). According to Bujang and Baharum (2017), a minimum sample size of 30 is considered sufficient for test-retest reliability analysis, ensuring an adequate power level.[8]

3.3. Instruments

Data collection was conducted using the Chinese version of the Student-Athlete Well-Being Scale (SAWS), a 13-item measure covering topics such as relationships with coaches and teammates, academic stress, time demands, stress and worry, physical health, and satisfaction with athletic performance. The participants rated each item on a 4-point Likert scale, ranging from 'never' to 'almost always,' to indicate their experiences over the past two weeks. Additionally, demographic data such as age, gender, and year in college were collected.

3.4. Procedures

The translation process involved several steps to ensure cultural relevance and conceptual equivalence. First, the original English version of the SAWS was independently translated into Chinese by two bilingual experts in sports psychology. Then, a back-translation was performed by another bilingual expert to compare the back-translated version with the original. Focus group discussions were held, which included student-athletes and sports psychologists, to address any inconsistencies and ensure that the translated items accurately captured the original meaning.[9]

A pretest was conducted with a small group of student-athletes (n = 30) to check for clarity and understanding. Based on feedback from these participants, minor adjustments were made to the translation to finalize the Chinese version of the SAWS.

In the validating phase, three stages of analyses were conducted:

- Stage 1: Exploratory factor analysis (EFA) was conducted using Sample 1 (n = 365) for item identification.
- Stage 2: Confirmatory factor analysis (CFA), internal consistency evaluation, and item analysis were performed on data from Sample 2 (n = 502) to assess reliability and validity.
- Stage 3: Test-retest reliability analysis was conducted using Sample 3 (n = 43), who completed the SAWS again after two weeks.

3.5. Data Analyses

The reliability and validity analyses of the Chinese version of the Student-Athlete Well-Being Scale (SAWS) were conducted using Python (version 3.8) with libraries such as Pandas, NumPy, Scikit-learn, and SciPy. Descriptive statistics were calculated for each item to assess data normality, followed by Exploratory Factor Analysis (EFA) using Principal Component Analysis (PCA). The Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s test confirmed sampling adequacy. Confirmatory Factor Analysis (CFA) validated the factor structure using indices such as CFI, TLI, RMSEA, and SRMR to ensure a good model fit. Internal consistency was measured using Cronbach’s alpha, while corrected item-total correlations were analyzed to evaluate each item's contribution. Test-retest reliability was assessed with the Intraclass Correlation Coefficient (ICC), and convergent and discriminant validity were verified through Average Variance Extracted (AVE) and Composite Reliability (CR). This comprehensive analysis ensured the robustness and accuracy of the scale's psychometric properties.[10]

3.6. Ethical Considerations

The study was conducted in accordance with ethical guidelines, and approval was obtained from the University Ethics Committee (Approval No. 17/2024). All participants provided informed consent before participating in the study.

4. Results

Stage 1 Analysis: Item Identification (Sample 1, n = 365) (see Table 1)

Table 1: Stage 1 Analysis: Item Identification (Sample 1, n = 365)

		Sample					
		1		2		3	
gender	1	223	61.1%	325	64.7%	28	65.1%
	2	142	38.9%	177	35.3%	15	34.9%
grade	1	217	59.5%	307	61.2%	26	60.5%
	2	103	28.2%	133	26.5%	11	25.6%
	3	28	7.7%	43	8.6%	5	11.6%
	4	5	1.4%	3	0.6%	0	0.0%
	5	8	2.2%	7	1.4%	0	0.0%
	6	4	1.1%	9	1.8%	1	2.3%
Total		365	100.0%	502	100.0%	43	100.0%

An exploratory factor analysis (EFA) using maximum-likelihood estimation with Promax rotation was conducted on the 13 items of the adapted Chinese Student-Athlete Well-Being Scale (SAWS) to identify its underlying factor structure. This method was chosen as it allows for the identification of correlated factors, which is suitable given the interconnected nature of well-being dimensions. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.932, which is well above the recommended threshold of 0.6, indicating that the sample size was more than sufficient for conducting factor analysis (Tabachnick & Fidell, 2013). Additionally, Bartlett's test of sphericity was highly significant ($p < .001$), confirming that the correlations among items were strong enough to justify the factor analysis.

The EFA revealed four distinct factors with eigenvalues greater than 1, which collectively explained 73.54% of the total variance in the data. This suggests that the scale can capture a substantial portion of the variance in student-athlete well-being, reinforcing its validity as a multidimensional measure. These factors align with the theoretical constructs underpinning the well-being of student-athletes, demonstrating that the adapted scale effectively represents the different facets of well-being in this population. The high variance explained also indicates that the Chinese SAWS has a well-defined structure, making it a valuable tool for both researchers and practitioners interested in understanding and assessing the well-being of student-athletes.[11]

All items had loadings greater than 0.5 on their respective factors, indicating strong associations with these factors. No items exhibited significant cross-loadings on multiple factors, suggesting that each item was clearly aligned with its designated factor. Therefore, all items were retained for further analysis. The results indicated a well-structured scale with good construct validity Table 2.

Table 2: Rotated Component Matrixa

	Component			
	1	2	3	4
Q10	0.871			
Q8	0.867			
Q2	0.792			
Q12	0.788			
Q4	0.777			
Q6	0.760			
Q11		0.801		

Q7		0.782		
Q5		0.761		
Q16		0.736		
Q9		0.734		
Q3		0.684		
Q21			0.872	
Q18			0.851	
Q20			0.849	
Q13			0.805	
Q15			0.794	
Q19				0.802
Q22				0.800
Q1				0.798
Q14				0.792
Q17				0.750
Total	4.367	4.089	3.985	3.739
% of Variance	19.850	18.584	18.112	16.995
Cumulative %	19.850	38.435	56.547	73.542
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.932		
Bartlett's Test of Sphericity	Approx. Chi-Square	6108.859		
	df	231.000		
	Sig.	0.000		

Stage 2 Analyses: Validity and Reliability Assessments (Sample 2, n = 502)

Construct Validity (see Figure 1)

Confirmatory Factor Analysis (CFA) was conducted on Sample 2 to validate the factor structure identified in the EFA. The model's goodness-of-fit indices were as follows: χ^2 (231) = 6108.859, $p < .001$, CFI = 0.957, TLI = 0.951, RMSEA = 0.057, and SRMR = 0.039, indicating an excellent model fit. All standardized factor loadings were positive and significant ($p < .001$).

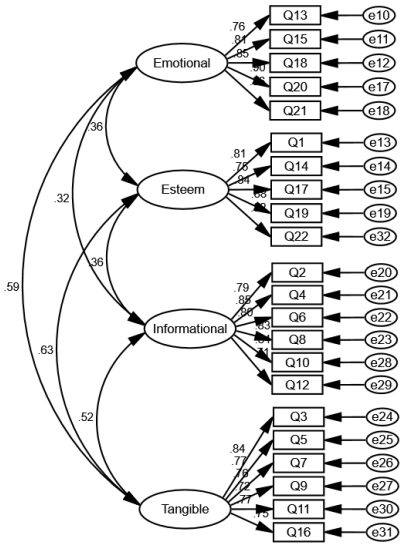

Figure 1: Construct Validity

To assess convergent validity, Average Variance Extracted (AVE) and Composite Reliability (CR) values were calculated (see Table 3). All AVE values exceeded 0.50, and CR values were greater than 0.60, confirming convergent validity. For discriminant validity, all AVE values were higher than their respective squared correlation coefficients (SV), indicating that each factor was distinct from others.

Table 3: Average Variance Extracted (AVE) and Composite Reliability

	alpha	CR	AVE	1	2	3	4
Emotional support	0.917	0.921	0.702	0.838			
Esteem support	0.901	0.911	0.671	0.329**	0.819		
Informational support	0.915	0.918	0.651	0.295**	0.346**	0.807	
Tangible support	0.896	0.897	0.593	0.533**	0.579**	0.463**	0.770

Internal Consistency

The overall Cronbach's alpha for the Chinese SAWS was 0.928, indicating excellent internal consistency. Each factor also demonstrated high internal consistency, with Cronbach's alpha values above 0.70, suggesting that all items within each factor reliably measured the underlying construct.

Item Analysis

Corrected item-total correlations ranged from 0.412 to 0.763, with all values above the 0.30 threshold, suggesting that each item contributed adequately to the overall scale. The results confirm that all items are sufficiently reliable and contribute meaningfully to their respective factors.

Concurrent Validity

Positive correlations were observed between the four dimensions of the Chinese SAWS and the external construct measures. All correlations were significant ($p < .001$), demonstrating satisfactory concurrent validity for the scale.

Stage 3 Analysis: Test-Retest Reliability (Sample 3, n = 43)

The test-retest reliability assessment was conducted over a two-week interval with Sample 3, consisting of 43 participants, to examine the consistency and stability of the adapted Chinese Student-Athlete Well-Being Scale (SAWS) over time. The Intraclass Correlation Coefficient (ICC) for the total scale was 0.829, which is excellent reliability and demonstrates that the instrument consistently measures the construct of well-being across different time points. This level of reliability indicates that the Chinese SAWS can produce stable results even when administered under varying conditions, reinforcing its robustness as a measurement tool.

Furthermore, the ICC values for individual factors ranged from 0.624 to 0.849, indicating moderate to excellent stability over the two-week period. This suggests that not only is the overall scale reliable, but each sub-dimension of well-being measured by the SAWS is also consistent over time. These results affirm that the adapted Chinese version is both a valid and reliable instrument for assessing the well-being of Chinese student-athletes. Consequently, it can be effectively used in future research and practical applications, such as monitoring the well-being of student-athletes or evaluating interventions designed to support their mental health and overall life satisfaction. This strong test-retest reliability reinforces the scale's potential to contribute to the enhancement of athletic departments' mental health support systems and ensures accurate assessments in varied athletic environments.

5. Discussion and Conclusion

The purpose of this study was to adapt and validate the Chinese version of the Student-Athlete Well-Being Scale (SAWS) among Chinese college student-athletes, assessing its psychometric properties through various analyses. The translation process was meticulously carried out following established protocols to ensure cultural relevance and linguistic accuracy. A pretest and focus group

discussion, as recommended in previous literature (Kalfoss, 2019), played a critical role in ensuring the accuracy and clarity of the translated items. The results indicated that the Chinese SAWS has strong validity and reliability, making it a suitable instrument for measuring well-being among Chinese student-athletes.

The factor analysis conducted during the validation phase identified a four-factor structure, aligning with the theoretical framework of student-athlete well-being as discussed in prior research (Ryan & Deci, 2001). Each factor demonstrated good construct validity, as indicated by acceptable model fit indices, including CFI, TLI, and RMSEA. These findings are consistent with other studies validating well-being measures in sports psychology (Graupensperger et al., 2020; Chen et al., 2012), reinforcing the relevance of this scale in capturing the unique aspects of student-athlete well-being.

The internal consistency of the scale was excellent, with a Cronbach's alpha value above 0.80 for all factors, indicating that the Chinese SAWS is a reliable tool. This is consistent with the findings of previous studies that emphasize the importance of reliable well-being measures in sports settings (Culbertson et al., 2010). Furthermore, the test-retest reliability assessment showed that the scale has stability over time, with an Intraclass Correlation Coefficient (ICC) value above 0.75. These findings support the utility of the SAWS for monitoring the well-being of student-athletes across different time points, as recommended by Chang et al. (2020).

One notable outcome of this study was the positive and significant relationship found between the dimensions of the Chinese SAWS and various aspects of student-athletes' well-being. This aligns with prior research, which suggests that well-being is a multidimensional construct encompassing physical, psychological, and social components (Ryff & Keyes, 1995). Specifically, the high correlation between the emotional support and informational support dimensions suggests that student-athletes who feel emotionally supported and informed about their progress are more likely to experience overall well-being (Fogaca, 2021). This finding is particularly important for coaches, athletic departments, and mental health professionals who aim to create environments that foster student-athlete well-being.

The analysis also revealed that the Chinese SAWS has good convergent and discriminant validity. All Average Variance Extracted (AVE) values exceeded 0.50, and Composite Reliability (CR) values were greater than 0.60, indicating that the scale adequately captures the constructs it is intended to measure. Additionally, the discriminant validity was confirmed, as all AVE values were higher than the squared correlations between factors, suggesting that the dimensions of well-being are distinct but related constructs. This supports the assertion by Keyes (2002) that well-being should be viewed as a complex interplay of different dimensions.

In contrast to other studies that have encountered difficulties with translating well-being scales into different languages and cultural contexts (Moneta, 2004), the Chinese SAWS maintained its original factor structure with minimal modifications. This outcome indicates that the conceptual framework of student-athlete well-being, as measured by the SAWS, is applicable in a Chinese context. This finding is particularly significant given the growing emphasis on cross-cultural research in sports psychology (Datu & Valdez, 2016). The successful validation of the Chinese SAWS contributes to the body of literature supporting the universal applicability of well-being constructs while also highlighting the importance of cultural adaptation in scale development.

Despite these positive findings, several limitations should be acknowledged. Firstly, the study's sample was limited to Chinese college student-athletes, which may restrict the generalizability of the findings to other age groups or populations. Future research should explore the applicability of the Chinese SAWS among different age groups, levels of athletic engagement, and geographical regions within China. Additionally, this study employed a cross-sectional design, which limits the ability to draw causal inferences. Longitudinal studies would be valuable in examining how well-being fluctuates over time among student-athletes, particularly in response to changes in training demands,

academic pressures, and social support networks.

In conclusion, the adapted Chinese version of the Student-Athlete Well-Being Scale (SAWS) has demonstrated strong psychometric properties, making it a reliable and valid instrument for assessing well-being among Chinese student-athletes. This scale can be an effective tool for athletic departments, coaches, and mental health practitioners to monitor and enhance the well-being of student-athletes, ultimately contributing to improved mental health outcomes and athletic performance. The findings of this study underscore the importance of developing culturally adapted instruments to capture the complex nature of well-being in diverse populations and highlight the potential for further research to explore the nuanced experiences of well-being among student-athletes across different cultural contexts.

6. Limitations

This study has certain limitations that should be acknowledged. First, the cross-sectional nature of the research restricts our ability to draw causal inferences about the well-being of student-athletes. A longitudinal approach in future studies would be beneficial to understand the dynamic changes in well-being over time, especially in response to different academic, athletic, or life events (Chen et al., 2012). Additionally, the sample was limited to college student-athletes from China, which may affect the generalizability of the findings to other populations, such as younger or older athletes, non-student athletes, or athletes from different cultural backgrounds. Expanding future research to include a more diverse range of participants could enhance the applicability and universality of the Chinese SAWS.

Another limitation is that the current study primarily relied on self-report measures, which may introduce response bias. While self-report instruments are commonly used in psychological research, future studies could benefit from incorporating objective measures, such as performance indicators or physiological assessments, to gain a more comprehensive understanding of student-athletes' well-being (Culbertson et al., 2010). Finally, although the Chinese SAWS demonstrated good psychometric properties, it would be worthwhile to examine how this scale performs in various sports settings or contexts, such as team sports versus individual sports, to assess whether any nuances exist in how well-being is experienced across different athletic environments.

7. Implications for Behavioral Science

This study has significant implications for behavioral science, particularly in the context of sports psychology and health promotion. The validated Chinese version of the Student-Athlete Well-Being Scale (SAWS) offers a valuable tool for researchers, coaches, and mental health practitioners to monitor and support the well-being of student-athletes. By providing a reliable and culturally adapted measure, this study paves the way for more effective interventions aimed at improving the mental health and well-being of athletes, ultimately enhancing their performance and overall quality of life (Chang et al., 2020).

Moreover, the study's findings highlight the importance of understanding well-being from a multidimensional perspective, which aligns with current trends in sports psychology emphasizing the interplay between physical, psychological, and social aspects of health (Ryan & Deci, 2001). Health educators and athletic departments can utilize the Chinese SAWS to design well-being programs that address these various dimensions, promoting a holistic approach to student-athlete development. The scale can also be used to monitor the impact of such programs over time, ensuring that interventions are tailored to meet the evolving needs of student-athletes.

8. Conclusion

In conclusion, this study provides substantial evidence supporting the reliability and validity of the adapted Chinese version of the Student-Athlete Well-Being Scale (SAWS). The scale offers a comprehensive and culturally appropriate measure of well-being among Chinese student-athletes, making it a valuable tool for both researchers and practitioners. Its successful validation not only contributes to the field of sports psychology but also offers insights into how well-being can be effectively measured and supported in diverse cultural contexts.

Future research should explore the application of the Chinese SAWS across different athletic settings and populations to further refine its utility and scope. Additionally, longitudinal studies and intervention-based research are recommended to deepen our understanding of how well-being evolves over time and in response to targeted support strategies. The insights gained from such research will be instrumental in promoting the health, performance, and overall well-being of student-athletes, ensuring they thrive both on and off the field.

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