



Development of student sportsmanship scale in Physical Education (S3-PE)

Escala de desarrollo de la deportividad estudiantil en Educación Física (S3-PE)

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Received: 28-09-25
Accepted: 31-10-25

How to cite in APA

Razali, R., Bahrum, B., Syamsulrizal, S., Tetikay, R., Maimun, M., & Akbari, M. (2026). Development of student sportsmanship scale in Physical Education (S3-PE). *Retos*, 74, 500-514. <https://doi.org/10.47197/retos.v74.117720>

Abstract

Introduction: Currently, there is still a limited scale of sportsmanship that is valid and reliable to the Indonesian cultural context for junior high school students.

Objective: This study aims to develop and test the validity and reliability of the Student Sportsmanship Scale in Physical Education (S3-PE) in junior high school students in Indonesia. **Methodology:** The scale was developed using the ADDIE model, starting with needs analysis and theory-based item construction. Aiken's V showed 19 of 20 items valid (>0.78); one item was removed. Content reliability was high (0.871), and inter-rater reliability was moderate (ICC = 0.529). The scale was piloted on 1.750 junior high students. Construct validity and reliability were tested using Covariance-Based Structural Equation Modeling (CB-SEM).

Results: Validity and reliability tests using CB-SEM showed that all items were valid (loading >0.70), reliable (α and CR >0.70), and AVE >0.50. The model fit was good, and concurrent validity was proven ($\rho = 0.693$; $p < 0.001$), although the Chi-square/df was slightly above the ideal limit.

Discussion: The results showed that the scale had strong construct validity and reliability. All statistical indicators met the recommended criteria, including discriminant and concurrent validity, and the model fit was excellent. Although the Chi-square/df value was slightly high, the overall model was deemed suitable for use.

Conclusions: These findings conclude that the S3-PE is a valid, reliable, and suitable measurement tool for student sportsmanship in the context of physical education at the junior high school level.

Keywords

Student sportsmanship scale; student sportsmanship; sportsmanship questionnaire; development of student sportsmanship; sporty physical education.

Resumen

Introducción: En la actualidad, todavía existe una escala limitada de deportividad que sea válida y confiable en el contexto cultural indonesio para estudiantes de educación secundaria básica. **Objetivo:** El presente estudio tiene como objetivo desarrollar y evaluar la validez y confiabilidad de la *Escala de Deportividad del Estudiante en Educación Física (Student Sportsmanship Scale in Physical Education - S3-PE)* en estudiantes de educación secundaria en Indonesia.

Metodología: La escala fue desarrollada utilizando el modelo ADDIE, comenzando con el análisis de necesidades y la construcción de ítems basada en teorías. El coeficiente V de Aiken mostró que 19 de los 20 ítems eran válidos (>0.78); un ítem fue eliminado. La confiabilidad del contenido fue alta (0.871) y la confiabilidad interevaluador fue moderada (ICC = 0.529). La escala se aplicó a una muestra piloto de 1.750 estudiantes de educación secundaria. La validez de constructo y la confiabilidad se evaluaron mediante el *Covariance-Based Structural Equation Modeling (CB-SEM)*.

Resultados: Las pruebas de validez y confiabilidad realizadas con CB-SEM demostraron que todos los ítems eran válidos (cargas factoriales >0.70), confiables (α y CR >0.70) y presentaban un AVE >0.50. El modelo mostró un buen ajuste, y se comprobó la validez concurrente ($\rho = 0,693$; $p < 0.001$), aunque el valor de Chi-cuadrado/gl estuvo ligeramente por encima del límite ideal.

Discusión: Los resultados indicaron que la escala posee una sólida validez de constructo y confiabilidad. Todos los indicadores estadísticos cumplieron con los criterios recomendados, incluyendo las validez discriminante y concurrente, y el ajuste del modelo fue excelente. Aunque el valor de Chi-cuadrado/gl fue algo elevado, el modelo global se consideró adecuado para su aplicación.

Conclusiones: Estos hallazgos permiten concluir que la S3-PE es un instrumento de medición válido, confiable y apropiado para evaluar la deportividad estudiantil en el contexto de la educación física en el nivel de educación secundaria básica.

Palabras clave

Escala de deportividad estudiantil; deportividad estudiantil; cuestionario de deportividad; desarrollo de la deportividad estudiantil; educación física deportiva

Introduction

Sportsmanship is a concept characterized by friendship, courage, patience, self-control, not belittling others, respecting the ideas and morals of others, courtesy, kindness, nobility, respect, cooperation, and generosity (Akbulut, 2020; Koç, 2013). These values form the basis for someone to act according to the rules and compete within the scope of fair play (Görgüt & Tutkun, 2023), thus successfully reducing various violent behaviors in games and sports (Ngatman et al., 2023). Unfortunately, sports and physical education, believed to be ideal media for instilling the value of sportsmanship, still show the opposite data. Where athletes, coaches, and spectators exhibit unsportsmanlike behavior that undermines the values of the sport itself (Pante & Gallardo, 2025).

Unsportsmanlike behavior, cheating, and negative personality traits are increasing and becoming ingrained in the culture, driven solely by individual or team victory (Paramida et al., 2023). When they lose a competition, athletes or students rarely congratulate their opponents and rarely shake hands with their coaches. They also show little respect and concern for their opponents. They rarely take necessary action when opponents are unfairly punished or injured during a game or competition. Achieving victory does not simply weaken character. If the value of sportsmanship is ignored and forgotten, the results can be detrimental or even cause problems (Giray, 2021). This situation is exacerbated by the admission of physical education teachers that they carry out few activities related to sportsmanship (Koc & Esenturk, 2017). Several factors that trigger unsportsmanlike behavior have been recorded, including the behavior of coaches (including teachers), provocation by the opposing team, injuries, and so on (Görgüt & Tutkun, 2023).

The development of the sportsmanship scale shows a trend toward a multidimensional approach (Vallerand et al., 1996, 1997). Sportsmanship is not only seen in adherence to rules, but also in strengthening one's attitude toward opponents, referees, and in managing emotions. Various issues or behaviors that demonstrate unsportsmanlike behavior are based on a lack of respect for social norms and ethics in sports. These include failing to greet others, being disrespectful to others, and maintaining good etiquette when competing with other players. It includes failing to adhere to game rules and respecting the decisions of referees or officials. It includes a lack of respect for opponents as competitive partners, treating them with respect and refraining from sarcastic or harmful behavior. Furthermore, rude attitudes or behavior, cheating, or displays of hostility undermine the spirit of fair play. For example, Olmedilla et al. (2009) findings revealed that in the first competition alone in Spain, 1202 sanctions were detected for 340 teams with 6120 players and 340 coaches. It is a relatively high figure, indicating unsportsmanlike behavior in sports activities.

As age increases, sportsmanship behavior displayed in physical education tends to decline (Esentürk et al., 2015). The older the age group, the more punishment for aggression and disrespect is displayed. More recently, Sniras (2024) also confirmed similar results in physical education, his investigation of 197 students found that 14-15 year olds were more susceptible than 12-13 year olds to forms of aggressive behavior, such as negativism, offense, irritation, physical and verbal aggression. It was also found that older students showed statistically significantly higher levels of hostility and aggression than younger students. Therefore, physical education teachers must be able to integrate students' sportsmanship behavior and periodically evaluate it as part of the learning outcomes to minimize various destructive behavioral practices as students grow or progress through their classes.

To measure, assess, and evaluate the development of student sportsmanship, several researchers have attempted to develop a sportsmanship scale. For example, Vallerand et al. (1997) developed the Multidimensional Sportpersonship Orientations Scale (MSOS) which includes 25 items using five indicators: commitment ($\alpha = 0.71$), social conventions ($\alpha = 0.86$), rules and officials ($\alpha = 0.83$), opponent ($\alpha = 0.78$), and negative approach ($\alpha = 0.54$). Furthermore, Koç (2013) developed the 22-item Sportpersonship Behavior Scale in Physical Education Course (SBSPEC) using two indicators (11 items each): exhibition of convenient behavior ($\alpha = 0.80$) and avoidance of unacceptable behavior ($\alpha = 0.78$). Gimeno et al. (2013) also developed the Sportsmanship Rating Scale in Tennis Competition with Young Players (SRSTCYP), involving 19 items for two indicators, each with discriminative capacity for both sportsmanship (12 items) and unsportsmanlike (17 items), with high internal consistency of the overall scale ($\alpha = 0.70$).



Of the three sportsmanship scales above, researchers see an urgent need to develop a student sportsmanship scale for use in physical education due to the limitations of these scales. Researchers want to retain the indicators developed by Vallerand et al. (1997), considering that these indicators are still relevant in addressing various sportsmanship issues in physical education circles. Researchers emphasized the formulation of items that are contextualized to physical education activities such as games and sports. For example, in the formulation of the commitment indicator item (MSOS), which reads "Give maximum effort," researchers clarified it to "I try to participate in physical education and sports lessons regularly even though it feels difficult," as well as for other items. Furthermore, from the measurement aspect, researchers want to improve its reliability. The MSOS negative approach indicator only has a reliability value of 0.54, which is still below the testing parameters required by Henseler et al. (2016) and Hair, Page, et al. (2019), which is >0.70 .

Based on the discussion above, the main objective of this study is to test the validity and reliability of the student sportsmanship scale in physical education. The results of this study are beneficial for teachers to evaluate the development of student sportsmanship attitudes and behaviors in physical education. This evaluation is crucial for encouraging participation in physical education and fostering a social environment that values responsibility, dedication, and perseverance in the face of challenges, upholding ethics, respecting rules, and respecting the views and decisions of others. Avoiding unsportsmanlike behavior such as cheating, violence, or hostility, in order to maintain the spirit of fair play in all aspects of life.

Method

This scale was developed by adopting the Analyze, Design, Develop, Implement, and Evaluate (ADDIE) research and development method developed by Branch (2009).

Analyze

The initial stage of the ADDIE model is a performance gap analysis process (Blegur et al., 2025; Blegur, Ma'mun, et al., 2024; Branch, 2009) to ensure that the scale development truly addresses specific needs or problems. In the context of this research, researchers reviewed various publications on sportsmanship scales for measurement, assessment, and evaluation needs in physical education, including development concepts, indicators, number of items, and age levels. Then, they were tasked with finding gaps in the development of the latest scale.

Based on the analysis of the development of three sportsmanship scales, namely the MSOS by Vallerand et al. (1997), SBSPEC by Koç (2013), and SRSTCYP by Gimeno et al. (2013), there is an urgent need to develop a sportsmanship scale that is relevant to the context of junior high school students in physical education learning. The existing scales are still general and do not represent the situations faced by students when playing or exercising at school. In addition, the reliability aspect needs to be improved, especially for indicators with low scores. The developed scale must use language that is easy to understand and reflect the values of sportsmanship and the character of junior high school students.

Design

To measure students' sportsmanship attitudes, researchers developed 20 items from the concept and five indicators developed by Vallerand et al. (1997) using a four-point Likert scale (strongly agree-disagree) for each item. First, commitment, which is the attitude and intention to continue participating in sports responsibly, demonstrating dedication to training and competition consistently despite facing difficulties. There are four items in the commitment indicator, including: "*I try to attend physical education and sports lessons regularly even though it is difficult.*" Second, social conventions involve respecting social norms and ethics that apply in sports, such as greeting, being polite, and maintaining etiquette when competing or interacting with other players. There are four items in the social conventions indicator, including: "*I greet and respect teammates and opponents before games or competitions.*"

Third, rules and officials refer to adherence to the rules of the game and respecting the decisions of the referee or match supervisor, even if those decisions may not always be favorable. There are four items in the rules and officials indicator, including: "*I believe that rules are made to maintain fairness in games and sports.*" Fourth, opponent, which refers to respecting opponents as competition partners, treating



them with respect, and not engaging in harmful or insulting actions. There are four items in the opponent indicator, including: *"I do not mock or belittle my opponents even if I win."* Finally, a negative approach, which refers to unsportsmanlike attitudes or behaviors such as avoiding matches, behaving rudely, cheating, or showing hostility that harms the spirit of fair play. There are four items in the negative approach indicator: *"I cheat in games or competitions to win."*

Specifically for the negative approach indicator, researchers used reverse scoring, where respondents who disagreed received a score of 4 (instead of a score of 1). This differed from the scoring for the other four positive indicators, where a response of disagreeing received a score of 1 and a response of strongly agreeing received a score of 4.

Develop

The student sportsmanship scale in physical education was then successfully constructed and underwent a content validation process to ensure that the item formulations could represent the concepts and indicators of sportsmanship from Vallerand et al. (1997). To ensure content validity, researchers involved a committee of six raters from various expertise backgrounds, such as physical education, sports testing and measurement, psychometrics, and sports psychology (see Table 1). The results of the rater assessments were analyzed using the Aiken (1985) formula and the inter-rater reliability of the Pearson intraclass correlation coefficient (ICC) using the following criteria: (1) <0.50 (poor), (2) 0.50-0.75 (moderate), (3) 0.75-0.90 (good), and (4) >0.90 (excellent) (Koo & Li, 2016). In general, this validation was conducted twice by revising several items according to the input of the rater committee.

Table 1. Rater committee

No	Education	Gender	Age/work experience	Expertise	Affiliation
1	Prof., Dr., M.Pd.	Male	71/40	Psychometrics	Universitas Syiah Kuala
2	Prof., Dr., M.Kes.	Male	61/32	Physical Education	Universitas Negeri Medan
3	Dr., M.A.	Male	62/36	Physical Education	Universitas Pendidikan Indonesia
4	Dr., M.Pd.	Male	39/11	Sport Psychology	STKIP Kusuma Negara
5	Dr., M.Kes.	Male	57/31	Sport Testing and Measurement	Universitas Syiah Kuala
6	S.Si., M.A.	Female	47/20	Sport Psychology	Universitas Negeri Medan

Implement

The implementation phase aims to pilot the S3-PE construct on the target population. This study recruited respondents using convenience sampling, where respondents were a group of individuals who (readily) participated in the study, not limited to those who were easily approachable and accessible through other means, or easily accessible to the researcher using Google Forms (Mahardika et al., 2024; Scholtz, 2021). To address threats to external validity, sample from a single location or group; look for variations in demographic characteristics (age, gender). Prior to data collection, the study received ethics committee approval to ensure ethical standards were met. Respondent data was also stored securely and anonymized to maintain privacy, used only as authorized, and not shared without the respondent's permission.

Researchers provided S3-PE using a Google form, which was then distributed to 1750 Junior High School students in Indonesia, including SMP Negeri 2 Kejuruan Muda, MTs Negeri 1 Kota Lhokseumawe, SMP Negeri 1 Banda Aceh, SMP Negeri 12 Banda Aceh, SMP Negeri 1 Simpang Mamplam, and SMP Negeri 1 Sabang. The sample details were 692 males and 1058 females ($M \pm SD = 13.3 \pm 1.5$) spread from grade VII = 618 students, each male = 246, female = 372. Grade VIII = 608, each male = 241, female = 367. Grade IX = 524, each male = 205, female = 319. Students responded to the scale using a four-point Likert scale (disagree-strongly agree).

Evaluate

Testing content validity using the Aiken (1985) formula and content reliability using the Cronbach alpha with criteria (1) <0.60 (poor), (2) 0.60 to <0.70 (acceptable for exploratory research), (3) 0.70 to <0.80 (good), (4) 0.80 to <0.90 (excellent), (5) 0.90 to 0.95 (somewhat high), and (6) ≥ 0.95 (too high; indica-

tors are redundant) (Hair, Page, et al., 2019). Next, test inter-rater reliability using the formula of Pearson's ICC with the criteria: (1) <0.50 (poor), (2) 0.50-0.75 (moderate), (3) 0.75-0.90 (good), and (4) >0.90 (excellent) (Koo & Li, 2016).

Testing construct validity and reliability using outer model analysis uses the criteria: (1) loading factor >0.70 (Hair Jr et al., 2019; Hulland, 1999; Kay Kwong, 2013), (2) reliability and construct validity, respectively, Cronbach alpha and composite reliability >0.70 (Hair, Page, et al., 2019; Henseler et al., 2016), and Average Variance Extracted >0.50 (Henseler et al., 2016), and (3) Fornell-Larcker discriminant validity (root AVE > correlation) (Fornell & Larcker, 1981). Furthermore, for testing goodness of fit (inner model) we used the criteria of: (1) Chi Square/df <3.00, (2) Root Mean Square Error of Approximation <0.08, (3) Standardized Root Mean Square Residual <0.10, (4) Normed Fit Index >0.90, (5) Tucker-Lewis Index >0.90, and (6) Comparative Fit Index >0.90 (Akinyode, 2016; Hair, Page, et al., 2019; Henseler et al., 2016).

The final test is concurrent validity. This validity aims to correlate the test and relevant criteria to test the number of agreements between the newly developed instrument and existing instruments (Adams et al., 2014; Blegur, Subarjah, et al., 2024; Lee et al., 2023). Therefore, in the concurrent validity test, researchers used Spearman's correlation analysis to correlate the Student Sportsmanship Scale in Physical Education (S3-PE) scores with the Multidimensional Sportsmanship Orientations Scale (MSOS) scores developed by Vallerand et al. (1997). This scale (MSOS) includes 25 items constructed from five indicators. First, commitment (5 items, $\alpha = 0.71$), including the item "Important to beat all practice." Second, social conventions (5 items, $\alpha = 0.86$), including "Congratulations opp. for good play." Third, rules and officials (5 items, $\alpha = 0.83$), including "Respect other officials' decisions." Fourth, opponent (5 items, $\alpha = 0.78$), including "Rectify unjust situation for opp." Lastly, negative approach (5 items, $\alpha = 0.54$), including "Gets mad if makes a mistake."

Results

This research report begins with testing the validity and reliability of content, followed by construct validity and reliability, testing the suitability of the model, and ends with testing the concurrent validity.

Content validity and reliability

The results of the first stage of content validation (original version) proved that as many as five items (25%) had a score <0.78 (6 raters with four assessment categories), each in items 11, 17-20, so that they did not meet the Aiken test parameters. Referring to these results, several important notes that explain the invalidity of these items include the use of diction that refers to competitive sports, even though this scale is in the context of learning (physical education).

In addition, in the formulation of items 17-20 (negative approach), the rater committee recommended that the formulation use negative statements (previously, the research team used positive statements). As noted by the rater, MA/male/62 years old, "Based on the MSOS, this section should present negative attitudes, as the opposite of the attitudes described above." After considering various inputs from the rater committee, the second stage of validity testing (revised version) reveals that one item still does not meet the validity value, namely item 11, with an Aiken value of 0.67 (<0.78). In contrast, the other 19 items have met the testing parameters.

Table 2. Aiken validity (original and revision version)

Original version				Revision version			
Scale	M±SD	Aiken-V	Decision	Scale	M±SD	Aiken-V	Decision
Item 1	3.8±0.4	0.94	Valid	Item 1	4.0±0.0	1.00	Valid
Item 2	3.5±0.5	0.83	Valid	Item 2	4.0±0.0	1.00	Valid
Item 3	3.8±0.4	0.94	Valid	Item 3	3.7±0.5	0.89	Valid
Item 4	3.7±0.5	0.89	Valid	Item 4	3.8±0.4	0.94	Valid
Item 5	3.7±0.5	0.89	Valid	Item 5	4.0±0.0	1.00	Valid
Item 6	3.7±0.5	0.89	Valid	Item 6	4.0±0.0	1.00	Valid
Item 7	3.8±0.4	0.94	Valid	Item 7	4.0±0.0	1.00	Valid
Item 8	3.8±0.4	0.94	Valid	Item 8	4.0±0.0	1.00	Valid
Item 9	3.8±0.4	0.94	Valid	Item 9	4.0±0.0	1.00	Valid
Item 10	3.7±0.8	0.89	Valid	Item 10	4.0±0.0	1.00	Valid



Item 11	2.8±0.4	0.61	Invalid	Item 11	3.0±0.0	0.67	Invalid
Item 12	3.8±0.4	0.94	Valid	Item 12	4.0±0.0	1.00	Valid
Item 13	3.8±0.4	0.94	Valid	Item 13	4.0±0.0	1.00	Valid
Item 14	3.5±0.5	0.83	Valid	Item 14	4.0±0.0	1.00	Valid
Item 15	3.8±0.4	0.94	Valid	Item 15	4.0±0.0	1.00	Valid
Item 16	3.8±1.4	0.94	Valid	Item 16	4.0±0.0	1.00	Valid
Item 17	3.0±1.1	0.67	Invalid	Item 17	3.8±0.4	0.94	Valid
Item 18	3.2±1.2	0.72	Invalid	Item 18	3.8±0.4	0.94	Valid
Item 19	3.2±1.2	0.72	Invalid	Item 19	3.8±0.4	0.94	Valid
Item 20	3.3±1.2	0.78	Invalid	Item 20	4.0±0.0	1.00	Valid

In addition to validity testing, researchers also conducted reliability tests using Cronbach's alpha and Pearson's intraclass correlation coefficient (ICC). In stage 1, the reliability value was 0.237 (0.60) and the inter-rater reliability value was 0.049 (0.50), indicating poor reliability.

Following up on the validity and reliability results, researchers revised the items according to the rating committee's notes and sent them back to them for revalidation. The resulting reliability value increased to 0.871, categorizing it as very good (0.8 to 0.9) (Hair, Page, et al., 2019). Meanwhile, the inter-rater reliability value increased to 0.529, categorizing it as moderate (0.50-0.75) (Koo & Li, 2016) (see Table 3). Thus, of the 19 items successfully developed for the Student Sportsmanship Scale in Physical Education, only one item failed to meet the testing criteria.

The ANOVA results also demonstrated that the six rater committees showed no significant differences in the scale's assessments in the first stage (validation) ($0.196 > 0.05$). Conversely, the second stage (revalidation) showed significant differences ($<0.001 < 0.05$) (see Table 3).

Table 3. Pearson intraclass correlation coefficient

	Intraclass correlation ^b		F test with true value 0			
			Value		Significance	
	Validation	Revalidation	Validation	Revalidation	Validation	Revalidation
Single measure	0.049 ^a	0.529 ^a	1.310	7.731	0.196	<0.001
Average measure	0.237 ^c	0.871 ^c	1.310	7.731	0.196	<0.001

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

The researcher captured several assessor notes during the validation and revalidation stages as follows. In item 1, rater IV (female/47 years old) provided the following input: "I regularly attend physical education and sports lessons even though they feel difficult." Likewise, in item 2, rater IV (female/47 years old) offered a more assertive item formulation as follows: "I show commitment and best effort when playing or competing." Continuing to item 8, MI (male/39 years old) provided the note: "Relevant, but could be more concrete, for example: kissing the coach's hand, greeting, etc." Still the same rater, in item 11, rater MI (male/39 years old) provided the note: "Less relevant in reflecting student integrity." Meanwhile, rater M (male/56 years old) also provided an important note: "I don't see a problem in seeking advantage by breaking the rules if it brings the desired results. Compliance with the rules is not always the main priority." For item 19, rater IV (female, 47 years old) recommended the item "I cheated in games or competitions to win" to improve the previous formulation. Finally, for item 20, rater MI (male, 39 years old) noted, "Broad scope. Could be elaborated in a more concrete version if needed."

Table 4. Student sportsmanship scale in physical education (S3-PE)

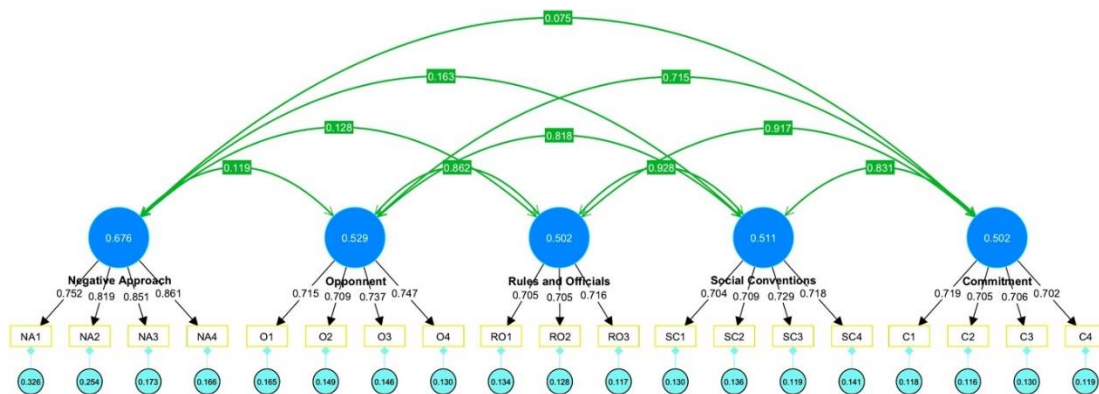
No	Original version	Revision version
1	I try to attend physical education and sports lessons regularly, even when it is difficult.	I regularly attend physical education and sports lessons, even when they are difficult.
2	I always strive to give my best effort when playing and competing.	I demonstrate commitment and best effort when playing and competing.
3	I do not give up easily when facing difficulties in physical education and sports lessons.	I demonstrate resilience when facing difficulties in physical education and sports lessons.
4	I am committed to following the practice schedule set by my teacher.	I adhere to the practice schedule set by the teacher.

5	I always greet and respect my teammates and opponents before a match.	I greet and respect teammates and opponents before games or competitions.
6	I do not use rude or insulting language while playing sports.	I do not use rude or insulting language during lessons.
7	I maintain good manners during physical education and sports lessons.	I maintain good manners during physical education and sports lessons.
8	I respect the traditions and norms of the games and sports I participate in.	I play by the rules of the game honestly and respect sports traditions, such as greeting or shaking hands before and after a game or competition.
9	I always try to follow the rules of games and sports set by teachers or referees.	I obey the rules of games and sports set by teachers or referees.
10	I accept referee decisions graciously, even if they are not in my favor.	I accept the decisions of teachers or referees graciously, even if they are not in my favor in the game or competition.
11	I believe that rules are in place to maintain fairness in games and sports.	I believe that rules are made to maintain fairness in games and sports.
12	I treat opponents with respect during competitions or matches.	I treat my opponents with respect during a game or competition.
13	I do not mock or belittle my opponents, even if I win.	I do not mock or belittle my opponents, even if I win.
14	I congratulate my opponents after a competition or match.	I congratulate my opponents after a game or competition.
15	I respect my opponents' efforts and skills.	I respect my opponents' efforts and skills.
16	I never avoid a match simply because I am afraid of losing.	I avoid games or competitions for fear of losing.
17	I do not engage in rude or aggressive behavior toward my opponents.	I do not feel guilty about being rude or aggressive toward my opponents.
18	I do not cheat to win.	I cheat in games or competitions to win.
19	I avoid behavior that could disrupt the sportsmanship of physical education and sports lessons.	I blame others for my losses.

Construct validity and reliability

After passing the content validity and reliability tests, the S3-PE was also piloted on 1750 students to test its construct validity and reliability using Covariance-Based Structural Equation Modeling (CB-SEM). Of the two SEM analysis approaches, PLS and CB, CB-SEM is considered more suitable for producing factor-based model fit indices, especially when handling large amounts of data (Dash & Paul, 2021). Furthermore, CB-SEM is used to assess the extent to which the proposed theoretical model can replicate the covariance matrix of the observed sample data (Hair et al., 2021).

Figure 1. Path diagram



The results of the CB-SEM analysis prove that 19 S3-PE items successfully meet the loading factor parameters, namely >0.70 (Hair, Black, et al., 2019; Hulland, 1999; Kay Kwong, 2013). Each: the commitment indicator is 0.702-0.719, the social conventions indicator is 0.704-0.729, the rules and officials indicator is 0.705-0.716, the opponent indicator is 709-747, and the negative approach indicator is 0.751-0.861 (see Figure 1). In addition, it has met the Cronbach alpha reliability parameters of 0.751-0.892 (>0.70) and composite reliability of 0.751-0.891 (>0.70) (Hair, Page, et al., 2019; Henseler et al., 2016), and the AVE parameter of 0.502-0.679 (>0.50) (Henseler et al., 2016). The Fornell-Larcker discriminant validity testing parameters have also been met with a value range of 0.708-0.822 (Fornell & Larcker, 1981) (see Table 5). Thus, it is concluded that each manifest variable in the S3-PE construction has proven successful in producing its latent variable covariance matrix, enabling the developed items to represent the actual situation accurately.

Table 5. Construct validity and reliability

Indicators	Cronbach alpha	Composite reliability	AVE	Discriminant validity
Commitment	0.801	0.801	0.502	0.708
Social conventions	0.807	0.807	0.511	0.822
Rules and officials	0.751	0.751	0.502	0.727
Opponent	0.817	0.818	0.529	0.708
Negative approach	0.892	0.891	0.676	0.715

Goodness of fit index

The purpose of the Goodness of Fit (GoF) test is to evaluate whether the proposed model can accurately represent the pattern of relationships between variables seen in the observed data (Hosmer & Lemeshow, 1980; Ryu, 2014). The GoF testing output confirmed the Chi-Square/df = 4.717 (>3.00), although the value is greater than the parameter, it is still tolerable or quite good (Hair, Black, et al., 2019; Marsh & Hocevar, 1985), Root Mean Square Error of Approximation = 0.046 (<0.08), Standardized Root Mean Square Residual = 0.030 (<0.10), Normed Fit Index = 0.959 (>0.90), Tucker-Lewis Index = 0.961 (>0.90), and Comparative Fit Index = 0.968 (>0.90) (see Table 6). Finally, the S3-PE structural model meets the GoF testing parameters (Akinyode, 2016; Hair, Page, et al., 2019; Henseler et al., 2016). It means that the items compiled in S3-PE have an appropriate psychometric function for measuring actual conditions.

Table 6. Goodness of fit index

	Estimated model	Null model
Chi Square/df	4.717 >3.00	96.000
Root Mean Square Error of Approximation (RMSEA)	0.046 <0.08	0.233
Standardized Root Mean Square Residual (SRMR)	0.030 <0.10	n/a
Normed Fit Index (NFI)	0.959 >0.90	n/a
Tucker-Lewis Index (TLI)	0.961 >0.90	n/a
Comparative Fit Index (CFI)	0.968 >0.90	n/a

Concurrent validity

After passing the previous content and construct validity tests, the S3-PE also passed the concurrent validity test. Concurrent validity indicates the agreement between two different assessments, where a researcher wants to test a newly constructed scale with a pre-existing scale (Adams et al., 2014). In concurrent validity testing, researchers look for correlations between the test and relevant criteria (Lee et al., 2023). Thus, this study correlated the S3-PE (as a newly developed scale) with the MSOS (a pre-existing scale). The results of the data normality test using the Kolmogorov-Smirnov formula and the linearity test using ANOVA proved that the S3-PE and MSOS data were not normally distributed (sig. = <0.001 <0.05) and were not significantly linearly correlated between them (sig. = <0.001 <0.05) (see Table 7). Thus, in the concurrent validity test, nonparametric statistics (Spearman correlation) were used.

Table 7. Results of normality and linearity tests

Variable	Kolmogorov-Smirnov		ANOVA table	
	Statistic	Sig.	F	Sig.
S3-PE	0.104	<0.001	2.289	<0.001
MSOS	0.067	<0.001		

Spearman's test showed a total correlation value of 0.693 (sig. = <0.001) (see Table 8); thus, researchers conclude that the concurrent validity of this newly developed scale is met. The correlation value between the two variables is classified as moderate (0.40-0.60) (Dancey & Reidy, 2020; Schober et al., 2018). Furthermore, all indicators of both scales are significantly correlated.

Table 8. Concurrent validity (Intercorrelation S3-PE with MSOS)

S3-PE	MSOS					
	Commitment	Social conventions	Rules and officials	Opponent	Negative approach	Total
Commitment	0.522**	0.437**	0.496**	0.280**	0.131**	0.520**
Social conventions	0.567**	0.544**	0.571**	0.320**	0.171**	0.612**
Rules and officials	0.612**	0.503**	0.596**	0.309**	0.152**	0.607**
Opponent	0.621**	0.639**	0.649**	0.388**	0.167**	0.692**
Negative approach	0.135**	0.143**	0.139**	-0.070**	0.522**	0.315**
Total	0.591**	0.539**	0.582**	0.247**	0.370**	0.693**

** Correlation is significant at the 0.01 level (2-tailed).

Discussion

Overview of the main hypothesis

This study aimed to develop and test the validity and reliability of a new scale called the Student Sportsmanship Scale in Physical Education (S3-PE). The primary hypothesis of this study stated that the S3-PE is a valid and reliable instrument for measuring the intended construct. Content validity testing results showed that 19 of the 20 items met Aiken's criteria of >0.78 , with one item eliminated because it did not meet this threshold. Content reliability reached 0.871, while inter-rater reliability using the ICC was recorded at 0.529, indicating moderate consistency.

Furthermore, construct validity and reliability testing using the CB-SEM approach supported the hypothesis, with all items having factor loadings >0.70 , Cronbach's alpha and composite reliability values >0.70 , and AVE >0.70 . Discriminant validity based on the Fornell-Larcker model was also met, ranging from 0.708 to 0.822. The goodness-of-fit model showed adequate results, with RMSEA = 0.046, SRMR = 0.030, NFI = 0.959, TLI = 0.961, and CFI = 0.968, although the Chi-Square/df value was slightly above the threshold. Finally, concurrent validity was supported by a significant Spearman correlation ($\rho = 0.693$, $p < 0.001$). Overall, these findings support the hypothesis that the S3-PE is a valid and reliable instrument.

Comparison with the data of publications related

This study developed and tested the validity and reliability of a new scale, the S3-PE, to measure student sportsmanship in the context of physical education. The results showed that the 19-item S3-PE scale demonstrated high content validity, construct validity, discriminant validity, concurrent validity, and reliability. Compared with previous scales developed in the literature, as discussed in the introduction, the S3-PE scale demonstrated superiority in both its indicator structure and statistical power.

In comparison, Vallerand et al. (1997) developed the MSOS with 25 items divided into five indicators: commitment, social conventions, rules and officials, opponents, and negative approach. Although most indicators on this scale demonstrated good internal reliability (with α ranging from 0.71 to 0.86), one indicator, negative approach, had low reliability ($\alpha = 0.54$), indicating a lack of internal consistency in this dimension. In contrast to the S3-PE, all indicators in this scale demonstrated internal reliability above 0.70, and the overall scale obtained a convincing Cronbach's alpha and composite reliability, indicating that all items work consistently in measuring the construct of sportsmanship.

Koç (2013), through the development of the SBSPEC, used two main indicators: exhibition of convenient behavior ($\alpha = 0.80$) and avoidance of unacceptable behavior ($\alpha = 0.78$), with a total of 22 items. This scale also demonstrated good reliability, but its two-dimensional structure is relatively narrow compared to the more complex construct of sportsmanship covered in the S3-PE scale. This newly developed scale (S3-PE), although consisting of 19 items, was developed based on modern psychometric measurement principles and tested using a CB-SEM approach, which allows for more comprehensive validity and reliability testing than the classical approach used in the SBSPEC.

Furthermore, Gimeno et al. (2013) developed the SRSTCYP, designed explicitly for the context of youth tennis competitions. This scale consists of 19 items to measure two indicators: sportsmanship and un-sportsmanlike behavior, with an overall internal consistency level ($\alpha = 0.70$). Although these scores are still within the acceptable range, the S3-PE demonstrates superiority with higher construct reliability and discriminant and concurrent validity indicators, which also support the instrument's overall



strength. Furthermore, the SRSTCYP was designed for a specific competitive sport context (tennis), while the S3-PE is more general in the context of physical education, making it more flexible and applicable across various sports and educational levels.

This comparison demonstrates that while previous scales have made important contributions to measuring sportsmanship, they still have several limitations in terms of construct coverage, psychometric strength, and context of use. The S3-PE scale presents a more comprehensive alternative, supported by a more sophisticated statistical approach and adequate test results in terms of validity and reliability. It makes a significant contribution to the development of evaluative instruments in the field of physical education and sportsmanship behavior, while complementing the existing literature by offering an adaptive, empirical, and reliable instrument.

The results of this study broaden the understanding of sportsmanship as a multidimensional construct involving cognitive, affective, and behavioral aspects. While the MSOS emphasizes social conventions and adherence to rules, and the SBSPEC focuses on positive behavior and the avoidance of negative behavior, the S3-PE integrates these dimensions within the broader context of physical education. Thus, this scale not only assesses adherence to rules but also measures the ability to control emotions, respect opponents and referees, and demonstrate moral responsibility during sports activities. This aligns with the findings of Giray (2021) and Paramida et al. (2023) who emphasized that the roots of unsportsmanlike behavior often arise from low internalization of moral and social values, not solely due to a lack of knowledge of the rules of the game. Therefore, the S3-PE can be a measuring tool that teachers can use to evaluate and correct problems of unsportsmanlike behavior by internalizing moral and social values in learning practices.

With high validity and reliability, the S3-PE can be used to map weak dimensions of sportsmanship, such as low respect for opponents or lack of emotional control, so that educational interventions can be focused appropriately through operational physical activities. These findings support the warning by Koc and Esenturk (2018) that the lack of sportsmanship strengthening activities in physical education learning is one of the factors causing unsportsmanlike behavior. Thus, the S3-PE presents a practical solution by providing measurable data for designing learning programs based on sportsmanship values and character. In line with the results of research Görgüt and Tutkun (2023) which highlighted the influence of coach behavior, provocation, and the competitive environment on unsportsmanlike behavior, the use of S3-PE allows coaches and teachers to assess not only students' actions on the field, but also their attitudes and moral dispositions towards sportsmanship.

Overall, the results of this study confirm that developing a valid and reliable measurement tool such as the S3-PE is a crucial step in systematically addressing unsportsmanlike behavior. This instrument serves not only as an evaluation tool but also as a means of moral and social development through physical education activities. Therefore, the primary contribution of this study lies in its ability to strengthen the relationship between modern psychometric measurements and the development of sportsmanlike character, a gap previously identified in previous research.

Importance of the study

Physical education is also a strategic arena for optimizing students' sportsmanship orientation (Burgueño & Medina-Casabón, 2020; Pennington, 2017; Tiryaki, 2023). For example, improving sportsmanship through an intervention program based on the Teaching Personal and Social Responsibility (TPSR) model (Sanchez et al., 2021). The successful development of this scale fills a gap in instruments that previously failed to accommodate the construct's dimensions holistically and appropriately within the physical education context, particularly for junior high school students. These results also contribute theoretically to psychology and the social sciences by providing a strong empirical basis for measuring this complex construct. The high concurrent correlation value ($\rho = 0.693$, $p < 0.001$) indicates that this scale is not only theoretically valid but also practically relevant when compared with other measurement tools. Thus, this study contributes significantly to strengthening the methodological foundation for scientific instrument development and opens up opportunities for the application of S3-PE in various research contexts and field interventions.

Improvements in student sportsmanship issues, such as rarely congratulating opponents and shaking hands with opposing coaches after defeat (Giray, 2021), bullying victimization (Demissie et al., 2014), and aggressive and violent behavior (Banjac et al., 2025), can only be achieved if teachers and/or



coaches use careful instruments to identify various unsportsmanlike behaviors. Given that sportsmanship issues frequently occur and erode the noble values of physical education and sports (Pante & Gallardo, 2025), including triggering violence against players and spectators (Ezomoh & Nwankwo, 2022), cheating and other negative behaviors are no longer considered deviant but are becoming part of the culture at various levels of competition (Paramida et al., 2023). This situation indicates that sportsmanship is not only threatened but also requires serious attention in education and character development through sports. Of course, its improvement requires reliable instruments to diagnose various unsportsmanlike behaviors and attempt to design remedial strategies.

Practical application

The results of this study open up broad opportunities for the practical application of the S3-PE scale in various contexts, including academic, professional, and institutional contexts. With proven high validity and reliability, this scale can be adopted as a standard assessment tool for measuring research-focused constructs, such as specific behaviors, attitudes, or perceptions, as outlined in the initial design of the S3-PE. In practice, the S3-PE can be used by researchers to evaluate interventions, measure program effectiveness, or conduct longitudinal studies to develop sportsmanship in both male and female students. In educational settings, this scale also has the potential to be used for needs mapping, psychological assessments, and more accurate data-based decision-making. This study, for example, reexamines the findings of Hafiar et al. (2023), who found that the development of sportsmanship in adolescents can be supported by their exposure to information related to athletic performance.

Similarly, a study by Bolter et al. (2018) found a discrepancy between leaders' and youths' perceptions of several sportsmanship behaviors. It demonstrates the importance of research and the use of a more comprehensive, valid, and reliable sportsmanship scale to measure student sportsmanship and physical education teachers' strategies in teaching students sportsmanship. Teachers, researchers, and education practitioners can also use this scale to identify areas for improvement, design training, and evaluate the impact of policies or work programs. By considering the suitability of indicators and flexibility of use, the S3-PE scale offers a standardized yet adaptive approach that can address the practical needs of various parties. It strengthens the S3-PE's position not only as a scientific measurement tool but also as an applicable instrument that has a direct impact on improving the quality of interventions and decision-making.

Prospects for further research

Based on the results and discussion of this study, there are several promising prospects for further research that could expand the use and development of the S3-PE scale. First, the proven validity and reliability open up opportunities to test this scale in a broader and more diverse population, demographically, geographically, and culturally. It is crucial for testing the stability and generalizability of the constructs being measured and developing new indicators of student sportsmanship.

Second, further research could examine the relationship between S3-PE scores and other relevant variables, such as job satisfaction, motivation, performance, or other psychosocial variables, to strengthen the scale's external validity. Longitudinal research could also be conducted to examine the consistency of scores over time and how constructs change over the long term. Third, the development of a short form of the S3-PE scale could be explored for more efficient practical use without compromising measurement accuracy. Furthermore, the use of a mixed methods approach would enrich understanding of the subjective meaning of each dimension within this scale.

Conclusions

This study aimed to develop and test the validity and reliability of the S3-PE scale as a psychometric measurement instrument. Based on the analysis, this objective was successfully achieved with supporting empirical evidence. Of the 20 initial items, 19 met content validity criteria based on Aiken's V value of ≥ 0.78 . Content reliability showed a high value of 0.871, and inter-rater reliability (ICC) of 0.529 indicated moderate and acceptable consistency.



Construct validity and reliability testing using CB-SEM showed that all items had factor loadings >0.70 , with Cronbach's alpha, composite reliability, and AVE values above the recommended threshold. Discriminant validity was also achieved through Fornell-Larcker analysis. Model suitability was supported by fit indices such as RMSEA = 0.046, SRMR = 0.030, NFI = 0.959, TLI = 0.961, and CFI = 0.968. Although the Chi-square/df value of 4.717 is slightly above the ideal limit, it is still methodologically tolerable. The results of the concurrent validity test using Spearman's correlation of 0.693 ($p < 0.001$) strengthen the relationship between the S3-PE and other relevant constructs. Therefore, it can be concluded that the S3-PE scale is a valid, reliable measurement tool, and in accordance with the initial objectives of the study.

Acknowledgements

The research team expresses gratitude to the Institute for Research and Community Service, Universitas Syiah Kuala, for funding and facilitating this study through the Associate Professor Research Scheme under contract number: 223/UN.11.2.1/PT.01.03/PNBP/2023.

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Appendix

Appendix:

Appendix 1.

No	Statement	Response			
		Disagree	Somewhat Disagree	Agree	Strongly agree
1	I regularly attend physical education and sports lessons, even when they are difficult. (<i>Saya mengikuti pembelajaran pendidikan jasmani dan olahraga secara rutin meskipun terasa sulit.</i>)				
2	I demonstrate commitment and best effort when playing and competing. (<i>Saya menunjukkan komitmen dan usaha terbaik saat bermain maupun berlomba.</i>)				
3	I demonstrate resilience when facing difficulties in physical education and sports lessons. (<i>Saya menunjukkan ketangguhan saat menghadapi kesulitan dalam pembelajaran pendidikan jasmani dan olahraga.</i>)				
4	I adhere to the practice schedule set by the teacher. (<i>Saya mematuhi jadwal latihan yang telah ditentukan guru.</i>)				
5	I greet and respect teammates and opponents before games or competitions. (<i>Saya menyapa dan menghormati teman satu tim dan lawan sebelum permainan atau perlombaan.</i>)				
6	I do not use rude or insulting language during lessons. (<i>Saya tidak berkata kasar atau menghina saat berlangsungnya pembelajaran.</i>)				
7	I maintain good manners during physical education and sports lessons. (<i>Saya menjaga sikap sopan santun selama mengikuti pembelajaran pendidikan jasmani dan olahraga.</i>)				
8	I play by the rules of the game honestly and respect sports traditions, such as greeting or shaking hands before and after a game or competition. (<i>Saya menjalankan aturan permainan dengan jujur dan menghormati tradisi olahraga seperti memberi salam atau berjabat tangan sebelum dan sesudah permainan atau perlombaan.</i>)				
9	I obey the rules of games and sports set by teachers or referees. (<i>Saya mematuhi aturan permainan dan olahraga yang ditetapkan guru atau wasit.</i>)				
10	I accept the decisions of teachers or referees graciously, even if they are not in my favor in the game or competition. (<i>Saya menerima keputusan guru atau wasit dengan lapang dada, meskipun tidak menguntungkan saya dalam permainan atau perlombaan.</i>)				
11	I believe that rules are made to maintain fairness in games and sports. (<i>Saya percaya bahwa aturan dibuat untuk menjaga keadilan dalam permainan dan olahraga.</i>)				
12	I treat my opponents with respect during a game or competition. (<i>Saya memperlakukan lawan dengan hormat selama permainan atau perlombaan.</i>)				
13	I do not mock or belittle my opponents, even if I win. (<i>Saya tidak mengejek atau merendahkan lawan meskipun saya menang.</i>)				
14	I congratulate my opponents after a game or competition. (<i>Saya mengucapkan selamat kepada lawan setelah berakhirnya permainan atau perlombaan.</i>)				
15	I respect my opponents' efforts and skills. (<i>Saya menghargai usaha dan kemampuan lawan dalam bermain.</i>)				
16	I avoid games or competitions for fear of losing. (<i>Saya menghindari permainan atau perlombaan karena takut kalah.</i>)				
17	I do not feel guilty about being rude or aggressive toward my opponents. (<i>Saya tidak merasa bersalah karena melakukan tindakan kasar atau agresif terhadap lawan.</i>)				
18	I cheat in games or competitions to win. (<i>Saya melakukan kecurangan dalam permainan atau perlombaan untuk mendapatkan kemenangan.</i>)				
19	I blame others for my losses. (<i>Saya akan menyalahkan orang lain karena kekalahan yang saya terima.</i>)				

Note. (1) First line (English), second line (Indonesian). (2) Commitment (item 1-4), social conventions (item 5-8), rules and officials (item 9-11), opponent (item 12-15, negative approach (item 16-19).