Research Article

Adaptation of the Perceived Autonomy Support Scale for Coaches (Sport Climate Questionnaire) into Turkish

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ABSTRACT

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This study seeks to determine the validity and reliability of the Turkish adaptation of the Perceived Autonomy Support Scale for Coaches (Sport Climate Questionnaire). The research group consisted of 353 active athletes aged between 12 and 18 years (199 females and 154 males; mean age = 13.95 ± 2.08 years). Data were collected using the Perceived Autonomy Support Scale for Coaches and the Empowering and Disempowering Motivational Climate Questionnaire. Descriptive statistics, Pearson correlation analysis, and confirmatory factor analysis (CFA) were used for data analysis. The CFA results confirmed the single-factor structure of both the long and short forms of the scale. Criterion-related validity analysis revealed a positive correlation between the Perceived Autonomy Support Scale for Coaches and the empowering climate dimension, while a negative correlation was found with the disempowering climate dimension. Both forms of the scale demonstrated adequate reliability coefficients, with satisfactory Cronbach's alpha and composite reliability values. Similarly, test-retest correlations were found to be sufficient. In conclusion, the long and short forms of the Perceived Autonomy Support Scale for Coaches are valid and reliable tools for assessing coaches' autonomy-supportive behaviors.

INTRODUCTION

The effects of coach behaviors on athletes continue to be increasingly studied (Carpentier & Mageau, 2013; Cronin et al., 2015; Smith et al., 2010). In the sports context, coaches can have both positive effects, such as enhancing well-being and improving

performance (Stenling & Tafvelin, 2014; Yıldırım & Koruç, 2021), and negative effects, such as leading to burnout (Isoard-Gautheur et al., 2012) on athletes. In this regard, examining various qualities of coaches, such as their autonomy-supportive behaviors, could provide valuable contributions to literature.

The concept of autonomy support is rooted in self-determination theory (SDT) (Williams et al., 1996). Self-determination theory is a macro theory that addresses motivation, development, and well-being. It focuses on the socio-cultural conditions that affect an individual's growth and development. The theory assumes that individuals have fundamental and universal psychological needs, such as autonomy, competence, and relatedness. The fulfillment of these needs is considered essential for individuals to continue living healthy and flourishing lives (Deci & Ryan, 2000; Ryan, 2009). In this context, autonomy support is defined as understanding the perspective of the other person, affirming their emotions, and minimizing pressures and demands (Deci & Ryan, 1985b). Autonomy refers to the ability of an individual to make decisions and choices based on their own independent will, free from external influence (Deci & Ryan, 2008).

The autonomy support provided by the coach can be described as part of the motivational climate. In an autonomy-supportive climate, individuals perceive that their attitudes and behaviors stem from within themselves, rather than responding to external environmental factors and demands, and they become aware of their own sense of self (Deci & Ryan, 1987). The coach's autonomy-supportive behaviors are expressed through actions such as motivating athletes' behaviors, offering them choices, considering their thoughts, showing care and concern, helping them take initiative, and providing positive feedback (Felton & Jowett, 2013; Quested & Duda, 2011). In autonomy-supportive contexts, significant individuals, such as coaches, offer athletes options, provide meaningful justification, minimize pressure, and accept the emotions and perspectives of the athletes. It is assumed that providing autonomy support to individuals, such as athletes, facilitates the internalization and integration of regulatory processes, thereby making it possible to promote effective, long-term behavior change (Williams et al., 1996).

To assess autonomy-supportive behaviors, Williams et al. (1996) developed the 15-item Health Care Climate Questionnaire (HCCQ), which contains general statements that can be adapted to various domains. By making minor item modifications (e.g., replacing "my doctor" with "my teacher" or "my coach"), the scale can be applied to different contexts such as sport, education, and organizational settings. In this context, the HCCQ has been adapted into

several domain-specific versions. For example, the Learning Climate Questionnaire (Black and Deci, 2000) was developed for the educational context; the Virtual Care Climate Questionnaire (Smit et al., 2017) was introduced for virtual care environments; and the Friendship Autonomy Support Questionnaire (Deci et al., 2006) was used for peer relationships. The 15-item long form and 6-item short form of the Sport Climate Survey, a sports-specific version of the scale, were developed by the Self-Determination Theory (SDT) team led by Edward L. Deci and Richard M. Ryan and published on the Self-Determination Theory website (https://selfdeterminationtheory.org/sport-climate-questionnaire/). The Sport Climate Survey assesses the autonomy-supportive behaviors athletes perceive from their coaches. However, no research has been found that focuses solely on the validity and reliability of the Sport Climate Survey. In this context, this research contributes to the field by assessing the validity and reliability of both the short and long forms.

There is no validity study of the Perceived Autonomy Support Scale for Coaches specifically for the field of sports. However, the long and short forms of the Perceived Autonomy Support Scale for Coaches have been used in various cultures, including Spanish (Balaguer et al., 2009), New Zealand (Hodge & Lonsdale, 2011), English (Adie et al., 2012), and American (Reynolds & McDonough, 2015) cultures. Additionally, the autonomy-supportive behaviors of coaches have been widely studied (Amorose, 2007; Mageau & Vallerand, 2003; Reinboth et al., 2004). Research has reported positive effects of coaches' autonomy-supportive behaviors on athletes, such as increased enjoyment of the sport, improved self-esteem (Côté, 2002; Smoll & Smith, 2002), enhanced motivation (Amorose, 2007; Mageau & Vallerand, 2003; Vallerand & Losier, 1999), and the support of basic psychological needs (Reinboth et al., 2004). However, further research involving different variables and conducted across different cultures could contribute to the field.

Different measurement tools are available in the literature to assess autonomy support behaviors. For example, the Perceived Parental Autonomy Support Scale (Mageau et al., 2015) is commonly used to evaluate parents' autonomy-supportive attitudes, while the Work Climate Questionnaire (Baard et al., 2002) is used to assess employees' perceptions of autonomy support in the workplace. In the field of sports, there are also several instruments designed to measure coaches' autonomy-supportive behaviors. Hagger et al. (2007) developed a scale to assess autonomy-supportive behaviors of physical education teachers. Müftüler (2016) adapted this scale into Turkish under the title "in exercise" for use with university students. Later, a coach-specific version of Müftüler's adaptation was developed by Karadağ

et al. (2025) and named the Coach-Created Autonomy Support Scale. Another relevant scale is the Empowering and Disempowering Motivational Climate Questionnaire, developed by Appleton et al. (2016), which includes an autonomy support subdimension. The Turkish adaptation of this scale was conducted by Gözmen Elmas et al. (2018). The full version adapted by Gözmen Elmas and colleagues consists of 34 items. The Sport Climate Questionnaire (Perceived Autonomy Support Scale for Coaches), which is the subject of this study, is another widely used tool to assess athletes' perceptions of the autonomy support provided by their coaches. The long form of the Perceived Autonomy Support Scale for Coaches consists of 15 items and provides a comprehensive assessment of autonomy support, while the short form, consisting of 6 items, offers a more practical option for time-constrained research contexts. Both forms were developed within the framework of Self-Determination Theory and are considered effective tools for understanding athletes' motivational experiences and evaluating autonomy-supportive coaching environments.

In the process of scale adaptation, it is essential to consider cultural differences in addition to preserving psychometric properties. This is because a scale developed in one culture may not exhibit the same structure in another. Factors such as cultural norms, values, language, and individual experiences can influence how participants interpret scale items (Byrne, 2016; Van Widenfelt et al., 2005). Therefore, rather than a direct translation, cultural adaptation strategies should be employed to assess how the concepts measured by the scale are perceived in the target culture, test its structural equivalence, and examine whether it provides consistent results. Therefore, it is important to examine how the scale of perceived autonomy support from coaches works in Turkish culture.

In summary, the Perceived Autonomy Support Scale for Coaches can be used as an alternative measurement tool due to its characteristics, such as being accepted in different cultures in the literature, its use in various studies, and the ease of applying both its short and long forms. Additionally, the scale's use in studies across different cultures can facilitate cross-cultural comparisons. Therefore, this study seeks to determine the validity and reliability of the Turkish adaptation of the Perceived Autonomy Support Scale for Coaches (Sport Climate Questionnaire). Furthermore, this study aims to test the measurement invariance of the scale based on gender and age.

METHODS

Participants

For data collection, a non-probability sampling method, specifically convenience sampling (Özdemir, 2010), was used. In determining the sample size, ratios such as 10 times or 20 times the number of items are considered, based on the ratio of the number of respondents to the number of items (Kline, 2016).

In this study, the research group consisted of 199 female and 154 male active athletes, totaling 353 participants (mean age = 13.95 ± 2.08 years) aged between 12 and 18, competing in different sports branches (in the mini, small, star, and youth categories) at club training academies. Participants included individuals who have been licensed and continued in sports for at least six months. The participants' average sports experience was 2.89 (± 2.33) years. The average time spent training with their current coach at their club was 2.12 (± 1.73) years. The average weekly training attendance at their club was 3.12 (± 1.24) days. Of the participants, 56.4% (199 individuals) engaged in volleyball, 32% (113 individuals) in football, and 11.6% (41 individuals) in basketball. Participants came from various cities, with 86.4% (305 individuals) from Denizli, 3.7% (13 individuals) from Uşak, 3.4% (12 individuals) from Muğla, 3.1% (12 individuals) from Manisa, 2.3% (8 individuals) from Aydın, 0.3% (1 individual) from İzmir, 0.3% (1 individual) from Isparta, 0.3% (1 individual) from Afyonkarahisar, and 0.3% (1 individual) from Antalya.

For test-retest reliability, analysis was conducted with 40 data separately from the main sample. The participants of the test-retest were 40 female volleyball players (mean age = 12.83 ± .96 years) between the ages of 12-15. The participants attended training sessions 2.78 (± .70) days a week, an average of 1.97 (± .11) hours per day. They had been participating in their sports for 2.87 (± 1.38) years. They had been continuing training sessions with their current coaches for 2.05 (± 1.17) years. All participants were from Denizli province.

Measures

Perceived Autonomy Support from Coach Scale (Sport Climate Questionnaire): The original scale was based on the Health Care Climate Questionnaire developed by Williams and colleagues (1996). Small modifications, such as replacing "my coach" with "my teacher," were made to the items of the Health Care Climate Questionnaire to allow the measurement of autonomy support across different fields. In this context, the Sport Climate Questionnaire was published on the website https://selfdeterminationtheory.org/sport-climate-questionnaire/ and made freely available for research purposes. The coach version of the scale was used to assess athletes' perceptions of the level of autonomy support provided by their coaches. The scale consisted of a 15-item long version and a 6-item short version. The short

version included items 1, 2, 4, 7, 10, and 14. The 13th item ("I don't really like the way my coach talks to me") was reverse-coded. The scale was unidimensional and uses a 7-point Likert-type scale, ranging from (1) strongly disagree to (7) strongly agree. A higher score indicated that the athlete perceived greater autonomy-supportive behavior from their coach.

Empowering and Disempowering Motivational Climate Questionnaire: The Coach-Created Empowering and Disempowering Motivational Climate Questionnaire was developed by Appleton and colleagues (2016) to assess coaches' empowering and disempowering behaviors. The scale was adapted into Turkish by Gözmen Elmas and others (2018). The scale consisted of 34 items in total, with 17 items related to empowering climate and 17 items related to disempowering climate. These two dimensions were further divided: the empowering climate includes sub-dimensions such as task climate, autonomy support, and social support; the disempowering climate includes sub-dimensions such as ego climate and control. The scale was a 7-point Likert-type scale, ranging from (1) strongly disagree to (5) strongly agree.

Procedures

Ethical approval for the study was obtained from the Ethics Committee of Pamukkale University (02.05.2024 and E-60116787-020-521240). Permission to use the scales in the study was granted by the authors of the scales. A Turkish version of the scale was prepared for evaluation by the ethics committee. The translation process of the scale into Turkish followed the translation-back translation method. The original English version of the scale was translated into Turkish by three experts proficient in English. The three Turkish versions of the scale were then compared by the researchers, with identical translations identified, and a single form was created. This form was then re-translated into English by an English linguist. The resulting English version was compared with the original, and after some corrections, the most appropriate version of the Turkish scale was finalized. Subsequently, the Turkish version was shown to a Turkish language expert working with the 12-18 age group, and after reviewing their feedback, the final version of the scale was prepared.

After obtaining approval from the Ethics Committee, the data collection phase began, and statistical evaluations, such as construct validity, were conducted. The researchers adhered to the principles of the Helsinki Declaration. Consent information was provided to the participants' families, and their approval was obtained. During the data collection process, the scale forms were distributed and collected through face-to-face interviews conducted by the researchers. No time limits were set while the participants completed the scales; they were

encouraged to provide accurate and sincere responses. Instructions on how to fill out the scales were given, and no incentives or pressure were applied. Participation was entirely voluntary.

Data Analysis

In data analysis, Cronbach's alpha and Pearson correlation (test-retest correlation and criterion-related validity) analysis were conducted using Jamovi 2.3.13; confirmatory factor analysis was performed with AMOS 23.0; and the calculation of composite reliability values was carried out using Microsoft Excel.

Construct Validity

One important question in data analysis was to what extent the factorial structure of the measurement tool was valid or how well the tool measures what it is supposed to measure. In this regard, analyses such as confirmatory factor analysis were used (Byrne, 2001).

For model fit, the following values were reported in the confirmatory factor analysis measurement: χ^2/df (chi-square divided by degrees of freedom), TLI (Tucker & Lewis Index), CFI (Comparative Fit Index), IFI (Incremental Fit Index), GFI (Goodness Fit Index), AGFI (Adjusted Goodness of Fit Index), SRMR (Standardized Root Mean Square Residual), and RMSEA (Root Mean Square Error of Approximation) (McDonald & Ho, 2002; Schreiber et al., 2006). For these values, χ^2/df should be less than 3, RMSEA and SRMR should be less than 0.05 for perfect fit, and less than 0.08 for acceptable fit. CFI, TLI, GFI, AGFI, and IFI should be above 0.90 for acceptable fit and above 0.95 for perfect fit (Schermelleh-Engel et al., 2003; Kline, 2016). A factor loading above 0.30 and statistically significant values are recommended (Hair et al., 2010).

Measurement Invariance

To assess measurement invariance, we used a multi-group confirmatory factor analysis method, which includes gender and grade groups. During this process, we conducted tests for different levels of invariance: configural, metric, scalar, and strict invariance. The suitability of invariance was evaluated based on the criteria proposed by Chen (2007) and Cheung and Rensvold (2002). According to these criteria, the change in the Comparative Fit Index (ΔCFI) should be less than 0.01, and the change in the Root Mean Square Error of Approximation (ΔRMSEA) should be less than 0.015.

Criterion-Related Validity

The Empowering and Disempowering Motivational Climate Questionnaire was used for Criterion-Related Validity. The Perceived Autonomy Support from Coach Scale and the empowering dimension (especially the autonomy support sub-dimension) measured a similar structure. The disempowering dimension measured slightly more contrasting qualities with the ego climate and control sub-dimensions. Positive relationships with the empowering dimension and negative relationships with the disempowering dimension can be expected. Therefore, the Empowering and Disempowering Motivational Climate Questionnaire was selected for Criterion-Related Validity. Pearson correlation analysis was employed to compute the correlations for criterion-related validity.

Reliability

For the reliability assessment of the scale, Cronbach's alpha (α), Composite Reliability (CR), and test-retest coefficients were used. In the literature, it is recommended that Cronbach's alpha and Composite Reliability values should be above 0.70 (Nunnally & Bernstein, 1978). Additionally, the test-retest correlation coefficient should ideally be above 0.70 (Alpar, 2006). This approach ensures the consistency and stability of the measurements over time, reinforcing the scale's reliability for assessing perceived autonomy support in athletes.

RESULTS

This section presents the results of the validity and reliability assessments of the Perceived Autonomy Support from Coaches Scale, including confirmatory factor analysis, correlation analyses, reliability values, measurement invariance and descriptive statistics.

The Perceived Autonomy Support from Coaches Scale utilizes a 7-point Likert scoring system. The long form scores range between 15 and 105, while the short form scores range between 6 and 42. Scores of 86.81 for the long form and 34.09 for the short form indicated that participants perceived above-average levels of autonomy-supportive behaviors from their coaches. The skewness and kurtosis values ranged from -1.145 to 1.982, falling within the recommended range of ±2 (George & Mallery, 2016). These results suggested that the data were normally distributed (Table 1).

Table 1.
Descriptive statistics of Perceived Autonomy Support from Coach Scale

	M	Sd	Skewness	Kurtosis
Long form of the scale	86.81	13.16	-1.338	1.982
Short form of the scale	34.09	5.98	-1.145	1.293

Validity Results

Construct Validity

Two different models were established to assess the construct validity of the Autonomy-Supportive Coach Behavior Scale. The first model tested the 15-item long form of the scale, while the second model tested the 6-item short form of the scale. Additionally, the results of both the non-modified and modified models of the scales are reported (see Table 1).

The results of the long form of scale showed that the values of CFI, GFI, TLI, and RMSEA fall within acceptable limits. However, the SRMR and chi-square difference values were within perfect fit boundaries, while the NFI and AGFI values did not provide sufficient fit to the data. When modifications were made between items 1-2, 4-5, 4-12, 7-10, and 14-15, the CFI and RMSEA values reached perfect fit boundaries, while NFI, TLI, GFI, and AGFI values improved to acceptable fit boundaries (see Table 2). The factor loadings of the long form range from .46 to .73 (see Figure 1). The lowest factor loading in both the long and short forms was .46.

Table 2.
Coaches' Autonomous Behaviors Scale data fit test values

| Fit index	Long form of the scale	Modified long form of the scale	Short form of the scale	Modified short form of the scale	Acceptable fit thresholds	Perfect fit thresholds
CFI	.916	.953	.955	.998	≥.90	≥.95
NFI	.872	.910	.939	.985	≥.90	≥.95
TLI	.902	.942	.924	.996	≥.90	≥.95
GFI	.914	.941	.969	.993	≥.90	≥.95
AGFI	.885	.917	.927	.978	≥.90	≥.95
SRMR	.048	.041	.041	.0208	.050 - .080	.000 - .050
RMSEA	.068	.052	.085	.019	.050 - .080	.000 - .050
Chi-Square	237.112	167.078	32.107	7.900		
SD	90	85	9	7	χ2/sd <3	
Chi-Square/SD	2.635	1.966	3.567	1.129		

Note. CFI = comparative-fit index; NNFI = non-normed fit index; IFI = incremental fit index; SRMR = standardized root means square residual; RMSEA = root mean square error of approximation; χ²/sd = chi-square difference.

For the short form of the scale, the NFI, TLI, AGFI, RMSEA, and chi-square difference values fall within acceptable limits, while the CFI, GFI, and SRMR values were within perfect

fit boundaries. When modifications were made between items 7-10 and 10-14, the NFI, TLI, AGFI, RMSEA, and chi-square difference values also reached perfect fit boundaries (see Table 2). The factor loadings for the short form range from .53 to .67 (see Figure 1). All factor loadings in both forms were statistically significant at the .001 level.

Figure 1.
Confirmatory factor analysis diagram of the long and short forms of the Scale of Perceived Autonomy Support from the Coach
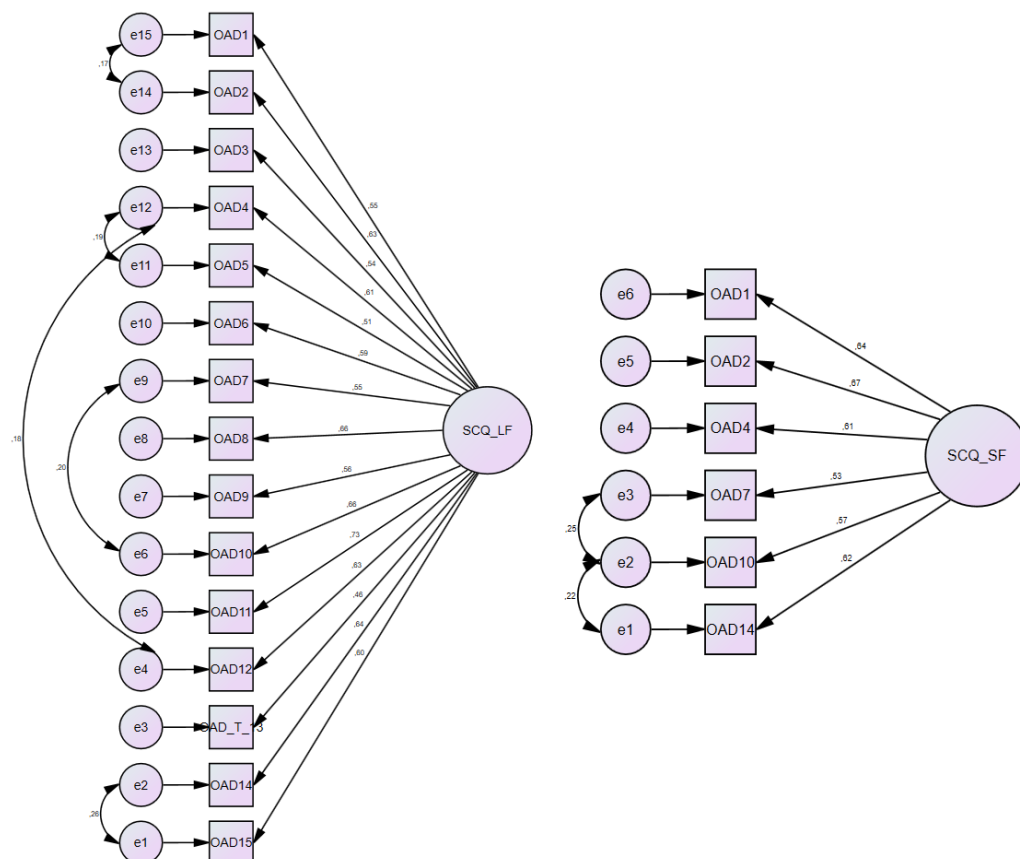
Measurement Invariance

The second objective of this study was to evaluate the measurement invariance of the Perceived Autonomy Support from Coaches Scale across gender and age groups.

The findings regarding the long form of the Scale of Perceived Autonomy Support from Coaches revealed the following results: For the gender variable, the ΔCFI and ΔRMSEA values support measurement invariance at the configural and metric invariance levels but did not support it at the scalar and strict invariance levels. For the age variable, the ΔCFI and ΔRMSEA values indicated measurement invariance across all levels: configural, metric, scalar, and strict invariance. Additionally, based on the Δχ²(Δdf) values, measurement invariance was not achieved for the gender and the age variables (Table 3).

The findings regarding the short form of the Scale of Perceived Autonomy Support from Coaches revealed the following results: For the gender variable, ΔCFI and ΔRMSEA values support measurement invariance at the configural and metric invariance levels; however, they did not support it at the scalar and strict invariance levels. For the age variable, ΔCFI and ΔRMSEA values indicated measurement invariance across all levels: configural, metric, scalar, and strict invariance. Additionally, based on the $\Delta\chi^2(\Delta df)$ values, measurement invariance was achieved only at the metric invariance level for the gender variable, whereas for the age variable, it was supported at the configural, metric, scalar, and strict invariance levels (Table 4).

Table 3.

Measurement invariance of the long form of the Perceived Autonomy Support from Coach Scale according to gender and age

		χ2 (sd)	Δ χ2 (Δ df)	CFI	Δ CFI	RMSEA	Δ RMSEA	Invariant?
Gender invariance of long form of scale	Boys	104.145 (85)	1.225	.951	-	.038	-	-
	Girls	182.815 (85)	2.151	.932	-	.076	-	-
	Configural invariance	327.063 (170)	-	.914	-	.051	-	Yes
	Metric invariance	355.896 (184)	28.832 (14)	.906	.008	.052	.001	Yes
	Scalar invariance	387.100 (185)	31.205 (1)	.890	.016	.056	.004	No
	Strict invariance	443.823 (205)	56.723 (20)	.870	.020	.058	.002	No
Age invariance of long form of scale	12-13 years	127.975 (85)	1.506	.947	-	.050	-	-
	14-18 years	151.860 (85)	1.787	.933	-	.072	-	-
	Configural invariance	317.987 (170)	-	.918	-	.050	-	Yes
	Metric invariance	343.517 (184)	25.530 (14)	.912	.006	.050	.000	Yes
	Scalar invariance	349.835 (185)	6.318 (1)	.909	.003	.050	.000	Yes
	Strict invariance	380.571 (200)	30.736 (20)	.900	.009	.051	.001	Yes

Note: χ2 (sd) = chi-square test statistic, df = degrees of freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, ΔCFI = CFI change; ΔRMSEA = RMSEA change; ΔSRMR = SRMR change; ** = measurement invariance verified for Δ χ2 (Δ df)

Table 4.

Measurement invariance of the short form of the Perceived Autonomy Support from Coach Scale according to gender and age

		χ2 (sd)	Δ χ2 (Δ df)	CFI	Δ CFI	RMSEA	Δ RMSEA	Invariant?
Gender invariance of short form of scale	Boys	5.328 (8)	.666	1.000	-	.000	-	-
	Girls	9.165 (7)	1.309	.995	-	.040	-	-
	Configural invariance	15.563 (14)	-	.997	-	.018	-	Yes
	Metric invariance	21.666 (19)	6.103 (5)**	.995	.002	.020	.002	Yes
	Scalar invariance	41.471 (20)	19.805 (1)	.959	.036	.055	.035	No
	Strict invariance	47.950 (26)	6.479 (6)	.958	.001	.049	.006	No
Age invariance of short form of scale	12-13 years	9.245 (8)	1.156	.995	-	.028	-	-
	14-18 years	5.252 (7)	.629	1.000	-	.000	-	-
	Configural invariance	40.696 (16)	-	.952	-	.066	-	Yes
	Metric invariance	46.971 (21)	6.275 (5)**	.949	.003	.059	.007	Yes
	Scalar invariance	50.698 (22)	3.727 (1)**	.944	.005	.061	.002	Yes
	Strict invariance	57.129 (28)	6.430 (6)**	.943	.001	.054	.007	Yes

Note: χ² (sd) = chi-square test statistic, df = degrees of freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, ΔCFI = CFI change; ΔRMSEA = RMSEA change; ΔSRMR = SRMR change; ** = measurement invariance verified for Δ χ2 (Δ df)

Criterion-Related Validity

The results of the criterion-related validity analysis of the scale revealed significant positive correlations between the long form of the Perceived Autonomy Support from Coaches Scale and the Coach Empowering Climate Scale and its subdimensions, ranging from .54 to .64. Additionally, significant negative correlations were found between the long form of the Perceived Autonomy Support from Coaches Scale and the Coach Disempowering Climate Scale and its subdimensions, ranging from -.45 to -.50. All correlations were statistically significant at level .001 (Table 5).

The results of the criterion-related validity analysis for the short form of the Perceived Autonomy Support from Coaches Scale revealed significant positive correlations with the Coach Empowering Climate Scale and its subdimensions, ranging from .48 to .56. In addition, significant negative correlations were found between the short form of the Perceived Autonomy Support from Coaches Scale and the Coach Disempowering Climate Scale and its subdimensions, ranging from -.37 to -.44. All correlations were statistically significant at level .001 (Table 5).

Table 5.
Criterion-related validity results of the Perceived Autonomy Support Scale

| | Perceived Autonomy Support from the Coach | |
	Long form of the scale	Short form of the scale
Empowering and Disempowering Motivational Climate Questionnaire		
Empowering climate	.638**	.565**
Task-climate	.592**	.524**
Autonomy-supportive	.541**	.478**
Socially supportive	.597**	.532**
Disempowering climate	-.487**	-.411**
Ego-climate and	-.500**	-.436**
Controlling	-.448**	-.374**

Reliability Results

The Perceived Autonomy Support from Coaches Scale demonstrated strong reliability indicators for both its 15-item long form and 6-item short form. The Cronbach's alpha (α) and Composite Reliability (CR) coefficients ranged between .78 and .89, confirming adequate internal consistency. Additionally, the test-retest correlation coefficients, measured over a 15-day interval, ranged from .71 to .82, indicating good temporal stability (Table 6). These results suggest that both forms of the scale were reliable instruments for measuring perceived autonomy support from coaches.

Table 6.
Reliability coefficients of the Perceived Autonomy Support from Coach Scale

	Cronbach Alpha	Composite reliability (CR)	Test retest (n=40)
Long form of the scale	.89	.89	.82**
Short form of the scale	.79	.78	.71**

DISCUSSION

This research examines the validity and reliability of the Turkish version of the Perceived Autonomy Support Scale for Coaches (Sport Climate Questionnaire).

Construct Validity

In this study, the construct validity of both the long (15-item) and short (6-item) forms of the *Perceived Autonomy Support from Coaches Scale* was evaluated using confirmatory factor analysis (CFA). The results demonstrated strong construct validity for both versions of the scale. The fit indices met established benchmarks: the chi-square to degrees of freedom ratio was below 3, RMSEA and SRMR values were under the .08 or .05 thresholds, and the NFI,

NNFI, and GFI values exceeded the recommended cut-off values of .90 or .95 (Schermelleh-Engel et al., 2003; Kline, 2016). Moreover, model modifications further improved the fit indices, bringing most indicators within the range of excellent model fit. An inspection of the standardized factor loadings showed that the lowest loading was .44, which exceeds the commonly accepted minimum threshold of .30 (Hair et al., 2010), thereby supporting the unidimensional structure of the scale. These findings are in line with previous validation studies. For instance, Williams et al. (1996) identified a unidimensional structure through exploratory factor analysis in a sample of obese patients in a medical setting in the United States. In the sport context, Reinboth et al. (2004) obtained similar results using the 5-item short form with adolescent football and cricket players in the United Kingdom. Likewise, Hodge and Lonsdale (2011) in New Zealand and Balaguer et al. (2009) in Spain employed the long form of the scale with young adults from various sports and reported findings consistent with the current study. Taken together, these results provide strong evidence for the structural validity of both forms of the scale across diverse cultural contexts, including the Turkish sample used in this research.

In the long form of the Perceived Autonomy Support from Coaches Scale, five modifications were made, while two modifications were applied to the short form. Following these modifications, several fit indices, such as TLI and RMSEA, reached perfect fit thresholds. It is important to note that even prior to these modifications, the fit indices already demonstrated acceptable model fit. The modifications in the long form involved items 1-2, 8-14, 11-12, 11-14, and 14-15, whereas in the short form, modifications were applied between items 4-5 and 5-6. Both the long and short forms are unidimensional and measure perceived autonomy-supportive behaviors from coaches. During the modification process, error terms of semantically similar items related to autonomy-supportive behaviors were correlated. For example, items such as "My coach makes me feel confident about my ability to succeed in sports" and "I feel accepted by my coach" reflect closely related aspects of autonomy support. Consequently, all items connected through modifications share a strong conceptual relationship. These findings indicate that the modifications align with the theoretical construct and enhance the scale's psychometric properties without altering its core conceptual framework.

Measurement Invariance

The second objective of this study was to assess the measurement invariance of the Perceived Autonomy Support from Coaches Scale across gender and age groups. For this

evaluation, the $\Delta\chi^2(\Delta df)$, ΔCFI, and ΔRMSEA values were used. Literature suggests that a ΔCFI smaller than 0.01 and a ΔRMSEA smaller than 0.015 are considered indicative of acceptable measurement invariance (Chen, 2007; Cheung & Rensvold, 2002). The findings of the study indicate that, in terms of gender, both the long and short forms of the scale show measurement invariance at the configural and metric invariance levels, with acceptable ΔCFI and ΔRMSEA values. However, measurement invariance was not achieved at the scalar and strict invariance levels. For the age variable, the ΔCFI, and ΔRMSEA values for both the long and short forms support measurement invariance at the configural, metric, scalar, and strict invariance levels.

Regarding the $\Delta\chi^2(\Delta df)$ value for the gender variable, the expected results were not obtained. However, it should be considered that the chi-square value may be influenced by sample size (Chen, 2007). Therefore, it is crucial to emphasize that the $\Delta\chi^2(\Delta df)$ value alone was not a definitive criterion when evaluating measurement invariance.

In conclusion, it can be stated that the Perceived Autonomy Support from Coaches Scale largely demonstrates measurement invariance across gender and age groups. However, the lack of measurement invariance at the scalar and strict levels for the gender variable suggests that potential gender-based differences should be considered when using the scale.

Criterion-Related Validity

The Perceived Autonomy Support Scale for Coaches demonstrated criterion-related validity through significant positive correlations with the Empowering Motivational Climate dimension and significant negative correlations with the Disempowering Motivational Climate dimension of the Coach-Created Motivational Climate Questionnaire. Although there is a lack of studies directly examining the correlations between perceived autonomy support from the coach and empowering/disempowering motivational climates, Appleton et al. (2016) incorporated several items from the Autonomy Support Scale developed by Williams et al. (1996) into the autonomy dimension of their Empowering and Disempowering Motivational Climate Questionnaire. In their study, Appleton and colleagues (2016) reported a positive correlation of .84 between the perceived autonomy-supportive climate and the socially supportive climate, as well as negative correlations of –.48 with ego-involving climate and –.44 with controlling coach behaviors. These findings partially support the results of the present study and provide additional evidence for the strong criterion-related validity of the Perceived Autonomy Support Scale for Coaches.

Reliability

The reliability measures of this study were assessed using Cronbach's Alpha, composite reliability coefficients, and test-retest methods. The lowest Cronbach's Alpha and composite reliability coefficients found in this study were 0.81. This value is above acceptable and indicates satisfactory reliability. The reliability values of this study are also supported by studies conducted in different cultures: in American culture (Williams et al., 1996), .90 in British culture (Adie et al., 2012), .96 in Spanish culture (Balaguer et al., 2009) and .95 in New Zealand culture (Hodge & Lonsdale, 2011). Additionally, the test-retest results in this study yielded values of 0.82 for the long form and 0.71 for the short form. These values exceed the 0.70 threshold suggested in the literature (Alpar, 2006) and are considered sufficient. In conclusion, it can be stated that the Perceived Autonomy Support from Coaches Scale demonstrates adequate reliability.

Limitations

It is important to acknowledge several limitations of this study. The first limitation is related to the age range of participants, which is between 12 and 18 years. Future research could replicate the scale with different age groups, such as 7 to 10 years old. In addition, the test-retest data of this study consists only of female volleyball players, which is a limitation. In further studies, test-retest can be conducted with different genders or sports branches. Another limitation is that the study sample consists of team athletes. Future research could replicate this study with individual athletes to explore potential differences. A further limitation is that this study was conducted using a cross-sectional design. Future studies using longitudinal designs could provide more insights into the dynamics of the scale over time. Lastly, this study measures athletes' perceptions of autonomy support from their coaches. It would be valuable for future studies to examine coaches' perceptions of autonomy support as well. A comparison between coaches' own perceptions and those of athletes could provide a more comprehensive understanding of the subject.

CONCLUSION

In conclusion, the unidimensional Turkish versions of both the 15-item long form and the 6-item short form of the *Scale of Perceived Autonomy Support from Coaches* have demonstrated strong validity and reliability. These findings indicate that the scale is a psychometrically sound instrument for assessing perceived autonomy-supportive behaviors of coaches in

future research. Furthermore, measurement invariance across gender and age groups has been established, supporting its applicability to diverse adolescent populations.

Overall, this scale offers valuable insights for professionals such as sport psychologists, coaches, and sport psychology researchers who work with young athletes. By utilizing this tool, researchers and practitioners can gain a deeper understanding of the coach–athlete interaction, particularly in terms of how coaches support athletes' autonomy. The outcomes related to autonomy support can thus be explored in both practical and empirical contexts, contributing to the enhancement of coaching practices and athlete development.

PRACTICAL IMPLICATIONS

This study provides an important measurement tool for professionals working in the field of sports, such as coaches, sports psychologists, and sports researchers. Furthermore, it makes a significant contribution to examining the impact of coach autonomy behaviors on athletes' development.

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Authors' Contribution

Both authors contributed conception and design of the study; first authors have collected data, both author analyzed, and interpretation of the data; both author contributed to drafting the article, its critical revisions, and reviewing the results, then both of them approved the final version of the manuscript.

Declaration of Conflict Interest

The authors declare that they have no conflict of interest.

Ethics Statement

We confirm that the conduct of the study complied with APA ethical standards and the Declaration of Helsinki. All authors acknowledge their ethical responsibility for the content of the article and accept the consequences of any ethical violations. Ethics committee approval for this study was obtained from Pamukkale University Non-Interventional Clinical Research Ethics Committee (E-60116787-020-521240, dated 02.05.2024).

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