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The Validation of the psychometric properties of the coach behaviour scale (CBS-SA) for saudi athletes

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ABSTRACT

The study aimed to analyse the psychometric properties of the Coach Behaviour Scale (CBS-SA) in Saudi Arabian athletes. The sample consisted of 201 athletes ($M_{age}=19.39$, $SD=2.13$; 135 men and 66 women) who completed the Coach Behaviour Scale in Arabic and an Arabic version of the Coach-Athlete Relationship Questionnaire. Results from the confirmatory factor analysis and exploratory structural equation modelling supported the presence of six factors in the CBS-SA rather than the seven in the original version. However, exploratory structural equation modelling revealed that fifteen items did not reach adequate factor loadings. Consequently, a 33-item, 6-factor version of the questionnaire was identified as a suitable solution based on both confirmatory factor analysis and exploratory structural equation modelling. In conclusion, the CBS-SA demonstrated adequate psychometric properties and can be used as a reliable tool to assess the most common coaching practices in Saudi Arabian athletes.

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The evaluation of coaching practices has become a key topic in sport psychology, given the significant influence that coaches' behaviours can have on athletes' performance and psychological well-being (González et al., 2016; González-García et al., 2022). As a result, several theoretical frameworks have been developed to examine coaching practices from different perspectives (Appleton et al., 2016; Callow et al., 2009; Chelladurai & Saleh, 1980; Conroy & Coastworth, 2007; Jowett & Ntoumanis, 2004). Among these, the coaching behaviour Scale for Sport (CBS-S) is considered one of the most comprehensive instruments for assessing coaching behaviours, as it captures a broad range of factors associated with coaching practices in sport contexts (Côté et al., 1999). Despite its widespread use, no previous research has examined coaching behaviours using this framework among Saudi Arabian athletes (Carlsson & Lundqvist, 2016; Côté et al., 1999; Jain et al., 2018; Jowett et al., 2017; Jurko et al., 2013; Koh et al., 2009; 2014). The absence of validated instruments in this context limits sport psychologists' and sport science professionals' ability to assess coaching practices with reliable, culturally appropriate measures. Therefore, the aim of the present study was to validate an Arabic version of the Coaching Behaviour Scale for Sport (CBS-S), hereafter referred to as the CBS-SA.

The CBS-S was developed by Côté and colleagues (Côté et al., 1999) based on previous qualitative investigations and studies examining coaching behaviour (Bloom et al., 1997; Côté et al., 1999; Sedgwick et al., 1997). The instrument was designed to assess several key dimensions of coaching within a single framework, incorporating aspects that are often overlooked or evaluated separately in other measures. Within this framework, coaching practices are categorised into seven dimensions (Côté et al., 1999): Technical Skills, Competition Strategies, Goal Setting, Physical Training and Planning, Mental Preparation, Personal Rapport, and Negative Personal Rapport.

Physical training and planning refer to the guidance provided by the coach in organizing and supporting the athlete's physical preparation for both training sessions and competitive events. Technical

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skills include instructional behaviours such as cues, demonstrations, and feedback. Mental preparation addresses how coaches support athletes in coping with pressure and maintaining performance in demanding situations. Goal setting reflects the coach's involvement in identifying, developing, and monitoring athletes' performance objectives. Competition strategies describe the interactions between coaches and athletes within the competitive environment. Personal rapport refers to the extent to which coaches demonstrate understanding, accessibility, and closeness toward athletes, whereas negative personal rapport involves the use of adverse interpersonal strategies, such as yelling or intimidation (Côté et al., 1999). By incorporating items representing these dimensions of perceived coaching behaviour, the scale allows for a comprehensive assessment of coaches' practices rather than focusing on isolated behaviours. The development of the CBS-S pursued two main objectives: first, to create a measure that accurately captures athletes' perceptions of coaching behaviours across different sports and competitive levels; and second, to provide coaches and sport administrators with relevant feedback regarding coaching practices identified by athletes and expert coaches as essential components of effective coaching (Mallett & Côté, 2006).

Although the CBS-S has been validated in several countries and cultural contexts (Carlsson & Lundqvist, 2016; Côté et al., 1999; Jain et al., 2018; Jowett et al., 2017; Jurko et al., 2013; Koh et al., 2009, 2014), to date, no study has validated this instrument in the Arabic language. The absence of such tools limits the assessment of coaching practices within the CBS-S framework and restricts researchers' and practitioners' ability to evaluate coaching behaviours comprehensively. Consequently, this gap hinders the development of evidence-based strategies to improve coaching practices. Given the well-established influence of coaches' behaviours on athletes' performance and psychological well-being (González et al., 2016; González et al., 2022), validating the CBS-S in Arabic would provide an important instrument for assessing coaching practices in Middle Eastern sport contexts. Furthermore, research conducted in Arabic-speaking contexts has primarily focused on validating the Coach–Athlete Relationship Questionnaire (CART-Q), including its Arabic version (Ahmad et al., 2021; Jelleli et al., 2023). This situation highlights the need for a broader instrument capable of evaluating coaching behaviours from a more comprehensive perspective. Such a tool would allow researchers and practitioners to examine multiple dimensions of coaching simultaneously, thereby offering a more holistic and parsimonious understanding of coaching practices in sport.

In the present study, the convergent validity of the CBS-S was assessed by examining its associations with the coach–athlete relationship, as measured using the Coach–Athlete Relationship Questionnaire (CART-Q; Jowett & Ntoumanis, 2004), in its Arabic adaptation, validated by Jelleli et al. (2023). The analysis was based on the 3C model, as the CBS-S evaluates coaching behaviours from the athletes' perspective. Within this framework, the coach–athlete relationship is conceptualised through three interrelated components: closeness, commitment, and complementarity (Jowett et al., 2017; Jowett & Ntoumanis, 2004). Closeness represents the emotional quality of the relationship and reflects the feelings coaches and athletes experience and express in their sporting interactions. Commitment refers to the cognitive dimension of the relationship and indicates the extent to which dyad members intend to maintain the relationship over time. Complementarity describes the cooperative nature of coach–athlete interactions, including the reciprocal behaviours, motivations, and resources that contribute to the development of a productive sporting relationship.

Previous research has explored the associations between the CBS-S and the CART-Q (Jowett et al., 2017). Findings from this study indicated that negative personal rapport was significantly and negatively associated with closeness, whereas positive personal rapport was significantly and positively associated with closeness, complementarity, and commitment. Furthermore, the dimensions of closeness and commitment were positively related to several coaching behaviour domains, including physical training and planning, technical skills, mental preparation, goal setting, and competition strategies.

The novelty of the present study lies in the validation of an Arabic version of the CBS-S for Saudi Arabian athletes, providing a reliable tool for assessing a broad range of coaching behaviours. This instrument may offer valuable information for coaches, practitioners, and sport psychologists to design intervention programs aimed at improving coaching practices and, consequently, enhancing athletes' performance and well-being. Therefore, the purpose of this study was to examine the psychometric

properties of the Arabic version of the Coach behaviour Scale for Sport (CBS-SA) in a sample of Saudi Arabian athletes.

Method

Participants

A sample of 201 Saudi Arabian athletes ($Mage=19.39$; $SD=2.13$; 135 men and 66 women) participated in the study. Participants reported practicing a range of sports disciplines, with several indicating participation in more than one activity. The most frequently practised sports were basketball ($n=60$), football/soccer ($n=58$), and table tennis ($n=47$). Other reported activities included weightlifting ($n=27$), swimming ($n=13$), tennis ($n=12$), badminton ($n=11$), and volleyball ($n=7$). A smaller number of participants reported involvement in gym-based training ($n=3$), as well as running ($n=1$), horse riding ($n=1$), CrossFit ($n=1$), padel ($n=1$), sprinting ($n=1$) and clay shooting ($n=1$).

Instruments

The Coaching behaviour Scale for Sport (CBS-S; Côté et al., 1999), adapted into Arabic (Appendix I), was used to assess athletes' perceptions of their coach's behaviours. The translation into Arabic was conducted by the Translation & Authoring Centre (TAC) at Prince Sultan University, a professional centre specialized in academic, technical, legal, and administrative translation. First, the instrument was translated into Arabic, and subsequently, a second group of translators evaluated the equivalence between the translated and original versions. The scale consists of seven dimensions of coaching behaviour. For Physical Training and Planning (7 items; e.g., "provides me with a plan for my physical preparation"), the 47-item version showed $\alpha = 0.88$ and $\Omega = 0.88$, while the 33-item version showed $\alpha = 0.88$ and $\Omega = 0.89$. Technical Skills (8 items; e.g., "gives me reinforcement about correct technique") had $\alpha = 0.97$ and $\Omega = 0.97$ for both the 47- and 33-item versions. Goal Setting (6 items; e.g., "helps me set long-term goals") presented $\alpha = 0.94$ and $\Omega = 0.94$ for both versions. Mental Preparation (5 items; e.g., "provides advice on how to perform under pressure") also showed $\alpha = 0.94$ and $\Omega = 0.94$ only in the 47-items version. Competition Strategies (7 items; e.g., "keeps me focused on competitions") had $\alpha = 0.97$ and $\Omega = 0.97$ in both versions. Personal Rapport (6 items; e.g., "is a good listener") showed $\alpha = 0.93$ and $\Omega = 0.93$ for both versions. Finally, Negative Personal Rapport (8 items; e.g., "intimidates me physically") had $\alpha = 0.97$ and $\Omega = 0.97$ in the 47-item version, and $\alpha = 0.97$ and $\Omega = 0.90$ in the 33-item version.

An Arabic version of the CART-Q (Jelleli et al., 2023) was employed to evaluate athletes' perceptions of their coach. The instrument includes 11 items organized into three subscales: Closeness (3 items; e.g., "I like my coach"; $\alpha = 0.92$ and $\Omega = 0.92$), Commitment (3 items; e.g., "I am committed to my coach"; $\alpha = 0.92$ and $\Omega = 0.92$), and Complementarity (3 items; e.g., "When I am coached by my coach, I am responsive to his/her efforts"; $\alpha = 0.95$ and $\Omega = 0.95$). Participants responded to the items using a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Procedure

The study followed international ethical standards and ensured the anonymity of all participants. Ethical approval was granted by the Institutional Review Board (IRB) of Prince Sultan University on November 8, 2025, under the reference code PSU IRB-2025-11-0264. Prior to participation, all subjects (all aged 18 or older) provided written informed consent. Initially, coaches and athletes were contacted in person and informed about the objectives, procedures, and study characteristics. After obtaining their agreement to participate, the questionnaire was administered online, and completing the final survey required approximately 30 minutes. The survey was distributed during training sessions and university classes through a direct link to the questionnaire between November 12 and December 31, 2025. Members of the research team were present during the data collection process to ensure that the sampling procedure was carried out with maximum rigour.

Data analyses

Statistical analyses were performed using Mplus version 7.3 (Muthén & Muthén, 2019). Following the analytical framework suggested by Marsh et al. (2009), the factorial structure of the CBS-S was first examined by comparing three competing models: exploratory structural equation modelling (ESEM), confirmatory factor analysis (CFA), and a bifactor model. In the ESEM model, item loadings on their hypothesized factors were estimated simultaneously with all potential cross-loadings, which were freely estimated but expected to remain minimal. In contrast, the CFA model tested a hierarchical five-factor structure in which: (1) each item loaded only on its designated first-order factor, (2) cross-loadings were constrained to zero, and (3) the first-order factors were specified to load onto a higher-order general factor. In the bifactor model, each item was allowed to load concurrently on a general CBS-S factor and on its corresponding specific factor representing each CBS-S dimension.

Model adequacy was evaluated using several goodness-of-fit indices, including the chi-square statistic (χ^2), the comparative fit index (CFI), the root mean square error of approximation (RMSEA) with its confidence intervals, the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the sample-size adjusted BIC. CFI values above .90 were interpreted as indicating acceptable model fit, whereas values above 0.95 indicated excellent fit. For RMSEA, values below 0.08 were considered indicative of reasonable fit, and values below .06 were considered indicative of very good fit (Hu & Bentler, 1999).

Finally, the reliability of CBS-S scores was assessed using Cronbach's alpha, average variance extracted (AVE), and composite reliability (ρ). AVE was calculated as $[(\text{sum of standardised loadings})^2 / ((\text{sum of standardised loadings})^2 + (\text{sum of indicator measurement errors}))]$ and represents the proportion of variance explained by measurement error relative to variance attributable to latent constructs. AVE values of 0.50 or higher indicate satisfactory reliability, as construct variance exceeds error variance. Composite reliability ($\rho = [(\text{sum of standardised loadings})^2 / ((\text{sum of standardised loadings})^2 + (\text{sum of error variances}))]$) reflects the overall reliability of a set of related but distinct indicators, with values of 0.70 or higher considered acceptable. Fourth, to assess the external validity of the CBS-S scores, a correlational analysis was conducted between the CBS-S scores and ACART-Q.

Results

Factorial structure of CBS-S scores

Confirmatory factor analysis (CFA)

First, a confirmatory factor analysis (CFA) was conducted to evaluate the factorial structure of the Arabic version of the 47-item CBS-S (Table 1). The chi-square test was significant ($\chi^2(1081) = 9785.115, p < 0.001$), which is expected in large samples. Incremental fit indices were at the lower bound of conventional acceptability, with CFI = 0.905 and TLI = 0.898, suggesting that the model captures the overall structure of the data moderately well but may not fully account for item-level relationships. Absolute fit indices were more favourable, with RMSEA = 0.064 (90% CI [0.059, 0.068]) and SRMR = 0.045, indicating relatively

Table 1. Results of the models of confirmatory factor analysis and Exploratory Structural Equation Modelling.

Model	χ^2	p	df	CFI	TLI	AIC	BIC	ABIC	RMSEA	90% CI rMSEA	SRMR
CFA - 47 Item	9785.115	< .001	1081	0.905	0.898	27020.368	27555.504	27042.236	0.064	[0.059, 0.068]	0.045
ESEM - 47 Item	1.464.070	<0.001	773	0.921	0.889	26.736.826	28.064.754	26.791.157	0.067	[0.061, 0.072]	0.015
CFA - 33 Item	832.223	<0.001	480	0.938	0.932	19.289.883	19.666.460	19.305.290	0.06	[0.053, 0.067]	0.04
ESEM - 33 Item	642.358	<0.001	345	0.948	0.921	19.246.671	20.069.194	19.280.324	0.065	[0.058, 0.073]	0.013
Bifactor - 33 Item	803.929	<0.001	462	0.940	0.932	19.247.749	19.683.786	19.265.589	0.061	[0.054, 0.068]	0.046

small residuals. Information criteria were $AIC = 27020.368$, $BIC = 27555.504$, and sample-size adjusted $BIC = 27042.236$.

Therefore, the modest CFI and TLI values suggest that some items may not optimally reflect their intended constructs. To further investigate the factorial structure and the potential influence of cross-loadings, an Exploratory Structural Equation Modelling (ESEM) was conducted. This approach will allow for a more flexible examination of item-factor relationships and will help identify items that could be refined or removed to improve overall model fit while preserving the theoretical integrity of the instrument.

Exploratory structural equation modelling (ESEM)

After checking that the model did not fit well in the CFA, there might have been cross-loadings across the items of several coach behaviour dimensions. As such, an ESEM analysis was performed (Table 2). The ESEM results indicated an acceptable fit with $CFI = 0.921$. However, $TLI = 0.889$ indicated a poor fit for internal consistency. The RMSEA was 0.067 (90% CI: [0.061, 0.072]), and the SRMR was 0.015, both suggesting reasonable model fit. The information criteria were $AIC = 26736.826$, $BIC = 28064.754$, and sample-size adjusted $BIC = 26791.157$ (Table 1).

Most items showed higher loadings on their target factor than on non-target factors, supporting discriminant validity (Table 2). However, some items displayed moderate cross-loadings (i.e., secondary loadings ≥ 0.30 on non-target factors). Therefore, several items from the original 47-item version of the CBS-S Arabic scale were removed to improve the clarity and discriminant validity of the instrument. Specifically, the following items were excluded: PEF (C4, C5, C6), MEN (C16, C17, C18, C19, C20, C21), GOAL (C25, C26), COMP (C34, C35), and RAPOS (C39), resulting in a final 33-item version of the instrument and 6 factors. The remaining items more clearly represent their respective constructs, providing a more parsimonious and robust structure for subsequent analyses, including Exploratory Structural Equation Modelling (ESEM).

Final structure

A confirmatory factor analysis was conducted using the final 33-item version of the CBS-S Arabic scale (Table 3). The model included the following factors and items: PEF (C1, C2, C3, C7), TECSK (C8–C15), GOAL (C22–C24), COMP (C27–C33), RAPOS (C36–C38), and RAPNEG (C40–C47). The model showed a significant chi-square value ($\chi^2(480) = 832.223$, $p < 0.001$), which is expected in large samples. Overall, the goodness-of-fit indices indicated an acceptable model fit (Table 1), with $CFI = 0.938$ and $TLI = 0.932$. Absolute fit indices were also satisfactory, with $RMSEA = 0.060$ (90% CI [0.053, 0.067]) and $SRMR = 0.040$. Information criteria values were $AIC = 19289.883$, $BIC = 19666.460$, and sample-size adjusted $BIC = 19305.290$.

To further examine the factorial structure and allow for potential cross-loadings between items and factors, an Exploratory Structural Equation Modelling (ESEM) analysis was conducted using the same 33 items (Table 3). The ESEM model also demonstrated good fit to the data ($\chi^2(345) = 642.358$, $p < 0.001$), with $CFI = 0.948$ and $TLI = 0.921$. The RMSEA was 0.065 (90% CI [0.058, 0.073]), and the SRMR was 0.013, indicating very small residuals. Information criteria were $AIC = 19246.671$, $BIC = 20,069.194$, and sample-size adjusted $BIC = 19280.324$. The remaining 33 items demonstrated stronger associations with their intended factors, resulting in a more parsimonious and theoretically coherent measurement structure (Table 3).

Bifactor analysis

To further examine the instrument's dimensionality, a bifactor model was estimated, including a general factor and six specific factors corresponding to the scale's theoretical dimensions (Table 4). The model showed an acceptable fit to the data: $\chi^2(462) = 803.929$, $p < 0.001$, $CFI = 0.940$, $TLI = 0.932$, $RMSEA = 0.061$ (90% CI [0.054, 0.068]), and $SRMR = 0.046$. Information criteria were $AIC = 19247.749$, $BIC = 19683.786$, and sample-size adjusted $BIC = 19265.589$ (Table 1). The standardised loadings indicated that most items loaded strongly on the general factor, with coefficients ranging from 0.64 to 0.90, suggesting a substantial common dimension underlying the scale (Table 4). In contrast, the loadings on the specific

Table 2. Standardised factor loadings for confirmatory factor analysis and exploratory structural equation modelling (ESEM) for the CBS-S Arabic Validation.

			Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7			Composite	
Items	λ	δ	(λ)	(λ)	(λ)	(λ)	(λ)	(λ)	(λ)	δ	AVE	reliability	
												value	
PEF												0.70	0.94
Item 1	0.825	0.319	0.654	0.387	0.132	0.169	0.254	0.108	0.078	0.295			
Item 2	0.777	0.396	0.657	0.364	0.076	0.162	0.167	0.136	0.181	0.325			
Item 3	0.832	0.307	0.677	0.328	0.135	0.299	0.166	0.231	0.121	0.230			
Item 4	0.921	0.151	0.653	0.409	0.189	0.254	0.351	0.135	0.094	0.155			
Item 5	0.890	0.208	0.565	0.479	0.165	0.187	0.417	0.125	0.022	0.199			
Item 6	0.896	0.198	0.576	0.517	0.197	0.198	0.343	0.059	0.08	0.195			
Item 7	0.717	0.485	0.537	0.242	0.185	0.257	0.193	0.260	0.166	0.420			
TECSK												0.84	0.97
Item 1	0.868	0.246	0.346	0.669	0.179	0.25	0.252	0.185	0.064	0.236			
Item 2	0.91	0.172	0.251	0.763	0.052	0.209	0.393	0.127	0.101	0.127			
Item 3	0.926	0.142	0.27	0.72	0.24	0.293	0.264	0.248	0.089	0.127			
Item 4	0.942	0.113	0.259	0.796	0.095	0.242	0.323	0.177	0.05	0.094			
Item 5	0.891	0.206	0.303	0.697	0.209	0.23	0.229	0.263	0.058	0.201			
Item 6	0.901	0.188	0.303	0.723	0.228	0.116	0.297	0.229	0.086	0.171			
Item 7	0.959	0.081	0.284	0.78	0.23	0.236	0.303	0.171	0.037	0.080			
Item 8	0.935	0.125	0.276	0.739	0.275	0.222	0.331	0.154	0.056	0.116			
GOAL												0.85	0.96
Item 1	0.919	0.156	0.309	0.394	0.488	0.385	0.413	0.159	0.107	0.156			
Item 2	0.917	0.159	0.239	0.388	0.554	0.332	0.416	0.147	0.126	0.164			
Item 3	0.953	0.092	0.257	0.458	0.598	0.282	0.417	0.205	0.125	0.055			
Item 4	0.921	0.151	0.254	0.403	0.488	0.267	0.495	0.175	0.132	0.170			
Item 5	0.908	0.175	0.225	0.529	0.422	0.189	0.53	0.149	0.127	0.136			
MEN												0.82	0.96
Item 1	0.895	0.199	0.264	0.392	0.191	0.561	0.438	0.193	0.082	0.190			
Item 2	0.907	0.177	0.291	0.489	0.248	0.551	0.307	0.213	0.059	0.167			
Item 3	0.894	0.201	0.304	0.363	0.294	0.599	0.282	0.257	0.125	0.169			
Item 4	0.922	0.151	0.283	0.324	0.268	0.623	0.387	0.257	0.13	0.123			
Item 5	0.914	0.165	0.302	0.368	0.118	0.579	0.442	0.277	0.107	0.140			
Item 6	0.913	0.166	0.232	0.456	0.217	0.44	0.501	0.306	0.072	0.148			
COMP												0.88	0.97
Item 1	0.906	0.179	0.188	0.508	0.154	0.38	0.574	0.265	0.091	0.130			
Item 2	0.938	0.121	0.232	0.402	0.259	0.296	0.674	0.191	0.118	0.126			
Item 3	0.955	0.087	0.236	0.36	0.207	0.239	0.763	0.223	0.137	0.063			
Item 4	0.932	0.131	0.242	0.305	0.278	0.295	0.7	0.224	0.158	0.119			
Item 5	0.939	0.119	0.254	0.344	0.22	0.233	0.729	0.242	0.154	0.102			
Item 6	0.923	0.147	0.272	0.296	0.292	0.239	0.69	0.272	0.085	0.139			
Item 7	0.931	0.132	0.273	0.426	0.273	0.258	0.621	0.268	0.107	0.134			
RAPOS												0.83	0.94
Item 1	0.85	0.277	0.26	0.521	0.2	0.34	0.364	0.335	0.056	0.257			
Item 2	0.848	0.281	0.219	0.508	0.084	0.388	0.351	0.366	0.117	0.265			
Item 3	0.858	0.263	0.233	0.32	0.142	0.262	0.328	0.619	0.223	0.214			
Item 4	0.828	0.314	0.21	0.271	0.141	0.163	0.333	0.705	0.264	0.158			
Item 5	0.875	0.234	0.165	0.307	0.155	0.234	0.412	0.64	0.241	0.162			
Item 6	0.869	0.244	0.193	0.437	0.105	0.351	0.428	0.435	0.124	0.249			
RAPNEG													
Item 1	0.86	0.261	0.084	0.079	0.111	0.064	0.02	0.185	0.838	0.233	0.81	0.97	
Item 2	0.92	0.153	0.061	0.010	0.057	−0.043	0.095	0.115	0.91	0.141			
Item 3	0.938	0.12	0.05	0.052	−0.027	−0.026	0.102	0.015	0.937	0.105			
Item 4	0.842	0.29	0.063	0.107	−0.023	0.107	0.102	0.126	0.822	0.270			
Item 5	0.967	0.064	0.048	0.029	0.048	0.053	0.104	0.088	0.954	0.063			
Item 6	0.972	0.054	0.077	0.045	0.068	0.042	0.066	0.057	0.962	0.053			
Item 7	0.975	0.05	0.054	0.067	0.035	0.028	0.085	0.046	0.966	0.048			
Item 8	0.848	0.28	0.076	0.069	0.083	0.16	0.069	0.041	0.831	0.260			

Note. In bold are the values corresponding to their related factor. PEF=Physical Training and Planning; TECSK=Technical Skills; MEN=Mental Preparation; GOAL=Goal Setting; COMP=Competition Strategies; RAPOS=Personal Rapport; RAPNEG=Negative Personal Rapport.

factors were generally smaller, particularly for the GOAL and COMP factors, indicating that a considerable proportion of the variance in item responses is explained by the general factor. However, the RAPNEG factor showed strong specific loadings (approximately 0.79–0.94), suggesting that this dimension retains substantial unique variance beyond the general factor.

Reliability of CBS-S scores

The CBS-SA showed strong internal consistency. Cronbach's alpha coefficients ranged from 0.88 to 0.97, while McDonald's omega values ranged from 0.89 to 0.97, indicating high reliability across all

Table 3. Standardised factor loadings for Confirmatory Factor Analysis (CFA) and Exploratory Structural Equation Modelling (ESEM) for the 33-item CBS-S Arabic validation.

Items	λ	δ	Factor 1 (λ)	Factor 2 (λ)	Factor 3 (λ)	Factor 4 (λ)	Factor 5 (λ)	Factor 6 (λ)	δ	AVE	Composite reliability value
PEF										0.64	0.89
Item 1	0.811	0.342	0.542	0.495	0.084	0.352	0.033	0.085	0.322		
Item 2	0.823	0.323	0.629	0.458	0.09	0.256	0.05	0.186	0.284		
Item 3	0.901	0.188	0.665	0.454	0.196	0.293	0.159	0.127	0.185		
Item 4	0.752	0.434	0.49	0.359	0.191	0.315	0.219	0.173	0.418		
TECSK										0.84	0.97
Item 1	0.868	0.247	0.216	0.742	0.175	0.339	0.103	0.074	0.241		
Item 2	0.912	0.168	0.13	0.801	0.039	0.419	0.062	0.106	0.150		
Item 3	0.925	0.144	0.165	0.795	0.207	0.36	0.164	0.099	0.132		
Item 4	0.943	0.11	0.145	0.848	0.081	0.371	0.099	0.057	0.103		
Item 5	0.89	0.208	0.174	0.78	0.161	0.32	0.171	0.069	0.200		
Item 6	0.9	0.189	0.162	0.793	0.047	0.372	0.137	0.097	0.177		
Item 7	0.959	0.081	0.143	0.85	0.158	0.385	0.071	0.047	0.077		
Item 8	0.934	0.128	0.163	0.805	0.116	0.418	0.066	0.067	0.129		
GOAL										0.84	0.94
Item 1	0.899	0.192	0.186	0.593	0.451	0.45	0.142	0.071	0.183		
Item 2	0.923	0.147	0.228	0.475	0.596	0.446	0.174	0.138	0.118		
Item 3	0.931	0.133	0.201	0.44	0.531	0.553	0.17	0.142	0.129		
COMP										0.88	0.97
Item 1	0.907	0.177	0.087	0.576	0.214	0.656	0.17	0.1	0.145		
Item 2	0.939	0.119	0.097	0.473	0.181	0.768	0.099	0.128	0.117		
Item 3	0.957	0.084	0.124	0.424	0.082	0.83	0.144	0.145	0.067		
Item 4	0.931	0.134	0.132	0.381	0.184	0.794	0.147	0.168	0.124		
Item 5	0.94	0.116	0.141	0.415	0.08	0.805	0.167	0.162	0.099		
Item 6	0.921	0.152	0.171	0.379	0.125	0.793	0.174	0.095	0.143		
Item 7	0.929	0.136	0.157	0.505	0.146	0.722	0.161	0.118	0.138		
RAPOS										0.79	0.93
Item 1	0.896	0.198	0.18	0.411	0.183	0.432	0.559	0.232	0.212		
Item 2	0.908	0.175	0.165	0.358	0.103	0.419	0.675	0.272	0.128		
Item 3	0.911	0.17	0.09	0.394	0.153	0.506	0.568	0.252	0.172		
RAPNEG										0.81	0.97
Item 1	0.86	0.261	0.045	0.112	0.087	0.066	0.16	0.843	0.237		
Item 2	0.92	0.153	0.032	0.012	-0.038	0.106	0.094	0.912	0.145		
Item 3	0.938	0.121	0.025	0.046	-0.065	0.087	-0.001	0.936	0.108		
Item 4	0.843	0.29	0.062	0.118	0.063	0.11	0.1	0.823	0.279		
Item 5	0.967	0.064	0.042	0.04	0.025	0.123	0.071	0.955	0.063		
Item 6	0.972	0.054	0.072	0.059	0.023	0.089	0.035	0.964	0.053		
Item 7	0.975	0.05	0.038	0.074	-0.004	0.092	0.035	0.967	0.048		
Item 8	0.848	0.28	0.054	0.096	0.141	0.111	0.022	0.833	0.260		

Notes. In bold are the values corresponding to their related factor. PEF=Physical Training and Planning; TECSK=Technical Skills; MEN=Mental Preparation; GOAL=Goal Setting; COMP=Competition Strategies; RAPOS=Personal Rapport; RAPNEG=Negative Personal Rapport.

factors. Convergent validity and internal consistency were further examined through the Average Variance Extracted (AVE) and Composite Reliability (CR) indices. As shown in Table 3, all factors demonstrated satisfactory composite reliability, with CR values ranging from 0.89 to 0.97, exceeding the recommended threshold of 0.70, indicating high internal consistency of the latent constructs. Regarding convergent validity, the AVEs ranged from 0.64 to 0.88 across the factors, all exceeding the recommended minimum of 0.50. These results indicate that the constructs explain a substantial proportion of the variance in their respective indicators, supporting adequate convergent validity of the measurement model.

Correlational analyses

Pearson correlation analyses were conducted to examine the relationships between the CBS-S dimensions and the variables derived from the coach-athlete relationship model (Table 5). As shown in Table 5, all dimensions of the CBS-S were positively and significantly correlated with each other ($r=0.21-0.83$, $p<0.01$). The strongest associations were observed between Technical Skills, Goal Setting, and Competition Strategies ($r=0.81-0.83$, $p<0.01$). Positive coaching behaviours, particularly Competition Strategies and Personal Rapport, also showed strong positive correlations with the coach-athlete relationship variables, including Commitment ($r=0.77$ and $r=0.75$, respectively), Closeness ($r=0.71$ and $r=0.64$, respectively),

Table 4. Standardised factor loadings for bifactor analysis for the 33-item CBS-S Arabic validation.

	Factor GEN	Factor 1 (λ)	Factor 2 (λ)	Factor 3 (λ)	Factor 4 (λ)	Factor 5 (λ)	Factor 6 (λ)	δ
PEF								
Item 1	0.698	0.399						0.354
Item 2	0.644	0.517						0.318
Item 3	0.725	0.561						0.159
Item 4	0.645	0.371						0.446
TECSK								
Item 1	0.807		0.317					0.248
Item 2	0.814		0.424					0.157
Item 3	0.875		0.312					0.138
Item 4	0.831		0.464					0.093
Item 5	0.824		0.33					0.212
Item 6	0.828		0.347					0.194
Item 7	0.871		0.394					0.086
Item 8	0.846		0.396					0.127
GOAL								
Item 1	0.875			0.203				0.193
Item 2	0.844			0.454				0.082
Item 3	0.862			0.32				0.154
COMP								
Item 1	0.9				0.202			0.149
Item 2	0.869				0.351			0.122
Item 3	0.841				0.476			0.066
Item 4	0.836				0.412			0.132
Item 5	0.828				0.459			0.103
Item 6	0.822				0.417			0.151
Item 7	0.881				0.3			0.133
RAPOS								
Item 1	0.771					0.446		0.207
Item 2	0.718					0.609		0.113
Item 3	0.773					0.455		0.196
RAPNEG								
Item 1	0.314						0.805	0.254
Item 2	0.215						0.895	0.152
Item 3	0.2						0.919	0.116
Item 4	0.311						0.788	0.283
Item 5	0.269						0.929	0.065
Item 6	0.261						0.937	0.054
Item 7	0.254						0.941	0.050
Item 8	0.315						0.793	0.273

Notes. In bold are the values corresponding to their related factor. GEN: General factor; PEF: Physical Training and Planning; TECSK: Technical Skills; MEN: Mental Preparation; GOAL: Goal Setting; COMP: Competition Strategies; RAPOS: Personal Rapport; RAPNEG: Negative Personal Rapport.

Table 5. Correlation among the study variables to test the external validity of CBS-SA 33-item.

Variable	1	2	3	4	5	6	7	8	9	10
1. Physical Training and Planning	—									
2. Technical Skills	0.75**	—								
3. Goal Setting	0.73**	0.81**	—							
4. Competition Strategies	0.69**	0.82**	0.83**	—						
5. Personal Rapport	0.64**	0.70**	0.73**	0.78**	—					
6. Negative Personal Rapport	0.28**	0.21**	0.26**	0.28**	0.40**	—				
7. Commitment	0.62**	0.70**	0.68**	0.77**	0.75**	0.37**	—			
8. Closeness	0.64**	0.75**	0.67**	0.71**	0.64**	0.22**	0.79**	—		
9. Complementarity	0.66**	0.78**	0.74**	0.76**	0.67**	0.21**	0.77**	0.86**	—	
10. Coach-Athlete Relationship General Factor	0.69**	0.81**	0.76**	0.81**	0.74**	0.28**	0.91**	0.93**	0.95**	—

and Complementarity ($r=0.76$ and $r=0.67$, respectively), all $p<0.01$. In contrast, Negative Personal Rapport showed weaker but still significant positive correlations with the other variables ($r=0.21$ – 0.40 , $p<0.01$). Additionally, the general factor demonstrated strong associations with the coach–athlete relationship dimensions, particularly Complementarity ($r=0.95$), Closeness ($r=0.93$), and Commitment ($r=0.91$), supporting the convergent validity of the scale.

Discussion

The present study aimed to analyse the psychometric properties of the Coaching behaviour Scale for Sport (CBS-S) in a sample of Arabic-speaking athletes. The results provided evidence of the instrument's factorial validity, reliability, and convergent validity. Overall, the analyses indicated that the Arabic version of the CBS-S demonstrates an adequate factorial structure and satisfactory psychometric properties for assessing athletes' perceptions of coaching behaviours. Regarding the factorial structure, the initial confirmatory factor analysis (CFA) conducted on the original 47-item version showed acceptable but not optimal model fit, as the Tucker–Lewis Index (TLI) did not meet the recommended threshold. These findings suggested that some items did not adequately represent their intended constructs. Consequently, an Exploratory Structural Equation Modelling (ESEM) approach was applied to account for potential cross-loadings between items and factors. The ESEM model produced results similar to those of the CFA, but the TLI still failed to meet acceptable cut-off values. In addition, several items displayed substantial cross-loadings across factors rather than loading clearly on their intended first-order factor. During the scale refinement process, items presenting high cross-loadings or insufficient factor loadings were removed. This procedure resulted in a final 33-item version of the scale and the elimination of the mental preparation factor, as its items showed considerable overlap with the competition strategies and technical skills dimensions. Subsequent CFA and ESEM analyses conducted on the refined 33-item, six-factor model demonstrated improved goodness-of-fit indices, supporting a more parsimonious and psychometrically robust measurement model.

The absence of the mental preparation factor may be explained by the psychometric performance of its items, which did not demonstrate adequate discriminant validity within the proposed factorial structure. The result may be explained by the fact that, in many sporting contexts, behaviours related to motivation, emotional support, or confidence-building may be interpreted as part of broader coaching practices, such as interpersonal support or competition strategies. Consequently, athletes may perceive mental preparation as embedded within other coaching behaviours rather than as an independent dimension. Similar variations in the factorial structure of the CBS-S have been reported in previous validation studies in other contexts. For example, Carlsson and Lundqvist (2016) identified items with insufficient factor loadings in the Swedish adaptation, while Koh et al. (2014) reported substantial correlations between several coaching behaviour dimensions when examining the scale among Singaporean athletes. These findings suggest that some aspects of coaching behaviour, particularly those related to psychological support, may overlap with other coaching domains depending on the cultural and sporting context.

Results from the bifactor analysis conducted with the 33-item version provided further insight into the instrument's dimensionality. The findings indicated that most items loaded strongly on a general factor, suggesting the presence of an overarching dimension reflecting athletes' global perceptions of coaching behaviour. At the same time, several specific factors retained meaningful variance beyond the general factor, particularly the Negative Personal Rapport dimension. This pattern suggests that, although athletes tend to evaluate coaching behaviours globally, certain domains capture unique aspects of the coach–athlete interaction. In particular, the Negative Personal Rapport dimension appears to represent a distinct component of coaching behaviour, reflecting athletes' sensitivity to adverse interpersonal coaching practices. The presence of a strong general factor is consistent with previous research suggesting that athletes often perceive coaching behaviours as interrelated aspects of the overall coaching experience rather than as completely independent dimensions. Supporting this interpretation, previous validation studies of the Coaching Behaviour Scale for Sport (CBS-S) have reported substantial correlations between coaching behaviour domains (e.g., Carlsson & Lundqvist, 2016; Koh et al., 2014).

The reliability analyses also supported the instrument's adequacy. All factors demonstrated satisfactory levels of internal consistency, with both Cronbach's alpha and McDonald's omega coefficients exceeding recommended thresholds. Furthermore, the composite reliability and average variance extracted (AVE) values provided additional evidence of construct reliability and convergent validity, indicating that the latent factors account for a substantial proportion of the variance in their respective indicators. These findings are consistent with previous validations of the Coaching Behaviour Scale for Sport (CBS-S) conducted in different cultural contexts (Carlsson & Lundqvist, 2016; Côté et al., 1999; Jain et al., 2018; Jowett et al., 2017; Jurko et al., 2013; Koh et al., 2009, 2014).

Regarding the correlational analyses, most CBS-S dimensions showed significant positive associations with the components of the coach–athlete relationship model, including commitment, closeness, and complementarity. These results align with theoretical expectations, as positive coaching behaviours are proposed to enhance both strategic and relational aspects of the coach–athlete interaction. Notably, competition strategies and personal rapport exhibited the strongest associations with relationship quality variables, emphasising the dual importance of tactical guidance and interpersonal support in effective coaching. The Negative Personal Rapport dimension, however, showed comparatively weaker correlations with the relationship variables. This pattern may reflect that negative personal rapport represents a qualitatively distinct aspect of coaching that is not directly captured by measures of closeness, commitment, or complementarity. In other words, while positive behaviours actively strengthen the relationship, negative behaviours may operate through different mechanisms, such as undermining motivation or athlete well-being, which are not fully represented by the traditional coach–athlete relationship scales. This interpretation is consistent with prior studies suggesting that detrimental coaching behaviours may exert unique influences that are only partially reflected in relationship quality measures (Carlsson & Lundqvist, 2016; Koh et al., 2014).

As a limitation, the present study relied on self-report measures, which may introduce potential biases such as social desirability, acquiescence, or common method variance. Additionally, the cross-sectional design of the study does not allow conclusions about the temporal stability of the construct or the causal relationships between coaching behaviours and other psychological variables. Future studies should therefore consider longitudinal designs to further examine the stability and predictive validity of the CBS-SA over time. Another limitation concerns the sample, which was restricted to Saudi Arabian athletes. Although this provides valuable information for this specific cultural context, the generalizability of the findings to other Arabic-speaking populations may be limited. It would therefore be advisable for future research to replicate these analyses in other Arabic-speaking countries to further examine the robustness and cross-cultural stability of the CBS-SA's factorial structure. Furthermore, coaching behaviours were assessed exclusively from the athletes' perspective. Although athletes' perceptions are highly relevant for understanding coaching practices, incorporating multiple informants (e.g., coaches, observers, or sport administrators) would provide a more comprehensive assessment of coaching behaviours and reduce potential perceptual biases. Finally, future research could also explore the relationships between the CBS-SA and additional psychological constructs (e.g., motivation, athlete well-being, or performance outcomes) to further establish the nomological network and criterion validity of the instrument.

From an applied perspective, the Arabic version of the CBS-S provides researchers, sport psychologists, and practitioners with a reliable and culturally appropriate instrument for assessing coaching behaviours from athletes' perspectives. This tool enables sport organisations and coaches to gain systematic feedback on how coaching practices are perceived by athletes, facilitating the identification of both effective behaviours and areas requiring improvement. In this sense, the CBS-SA may serve as a valuable diagnostic resource to guide evidence-based interventions aimed at enhancing coaching effectiveness and supporting athletes' development and well-being. Furthermore, the availability of a validated Arabic instrument to assess coaching behaviours offers important opportunities for the development and evaluation of coach education and professional development programs in Arabic-speaking sport contexts. By providing objective indicators of coaching practices, the CBS-SA may assist sport federations, clubs, and training institutions in monitoring coaching quality and evaluating the effectiveness of educational initiatives aimed at improving coaches' interpersonal, instructional, and motivational competencies. Finally, the use of validated instruments to assess coaching practices promotes a more reflective and accountable coaching culture within the sport community. By increasing awareness of both constructive coaching strategies and potentially detrimental behaviours, such tools may help foster healthier coach–athlete relationships and more supportive sport environments that ultimately enhance athletes' performance, motivation, and psychological well-being.

Conclusion

The present study provides compelling evidence that the 33-item, six-factor Arabic version of the CBS-S (CBS-SA) constitutes a valid, reliable, and culturally appropriate instrument for assessing coaching

behaviours in Arabic-speaking sport contexts. The scale preserves the theoretical foundations of the original instrument while adopting a more parsimonious structure, facilitating its use in both applied and research settings. Psychometric analyses demonstrated excellent goodness-of-fit indices, supporting the instrument's robustness and stability. The findings were largely consistent with the original framework and closely aligned with international adaptations conducted across diverse cultural contexts, although the Mental Preparation dimension did not emerge as a distinct factor (Carlsson & Lundqvist, 2016; Jain et al., 2018; Jowett et al., 2017; Jurko et al., 2013; Koh et al., 2009, 2014). These results underscore the CBS-SA as a powerful tool for systematically evaluating coaching practices, offering researchers, sport psychologists, and practitioners a comprehensive framework for understanding, monitoring, and enhancing coaching behaviours. By providing a reliable, culturally sensitive measure, the CBS-SA significantly advances evidence-based coaching interventions and promotes optimal athlete development in Arabic-speaking sporting environments.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, P. Prieto-González, upon reasonable request.

References

- Ahmad, H., Ada, E. N., Jowett, S., Alabduljader, K., & Kazak, Z. (2021). (1998). The Validation of Direct and Meta Versions of the Coach–Athlete Relationship Questionnaire (ArCART-Q) in the Arabic Language: Their relationship to athlete's satisfaction with individual performance. *International Journal of Environmental Research and Public Health*, 18(4), 1998. <https://doi.org/10.3390/ijerph18041998>

- Appleton, P. R., Ntoumanis, N., Quested, E., Viladrich, C., & Duda, J. L. (2016). Initial validation of the coach-created Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ-C). *Psychology of Sport and Exercise*, 22, 53–65. <https://doi.org/10.1016/j.psychsport.2015.05.008>
- Bloom, G. A., Durand-Bush, N., & Salmela, J. H. (1997). Pre-and postcompetition routines of expert coaches of team sports. *The Sport Psychologist*, 11(2), 127–141. <https://doi.org/10.1123/tsp.11.2.127>
- Callow, N., Smith, M. J., Hardy, L., Arthur, C. A., & Hardy, J. (2009). Measurement of transformational leadership and its relationship with team cohesion and performance level. *Journal of Applied Sport Psychology*, 21(4), 395–412. <https://doi.org/10.1080/10413200903204754>
- Carlsson, A., & Lundqvist, C. (2016). The Coaching Behaviour Scale for Sport (CBS-S): A psychometric evaluation of the Swedish version. *Scandinavian Journal of Medicine & Science in Sports*, 26(1), 116–123. <https://doi.org/10.1111/sms.12359>
- Chelladurai, P., & Saleh, S. D. (1980). Dimensions of leader behaviour in sports: Development of a leadership scale. *Journal of Sport Psychology*, 2(1), 34–45. <https://doi.org/10.1123/jsp.2.1.34>
- Conroy, D. E., & Coatsworth, J. D. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport and Exercise*, 8(5), 671–684. <https://doi.org/10.1016/j.psychsport.2006.12.001>
- Côté, J., Yardley, J., Hay, J., Sedgwick, W., & Baker, J. R. (1999). An exploratory examination of the coaching behaviour scale for sport. *Avante*, 5(3), 82–92.
- González, L., García-Merita, M., Castillo, I., & Balaguer, I. (2016). Young athletes' perceptions of coach behaviours and their implications on their well- and ill-being over time. *Journal of Strength and Conditioning Research*, 30(4), 1147–1154. <https://doi.org/10.1519/JSC.0000000000001170>
- González-García, H., Martinent, G., & Nicolas, M. (2022). A Temporal Study on Coach Behavior Profiles: Relationships With Athletes Coping and Affects Within Sport Competition. *Journal of Sport & Exercise Psychology*, 44(2), 94–102. <https://doi.org/10.1123/jsep.2021-0071>
- Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jain, T., Sharma, R., Singh, A., & Mehta, K. (2018). The Coaching behaviour Scale for Sport (CBS-S): Factor structure examination for elite Indian sportsperson. *Indian Journal of Positive Psychology*, 9(01), 1–8. <https://doi.org/10.15614/ijpp/2018/v9i1/173674>
- Jelleli, H., Hindawi, O., Kaddech, N., Rebhi, M., Ben Aissa, M., Saidane, M., Nachb, A., Guelmami, N., & Dergaa, I. (2023). Reliability and validity of the Arabic version of coach-athlete relationship questionnaire: ACART-Q. *Cogent Social Sciences*, 9(2), 2282275. <https://doi.org/10.1080/23311886.2023.2282275>
- Jowett, S., Nicolas, M., & Yang, S. (2017). Unravelling the links between coach behaviours and coach-athlete relationships. *European Journal of Sports & Exercise Science*, 5(3), 10–19.
- Jowett, S., & Ntoumanis, N. (2004). The Coach-Athlete Relationship Questionnaire (CART-Q): Development and initial validation. *Scandinavian Journal of Medicine & Science in Sports*, 14(4), 245–257. <https://doi.org/10.1111/j.1600-0838.2003.00338.x>
- Jurko, D., Tomljanović, M., & Čular, D. (2013). Initial validation of coaching behaviour scales in volleyball. *Sport Spa*, 10(1), 47–50.
- Koh, K. T., Kawabata, M., & Mallett, C. J. (2014). The Coaching behaviour Scale for Sport: Factor structure examination for Singaporean youth athletes. *International Journal of Sports Science & Coaching*, 9(6), 1311–1324. <https://doi.org/10.1260/1747-9541.9.6.1311>
- Koh, K. T., Mallett, C., & Wang, C. K. J. (2009). Examining the ecological validity of the Coaching behaviour Scale (Sports) for Basketball. *International Journal of Sports Science & Coaching*, 4(2), 261–272. <https://doi.org/10.1260/174795409788549508>
- Mallett, C., & Côté, J. (2006). Beyond winning and losing: Guidelines for evaluating high performance coaches. *The Sport Psychologist*, 20(2), 213–221. <https://doi.org/10.1123/tsp.20.2.213>
- Marsh, H. W., Muthén, B., Asparouhov, T., Lüdtke, O., Robitzsch, A., Morin, A. J. S., & Trautwein, U. (2009). Exploratory structural equation modelling, integrating CFA and EFA: Application to students' evaluations of university teaching. *Structural Equation Modeling: A Multidisciplinary Journal*, 16(3), 439–476. <https://doi.org/10.1080/10705510903008220>
- Muthén, L. K., & Muthén, B. O. (2019). *Mplus User's Guide* (7th Ed.). Muthén and Muthén.
- Sedgwick, W. A., Côté, J., & Dowd, J. (1997). Confidence building strategies used by Canadian high level rowing coaches. *Avante*, 3, 80–92.