Research article

Athletic justice: Scale development and validation

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A B S T R A C T

The current study aimed to create a reliable and valid scale to measure athletes' perception of fairness regarding coaches' behaviors. The study utilized a scale development process, including three steps: (a) item generation, (b) scale development, and (c) scale evaluation. Both quantitative and qualitative approaches were utilized to generate items and achieve content validity. In developing the AJ scale, elite athletes from 29 different sports in Saudi Arabia were recruited for two rounds of data collection. The first data set (n = 279) was collected using an initial 35-item AJ scale developed from existing justice scales and interviews with elite athletes, while the second data collection (n = 503) was performed using a refined 12-item scale based on the analysis of the first data set. The results of ESEM showed an appropriate model fit for the scale with 12 items including four dimensions. In addition, the criterion validity was supported as each dimension of AJ was positively associated with athlete satisfaction. The newly developed AJ scale will help researchers measure perceived fairness toward coaches' behaviors based on the unique culture, climate, and environment that exists in the context of sports and explore the relationships between AJ and important attitudinal and behavioral outcomes that impact team performance.

1. Introduction

Organizational justice, which refers to perceived fairness in the workplace [1], has been frequently investigated and identified by scholars as a critical factor that may impact employees' attitudes, behaviors, and performance [2]. For example, when an individual perceives that his/her organization is fair, he/she is more likely to be satisfied with his/her jobs, feel committed to their organization and work, and engage in more productive behaviors (e.g., organizational citizenship behaviors; [3]). On the other hand, when an individual perceives his/her workplace as unfair, the individual may feel demotivated and be more likely to engage in absenteeism or turnover [4].

Since Hums and Chelladurai [5] introduced its concept to the sport field, numerous studies have utilized the concept to investigate how the fairness perceptions of sport organization members, such as athletes [6,7], coaches [8–10], and sport administrators/managers [11,12] influences their attitudes and behaviors [10,13]. However, there is a need to develop organizational justice

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scales unique to the context of sport. Although researchers in sport studies have applied numerous constructs of organizational behaviors (e.g., leadership, perceived organizational support, employee commitment, job satisfaction, counterproductive work behaviors, and citizenship behaviors) to various sport settings, there exist significant distinctions between sport institutions and other business organizations [14]. While several researchers have created sport-specific scales to measure constructs such as leadership [15], satisfaction [16], and distributive justice [5,17–19], most research has been limited to utilizing scales from non-sport business settings created by organizational behavior researchers. In turn, numerous scholars [10,18,20,21] have called for the development of organizational justice scales that reflect the unique nature of sport. Specifically, Fletcher and Wagstaff [22] argued that there is a vital need to create instruments to accurately reflect the distinctive characteristics of the culture and environment within sport organizations. Despite such recommendations, the authors are unaware of any organizational justice scales specifically designed for use in the context of sport.

Therefore, the major objective of the current study was to fill this gap in the existing literature by developing an organizational justice scale attuned to the context of sport. In doing so, we take a novel approach to the topic of organizational justice in sport, specifically examining the perceived fairness of athletes toward their coaches' actions and behaviors—an approach we refer to as *athletic justice (AJ)*. In examining AJ, the current study attempted to understand athletes' internal judgments regarding the extent to which coaches have been fair in such functions as assessing their efforts and abilities, distributing playing time, and assigning their roles (e.g., team captain) and positions within a team. This study represents an initial effort to explore various forms of AJ exhibited within sports teams and to discover athletes' perspectives about the nature of AJ in the sporting context.

1.1. Conceptual background and dimensions of organizational justice

Organizational justice is multi-dimensional, and the current study utilized the four-type model. According to the four-type model [23], members of a given organization develop their fairness perception on the basis of the presence or lack of fairness in (a) outcomes or distributions, (b) process or rules/policies adopted in making the outcome related decisions, (c) quality of interpersonal treatment by management, and (d) justifications, explanations, and information provided by management regarding the determined outcomes. Each of these four dimensions is defined in more detail below.

Distributive justice is defined as the perceived fairness of organization members toward outcomes, such as rewards and punishments in the workplace [24,25]. In the context of sport, when making internal judgments, athletes may perceive either fairness or a lack of fairness based on actual consequences (e.g., playing time, allocation of positions, leadership roles) determined by their coaches. *Procedural justice* is defined as perceived fairness toward the procedures or rules employed to make the outcome decisions [26]. For instance, athletes are more likely to perceive decisions as fair and just when coaches provide clear explanations and use consistent and transparent procedures in making decisions about playing time or positions. *Interpersonal justice* refers to the perceived fairness of interpersonal treatment that members receive [27], and athletes will be more likely to perceive fairness when their coaches are respectful, supportive, and empathetic. *Informational justice*, meanwhile, is the perceived fairness of explanations and information provided to members in an organization [23]. When coaches provide clear and timely feedback, communicate expectations effectively, and give athletes the necessary information to make informed decisions, athletes are more likely to perceive fairness. In other word, the athletes may perceive either fairness or a lack of fairness based on actual consequences (e.g., playing time, internal awards, positions), the processes incorporated by the coaches to make the decisions, the method adopted by the coaches to communicate decisions to the athletes, and justifications provided to athletes for the decisions. In turn, perceptions of justice may impact athletes' emotions, cognition, and eventually their behaviors and performance on their teams [28,29]. Coaches who practice such fair behaviors are more likely to create a positive team climate that fosters athlete well-being and performance [6].

1.2. Organizational justice in sport

Numerous studies have adopted the concept of justice c in the context sport. Initial studies on the concept examined perceptions of fairness toward the resource allocation system in U.S. intercollegiate athletics, which has been the most frequently studied setting and dimension of organizational justice research in the field of sport management [9,17,18,20,30–34]. More recently, researchers have used other dimensions of organizational justice to examine stakeholders' perceptions of fairness in such settings as high school sports [35–38], a university recreational department [39], and Olympic sports [40].

An abundance of research in the fields of sport psychology and sport management has examined factors that impact athletes' experiences in their teams, as the team environment can influence individual performance both positively and negatively. In particular, organizational justice may serve an important role, since athletes' perceptions of fairness toward coaches' decisions can impact teams' function and performance. Athletes' perceptions of the extent to which coaches foster justice through their decisions can help explain individual athletes' motivation and satisfaction as well as the team's cohesion and collective efficacy [6,41]. Jordan et al. [42], for example, adopted the concept of organizational justice, suggesting that athletes' perceptions of fairness in their teams should play an important role in influencing attitudinal outcomes (e.g., satisfaction and commitment) and behavioral outcome (e.g., effort, willingness to help, and team unity), which, in turn, impacts individual and team performances [43].

2. Method

2.1. Item generation procedure

This study employed both deductive and inductive approaches [44] to produce a comprehensive pool of items that could potentially be included in a new justice scale, which can measure and assess athletes' perception of fairness toward coaching behaviors. First, investigators employed a deductive approach by reviewing a total of 16 existing organizational justice scales (e.g. Refs. [27,45–48], developed in the field of organizational behavior as well as modified justice scales to be used in the context of sport (e.g., Refs. [37,49]) to generate an initial list of possible items for the new AJ scale. During the review process, the investigators thoroughly examined each item from other scales to determine its validity and applicability within the sport context. In addition, we adopted an inductive approach to explore potential items that may reflect the uniqueness of sport to complement existing justice scales developed in other

Table 1
Original 35-item scale.

Potential Dimension	Item	Source
Distributive Justice	1. My role on the team reflects the effort I exert.	Colquitt, 2001; Czekanski & Turner, 2015; Moorman, 1991; Price & Muller, 1986; Whisenant & Smucker, 2009
	2. My role on the team reflects my contributions to the team.	Colquitt, 2001; Czekanski & Turner, 2015; Whisenant & Smucker, 2009
	3. My coach fairly rewards athletes on the team for work that they have done well.	Moorman, 1991; Price & Muller, 1986
	4. My role on the team is justified given my performance.	Colquitt, 2001; Czekanski & Turner, 2015; Nikbin et al., 2014; Whisenant & Smucker, 2009
	5. My coach fairly rewards members of the team based on their skill level.	Nikbin et al., 2014
	6. My coach accepts responsibility for the team's poor performance.	Interview
	7. My coach shows favoritism toward the most talented athletes on the team (Reversed).	Interview
	8. My coach shows favoritism toward athletes based on non-sport related factors, such as nationality and family background. (Reversed)	Interview
	9. My coach gives equal attention to all members of the team.	Interview
	10. My coach disciplines everyone on the team fairly.	Interview
Procedural Justice	1. My coach uses consistent standards in evaluating performance.	Colquitt, 2001; Czekanski & Turner, 2015; Folger & Konovsky, 1989; Konovsky et al., 1987; Moorman, 1991
	2. My coach obtains accurate information about all team members' performance.	Colquitt, 2001; Folger & Konovsky, 1989
	3. My coach provides opportunities to appeal or challenge their decisions.	Colquitt, 2001; Czekanski & Turner, 2015; Moorman, 1991
	4. My coach hears the concerns of all those affected by their decisions.	Moorman, 1991
	5. My coach provides useful feedback regarding their decisions and their implementation.	Moorman, 1991
	6. My coach gives team members feedback that help them learn how well they are doing.	Folger & Konovsky, 1989
	7. The process used to define each athlete's role on the team has been free of bias.	Colquitt, 2001; Czekanski & Turner, 2015; Moorman, 1991
	8. My coach is influenced by pressure from administrators (Reversed).	Interview
	9. My coach's decisions are influenced by political factors (Reversed).	Interview
	10. My coach is influenced by pressure from team members' parents. (Reversed)	Interview
	11. My coach has proper training about ethical issues in sport.	Interview
Informational Justice	1. My coach provides team members with timely feedback about their decisions and their implementation.	Colqutt, 2001
	2. My coach communicates their decisions in a timely manner	Colquitt, 2001; Czekanski & Turner, 2015
	3. My coach is completely candid and frank in communication with everyone on the team.	Colquitt, 2001; Folger & Konovsky, 1989
	4. My coach has explained the team procedures thoroughly.	Colquitt, 2001; Folger & Konovsky, 1989
	5. My coach has been open with his/her communication with everyone on the team.	Czekanski & Turner, 2015
	6. My coach's explanations regarding the procedures used to make decisions are reasonable.	Colquitt,2001
	7. My coach seems to tailor (his/her) communications to individuals' specific needs.	Colquitt, 2001
Interpersonal Justice	1. My coach treats everyone on the team with kindness and consideration.	Moorman, 1991
	2. My coach shows concern for team members' rights as athletes.	Moorman, 1991
	3. My coach takes steps to deal with everyone on the team in a truthful manner.	Moorman, 1991
	4. My coach refrains from making improper comments.	Colquitt, 2001; Czekanski & Turner, 2015
	5. My coach treats everyone on the team with respect.	Colquitt, 2001; Czekanski & Turner, 2015
	6. My coach treats everyone on the team in a polite manner.	Colquitt, 2001; Czekanski & Turner, 2015
	7. My coach treats everyone on the team with dignity.	Colquitt, 2001; Czekanski & Turner, 2015

business settings. For the approach, the researchers conducted semi-structured interviews with 22 current or former athletes in the Kingdom of Saudi Arabia who participated in elite, competitive sport. During the interviews, participants were asked about their perceptions of fairness and unfairness based on their experiences in the elite sport system. Specifically, participants were given prompts, such as "tell me about a decision by your coach that you felt was unfair?" and "why did you fell that decision by the coach was unfair?" to facilitate discussion of instances in which they had experienced or observed fairness/unfairness in sport. Following the interviews, members of the research team reviewed verbatim transcripts of each interview to identify potential items that corresponded to issues of unfairness frequently mentioned in participants' responses.

Ultimately, an initial list of 42 potential items was generated to be included in the new AJ scale. Five experts in the organizational behaviors assessed the appropriateness of each item using a 4-point scale (i.e., 1 = not relevant; 2 = somewhat relevant; 3 = quite relevant; 4 = highly relevant). Content validity index (CVI) [50] of each item was utilized to determine whether to delete, retain, or modify each item. The process resulted in a total of 35 items under four justice dimensions for inclusion in the initial survey (see in Table 1). These items would be evaluated by participants using a 7-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

2.2. Participants and procedure

The current study employed a two-stage data collection process, involving the two data collections from current elite athletes in the Kingdom of Saudi Arabia using an online survey. The first survey, comprising initial 35 items, was distributed between July–August 2022. Subsequently, the second survey, consisting refined 12 items, was distributed between September–October 2022. Sport clubs were contacted to receive permissions and recruit their athletes. Participants were received emails including a link attached to the online survey. The link also provided a brief summary of this study and detailed instructions for the survey. A total of 368 athletes participated in the first round of data collection, of which 279 provided complete, sincere responses based upon close examination of the data to ensure reliability of the findings. Of these respondents, 256 (91.76 %) were men and 23 (8.24 %) were women from 27 different sports, including football (53.76 %), track and field (10.04 %), swimming (4.30 %), and basketball (3.94 %). A total of 589 respondents participated in the second round of data collection, with 503 providing complete, sincere responses. Of these respondents, 451 (89.66 %) were men and 52 (10.34 %) were women from 29 different sports, including football (45.92 %), basketball (11.13 %), track and field (8.75 %), fencing (5.17 %), and swimming (3.98 %). Table 2 provides detailed participant information.

2.3. Measures

The first survey included demographics (e.g., gender, age, sports, and career experience) and the initial 35 items pertaining to AJ under four justice dimensions: (a) distributive justice, (b) procedural justice, (c) informational justice, and (d) interpersonal justice. The second survey set included demographic information, 12 items measuring AJ, which were refined using the results of the first data collection, as well as five items measuring athletic satisfaction (Judge et al., [51]), in order to test criterion validity to assess whether

Table 2
Demographic statistics of participants in data set 1 and 2.

		Set 1 (n = 279)		Set 2 (n = 503)	
		n	Percent (%)	n	Percent (%)
Gender	Male	256	91.76 %	451	89.66 %
	Female	23	8.24 %	52	10.34 %
Type of Sport	Football	150	53.76 %	231	45.92 %
	Athletics	28	10.04 %	44	8.75 %
	Swimming	12	4.30 %	20	3.98 %
	Basketball	11	3.94 %	56	11.13 %
	Gymnastics	10	3.58 %	10	1.99 %
	Taekwondo	10	3.58 %	19	3.78 %
	Judo	7	2.51 %	5	0.99 %
	Body Building	6	2.15 %	7	1.39 %
	Volleyball	6	2.15 %	16	3.18 %
	Cycling	4	1.43 %	4	0.80 %
	Archery	3	1.08 %	6	1.19 %
	Boxing	3	1.08 %	4	0.80 %
	Fencing	3	1.08 %	26	5.17 %
	Karate	3	1.08 %	5	0.99 %
	Wrestling	3	1.08 %	3	0.60 %
	Handball	2	0.72 %	7	1.39 %
	MMA	2	0.72 %	3	0.60 %
	Powerlifting	2	0.72 %	2	0.40 %
	Rowing	2	0.72 %	2	0.40 %
	Table Tennis	2	0.72 %	6	1.19 %
	Tennis	2	0.72 %	3	0.60 %
	Others	6	2.15 %	11	2.19 %
	N/A	2	0.72 %	13	2.58 %

AJ scale could accurately predicts or correlates with a specific outcome, which proven to have significant associations with organizational justice. Athletic satisfaction refers to an athlete's feeling of happiness or pleasure about his or her experiences in sport [16]. Example items were "I feel satisfied with my team" and "Most days I am enthusiastic about my team and my sport". These items of four dimensions of AJ and athlete satisfaction were measured by 7-point Likert-type scales, ranging from 1 (strongly disagree) to 7 (strongly agree).

2.4. Data analysis

In the present study, Exploratory Structural Equation Modeling (ESEM) was to evaluate and refine the scale for measuring AJ in elite-level sports. ESEM, proposed by Asparouhov and Muthén [52], has been recognized as a more comprehensive approach to factor analysis compared to Exploratory Factor Analysis (EFA). ESEM combines the strengths of both EFA and Structural Equation Modeling (SEM), allowing for the estimation of factor loadings, measurement error, and latent variables within a single model. ESEM's allowance for cross-loadings enables items to be associated with multiple factors, reflecting the complex reality of data more accurately. This approach results in models with better fit indices, enhancing their validity and representing underlying data structures more faithfully [53]. Our research, involving multifaceted constructs across various sports, benefited significantly from ESEM's capacity to handle complex models. Moreover, ESEM's exploratory nature facilitated the identification of unexpected patterns and relationships within the data, contributing to more meaningful and interpretable results. This was crucial in achieving the objectives of our study, as it provided a nuanced understanding of the phenomena under investigation. These qualities make ESEM particularly suitable for situations where both measurement invariance and factor structure are of interest. Additionally, ESEM can handle data that violates traditional EFA assumptions, such as non-normal or ordinal data, making it a more versatile technique [54,55].

There are several indices often utilized to evaluate the results of an ESEM analysis. These include goodness-of-fit indices, which provide a summary of how well the model fits the data, such as the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI). Factor loadings are also tested, with coefficients reflecting the relationships between observed variables and latent factors, usually displayed as factor loading matrices. Additionally, the latent variable covariance matrix reflects the relationships between latent factors and can be used to assess the validity of the factor structure.

The generally accepted threshold for these indices includes values larger than 0.90 for CFI and TLI, and values less than 0.06 and 0.08 for RMSEA and SRMR, respectively. The initial dataset was analyzed to ensure these conditions were met. If the conditions were not satisfied, the analysis was conducted multiple times, removing items with poor coefficient values until the conditions were met. All
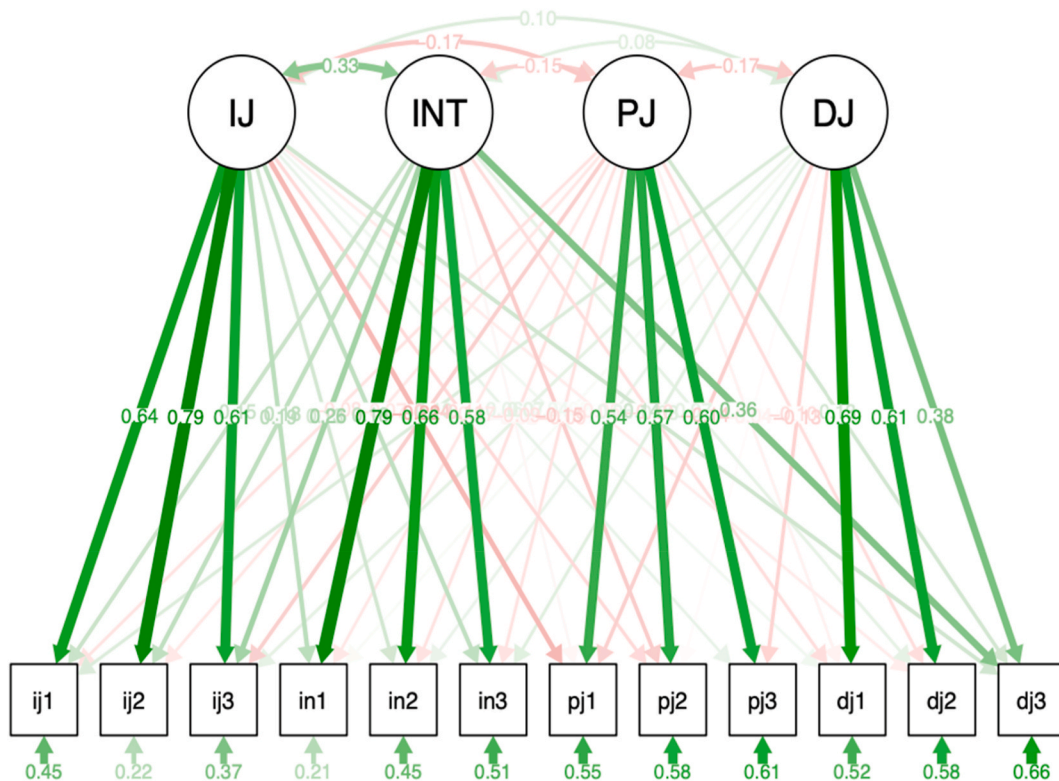

Fig. 1. Results of ESEM
DJ: Distributive Justice, PJ: Procedural justice, ITJ: Interpersonal justice, IFJ: Informational justice.

statistical procedures were conducted using R 4.2.0.

To further evaluate the effectiveness of AJ measures derived from the first phase of the study, a second study was conducted employing a refined set of 12 items based on the results of the first round of data collection. In the second stage of data collection, the researchers aimed to not only assess AJ but also to incorporate an additional variable (i.e., athletic satisfaction) to determine if the desired overall results could be obtained. By examining the relationship between AJ and athletic satisfaction, the researchers sought to establish the practical relevance and external validity of the new AJ scale.

The inclusion of athletic satisfaction in the questionnaire allowed the researchers to explore the connections between the various dimensions of AJ and the athletes' levels of satisfaction within their sporting environments. This approach provided a more comprehensive understanding of the impact of AJ on athletes' experiences, as well as valuable insights for practitioners working with athletes to enhance their well-being and performance.

The findings from the second study were instrumental in confirming the factor structure and item organization of the 12-item AJ scale, while also shedding light on the relationship between AJ and athletic satisfaction. The analysis revealed strong correlations between most of the AJ dimensions and athletic satisfaction, highlighting the importance of understanding and addressing AJ concerns to improve athletes' overall satisfaction. This study further solidified the validity and practical relevance of the developed AJ scale, paving the way for future research and applications in the fields of sport management and sport psychology.

3. Results

ESEM was performed with the initial 35-item dataset to identify the construct of AJ under four potential dimensions, informed by a literature review and the results of a qualitative interviews. The four potential dimensions included distributive, procedural, informational, and interpersonal justice. The ESEM model confirmed the existence of four factors in the 35-item questionnaire; however, several items had loadings on non-target dimensions or significantly high loadings on multiple factors. Additionally, some items exhibited weak or negative factor loadings (<0.30) on the targeted dimension. Consequently, these poorly performing items were removed from the analysis.

Based on the 279 complete responses from the first data collection, 12 of the original 35 items were retained after screening, with three items allocated to each targeted dimension, exhibiting the strongest factor loadings. The ESEM model showed acceptable model fits ($X^2 = 1494.272$ with $p < .001$, CFI = 0.996, TLI = 0.990, RMSEA = 0.026, and Standardized RMR = 0.016). Correlations among the four dimensions were presented in a table, with values ranging between 0.254 and 0.719. The Cronbach's α values for the dimensions were 0.601, 0.733, 0.834, and 0.824, respectively. Although the α for distributive justice appeared slightly low, it was still deemed acceptable according to the criteria established by George and Mallery [56]. (See Fig. 1, Tables 3 and 4).

In the second phase of the study, the primary objective was to confirm the factor structure and item organization of the 12-item scale developed in the first phase. This scale comprised three questions for each of the four dimensions of AJ, which were derived from the initial study. To investigate the practical relevance of the refined scale, the researchers also examined the relationship between each factor of AJ and athletic satisfaction. To achieve this objective, the researchers collected data from a new sample of participants and conducted a Confirmatory Factor Analysis (CFA).

Table 3
Factor loadings of first ESEM analysis.

Dimension	Item	Loadings	Dimension	Item	Loadings
DJ	DJ1	1.018*	IFJ	DJ 1	0.081
	DJ2	1.009*		DJ 2	−0.057
	DJ4	0.458*		DJ 4	0.151
	PJ10	0.112		PJ10	0.518*
	PJ 11	−0.167		PJ11	0.201
	PJ 12	0.082		PJ12	−0.102
	IFJ1	0.124		IFJ1	1.030*
	IFJ2	0.006		IFJ 2	1.271*
	IFJ3	0.085		IFJ 3	1.019*
	ITJ5	0.002		ITJ5	0.144
	ITJ6	0.091		ITJ 6	0.104
	ITJ7	0.08		ITJ 7	0.133
PJ	DJ1	0.008	ITJ	DJ 1	−0.19
	DJ2	0.061		DJ 2	0.038
	DJ4	−0.155*		DJ 4	0.374*
	PJ10	1.288*		PJ10	−0.064
	PJ11	1.392*		PJ11	0.251
	PJ12	1.447*		PJ12	−0.006
	IFJ1	0.045		IFJ1	0.087
	IFJ2	0.027		IFJ2	0.092
	IFJ3	0.122		IFJ3	0.270*
	ITJ5	0.046		ITJ5	0.973*
	ITJ6	0.070		ITJ6	0.853*
	ITJ7	0.064		ITJ7	0.708*

DJ: Distributive Justice, PJ: Procedural Justice, ITJ: Interpersonal Justice, IFJ: Informational Justice *p < .05 **p < .01.

Table 4

Correlations of variables in first ESEM model.

	DJ	PJ	IFJ	ITJ
DJ				
PJ	.212			
IFJ	.164	.131		
ITJ	.201	.139	.528*	

DJ: Distributive Justice, PJ: Procedural Justice, ITJ: Interpersonal Justice, IFJ: Informational Justice *p < .05.

Based on the 503 complete responses from the second round of data collection, CFA was performed on this refined sample to test the adequacy of the revised 12-item scale in representing the four dimensions of AJ. The results of the CFA were promising, demonstrating that the scale met all the required validity and reliability conditions. Specifically, the goodness-of-fit indices were as follows: Chi-square (X^2) = 197.548 with p < .001, CFI = 0.955, TLI = 0.941, RMSEA = 0.054, and SRMR = 0.041. These values indicate that the model has an acceptable fit to the data, providing confidence in the factor structure of the scale (See Table 5).

In terms of reliability, the four dimensions of the scale and athletic satisfaction exhibited satisfactory Cronbach's alpha values, which were 0.677, 0.669, 0.823, 0.788 and 0.770 respectively. Although the first two dimensions had alpha values slightly below 0.70, the normally accepted threshold, they were still considered acceptable given the exploratory nature of the current study as a scale development effort with a small sample size [57]. Additionally, the Composite Reliability (CR) values for the dimensions were 0.696, 0.673, 0.825, 0.791 and 0.775, further supporting the reliability of the scale. The Average Variance Extracted (AVE) values, which reflect the convergent validity of the scale, were 0.425, 0.420, 0.613, 0.560, and 0.537 for the respective dimensions.

Investigators conducted a correlation analysis to assess these relationships with athletic satisfaction and other AJ dimensions. The results indicated that, except for procedural justice, all dimensions had a strong overall correlation with athletic satisfaction, with correlation coefficients of 0.510, −0.184, 0.642, and 0.691, respectively. These findings suggest that the dimensions of AJ, apart from procedural justice, are positively related to athletes' satisfaction levels, providing valuable insight for practitioners in the field (See Table 6).

In conclusion, the second phase of the study successfully confirmed the factor structure and item organization of the 12-item scale, with three items for each of the four dimensions of AJ. The scale demonstrated acceptable model fit, validity, and reliability, offering researchers and practitioners a robust and valuable tool for further investigations into the construct of AJ.

4. Discussion

The current study has addressed the limitations of EFA by employing ESEM in developing a scale to measure AJ in sport. In fact, it is worth noting that the ESEM approach allows for cross-loadings, which provides a more realistic representation of the factor structure in multidimensional constructs [53]. This is particularly relevant in the context of AJ, where each dimension is expected to be interrelated and have overlapping properties based on the existing literature. By accounting for these relationships, the current study offers a more comprehensive understanding of the underlying factors contributing to the concept of AJ. The more comprehensive factor analysis using various indices, such as goodness-of-fit indices and factor loadings, added rigor to the process. With the refined

Table 5

CFA results.

Dimension		Items	Loading	α	CR	AVE
DJ				.677	.696	.425
	1	My role on the team reflects the effort I exert.	.689			
	2	My role on the team reflects my contributions to the team.	.705			
	3	My role on the team is justified given my performance.	.550			
PJ				.669	.673	.420
	1	My coach is influenced by pressure from administrators.	.655			
	2	My coach's decisions are influenced by political factors	.728			
	3	My coach is influenced by pressure from team members' parent	.524			
IFJ				.823	.825	.613
	1	My coach provides team members with timely feedback about their decisions and their implementation.	.675			
	2	My coach communicates their decisions in a timely manner	.836			
	3	My coach is completely candid and frank in communication with everyone on the team.	.828			
ITJ				.788	.791	.560
	1	My coach treats everyone on the team with respect	.825			
	2	My coach treats everyone on the team in a polite manner	.696			
	3	My coach treats everyone on the team with dignity	.717			
AS				.770	.775	.537
	1	Most days I am enthusiastic about my team and my sport.	.641			
	2	I feel satisfied with my team.	.735			
	3	I find real enjoyment in my team.	.813			
χ^2 = 197.547 (df = 80, p < .001), CFI = .955, TLI = .941, RMSEA = .054, SRMR = .041						

DJ: Distributive Justice, PJ: Procedural Justice, ITJ: Interpersonal Justice, IFJ: Informational, AS: Athlete Satisfaction.

Table 6
Correlations between justice dimensions and athlete satisfaction.

	DJ	PJ	IFJ	ITJ	AS
DJ					
PJ	−.202				
IFJ	.464*	−.389*			
ITJ	.487*	−.322*	.770*		
AS	.510*	−.184	.642*	.691*	

DJ: Distributive Justice, PJ: Procedural Justice, ITJ: Interpersonal Justice, IFJ: Informational Justice, AS: Athlete Satisfaction *p < .05.

scale and acceptable model fits, the study offered valuable insights into the dimensions of AJ in sport. In addition, the acceptable reliability value (e.g., Cronbach's α values) for each dimension in the scale can allow researchers to adopt this newly developed AJ scale confidently in their future research.

The new AJ scale with four identified dimensions—distributive, procedural, interpersonal, and informational— has several potential applications. First, coaches could use the scale to assess how athletes perceive their coaching behaviors and identify areas for improvement by adjusting their coaching practices accordingly. Second, sport teams could use the scale as an evaluation tool for coaches or for coaching education or training programs based on athletes' perceptions of fairness. Next, researchers could use the scale to examine the impacts of AJ on important outcomes in sport teams, such as athlete development, well-being, satisfaction, team commitment, and team performance. Overall, the new AJ scale could serve as a valuable tool for understanding the relationships between coaches and athletes, which could improve the quality of coaching and athlete experiences in sport teams.

In conclusion, the results of this study validates the effectiveness of ESEM in creating a new scale to measure AJ. The newly developed AJ scale with three items for each dimension, shows acceptable model fits with reliability. The results confirmed that the scale could be used as a valuable tool in examining the construct of AJ. Since athletes' perceived fairness toward coaches' decisions and behaviors could build a strong relationship between coaches and athletes [6,58,59], future studies could use this tool to extend relevant research by examining the relationships between each dimension and various outcomes, such as quality of relationship between athletes and coaches, team cohesion and commitment, athletes' citizenship behaviors, and individual/team performance. In fact, the body of research on organizational justice has empirically found organizational justice have significant relationships with attitudinal as well as behavioral outcomes [2]. Based on the findings of relevant research regarding the athlete-coach relationship [58–60], the conceptual framework (as shown in Fig. 2) can be developed to describe the relationship between AJ and potential outcomes. According to the model, when athletes perceive fairness toward coaches' behaviors, they will develop emotional attachment to their athletic involvement, which in turn impacts their behaviors. The newly-developed AJ scale can be used to test these relationships. Additionally, the scale could be applied across different sports and levels of competition to assess its generalizability and identify any context-specific variations in the dimensions of AJ.
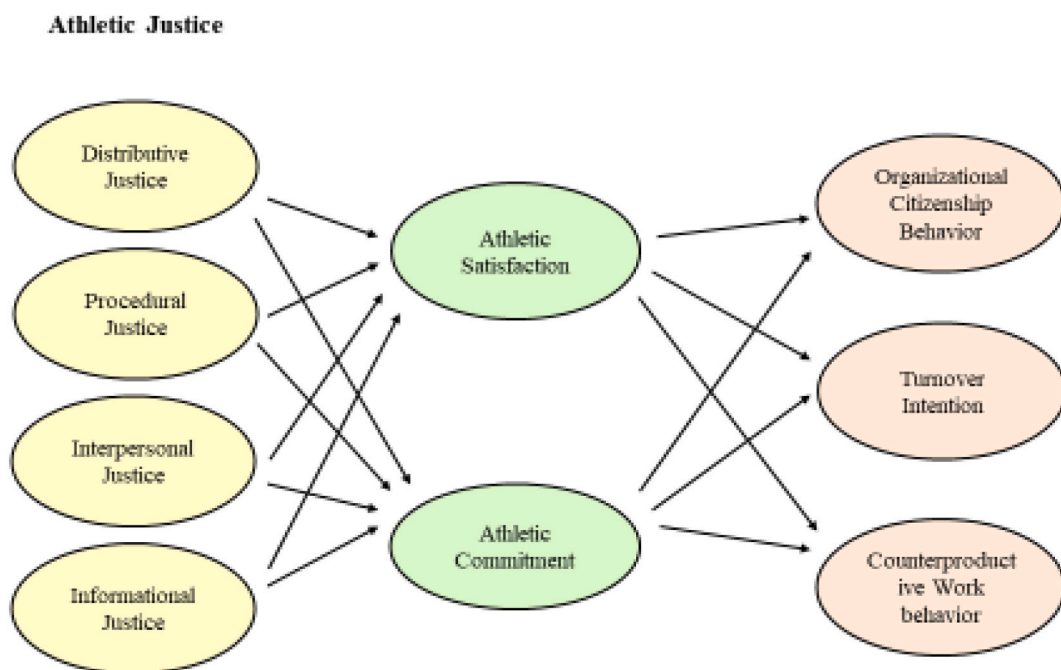

Fig. 2. Potential conceptual framework of the relationships between AJ and outcomes.

The current research also offers notable practical implications. Firstly, this scale can serve as a tool for coaches to assess athletes' feedback on their own behaviors and practices from athletic justice perspective. The coaches can utilize the feedback to evaluate their coaching behaviors, such as decision-making, policies, and treatments. Secondly, the scale can effectively guide coaches in identifying areas that they need to improve. By utilizing the valuable feedback, coaches can make necessary modifications to their coaching behaviors, which will lead to ensuring fairness within their teams. As discussed in the conceptual model, the perception of AJ is proposed to have significant impact on athlete satisfaction and commitment (e.g., team cohesion), which eventually may result in improved team performance.

5. Limitations and future research

While attempting a fill the gap in the literature by developing an organizational justice scale in the context of sports, there are several limitations identified to be addressed and considered when interpreting the findings.

First, the data in this study were collected from athletes in Saudi Arabia, which may limit the generalizability of the findings to athletes in other countries or cultural contexts due to potential cultural differences that may influence athletes' attitudes, behaviors, and experiences [61]. The differences may affect the validity and generalizability of research findings. Thus, future research should aim to replicate this study in diverse cultural contexts assess the extent to which these findings may be generalized.

Second, there is the potential for sampling bias due to the data collection method the current study adopted. The data were collected from elite athletes in Saudi Arabia, which may not be representative of the broader population of athletes in the country. For example, athletes at the elite level may have unique characteristics or experiences that differ from those who compete at other levels of sport (e.g., collegiate, youth, high school). To improve the generalizability of the findings, future research should aim to collect data from a more diverse and representative sample.

Third, the present research undertook the measurement and validation of a scale across a diverse array of sports within Saudi Arabia. This comprehensive approach was designed to elucidate broader trends and patterns that extend beyond the confines of any individual sport. However, it is acknowledged that this methodology may have implications for the generalizability of the findings. Additionally, although responses were anonymous, there is still a possibility that athletes' responses might have been influenced by factors such as apprehension in relation to their trainers, potentially impacting the sincerity of their answers. Future research endeavors should aim to address these limitations, implementing strategies to enhance the generalizability of the findings and ensure the authenticity of the responses obtained.

Next, the current study solely relied on self-report measures, which could have been susceptible to response bias. For example, participants might have been hesitant to report unfair experiences with their coaches or may have over-reported positive experiences with their coaches. Future research could employ different data collection approaches, such as observational or interview-based measures, to supplement self-report data.

Finally, the findings about the association between AJ and outcomes are limited to the specific variable (i.e., athlete satisfaction) in this study. As this study provides a reliable and valid method to measure and assess athletes' perceptions of fairness toward coaching behavior, researchers should examine impacts of AJ on other important outcome variables as proposed in Fig. 1 to provide a more nuanced understanding of athletes' experiences.

Ethic statement

This study approved by the Research Ethics Committee of the Hong Kong Baptist University (REC/20–21/0325). Informed consent was obtained from each participant, ensuring their agreement to participate in the survey and allowing the publication of aggregate data that represents averages or generalizations. This data is non-identifiable, making it suitable for conferences or publications.

Data availability statement

The data are not publicly available, but are available upon request from the corresponding author.

Additional information

No additional information is available for this paper.

CRediT authorship contribution statement

Seungmo Kim: Writing - review & editing, Writing - original draft, Resources, Project administration, Investigation, Funding acquisition, Conceptualization. **Majed Essa Alahmad:** Data curation. **Taeyeon Oh:** Validation, Software, Methodology, Formal

analysis, Data curation. **Adam Love:** Writing - review & editing, Writing - original draft, Conceptualization.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors did not use the ChatGPT.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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