

The examination of the psychometric properties of the Turkish Collective Efficacy Questionnaire for Sports

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Background: Current research has demonstrated a consistent and positive relationship between collective efficacy and group performance in organizational settings, including sports. However, there is still a need for the development of scales measuring this relationship in order to clarify the scientific shortcomings. **Objective:** The current study analyzed the psychometric properties of the Turkish version of the Collective Efficacy Questionnaire for Sports (T-CEQS). **Methods:** The sample consisted of 522 college-age student-athletes (176 women, 346 men) from different universities in Turkey with a mean age of 21.40 years ($SD = 2.11$). The CEQS consists of 20 items, with five subscales. A confirmatory factor analysis was used to test the factor structure. Pearson's product-moment coefficients were used to assess the correlations between the CEQS factors and the Collective Self-Efficacy Scale (CES). Cronbach's alphas were calculated for the subscales in order to evaluate their internal consistency. **Results:** The results confirm the 5-factor internal structure of the T-CEQS. The results of the correlation analysis between the T-CEQS subscales and the CES indicated significant and positive relationships. We also found acceptable values of the alpha coefficient (between .70 and .85), which confirms the T-CEQS as a reliable instrument. **Conclusions:** The T-CEQS is a relatively short questionnaire that allows researchers to measure team efficacy beliefs across sports. It also is a multidimensional state measure, based on current capabilities, not potential capabilities or expected future capabilities. The present findings provide preliminary support for the utility of the T-CEQS as a measure for assessing collective efficacy in Turkish sport teams prior to competitions.

Keywords: efficacy belief, team confidence, team sports, measurement, scale development

Introduction

In most organized sports, individuals perform as a part of a team, requiring them to work together to reach their common goals. Team members vary in their beliefs about how well they work together and coordinate their capabilities to reach their goals. Bandura (1997) proposed collective efficacy as the construct to refer to people's judgments of one's group's capabilities. He defined collective efficacy as "a group's shared belief in their conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997, p. 476).

Although collective efficacy is a group's shared belief, it still reflects the individuals' perceptions of the group's capabilities (Bandura, 2006). Research has shown a consistent and positive relationship between collective efficacy and group performance in organizational settings, including sports (Gully, Incalcaterra, Joshi, & Beaubien, 2002). However, in order to advance knowledge on the relationship between collective efficacy and performance and as it develops and changes over time, measures are needed that are tied to all facets of team performance (Feltz, Short, & Sullivan, 2008).

Measurement of collective efficacy has followed two approaches. The first has been to take an aggregate of the individual efficacies of the team members. The second method to measure collective efficacy is to assess team members' perceptions of their collective abilities, rather than their self-efficacy beliefs. Using both methods, Feltz and Lirgg (1998) found that using aggregated

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collective efficacy ratings had more predictive power than did using aggregated individual efficacy ratings. Of course, group perceptions are most likely swayed by the perceived abilities of the various individuals comprising the group, making these two methods at least moderately correlated (Bandura, 1997). Even so, the most common method of obtaining collective efficacy beliefs in sport research has been to have team members rate the confidence in their teams, either by having them rate *their own* confidence in their teams (Feltz & Lirgg, 1998) or by having them rate how they think *their team* feels (Heuze, Raimbault, & Fontayne, 2006). Because it would be rare to find that every member of the team has the same view, getting some indication of consensus may need to be obtained (Feltz & Chase, 1998). If consensus is an issue, using multi-level modeling (HLM), which analyzes both individual and group levels, might be considered (Myers & Feltz, 2007).

Much of the collective efficacy research in sport has utilized measurement scales that were specific to the sport examined (e.g., Feltz & Lirgg, 1998; Magyar, Feltz, & Simpson, 2004; Paskevich, Brawley, Dorsch, & Widemeyer, 1999). These scales were based on Bandura's (2006) recommendation that scales be specific to the domains that are being assessed. Items chosen are usually created in consultation with experts from the sport for which the scale is being developed. While these sport-specific collective efficacy scales have been appropriate, Short, Sullivan, and Feltz (2005) acknowledged the need for a scale that would be functional across different sports to provide more power to investigate the network of variables that correlate with collective efficacy beliefs. Developed to be consistent with Bandura's (1997) contention that "efficacy beliefs involve different types of capabilities, such as management of thought, affect, action, and motivation" (p. 45), Short et al. (2005) created the Collective Efficacy Questionnaire for Sports (CEQS) as a multidimensional instrument. Preliminary validation was found for a 5-factor, 20-item measure. The five interrelated factors were Ability, Effort, Preparation, Persistence, and Unity. These five factors were significant because earlier scales measuring sport-specific collective efficacy heavily favored ability and performance. Furthermore, the CEQS was designed as a state measure, making it flexible in its usage.

The importance of this study arises from the fact that from a social-psychological aspect efficacy in diverse cultural settings and in different academic fields such as physical education and sports contribute to a great extent in widening perspectives. The leading studies concerning self-efficacy in physical education opened up new horizons for physical education (Bridley, 2013; Hagger, Chatzisarantis, & Biddle, 2001;

Hilland, Brown, & Fairclough, 2018; Manley, 2008). Following the lead of the North American researchers the importance of self-efficacy in physical education led researchers from various countries to focus on the subject. For example, collective efficacy research in sport has been conducted in Belgium (Fransen et al., 2012), Portugal (Duarte, 2008), Iran (Ramzaninezhad, Keshan, Shahamat, & Kordshooli, 2009), France (Heuze et al., 2006), and Japan (Aria, 2011; Kawazu, Sugiyama, & Nakasuga, 2012; Uchida, Machida, Tsuchiya, & Kugihara, 2014). Researchers of these studies generally created their own sport-specific scales to measure collective efficacy.

Recently, a Spanish version of the CEQS, using male and female athletes from a variety of sports, was employed to validate the psychometric properties of the 5-factor model developed in the United States (Martinez, Guillen, & Feltz, 2011). Concurrent, construct, and discriminant validity and internal consistency were all confirmed, justifying the scale's use with Spanish athletes. Martinez et al. (2011) acknowledged that more work needs to be conducted to obtain ecological validity. To this end, the aim of the present study was to provide further validation of the CEQS with a sample of Turkish athletes. Thus, this study will fill a gap in the literature by examining a unique cultural setting.

Methods

Participants and settings

This study included 522 college-age student-athletes (176 women, 346 men) from two different universities in Turkey whose ages ranged between 17 and 29 ($M = 21.40$ years; $SD = 2.11$). The participants were from 45 different teams and four sports disciplines belonging to interuniversity sports federation. The sports disciplines were soccer ($n = 129$), basketball ($n = 137$), volleyball ($n = 230$), and ice hockey ($n = 26$). Also, the survey included both men and women from each discipline (the volleyball group consisted of 111 men and 119 women, the soccer group consisted of 109 men and 20 women, the basketball group consisted of 100 men and 37 women) with the exception of the ice hockey group, which consisted of 26 men and no women.

The study conforms to requirements stipulated in the Declaration of Helsinki. The participants completed the surveys voluntarily and anonymously and provided informed consent. The participants were informed about the objectives of the study and told to answer all questions and items as honestly as possible and not to share opinions with their teammates. In every session of questionnaire completion one of the

Turkish researchers was on-site in order to provide help if the participants had any issues or questions about the items. Completion of the questionnaire forms took about 10 min.

Instruments

In this study, the "Collective Efficacy Questionnaire for Sport (CEQS)" and the "Collective Self-Efficacy Scale (CES)" were used as data collection tools. The CEQS was developed by Short et al. (2005) in order to examine athletes' multidimensional collective efficacy beliefs. The CEQS consists of 20 items, with five subscales each represented by four items. The subscales were listed as follows: effort (e.g., demonstrate a strong work ethic), ability (e.g., play more skillfully than the opponent), preparation (e.g., physically prepare for this competition), persistence (e.g., persist when obstacles are present), and unity (e.g., maintain effective communication). Short et al. (2005) have also supported a higher order factor of "total" collective efficacy that can be computed by summing the ratings for all items. Each item of the CEQS begins with the stem of "Rate your team's ability in terms of the upcoming game or competition, that your team has the ability to..." All items were scored on a 10-point Likert-type scale where 0 (*not at all confident*) to 9 (*extremely confident*) options were provided to gauge efficacy strength. The feedbacks from the student-athletes participating in the pilot study showed that 10-point Likert type scale was not suitable for Turkish culture. Then the original 10-Likert type was modified and transformed into the 5-Likert type. This modification was made because of cultural differences. In a culture where nuances matter a lot, Turks tend to differentiate and clarify the exact intervals of anchors between the response choices. Therefore, in the Turkish version (T-CEQS), all items were measured and sorted using a five-point Likert scale (1 = *not at all confident*, 2 = *slightly confident*, 3 = *somewhat confident*, 4 = *very confident*, 5 = *extremely confident*) with the permission of the authors who developed the original scale in order to make it convenient and applicable to differences in Turkish culture.

The adaptation of the CES for Turkish athletes was developed by Ocel (2002). Ocel's adaptation was used to examine the concurrent and discriminant validity of the CEQS. The CES originally developed by Riggs, Warka, Babasa, Betancourt, and Hooker (1994) was used to measure the beliefs of individuals in a group regarding their teams' capacity. In group settings, individuals assess their group's collective ability to perform required tasks or goals without reference to the outcomes. For example, in Ocel's (2002) adaptation, the first item allows for a group member to make assessment whether his/her peers are above average. Another

item checks for the conceived self-assessment of the team's potential/power compared to the other teams. The CES has 7 items in total as described above and it has no sub-dimension. The construct validity of Turkish version of the scale was sufficient and the overall internal consistency coefficient had been reported as .70. All items were measured using a five-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *undecided*, 4 = *agree*, 5 = *strongly agree*).

Procedure

To translate the CEQS into Turkish parallel back-translation method was used (Brislin, 1986). Three experts translated the CEQS from English to Turkish. Translations made by the experts were compared and some changes were made in terms of cultural differentiation and Turkish grammar rules. Then, another three experts carried out the Turkish-English translation without seeing the original version of the scale. The translations of the scale were compared by the researchers and the final form of the Turkish version was completed. All experts who participated in our study are native Turkish speakers who are competent in both languages, English and Turkish. The questionnaire was then administered to 20 Turkish student-athletes who confirmed the clarity of the instructions and the items. Finally, the authors, with advice from the translators, carried out the adjustments to the questionnaire based on the corrections made by the athletes.

The questionnaire was administered in intercollegiate championships that were held in different cities of Turkey. All student-athletes were delivered the questionnaires approximately 1 hour before their competitions and asked to complete the forms in the absence of their coaches.

Data analysis

Before the data analysis, all of 540 questionnaire forms were checked and 18 of them were omitted from the analysis as they were incorrectly filled out. Also, all negatively worded items in the CES were reverse-coded.

In order to determine the coherence of the data in regard to factor analysis, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy coefficient and Bartlett's test of sphericity were used. Tavsancil (2002) stated that the KMO is considered perfect as the KMO value approaches 1, and the value is unacceptable when it is below .50. On the other hand, when the Bartlett Sphericity test is found meaningful, it shows that the data is obtained from a multi-variable normal distribution (Büyüköztürk, 2008). The sample size was adequate for factor analysis as the sample size used in this study was above 500 (Bryant & Yarnold, 1995; Comrey & Lee, 1992; Cureton & D'Agostino, 1983;

P. Kline, 1994). We calculated the descriptive statistics (mean, standard deviation, range, skewness, and kurtosis) of the variables of the study with the intention of checking whether or not our data fell within the normalcy of the statistics that allows us to carry out confirmatory factor analysis (CFA). R. B. Kline (2005) indicates that value of 3 for skewness and 10 for kurtosis is acceptable. We used the statistical program SPSS (Version 20; SPSS, Chicago, IL, USA) for these calculations.

CFA was employed to examine the construct validity using the maximum likelihood method with the program AMOS (Version 18; Amos Development Corporation, Crawfordville, FL, USA). To assess model fit, we used well-established indices such as chi-square/degrees of freedom (χ^2/df), root mean square error of approximation (RMSEA), root mean residual (RMR), standardized root mean residual (SRMR), comparative fit index (CFI), Tucker-Lewis index (TLI), incremental fit index (IFI), goodness of fit index (GFI), and normed fit index (NFI). For the χ^2/df values of less than 5 are considered adequate (Schumacker & Lomax, 1996). RMSEA and SRMR should be less than .08 (Hu & Bentler, 1999; Jöreskog & Sörbom, 1993), whereas the RMR should be less than .05 (Brown, 2006; Hu & Bentler, 1999). For the CFI, TLI, IFI, GFI, and NFI indices, values greater than .90 are considered acceptable and values greater than .95 indicate good fit to the data (Hu & Bentler, 1999).

Cronbach's alphas and composite reliability values were calculated for the scales in order to evaluate their internal consistency (Cronbach, 1951). Nunnally and Bernstein (1994) states that when Cronbach's alpha and composite reliability coefficients are equal to or above .70, it is a sufficient condition for the reliability of a scale in general. In order to further ascertain reliability average variance extracted values were also calculated (Peterson, 2000). Pearson correlation coefficient was employed to assess concurrent and discriminant

validity (Marsh, 1998). The values from .70 to 1.00 was considered as high, from .30 to .70 as average, and from .00 to .30 as low correlation (Büyüköztürk, 2008). Multivariate analysis of variance (MANOVA) was used to determine gender differences between the scores acquired from the questionnaire. Before the MANOVA, we also calculated skewness and kurtosis values and examined Box's M and Levene's statistics for all dependent variables in order to determine if the data provided the assumptions of the multivariate statistics (Büyüköztürk, 2008).

Results

Descriptive statistics

The descriptive statistics for the variables are shown in Table 1. Athletes reported being "somewhat confident" to "very confident" on the five subscales as well as on the total composite efficacy scale. The highest scores were found for effort and preparation. Athletes also reported a moderate score on the CES. The scores on the T-CEQS for asymmetry and kurtosis oscillate between -.94 and .82, indicating that the data are distributed within the area of normal data distribution. According to the results of the analysis to determine the aptness of the data for multivariate normality, KMO was found to be .96, and Bartlett's Sphericity test was found meaningful ($p < .001$).

Confirmatory factor analysis

The results of the CFA indicate an acceptable fit of the CEQS model with a five-factor structure ($\chi^2/df = 3.46$, GFI = .90, NFI = .91, CFI = .93, IFI = .93, TLI = .92, RMR = .04, SRMR = .04, RMSEA = .07). The factor structure and interfactor correlations are presented in Figure 1.

To define the contribution of each of the items with their respective factors, we also analyzed the

Table 1
Descriptive statistics for the T-CEQS and CES

	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Range
CEQS					
Effort	3.89	0.77	-0.80	0.47	1.25-5.00
Ability	3.79	0.82	-0.75	0.28	1.00-5.00
Preparation	3.88	0.84	-0.84	0.47	1.00-5.00
Persistence	3.71	0.75	-0.60	0.17	1.00-5.00
Unity	3.86	0.83	-0.94	0.82	1.00-5.00
Total CEQS	3.82	0.71	-0.74	0.30	1.30-5.00
CES	3.46	0.78	-0.32	-0.05	1.00-5.00

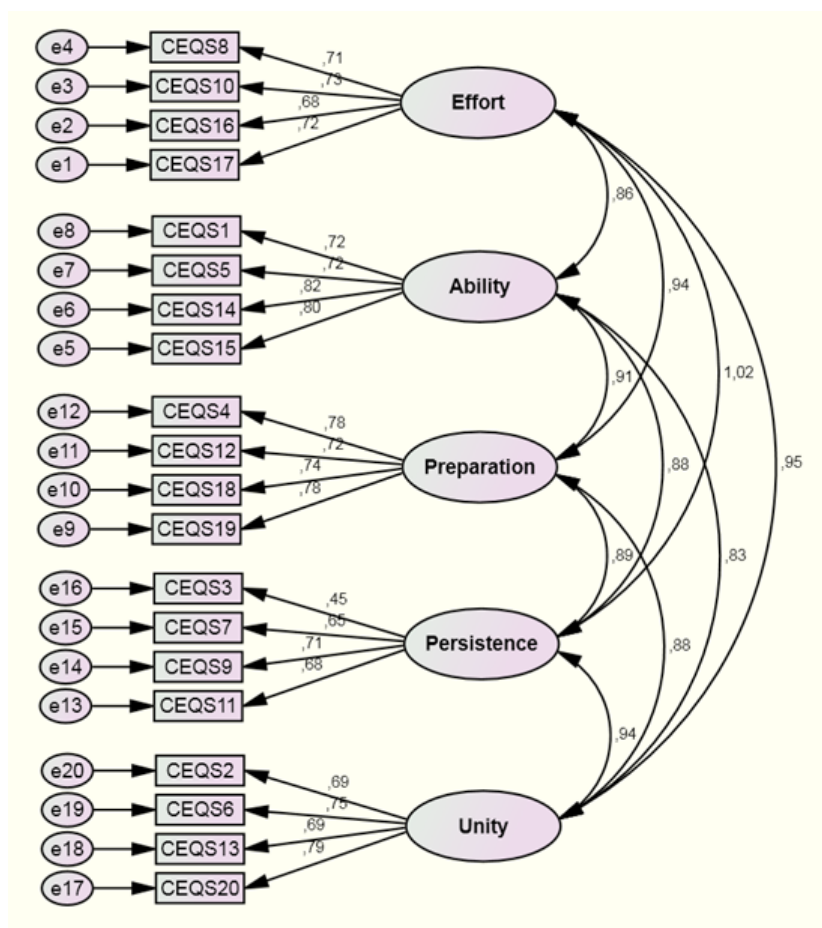


Figure 1. The factor structure and interfactor correlations of the five-factor, 20-item model.

standardized regression loadings and squared multiple correlations. In Table 2, all items demonstrated acceptable standardized regression loadings and squared multiple correlations. The item with the highest regression loadings (.82) is number 14 (*Play more skillfully than the opponent*) which is related to the *Ability* factor. The items with the lowest regression loadings (.45) are number 3 (*Perform under pressure*) related to the *Persistence* factor.

Correlations and internal consistency of the T-CEQS and CES

To examine the concurrent and discriminant validity of the T-CEQS, bivariate correlations were performed using Pearson's coefficient. The results in Table 3 indicate a significant relationship between the factors of the collective efficacy construct and the CES (r s range from .32 to .41), which provides evidence of the concurrent validity of the T-CEQS. In addition, Cronbach's alpha values were calculated as .80, .85, .84, .70, .82 and .95 for the subscales and total scale, respectively. While composite reliability values changed between

.72 and .85, average variance extracted values were between .40 and .59.

Gender differences

Results from the MANOVA indicated that there was a significant main effect of gender (Wilks's lambda = .95, $F(5, 516) = 5.22$, $p < .001$). In tests between subject effects by gender, the results showed a significant difference in the *Persistence* factor ($F(1, 520) = 5.28$, $p < .001$). The male student-athletes had higher collective efficacy scores ($M = 3.77$, $SD = 0.78$) than the female student-athletes ($M = 3.61$, $SD = 0.68$).

Discussion

The purpose of the current study was to translate and confirm the factor structure, and establish the construct validity of the Turkish version of the Collective Efficacy Questionnaire for Sports (T-CEQS).

CFA was administered in order to determine the factor structure of this scale. The results confirmed the

Table 2
Statistical characteristics of items used in the CFA for the T-CEQS

	<i>M</i>	<i>SD</i>	SRW	SMC
Effort				
8. Demonstrate a strong work ethic	3.90	0.99	.71	.50
10. Play to its capabilities	3.73	1.01	.73	.54
16. Show enthusiasm	4.07	0.91	.68	.47
17. Overcome distractions	3.87	0.98	.72	.52
Ability				
1. Outplay the opposing team	3.82	0.99	.72	.53
5. Show more ability than the other team	3.84	0.96	.72	.52
14. Play more skillfully than the opponent	3.73	1.01	.82	.67
15. Perform better than the opposing team(s)	3.76	1.00	.80	.63
Preparation				
4. Be ready	3.90	1.02	.78	.61
12. Mentally prepare for this competition	3.88	1.03	.72	.51
18. Physically prepare for this competition	3.89	1.00	.74	.54
19. Devise a successful strategy	3.82	1.02	.78	.61
Persistence				
3. Perform under pressure	3.49	1.16	.45	.20
7. Persist when obstacles are present	3.75	0.99	.65	.42
9. Stay in the game when it seems like your team isn't getting any breaks	3.89	1.01	.71	.51
11. Play well without your best player	3.73	0.97	.68	.46
Unity				
2. Resolve conflicts	3.69	1.01	.69	.47
6. Be united	3.96	1.08	.75	.57
13. Keep a positive attitude	3.81	1.01	.69	.47
20. Maintain effective communication	3.97	1.01	.79	.63

Note. SRW = standardized regression weight; SMC = squared multiple correlation.

Table 3
Correlations and reliability estimates for the T-CEQS and CES

	Effort	Ability	Preparation	Persistence	Unity	Total CEQS	CES	Alpha	CR	AVE
CEQS										
Effort	1.00							.80	.80	.50
Ability	.72*	1.00						.85	.85	.59
Preparation	.77*	.77*	1.00					.84	.84	.57
Persistence	.76*	.72*	.71*	1.00				.70	.72	.40
Unity	.77*	.69*	.73*	.74*	1.00			.82	.82	.53
Total CEQS	.90*	.88*	.90*	.88*	.89*	1.00		.95		
CES	.36*	.41*	.33*	.32*	.33*	.39*	1.00	.78		

Note. CR = composite reliability; AVE = average variance extracted. * $p < .01$.

5-factor structure of effort, ability, unity, persistence, and preparation. Our results (CFI = .92, GFI = .90, RMSEA = .09) were very similar to those found for the original English (Short et al., 2005), Spanish (Martínez et al., 2011), Flemish (Fransen, Kleinert, Dithurbide, Vanbeselaerer, & Boen, 2014) and Tunisian (Boughattas & Kridis, 2017) versions of the questionnaire, with similar fit indices (English CFI = .92, RMSEA = .09; Spanish CFI = .92, RMSEA = .08; Flemish GFI = .87, RMSEA = .09; Tunisian CFI = .94, GFI = .94, RMSEA = .08). The factor analysis supported the construct validity of the T-CEQS in which the results were compatible with the theoretical model. Furthermore, using the 5-point response scale did not result in any less fit than what was found in the original 10-point English scale. In our study, the factor loadings of the items that belonged to the subfactors ranged between .45 and .82. In other studies, the values range between .64 and .93 (Short et al., 2005), .58 and .83 (Martínez et al., 2011), and .72 and .83 (Boughattas & Kridis, 2017).

We used the CES to determine the concurrent and discriminant validity of the T-CEQS. This instrument is used to measure a similar construct and it also focuses on the individual's self-efficacy perception of his/her team or peers. The results of the correlation analysis between the T-CEQS and the CES subscales indicated significant and positive relationships. In addition, the correlation between the T-CEQS subscales is greater than those between the T-CEQS and the CES, thereby supporting the discriminant validity of the T-CEQS.

The results of the correlation analysis demonstrated that the subscales were moderately related to each other, and all were highly correlated with the total CEQS score. In our study, the correlation coefficients among the subfactors were calculated between .69 and .77. These values were similar to those shown in previous studies. In the original study, Short et al. (2005) arrived at correlation values between .59 and .86. In other studies (Boughattas & Kridis, 2017; Fransen et al., 2014; Martínez et al., 2011), the correlations coefficients were calculated between .61 and .74, .51 and .80, and .48 and .79, respectively.

The analyses that were made to determine the reliability level of the scale indicated that the scale had a high reliability level. The reliability of the T-CEQS confirmed acceptable alpha, CR and AVE scores for the five subscales demonstrating that this is a questionnaire with acceptable internal consistency. Cronbach's alpha values for the subscales were calculated between .70 and .85 in this study. These values ranged between .85 and .91 in the original English version of the questionnaire (Short et al., 2005). Martínez et al. (2011) also reported that the reliability coefficients for the CEQS

subscales were between .80 and .88 in their study. In other studies (Boughattas & Kridis, 2017; Fransen et al., 2014), the reliability coefficients were calculated between .83 and .93, and .81 and .85, respectively.

In regard to the influence of gender on collective efficacy levels, our study found out that there was a significant difference between the collective efficacy levels of male and female student-athletes. Similar findings were reported in some studies which were conducted on athletes and physical activity participants (Spence, et al., 2010; Vargas-Tonsing & Bartholomew, 2006).

This study did have its limitations in terms of its sample characteristics and target sample. The study sample consisted of the student-athletes from only four sport branches. Therefore, it is suggested that further studies should target athletes from different sport disciplines such as handball or curling.

Conclusion

The T-CEQS, like the original CEQS, is a relatively short questionnaire that allows researchers to measure team efficacy beliefs across sports, such as to investigate whether some sports exhibit stronger collective efficacy among participants than those in other sports. The present findings provide preliminary support for the utility of the T-CEQS as a measure for assessing collective efficacy in Turkish sport teams prior to competitions.

Conflict of interest

There were no conflicts of interest.

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