Adaptation of the Challenge and Threat in Sport Scale into Turkish: A Validity And Reliability Testing Study

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Abstract

Athletes have to cope not only with their opponents but also with many psychological factors for success. The aim of this study is to test the validity and reliability of the "Challenge And Threat In Sport Scale" developed by Rossato, Uphill, Swain and Coleman (2018) for Turkish culture. The psychometric properties of the scale were tested on 75 female (27.3%) and 200 male (72.7%), total 275 (average age= 17.91±2.82) athletes. There are a total of 12 items and 2 subscales in the original of the Challenge And Threat In Sport Scale. To test the construct validity of the scale in Turkish culture, explatory factor analysis and confirmatory factor analysis was applied. Internal consistency co-efficients were calculated for each subscale of the measurement tool. As a result of the confirmatory factor analysis, it was seen that the Turkish version of the scale, as in the original scale, consisted of 11 items and 2 subscales: "challenge" and "threat". It was fastened down that the factor loads of the items that make up the scale varied between .40 and .81. According to the confirmatory factor analysis results, it was calculated as $\chi^2 / df = 2.64$, GFI = .94, AGFI = .90, CFI = .94, IFI = .94, SRMR = .07 and RMSEA = .07. Cronbach Alpha internal consistency coefficients of the scale were calculated as .84 for the "threat" subscale and .80 for the "challenge" subscale. As a result, it can be said that the psychometric properties of "Turkish Challenge And Threat In Sport Scale" is an adequate measurement tool to evaluate the challenge and threat levels of competing athletes in various branches.

Key Words: Challenge, threat, validity, reliability, sport

1. INTRODUCTION

Sport is defined as a motivating performance state in which a person should strive to achieve a specific goal or aim (Meijen et al, 2014). In addition, sports is a part of society and culture, including social institutions such as family, religion, politics, economy and education, which are of great importance in almost every society in the world (Hoekman et al., 2019). Ignoring sports is to overlook a phenomenon that spans many social areas, including arts, mass media, economics, society, and international diplomacy (Delaney and Madigan, 2015). Many people express what the concept of sports is according to their own experiences. For most of us, sport is health and leisure, but for some of us it can be seen as work, employment or commerce. In its the most extended meaning, sport is defined as a competition based on a certain rule or a physical activity (Stebbins, 2019).

It is accepted that participation in sports activities has positive effects on healthy life and mental health (Schinke, 2018). In this direction, it is important for all individuals who make up the society to participate in sports activities in terms of raising healthy generations (Bailey et al., 2015; Mills et al., 2019). While sports have many physical and psychological benefits on people, especially athletes may frequently encounter psychological situations such as rivalry, stress, and threat (Kumar et al., 2017; Singh and Parmar, 2015). Sports and competition are two inseparable concepts, and this competition that athletes have to go through causes the emergence of many psychological conditions, especially stress (Jones, 2009). While stress can occur in many situations, athletes' feeling of excessive stress in competitive sports environments is one of them (Moore et al., 2012). Although for people, stress can mean an emotional response, pressure, tension or disturbing external forces, this is shown as a factor that significantly affects the individual's personal, social and work life (Özden and Sertel-Berk, 2017). The stress that occurs in a presentation at a job interview or in world record performance in the Olympics will positively affect the motivation of some individuals and increase their performance, while the others may be discouraged and this will reduce their performance. While for some people a motivated performance state is seen as a challenge, for others it can be seen as a threat (Meijen et al., 2013). Stress can have different effects on athletes' performance; some athletes can cope with stress and make perfect their performance, while others fail to cope with stress (Brimmell et al., 2019). Especially some emotions that arise during the competition show an increase in the secretion of cortisol, which is the stress hormone (Söylemez et al., 2018). Challenge can become a stressful situation for many athletes when the pressure created by the effort of athletes to achieve certain goals, combined with the inherent uncertainty of the competition results (Rossato et al., 2018). How athletes cope with various factors, primarily threat and stress, plays an important role in sportive success (Williams et al., 2010). Constructive coping strategies with stress can cause positive outcomes, destructive strategies can cause negative positive outcomes (Dost-Gözkan, 2017). Therefore, researchers working in the field of sports psychology in the literature have revealed many studies on the causes of stress and threat in athletes and coping with stress (Bali, 2015; Hase et al., 2019; Schinke et al., 2018; Smith and McGannon, 2018). Sports psychology is a field of science that deals with the interaction between the psychological aspects of top-level athletic performance and physical and psychological functioning, including the psychological processes of the athlete, trainer or team (Guo et al., 2018). In general, sports psychology focuses on improving team dynamics and cohesion as well as evidence-based practice, focusing on psychological skills (e.g. mental skills) for excellent

performance or performance enhancement (Cremandes et al., 2014). As a result, sports psychologists have collected a lot of information from research on how individuals and teams perform under extreme pressure and how they cope with the stress and challenge encountered in high performance environments (Barker et al., 2016).

While it is stated in the literature that the most accurate method of measuring the stress or threat experienced by athletes is cardiovascular indices (Martinek et al., 2013; Rossato et al., 2018; Turner et al., 2014) stated that this method created various contradictions and these contradictions were eliminated. It is important to adapt this scale developed in this context to Turkish culture. Especially when the national literature is examined, it is understood that a valid and reliable measurement tool that aims to measure the challenges and threats of athletes is missing. It is anticipated that evaluating the challenges and threats that athletes face in national and international competitions to show a high level performance will make a significant contribution to the development of Turkish sports. In this context, the aim of the study is to adapt the "Challenge and Threat in Sport Scale" developed by Rossato et al. (2018) to Turkish culture.

1.1 Challenge and Threat in Sports
The literature agrees that the way athletes respond to competition is in two ways as challenge and threat (Blascovich et al., 2004; Martinek et al., 2013; Seery, 2011). Challenge and threat are two separate psycho-physiological responses to stressors. An approach was developed to explain how individuals respond to such a situation, and this approach tried to explain whether the person challenged with stress or perceived stress as a threat to him (Meijen et al., 2014). This approach is the "Theory of Challenge and Threat in Athletes" put forward by Jones (1995). Specifically in this theory, if athletes respond positively to stress in competitive environments, it is a feeling of "challenge", whereas if they respond negatively, this creates a feeling of "threat". It is claimed that the fight against stress occurs when individuals have a high level of self-efficacy and a sense of control and adapt to their goals. On the other hand, when self-efficacy decreases, perception of control decreases, and a sense of threat arises in athletes (Jones., 1995). While the feeling of challenge and threat is stated as the emotions that arise only in uncertainty and danger situations, the individual does not experience a feeling of challenge or threat in a situation where there is no danger (Blascovich et al., 2004). Athletes who can cope with stress, perform better than those who perceive stress as a threat (Hase et al., 2019).

Challenge and threat situations are defined by two distinct forms of cardiovascular reactivity. This concept has been supported by a consistent research community that identifies cardiovascular difficulty indices and threat states in motivating performance situations (Blascovich et al., 2004; Seery, 2011; Turner et al., 2014). Assessment of challenge or threat in studies included in "The Theory of Challenge and Threat States in Athletes" is typically measured by cardiovascular indices. Most of the studies in the literature have suggested cardiovascular indices as the most accurate and objective way of measuring perceptions of challenge and threat (Martinek et al., 2013, Turner et al., 2014). However, Rossato et al. (2018) discussed the issue that these cardiovascular indices, challenge and threat experiences could be complemented by an athlete's self-report scale, despite the advantages suggested in relation to cardiovascular indices, and cited three reasons to support this. First, there is

inconsistency between studies as to which cardiovascular markers are indicative of challenge and threat. Second, cardiovascular measures are based on the assumption that athletes will respond to stress with challenge or threat upon anticipating competition. Cerin (2003) stated that challenge and threat experiences are an important feature of athletes and argued that this is independent of cardiovascular indices. Finally, although athletes may show similar cardiovascular indexes, their challenge with stress and threat situations may differ in competition. Based on this point, Rossato et al. (2018) thought that athletes' experiences of challenge and threat could contribute to the development of the theory with a self-report scale, and developed the "Challenge and Threat in Sport Scale" to help explain some findings that are inconsistent with the hypotheses in the current literature. The theoretical background of this developed scale is the "Theory of Challenge and Threat in Athletes" mentioned above. This theory is based on golf (Moore et al., 2013a, Moore et al., 2013b, Kingsbury et al., 2014), billiards (Di Corrado et al., 2015), cricket (Turner et al., 2012) and football (Dixon et al., 2020). It is also known that it is used in studies related to various branches of sports.

In the original form of the scale, a two-factor structure was introduced and fit indices were determined as acceptable values. This study, it was aimed to conduct a Explatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) in order to test the psychometric properties of "The Challenge And Threat In Sport Scale" and to verify the factor structure in the original form. In addition, it is expected that fit indices will be at an acceptable level as a result of CFA. Finally, it was aimed to have the internal consistency coefficient of the scale at an acceptable level. If these goals and expectations are met, the validity and reliability of the adapted scale will increase.

2. METHOD

2.1 Participants

The working group of the study consists of 275 athletes, 75 (27.3%) women and 200 (72.7%) men, who actively continue their sports life during the 2019 competition season. The individuals in the working group were selected and included in the study using the convenience sampling method. Convenience sampling method; It is a sampling method that is created until reaching the most accessible group of the size required by the research and aims to prevent the loss of time, money and labor (6). The average age of the participants ranged from 15-30 years (Average age = 17.91 ± 2.82).

2.2 Data Collection Tools

"The Challenge and Threat in Sport Scale" was used as a data collection tool in the study. In addition, a "Personal Information Form" containing the demographic information of the athletes was included.
Personal Information Form: In this form, age, gender, educational status, status of being a national athlete, sports branch, year of interest in sports, number of official competitions competed in a year, competition status in international competitions, degree and type of sports branch (Team/Individual) questions were asked about.

The Challenge and Threat in Sport Scale: While 'The Challenge and Threat in Sport Scale', which was adapted to Turkish in this study, consists of 12 items and 2 subscales (challenge and threat), to what extent participants agree with the items in the scale, "being totally disagree (1)" and "being totally

agree (6)″ on a 6-point Likert type scale. The internal consistency coefficients of the original version of the scale were calculated as .83 for the "Challenge" subscale and .90 for the "Threat" subscale.

In the first phase of the scale developed by Rossato et al. (2018) in 3 stages, 25 athletes and 2 experts were asked to evaluate the item pool consisting of 25 items, and as a result of these evaluations, 4 items that could not reach 50% applicability were removed from the scale. In the second stage, a 21-item scale form was applied to 197 athletes before the competition. As a result of the Principal Components Analysis made with the data obtained, the number of items was determined as 12. In the last stage, a 12-item scale form was applied to 201 athletes before the competition or competition, and a Confirmatory Factor Analysis (CFA) was performed on the collected data and the applicability of the scale was verified.

2.3 Process

Hambleton and Patsula (1999) stated that some steps should be well known and applied in order to realize scale adaptation in the most accurate way. These steps were followed in the process of adapting "The Challenge And Threat In Sport Scale" to Turkish culture.

In the first stage of the adaptation study, permission was obtained via mail from the authors who developed the scale for academic ethics for the use and adaptation of the scale, and then the adaptation process of the scale started. First of all, the translation study of the scale into Turkish was started to ensure language validity. The Turkish translation of the scale was made by 6 academicians working in the field of sports and having English language proficiency. Turkish form of the scale was created by making arrangements on the scale in line with the opinions received from the experts and the judge forms created. This form was tested by piloting it with the participation of 30 athletes who actively participated in the competitions. As a result of the feedback received from the pilot group, necessary adjustments were made on the scale. The scale, which was finalized as a result of the regulations, was applied to 275 athletes in the working group. At the beginning of the personal information form, the participants were informed that participation for the purpose of the research was on a voluntary and confidential basis.

The scale is originally a 6-point Likert type scale. Although there are words that will classify an expression in English with six degrees, there is difficulty in finding words to meet this rating in Turkish. For example, in Turkish, it is quite difficult to distinguish the difference between "partially participate and neither more or less" (Sever, 2014). In this context, expressions in which the scale was graded as 6-point Likert type in the original version were rated as 5-point Likert in the Turkish adaptation form.

2.4. Analysis of Data

SPSS 24 and AMOS 22.0 package programs were used for the statistical analysis of the research data. In the analysis of the data, firstly, the skewness and kurtosis coefficients for the normality of the distribution were examined. Before the analysis of the data transferred to the electronic environment, KMO (Kaiser-Mayer-Olkin) and Bartlet Sphericity values were calculated to test the suitability of the

data obtained from the participant group for factor analysis. Then, EFA was applied to the obtained data. Principal Components Analysis was used in EFA. In order to test the reliability of the scale, Cronbach's Alpha coefficients were calculated, and composite reliability results were also reported. In the next step, CFA was carried out to test the construct validity of "The Challenge and Threat in Sport Scale". In this study, a factor value of .40 and above was taken into account in order for an item to be included in a factor. However, in item selection, attention was paid to ensure that the difference between the load values of the factor in which the items were found and the load values of other factors was .10 and higher.
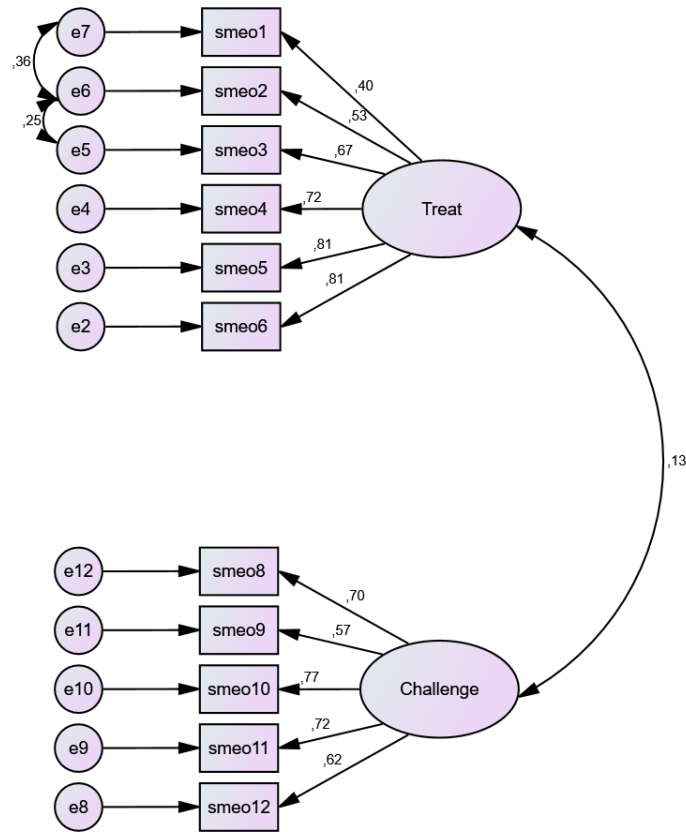
3. RESULTS

Skewness and kurtosis tests were applied for the normality distribution of the data. The values of skewness (Challenge: -1.23; Threat: -.15) and kurtosis (Challenge: -2.30; Threat: -.62) obtained as a result of the analysis are between ± 2.5 values indicate that the data are distributed normally (Tabachnick and Fidell, 2001).

Table 1. Descriptive Statistics

Subscales	Average	Sd	Skewness	Kurtosis	Min-Max.
Threat	2.90	.93	-.15	-.62	1-5
Challenge	4.12	.76	-1.23	2.30	1.5

The model described in CFA is given in Figure 1. The two-factor structure was confirmed in this study, as was the result obtained in the original version of the scale. In order to improve the fit indices of the model created as a result of the analysis, improvements were made between e6 and e7 (r=.36) and e5 and e6 (r=.25). Since they are structured to measure the same dimension and therefore they are related to each other, it was deemed appropriate to make improvements (Sönmez and Alacapınar, 2016).

Figure 1: Path Diagram and Factor Loads

When Figure 1 is examined, as a result of the Confirmatory Factor Analysis, the factor loadings for the "Challenge" subscale vary between .57 and .77, while in the "Threat" subscale it changes between .40 and .80. As a result of CFA of "The Challenge and Threat in Sport Scale, it was determined that the factor load of item number 7 was below .40 and it was decided to exclude item number 7 from the scale for this reason.

As a result of the analysis, fit indices of the Challenge and Threat Scale in Sports were found as χ2 / df = 2.64, RMSEA = .07, AGFI = .90, SRMR = .07, GFI = .94, CFI = .94 and IFI = .94. has been found.

Table 2. AVE, CR values and Internal Consistency Coefficients

	Challenge	Treat	AVE	CR	Alpha
Challenge	1	.179**	.45	.83	.84
Threat	.179**	1	.46	.83	.80

According to Table 2, there is a positive and significant relationship between the "Challenge" and "Threat" subscales of "The Challenge and Threat in Sport Scale". When AVE (Average Variance Extracted) and CR (Composite Reliability) values were examined in order to learn more about the convergent and divergent validity of the scale, CR values in both dimensions were calculated over .70, which is the critical value. When the AVE values are examined, it is seen that the AVE value is lower than the critical value of .50 in both subscales. In addition, it was determined that the average variance extracted (AVE) value of the structures in the study was larger than the correlation coefficients between the structures, and it was observed that the divergent validity was achieved. The Cronbach Alpha values for the Turkish form of the scale were .84 for the "Challenge" dimension and .80 for the "Threat" dimension.

4. DISCUSSION AND CONCLUSION

In this study, it was aimed to adapt "The Challenge and Threat in Sport Scale", which was developed by Rossato et al. (2018) to measure the self-reporting of athletes' challenge and threat experience, to Turkish culture by examining the psychometric properties of the athletes aged 15-30. The development of "The Challenge and Threat in Sport Scale" has been catalyzed by the proliferation of recent research on combat and threat in sports, which points to the need to better determine the challenge and threat experience of athletes (Cerin, 2003; Meijen et al., 2014). From a general point of view, this measuring tool can help further test and explain some of the ambiguous findings in the literature based on the self-report of challenge and threat in the experience of athletes (Turner et al., 2012).

In the original form of the scale, there are two subscales: "Challenge" (items 1, 2, 3, 4, 5 and 6) and "Threat" (items 7, 8, 9, 10, 11 and 12). At the stage of determining the structure of the scale, it was determined that item 7 (*I feel like this task is a threat*) does not work in Turkish culture. In the factor analysis, the load value of this item was excluded from the scale because it was below .40.

When examining the model fit findings, having χ^2 / sd value below 3 indicates perfect fit. In addition, SRMR and RMSEA values of fit indices .08 or below indicate good fit, GFI, AGFI, CFI, IFI values of .90 and above indicate good fit and acceptable fit (Hu and Bentler, 1999; Munro, 2005; Schreiber et al., 2006; Tabachnick and Fidell, 2001). As a result of the CFA performed to test the construct validity of the scale, it is seen that the model fit values have perfect and good fit. When the model fit values and factor load values of the scale are examined, it is seen that the 11-item structure of The Challenge And Threat In Sport Scale consisting of two factors is confirmed.

In the original version of the scale (36), Cronbach Alpha values were shown as .83 in the "Challenge" subscale and .90 in the "Threat" subscale. In this study, Cronbach Alpha values were found as .80 in the "Challenge" subscale and .84 in the "Threat" subscale. Field (2009) states that reliability is evaluated with internal consistency coefficient in a study and that these values are acceptable between .70 and .80, and if it is above .80, it is considered highly reliable. When the resulting data is evaluated, it is seen that high reliability values have emerged as a result of this research, as in the original version of the scale.

AVE value is expected to be above .50 in the literature. However, AVE values for both subscales (challenge and threat) were found below .50 in the study (Table 3). Although the literature generally accepted this value as .50, the values obtained in this study Fornell and Lacker (1981); Huang, Wang, Wu and Wang (2013); Hair et al. (2014) showed that it has acceptable values. In addition, low AVE values are acceptable in cases where CR values are greater than 0.70 (Hatcher; 1994).

As a result of all these analyzes, it can be said that the Turkish form of the "Challenge And Threat In Sport Scale" is a valid and reliable measurement tool in order to determine the stress experienced by athletes in the competitions and has been verified in Turkish culture. This research is important because it is a measuring tool to measure their own statement regarding the concerns and challenges of athletes experience in Turkey. It is thought that this adaptation will help the athletes to evaluate the challenges and threats they face in national and international competitions in order to show top performance. It is thought that it will strengthen the experimental studies used to measure the stress and threats status of athletes in the field of sports sciences. Considering that coping with challenge and treats, which are measured by cardiovascular indices, create contradictions in the literature, this self-report scale will make a significant contribution to removing the contradictions. This research can be examined with different age groups and different psychological structures.

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Ek-1. Sporda Mücadele ve Endişe Ölçeği

1	2	3	4	5
Hiç Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum

Bu çalışma, sporcuların müsabakalar öncesinde veya sırasında karşılaştıkları mücadele ve tehdit unsurlarını belirlemek amacıyla yapılmaktadır. İfadeleri ayrıntılı okuyarak sizin için uygun cevabı seçmeniz yeterli olacaktır. Bu çalışmadan elde edilen bilgilerin gizli kalacağı tarafımızca garanti ve sorumluluk altına alınmıştır. Ortalama cevaplama süresi 4 dakikadır.

Sporda Mücadele ve Endişe Ölçeği (The Challenge and Threat in Sport (CAT-Sport) Scale)

Endişe	Threat
1. Yanlış bir şey söylemekten veya yapmaktan endişelenirim.	**1.** I am worrying that I will say or do the wrong things.
2. İnsanlar üzerinde ne çeşit bir izlenim bırakacağım bende endişe yaratır.	**2.** I am worrying about the kind of impression I will make.
3. Başkalarının beni hatalı bulmasından endişelenirim.	**3.** I am concerned that others will find fault with me.
4. Başkalarının hakkımda ne düşündüğüyle ilgilenirim.	**4.** I am concerned what other people will think of me.
5. Bir fark yaratmasa bile başkalarının hakkımda ne düşüneceğinden endişelenirim.	**5.** I worry what other people will think of me, even though it won't make a difference.
6. Başkalarının hakkımda ne düşündüğü beni endişelendirir.	**6.** I am worrying about what other people are thinking of me.
Mücadele	**Challenge**
7. Beklentim başarısızlıktan daha çok başarı yönündedir.	**7.** I am thinking about being successful in this task rather than expecting to fail.
8. Başarının getireceği ödüllerin ve kazançların beklentisi içindeyim.	**8.** I am looking forward to the rewards and benefits of success.
9. Mücadele gerektiren durumlar çabalarımı artırma yönünde beni motive eder.	**9.** A challenging situation motivates me to increase my efforts.
10. Bu işi başaramamaktan daha çok başarabileceğimi düşünüyorum.	**10.** I expect that I will achieve success rather than experience failure.
11. Beceri ve yeteneklerimi test etme fırsatını sabırsızlıkla bekliyorum.	**11.** I am looking forward to the opportunity to test my skills and abilities.