DEVELOPMENT OF ORGANIZATIONAL STRESS SCALE FOR ATHLETES

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ABSTRACT

The purpose of this study is to develop an instrument to assess the level of athletes' organizational stress. For this purpose, two samples were taken from athletes playing soccer, basketball, volleyball, and handball. The number of athletes was N=479 for the first sample and was N=430 for the second sample. The draft version of the scale consisted of 139 items and was distributed to the first sample. Exploratory factor analysis was conducted on the first data set. There were 43 items which had eigenvalues above 1 and these items were loaded under five factors. These factors were subscaled as trainer behaviors α=0.95, management and finance α=0.86, health and nutrition α=0.82, spectator behaviors α=0.86 and participating decision making α=0.70.

This obtained 43-item scale was administered to the second sample to apply confirmatory factor analysis. Chi-square/degrees of freedom ratio was found as (/df =2.42). The other parameters were determined as RMSEA=0.057, NFI=0.96, NNFI=0.97, CFI=0.98, GFI=0. 87 and AGFI=0.85, and 13 items were excluded from the scale. Total Cronbach alpha for the final version of scale was found to be α=0.94, for the subscales as followed; trainer behaviors α=0.91, management and finance α=0.87, health and nutrition α=0.82, spectator behaviors α=0.82, and participating decision making α=0.70.

In conclusion, this developed instrument is valid and reliable to assess the level of athletes' organizational stress.

Key Words: Exploratory factor analysis, Confirmatory factor analysis, Athletes, Organizational stress

SPDORCULAR İÇİN ÖRGÜTSEL STRES DÜZEYİ BELİRLEME ÖLÇEĞİ

ÖZET

Bu çalışmanın amacı, sporcuların örgütsel stres düzeyini tespit etmek için kullanılacak bir ölçüm aracı geliştirmektir. Bu amaçla Futbol, Basketbol, Voleybol ve Hentbol'culardan oluşan evrenden iki ayrı örneklem alınmıştır. Birinci örneklem (N=479), ikinci örneklem (N=430) sporcudan oluşmuştur. Birinci örneklem için, araştırmacı tarafından hazırlanan 139 maddeden oluşan ölçeğe, Açıklayıcı Faktör Analizi yapılmış ve 43 maddenin öz değeri 1'den büyük 5 faktör altında toplandığı saptanmıştır. Bu faktörler; antrenör davranışı α=0.95, yönetim ve finansman α=0.86, sağlık ve beslenme α=0.82, seyirci davranışları α=0.86 ve kararlara katılma α=0.70 alt boyutları olarak adlandırılmıştır. Toplam ölçeğin alfa değeri ise α=0.96 bulunmuştur.

Elde edilen 43 maddelik bu ölçek Doğrulayıcı Faktör Analizi için ikinci örnekleme uygulanmış ve analiz sonucunda Ki-karenin serbestlik derecesine oranı (/sd=2,42) bulunmuştur. Diğer uyum iyiliği değerleri ise RMSEA=0.057, NFI=0.96, NNFI=0.97, CFI=0.98, GFI=0,87 ve AGFI=0.85 olarak belirlenmiş ve ölçekteki soru sayısı 30'a düşmüştür. Toplam ölçeğin alfa değerinin α=0.94 olduğu, alt boyutlardan ise antrenör davranışı α=0.91, yönetim ve finansman α=0.87, sağlık ve beslenme α=0.82, seyirci davranışı α=0.82 ve kararlara katılma alt boyutunun ise α=0.70 olduğu saptanmıştır. Sonuçlar, geliştirilen ölçüm aracının sporcuların örgütsel stres düzeylerini ölçmede geçerli ve güvenilir bir ölçek olduğunu ortaya koymuştur.

Anahtar Kelimeler: Sporcu, Örgütsel Stres, Açıklayıcı Faktör Analizi, Doğrulayıcı Faktör Analizi

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INTRODUCTION

Stress is a common term used by people of all ages in different areas of their daily life. It is defined as "a psychologically or physiologically ambiguous response to the situations in which people feel threatened or have warning signs for their well-being and comforts, thereby hindering their ability to adequately function" (Şimşek, 1999). Lazarus and Folkman (1984) defined psychological stress as a specific relation between the individual and his or her environment, which produces a situation for the individual to perceive a health threat or to consume the resources. In another definition, Morgan (1993) stated that stress is the condition that results when the individual perceives his or her environment as threatening.

When the definitions of stress are reviewed, some common characteristics can be observed, such as; "harmful stimulus", "response to harmful stimulus", and an "interaction between organism and harmful stimulus" (Morgan, 1993).

Everyone is naturally faced with stress in their lives. When people experience stress, they learn how to cope with it and how to evaluate their situation. Learning how to solve everyday problems can give individuals a sense of control. Selye (1974) stated that "Zero stress is the death". In this case, the individual's lacks energy and ability to be able to respond to the stimulus inherent in the environment becomes fatal. However, over stress may be fatal, too. In this case, the individual spends excessive amount of energy and becomes exhausted. Optimally, therefore, every person should experience a certain amount of stress which will be useful for them to live better.

As it is stated above, everyone experiences stress at work or in their daily life. This can also be seen in sport fields. Specifically, elite athletes are under immense physical and emotional pressure to be successful. In order to perform at their desired level, they have to adhere to a long training schedule and strict regimes, while living a disciplined lifestyle. Every competition is important for athletes both socially and financially. In this kind of situation, no matter how well an athlete is trained or how well his or her physical conditions are, achieving success depends on their ability to coping with stress. Stress is impossible to avoid, and athletes should learn how to manage it.

The negative effect of stress may damage athletes' physical energies, achievements and victories, enjoyments and entertainments (Nicholls, Polman, Levy, & Hulleman, 2012). Moreover, stress may also cause athletes to think poorly about themselves which can damage their self-confidence. Psychological stress may impair athletes' performance levels, which had been gained over the years and cause injuries, and therefore resulting in an early retirement (Altungül, 2006).

The researches on organizational stress sources in sport generally focus on athletes' stress levels on the competition environment (Anderson & Williams, 1999; Anshel & Wells, 2000; Dugdale, Eklund, & Gordon, 2002; Geisler & Kerr, 2007; Hanton & Fletcher, 2005). Besides competition; however, other stress factors may influence performance such as social, organizational, political, professional, and cultural. Researchers supporting this idea have provided some evidence about the effect of social and organizational factors influencing athlete's performance with qualitative data (Anshel & Delany, 2001; Nicholls, Holt, Polman, & Bloomfield, 2006; O'Neil & Steyn, 2007).

In the literature, there are some studies focused on athletes and organizational stress factors. In their study, Woodman and Hardy (2001), found many problems exist between trainers and athletes. In another study, Krotee and Bucher (2007) stated that trainers might have an influence on athletes' behaviors. Therefore, authors support the idea that trainers may have opportunities to improve

athletes' physical, cognitive, and social/emotional developments. Holt and Hogg (1999) found the communication between trainers and players to be a stress-created factor in elite level women soccer players. Anshel and Wells (2000) also pointed out that female athletes exhibited more stress in terms of trainer and spectator behaviors than male athletes. Moreover, Nicholls et al. (2006), in their study with professional rugby players, stated that the perceived stress situations among players possibly were caused by the negative spectator behaviors as well as the media. Anshel and Wells (2000) identified the perceived sources of stress experienced by basketball players as interpersonal conflicts, referee decisions, personal performance problems, opposition influences, and team behaviors. Furthermore, O'Neil and Steyn (2007) found factors such as trainer behaviors, injuries, nutrition, and spectator behaviors as perceived sources of stress among elite players.

It is well established that there are many studies on the topic of sources of stress, using qualitative research methods (Anshel & Wells, 2000; Champbell & Jones, 2002; Holt & Hogg, 2002; Nicholls et al., 2006; Woodman & Hardy, 2001). Researchers also looked for the different aspects of this topic using a variety of scales specifically measuring sources of stress during competition (Brewer, 1994; Fletcher & Hanton, 2003; Krotee & Bucher, 2007; Steers, 1988; Trail & James, 2001; Walter & John, 1985; Wan & Wiggins, 1999). However, there is a need to directly and extensively assess the level of athletes' organizational stress. Therefore, the purpose of this study was to develop an instrument which can be useful to in quantitatively measuring the levels of athletes' organizational stress.

METHODOLOGY

The development of the scale was completed in two stages. For this reason, two samples were taken from the population of team athletes (Soccer, Basketball, Volleyball, and Handball). The data from the first sample was used to apply exploratory factor analysis (EFA) to the first draft version of scale. The draft version of scale has been changed with consideration to the result of EFA and distributed to the second sample. Confirmatory factor analysis (CFA) was used to finalize the scale. This study was approved by the ethical committee of Abant Izzet Baysal University.

The first Stage

In the first stage of the study, the first sample consisted of 479 female (144) and male (335) athletes from soccer (379), basketball (54), volleyball (28), and handball (48) teams, age ranging between 13-35 from the Turkish first, second, and third division leagues. The total number of scale filled out by participants was 520 but only 479 of them filled out properly and were used for the analysis.

Data collection instrument

The item pool to assess athletes' organizational stress was prepared to determine the sources of organizational stress among athletes by the researchers and consisted of 139 items. The item pool was prepared with consideration to the study about the determination of the source of stress in elite athletes conducted by Woodman and Hardy (2001). The qualitative study by Woodman and Hardy suggested four main sources of organizational stress for elite athletes; environmental factors, personal factors, leadership factors, and team factors. Besides the model by Woodman and Hardy, expert opinions were also gathered for the "construct validity" of the scale. The experts to whom opinions about athletes' perceived organizational stress were gathered were eight female and male academicians from the field of sports science and they all had success in the international sports area.

The item pool was consisted of 139 statements with the light of obtained data. Statements in the item pool were related

to trainer behaviors, health, nutrition, management, media, referee decisions, and participation in decision making. The responses to the items were evaluated with a 5-point Likert-type scale anchored with (1) “almost no”, (2) “little”, (3) “moderate”, (4) “much”, to (5) “too much”.

Data Analysis

EFA was conducted for the statistical analysis. Varimax rotation method and Principle Component Analysis were used to simplify and clarify the data structure. Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were used to assess the appropriateness of using EFA on the data. Eigenvalue and Scree Plot methods were checked to determine the number of factors. Cronbach’s alpha was used for internal consistency or reliability. Pearson correlation analysis was lastly conducted to find out the relationship between subscales.

Results for Exploratory Factor Analysis

Initially, assumption tests were conducted before running EFA to the data gathered from 479 elite athletes. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test was used to find if the dataset is "appropriate" for factor analysis. KMO measure of sampling adequacy for the scale was found to be .96. Moreover, Barlett’s test of sphericity was found to be significant (p< .01). The explanation of the eigen values and total variance explained are shown in Table 1.

Table 1. Eigen Values and Total Variance Explained

Component	Total	Eigen Values %	Total Variance %
1	16.25	37.79	37.79
2	2.90	6.74	44.54
3	2.07	4.83	49.37
4	1.63	3.80	53.17
5	1.42	3.30	**56.48**

Principal Component Analysis

In Table 1, the total of 43 items out of 139 have the eigenvalues over 1 (Kaiser Criterion) and these items were scaled under 5 factors. The total proportion of variance that the analysis accounts for in these 5 factors was 56.48%. In order to determine the appropriate number of factors, we have also checked scree plot. The number of factors is taken as the factor number that appears just before the “elbow” in the plot. Similar to Kaiser Criterion, 5 factors were determined as the optimal number to retain. The other factors did not increase the total variance and very close to each other. The result of the varimax rotation provided 5 factors. The first factor was composed of 20 items, the second factor was composed of 7 items, the third and fourth factors were both composed of 6 items, and the fifth factor was composed of 4 items.

Finally, each factor (subscale) was subjected to the Cronbach’s alpha internal consistency test. Moreover, internal consistency for the total items was also calculated. As the result of the varimax rotation test displayed 5 subscales with 43 items, the initial total number of 139 items was reorganized again and numerated from 1 to 43. After this rearrangement, items for the first factor were determined as; 2, 4, 5, 7, 8, 9, 11, 12, 14, 17, 18, 19, 20, 21, 26, 29, 36, 37, 38, and 39, items for the second factor were determined as; 3, 6, 10, 13, 15, 16, and 33, items for the third factor were determined as; 22, 23, 25, 31, 40, and 42, items for the forth factor were determined as; 27, 28, 30, 34, 41, and 43, and finally items for the fifth factor were determined as ; 1, 24, 32, and 35. Table 2 displays the written forms of the items and the Cronbach’s alpha internal consistency for the subscales and the total items.

Table 2. Description of the subscales, Internal Consistency (IC) for the Subscales and the Total Items

	Number of Items	IC for the Subscales
Trainer's Behaviors		
Item 2. The trainer not being in a good coalition with you. Item 4. The trainer's constant change of mind. Item 5. The trainer using the physical exercise as a punishment tool. Item 7. The trainer not complementing your achievements, Item 8. The trainer's irresponsible behaviors. Item 9. Not being able to meet the trainer's expectations. Item 11. The trainer not having a plan. Item 12. The trainer putting your health at risk. Item 14. The trainer showing lack of respect towards your beliefs. Item 17. The trainer causing tension with you. Item 18. The trainer not motivating the team. Item 19. The trainer not keeping track of new trends. Item 20. The trainer having too many expectations. Item 21. Not receiving support from your trainer. Item 26. The trainer lack of incompetence in his/her field. Item 29. The trainer being overly anxious. Item 36. The trainer verbal abuse towards you. Item 37. The trainer not being understanding. Item 38. The trainer constantly commanding. Item 39. The trainer lacking discipline.	20	**α=.95**
Management and Financing		
Item 3. Having a low incentive payment towards victory. Item 6. The managers not keeping their promises. Item 10. The managers asking for incapable doings. Item 13. The managers not caring about the problems of the team. Item 15. Your club experiencing financial problems. Item 16. The managers not showing the expected interest towards the athletes. Item 33. Not being able to receive transfer fees on time.	7	**α=.86**
Health and Nutrition		
Item 22. Irregular eating. Item 23. Constant recurring injury. Item 25. Your food lacking flavor. Item 31. Your food not fulfilling your burnt calories Item 40. Lacking freshness in your nutrients. Item 42. Not receiving enough medical support.	6	**α=.82**
Spectator Behaviors		
Item 27. Spectators' chants containing profanity. Item 28. Administration tension conflict with spectator. Item 30. Spectators' disrespectful chants to the visiting team. Item 30. Spectators' disrespectful chants to our team. Item 41. Spectators' aggressive behavior. Item 43. Spectator throwing objects on the field/court.	6	**α=.86**
Participation in Decision Making		
Item 1. Your inputs not being in consideration during the preparation of training. Item 24. Your opinion not being counted for an oncoming transfer. Item 32. Your view not being in consideration during the purchase of equipment. Item 35. Your view not being considered for the location of camp.	4	**α=.70**
IC for the Total Items	43	**α=.96**

The Cronbach's alpha internal consistency (Table 2) for the first subscale (trainer's behaviors) it was α = .95, for the second subscale (management and financing) it was α = .86, for the third subscale (health and nutrition) it was α = .82, for the forth subscale (spectator behaviors) it was α = .86, and for the fifth subscale (participation in decision making) was α = .70. The Cronbach's alpha for the total scale was obtained to be α = .96. In order to evaluate the construct validity of subscales obtained with the factor analysis, an intercorrelation matrix was also calculated (Table 3).

Table 3. Intercorrelation Matrix for the Subscales

	1	*2*	*3*	*4*	*5*
1. Trainer's Bahaviors	-	.669**	.692**	.570**	.273**
2. Management and Financing		-	.575**	.529**	.169**
3. Health and Nutrition			-	.526**	.256**
4. Spectator Behaviors					.387**
5. Participation in Decision Making					-

**.01significance level.

Table 3 shows that there were low and moderate levels of significant relationships (p < .01) among subscales. The highest relationship (r = .69) among subscales was found between trainer's behaviors and health and nutrition subscales.

The Second Stage

After the statistical analyses applied to the first sample group, the scale was rearranged and administered to 430 female (185) and male (245) athletes from soccer (152), basketball (148), volleyball (61), and handball (69) teams, age ranging between 13-35 from the Turkish first, second, and third division leagues. The total number of scale filled out by participants was 475 but only 430 of them filled out properly and were used for the further analysis.

Data Collection Instrument

After conducting EFA on the data of the first sample group, the scale was determined to have 43 items under 5 different subscales. These subscales were named as trainer behaviors, management and finance, health and nutrition, spectator behaviors, and participation in decision making. Considering this result, the second version of the scale was prepared to be ready to distribute to the second sample group. The responses to the items were again evaluated with a 5-point Likert-type scale anchored with (1) "Almost no", (2) "little", (3) "moderate", (4) "much", to (5) "too much".

Data Analysis

After examination of exploratory analyses, a model with five factors and 43 items was specified. In order to test the appropriateness of this obtained model structure, first level CFA was conducted. LISREL software packet program was used to conduct this analysis (Jöreskog & Sörbom, 2001). After making some corrections on the scale with consideration to the result of CFA, internal consistency for each subscale and for scale, as a whole, was assessed. Lastly, Pearson correlation analysis was conducted to find out the relationships between subscales.

Results for Confirmatory Factor Analysis

The scale with 5 subscales and 43 items obtained from EFA was distributed to a new sample group and the data from this sample group were subjected to CFA. The maximum likelihood estimation method was used for the CFA.

The result of the first CFA revealed a significant chi-square value, χ^2=2716.25, SD = 850, and p = .00. According to the obtained result, chi-square/degrees of freedom ratio was found to be, χ^2/df = 3.79. The other fit indices were determined as follows, RMSEA = .072, NFI = .95, NNFI = .97, CFI = .97, GFI = .77, and AGFI = .75.

The result of the first analysis showed satisfactory fit to the data for RMSEA, NFI, NNFI, and CFI. However, the results for GFI and AGFI could not show a satisfactory fit to the data. It is thus safe to conclude that there could be some improvements on the model fit. In the model modification suggestions, the highest repeated frequency rate of sorted items was scanned and the highest repeated frequency rate of 13 items was suggested to be excluded from the model (items 11, 19, 20, 29, 36, 37, 38, and 39 from trainer's behaviors, item 3 from management and financing, item 25 from health and nutrition, items 30 and 43 from spectator behaviors, item 1 from participation in decision making) (Şimşek, 2007).

After excluding 13 items from the scale, the CFA results for the remaining 30 items was obtained as, χ^2= 954.82, *SD* = 395, and *p* = .00. The chi-square/degrees of freedom ratio was found to be, χ^2/df = 2.42. The other fit indices were determined as; RMSEA = .057, NFI = .96, NNFI = .97, CFI = .98, GFI = .87, and AGFI= .85. These 30 items obtained from CFA were checked with the latent variables for their corresponding *t*-values. Standard factor loadings, *t*, and R^2 values for the items are given in Table 4.

Table 4.Standard Factor Loadings (SFL), t, and R^2 Values for the Items

	SFL	*t-value*	R^2
Trainer's Bahaviors			
Item 2	.47	10.07	.22
Item 4	.54	11.68	.29
Item 5	.49	10.56	.24
Item 7	.49	10.54	.24
Item 8	.81	19.94	.65
Item 9	.69	15.99	.48
Item 12	.82	20.58	.68
Item 14	.62	13.85	.38
Item 17	.77	18.54	.59
Item 18	.83	21.02	.70
Item 21	.78	18.96	.61
Item 26	.76	18.34	.58
Management and Financing			
Item 6	.71	16.19	.50
Item 10	.74	17.28	.55
Item 13	.74	16.99	.54
Item 15	.68	15.26	.46
Item 16	.78	18.30	.60
Item 33	.67	15.07	.45
Health and Nutrition			
Item 22	.65	14.40	.42
Item 23	.75	17.37	.56
Item 31	.58	12.50	.34
Item 40	.76	17.83	.58
Item 42	.68	15.17	.46
Spectator Behaviors			
Item 27	.69	15.16	.48
Item 28	.70	15.47	.50
Item 34	.74	16.49	.55
Item 41	.76	17.21	.58
Participation in Decision Making			
Item 24	.60	11.40	.36
Item 32	.67	12.79	.45
Item 35	.73	13.92	.53

According to Table 4, item 18 was found to have the highest standard factor loading = .83, *t*-value = 21.02, and R^2 = .77 and item 2 was found to have the lowest standard factor loading = .42, *t*-value = 10.07, and R^2 = .22. Table 5 displays the Cronbach's alpha internal consistency to the model obtained from the CFA results for the remaining items in the subscales and the total items.

Table 5. Description of the subscales after CFA, Internal Consistency (IC) for the Subscales and the Total Items

	Number of Items	IC for the Subscales
Trainer's Behaviors		
Item 1. The trainer not being in a good coalition with you.		
Item 2. The trainer's constant change of mind.		
Item 3. The trainer using the physical exercise as a punishment tool.		
Item 5. The trainer not complementing your achievements.		
Item 6. The trainer's irresponsible behaviors.		
Item 7. Not being able to meet the trainer's expectations.	12	**α=.91**
Item 9. The trainer putting your health at risk.		
Item 11. The trainer showing lack of respect towards your beliefs.		
Item 14. The trainer causing tension with you.		
Item 15. The trainer not motivating the team.		
Item 16. Not receiving support from your trainer.		
Item 21. The trainer lack of incompetence in his/her fiel		
Management and Financing		
Item 4. The managers not keeping their promises.		
Item 8. The managers asking for incapable doings.		
Item 10. The managers not caring about the problems of the team.		
Item 12. Your club experiencing financial problems.	6	**α=.87**
Item 13. The managers not showing the expected interest towards the athletes.		
Item 25. Not being able to receive transfer fees on time.		
Health and Nutrition		
Item 17. Irregular eating.		
Item 18. Constant recurring injury.		
Item 23. Your food not fulfilling your burnt calories	5	**α=.82**
Item 2. Lacking freshness in your nutrients.		
Item 30. Not receiving enough medical support.		
Spectator Behaviors		
Item 21. Spectators' chants containing profanity.		
Item 22. Administration tension conflict with spectator.		
Item 26. Spectators' disrespectful chants to our team.	4	**α=.82**
Item 29. Spectators' aggressive behavior.		
Participation in Decision Making		
Item 19. Your opinion not being counted for an oncoming transfer.		
Item 24. Your view not being in consideration during the purchase of equipment.	3	**α=.70**
Item 27. Your view not being considered for the location of camp.		
IC for the Total Items		**α=.94**

The Cronbach's alpha internal consistency (Table 5) for the first subscale (trainer's behaviors) it was α = .91, for the second subscale (management and financing) it was α = .87, for the third subscale (health and nutrition) it was α = .82, for the forth subscale (spectator behaviors) it was α = .82, and for the fifth subscale (participation in decision making) was α = .70. The Cronbach's alpha for the total scale was determined to be α = .94. In order to evaluate the construct validity

of subscales obtained with the CFA, an intercorrelation matrix was also calculated (Table 6).

Table 6. Intercorrelation Matrix for the Subscales after CFA

	1	*2*	*3*	*4*	*5*
1. Trainer's Bahaviors	-	.644**	.717**	.493**	.239**
2. Management and Financing		-	.638**	.414**	.271**
3. Health and Nutrition			-	.487**	.260**
4. Spectator Behaviors				-	.394**
5. Participation in Decision Making					-

****.01significance level.**

Table 6 shows that significantly positive relationships were found among all subscales ($p < .01$). The highest positive relationship ($r = .72$) among subscales was found between trainer's behaviors and health as well as nutrition subscales. The lowest positive relationship ($r = .24$); on the other hand, was found between participation in decision making and trainer's behaviors.

DISCUSSION

In this study, an instrument was developed with a Likert-type scale to assess the level of athletes' organizational stress. The findings obtained from the process of developing this instrument were discussed in the context of applied factor analyses.

Exploratory Factor Analysis

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test was initially used to find if the dataset is "appropriate" for factor analysis. In the literature, it is stated that the KMO value; less than .50 indicates not applicable dataset for factor analysis, .50 - .60 indicates miserable variance, .60 - .70 indicates mediocre variance, .70 - .80 middling variance, .80 - .90 indicates meritorious, and above .90 indicates marvelous variance. The values approaching 1 indicate that the dataset is appropriate for the factor analysis (Çokluk, Şekercioğlu, & Büyüköztürk, 2010; George & Mallery, 2003). The KMO value for our dataset was .96, which shows a good sampling adequacy. Therefore, this dataset is satisfactory for the factor analysis to proceed.

Bartlett's test of sphericity was also conducted to test the null hypothesis if the variables in the population correlation matrix are uncorrelated. The observed significance level was $p < .01$; thus, the hypothesis was rejected. It was concluded that the strength of the relationship among variables was strong enough to proceed to the factor analysis for this data.

The draft version of the instrument was proved to be appropriate for the factor analysis and subjected to Eigenvalue and Scree Plot tests to determine the number of factors for the extraction. In Table 1, it can be seen that 43 items out of 139 items have the eigenvalues over 1 (Kaiser Criterion) and these items were scaled under the 5 factors. The total proportion of variance that the analysis accounts for in these 5 factors is 56.48%. Even though it is believed that the higher the amount of total variance, the stronger the structure of factor is, the variances, changing between 40% and 60%, are acceptable in the social sciences (George & Mallery, 2003). Therefore, it can be concluded that the obtained variance is good enough for explaining the structure of instrument.

In order to determine the appropriate number of factors, we have also checked scree plot. The eigenvalues for factors are plotted against the respective factor numbers. The number of factors is taken as the factor number that appears just before the "elbow" in the plot. In our case, 5 factors were determined as the optimal number to retain. The other factors did not increase the total variance and were very close to each other. According to the result, we retained 5 factors for the instrument. The level off point for the factor loading was taken as .40 and this was

supported to be appropriate in the literature (Çokluk et al., 2010; George & Mallery, 2003; Kline, 1994).

The preliminary factor analysis with varimax rotation resulted with the dropping of some items which had eigenvalues lower than 1 (22 items). The obtained items after the first analysis were subjected to the varimax rotation again; and this time, 3 items were dropped due to having eigenvalues lower than 1 and factor loadings below .40. Some more items (7 items) were also dropped from the follow up factor analysis because some of them did not have any factor loadings and some had eigenvalues lower than 1. The obtained items were found to be loaded under 5 subscales. Finally, each subscale was subjected to the Cronbach's alpha internal consistency test. Moreover, internal consistency for the total items was also calculated.

The Cronbach's alpha value for the third subscale was found to be α = .79. The data indicated that if items 93 and 128 were to be removed then the value of alpha would increase from the current .79 to .82. In general, Cronbach's alpha will generally increase as the intercorrelations among test items increase (Hatcher, 1994). Therefore, these two items were excluded from the third subscale. The result of the varimax rotation test displayed 5 subscales with 43 items and factor loading was found to be above .40.

The Cronbach's alpha internal consistency (Table 2) for the first subscale (trainer's behaviors) was α = .95, for the second subscale (management and financing) was α = .86, for the third subscale (health and nutrition) was α = .82, for the forth subscale (spectator behaviors) was α = .86, and for the fifth subscale (participation in decision making) was α = .70. The Cronbach's alpha for the total scale was obtained to be α = .96. George and Mallery (2003) provided the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and_ < .5 – Unacceptable". Therefore, our data indicated a good internal consistency for the developed instrument.

In order to evaluate the construct validity of subscales obtained with the factor analysis, an intercorrelation matrix was also calculated (Table 3). It was found that there were low and moderate levels of significant relationships (p < .01) among subscales. The highest relationship (r = .69) among subscales was found between trainer's behaviors and health as well as nutrition subscales.

Confirmatory Factor Analysis

After examination of exploratory analyses, a model with five factors and 43 items was specified. This obtained model was then subjected to two levels of CFA.

The first CFA revealed a significant result for chi-square/degrees of freedom ratio, χ^2/df = 3.79, p = .00, and fit indices were followed as RMSEA = .072, NFI = .95, NNFI = .97, CFI = .97, GFI = .75, and AGFI = .75.

In the case of the chi-square statistic, smaller rather than larger values indicate a good fit. That is, if the value is closer to "0", then it indicates a good fit. The chi-square statistic is very sensitive to the sample size, rendering it unclear in many situations whether the statistical significance of the chi square statistic is due to a poor fit of the model or to the size of the sample (Hoyle, 1995; Çokluk et al., 2010; Yılmaz & Çelik, 2009; Schumacker & Lomax, 2004). Thus, in order to avoid this problem, the result of chi-square/degrees of freedom ratio was considered as a base for the analysis. The value for this ratio is acceptable if it is 3 or below 3 and good if it is between 3 and 5 (Kline, 1994; Şimşek, 2007). The result of the first analysis for chi-square/degrees of freedom ratio was found to be χ^2/df = 3.19 which was in the range of acceptable level.

The literature about the other model fit indices states that models whose RMSEA is .05 or less have a good fit and whose RMSEA is .05 to .10 have a satisfactory fit. GFI and AGFI are measures of the relative amount of variances and covariances jointly accounted for by the model. The

values between .90 and .95 for NFI and GFI indicate an adequate model fit and values between .95 and 1 indicate a good model fit. The values between .095 and .097 for NNFI and CFI indicate a satisfactory model fit and values between .097 and 1 indicate a good model fit. For AGFI, values between .85 and .90 shows a satisfactory fit and values between .90 and 1 show a good model fit (Schermelleh, Moosbrugger, & Müller, 2003; Yılmaz & Çelik, 2009). The result of the first analysis showed satisfactory fit to the data for RMSEA, NFI, NNFI, and CFI. However, the results for GFI and AGFI could not show a satisfactory fit to the data. Thus, it is safe to conclude that there could be some improvements on the model fit.

As GFI and AGFI indicated poor fit indices, the model modification suggestions in LISREL were checked. However, model modification based on the relationships between items was not found theoretically appropriate to the data by researchers. We used another modification method to improve the model by looking at the highest repeated frequency rate of sorted items (Şimşek, 2007) and 13 items with the high repeated frequency rate were recommended for exclusion from the model (items 11, 19, 20, 29, 36, 37, 38, 39 from trainer's behaviors, item 3 from management and financing, item 25 from health and nutrition, items 30 and 43 from spectator behaviors, item 1 from participation in decision making).

The CFA was conducted a second time after excluding those items. The result of this analysis demonstrated a satisfactory fit to the data, χ^2/df = 2.42, RMSEA = .057, NFI = .96, NNFI = .97, CFI = .98, GFI = .87, and AGFI= .85.

The results of the second CFA displayed a better fit for the data than that of the first analysis. The result for the chi-square/degrees of freedom ratio in the second analysis decreased below 3 which shows a good fit to the data according to the literature (Kline, 1994; Şimşek, 2007).

The RMSEA result which was found to be close to .05 also showed a better fit of the model. Similarly, the NFI, NNFI, and CFI indices to assess the fit of model were also found to have a better fit to the data. Moreover, the results for GFI and AGFI which were found to have poor fit in the first analysis were found to be improved to the fit of the model in the second analysis. As we indicated above, the satisfactory values for GFI and AGFI are between .90 and .95, and between .85 and .90, respectively. The result for AGFI (.85) shows a satisfactory fit and for GFI (.87) shows a fit very close to the satisfactory level. Thus, this second model is a satisfactory and competing representation of the underlying structure of the instrument.

Overall, the model fit well, so we moved on to a description of the model's parameters and to test the amount of variance in the variables accounted for by the factors. For this purpose, the *t*-values, R^2, and the standard factor loadings of the obtained structure with 30 items (Table 4) after the second analysis were also calculated. If the *t*-value emerged from the relationship between observed and latent variables is extended to 1.96 then *p* value should be at a .05 level, and if it is extended to 2.56 then *p* value should be at a .01 level (Çokluk et al., 2010). In this study, the 30 items obtained from CFA were checked with the latent variables for their corresponding *t*-values and it was found out that the lowest *t*-value belonged to item 2 (10.07) which is far above 2.56.

A standard factor loading which is obtained from CFA indicates the correlation between particular observed and latent variables. The proportion of the variances, or R^2, in the observed variables that is accounted for by its corresponding latent variable is used as an indicator of each item's common factor reliability and it also shows the power of the correlation between observed and latent variables. When we assessed the standard factor loadings and R^2, the factor called trainer's behaviors was explained the most with 18 items (standard factor loading = .83, R^2 = .70) and the least with 2 items (standard

factor loading = .47, R^2 = .22), management and financing was explained the most with 16 items (standard factor loading = .78, R^2 = .60) and the least with 33 items (standard factor loading = .67, R^2 = .45), health and nutrition was explained the most with 40 items (standard factor loading = .76, R^2 = .58) and the least with 22 items (standard factor loading = .65, R^2 = .42), spectator behaviors was explained the most with 41 items (standard factor loading = .76, R^2 = .58) and the least with 27 items (standard factor loading = .69, R^2 = .48), and finally participation in decision making was explained the most with 35 items (standard factor loading = .73, R^2 = .53) and the least with 24 items (standard factor loading = .60, R^2 = .36). Therefore, it can be said that results for the standard factor loading and R^2 indicated overall a good reliability and validity for the model.

The internal consistency of scores on the five factors with 30 items obtained from CFA was estimated by the Cronbach alpha coefficient. The alpha coefficients obtained for this structure were quite high for all factors and for total (item-total correlation α = .94). When we compare this result with the 43-item structure result (item-total correlation α = .96), there is no substantial difference between these structures. It can be concluded that factor structures have an excellent reliability in this model (Table 5).

The correlation coefficient among factors obtained with CFA was assessed, and it was determined that there are significantly positive relationships among factors in the 30-item structure (Table 6), similar to the findings of the 43-item structure obtained with the EFA.

CONCLUSION

In the literature, there are several studies highlighting the organizational impact on elite athletes' well-being and performance (Fletcher & Hanton, 2003; Kristiansen, Halvari, & Roberts, 2011; Woodman & Hardy, 2001). Therefore, stressors coming from organizational factors should be determined to solve the problems related to these factors. Even though researchers stated a need for the development of a comprehensive measure of organizational stress (Fletcher, Hanton, & Mellalieu, 2006; Fletcher & Wagstaff, 2009), most research on organizational stress in sports has been conducted through qualitative interviews (Fletcher & Hanton, 2003; Levy et al., 2009; McKay, Niven, Lavallee, & White, 2008; Woodman & Hardy, 2001). Recently, two scales were developed to measure organizational stress factors (Kristiansen, Halvari, & Roberts, 2011). The first one, *Coach-athlete Stressors in Football Questionnaire* (CSFQ), has 7 items and measures the coach-athlete relationship. The second one, *Media Stress in Football Questionnaire* (MSFQ), has 6 items and measures experience of negative media coverage and outcome coverage. The scale developed in this study has 5 subscales including trainer's behaviors which can be similar with CSFQ. Even though there were some items related to media and referee decisions in the item pool, all those items had factor loadings below .40, therefore, excluded from the scale after EFA. Moreover, media stress can be also thought as a different kind of stress resource (Kristiansen, Hanstad, & Roberts, 2011) and, therefore, another scale can be developed to specifically measure this stressor.

In conclusion, this validity and reliability study provided evident that **organizational stress scale for athletes** developed to assess the sources of athletes' organizational stress is a multifaceted construct consisting of five subscales and researchers can use this scale with confidence (i.e., the items have adequate validity and reliability).

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