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Original

ESTUDIO TURCO DE VALIDACIÓN Y CONFIABILIDAD DE LA ESCALA DE ACTITUDES DE MEJORA DEL RENDIMIENTO

TURKISH VALIDATION AND RELIABILITY STUDY OF PERFORMANCE ENHANCEMENT ATTITUDE SCALE

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RESUMEN

Según la mayoría de los investigadores, las "actitudes" son uno de los principales determinantes en el uso de sustancias dopantes. La Escala de Actitud y Mejora del Desempeño (PEAS), que constituye uno de los ejemplos en este contexto, es una escala de autoinforme de 17 ítems. En el presente estudio, el objetivo fue determinar la validez y confiabilidad de la versión turca de PEAS. La escala se realizó entre 224 atletas con licencia mayores de 18 años. Se aplicó un análisis de constructo. Se realizó un análisis factorial para evaluar la validez de constructo y examinar la confiabilidad de constructo. Se llevó a cabo la prueba del coeficiente de correlación intraclase (ICC) para evaluar la confiabilidad prueba-reprueba. Se realizó un análisis factorial confirmatorio para evaluar la estructura factorial de la escala. Para evaluar la validez de la escala se utilizó la Escala de Actitud Relacionada con el Uso del Dopaje (ASRUD). En el análisis factorial exploratorio de escala unidimensional de 17 ítems, se encontró que las cargas factoriales varían entre 0.298 y 0.700, excluyendo los ítems 1 y 7, los cuales tenían cargas factoriales bajas. Según el análisis factorial confirmatorio, los índices de ajuste de la escala fueron bajos en el primer y séptimo ítems y aceptables en otros ítems, como en el análisis factorial exploratorio. El valor de RMSEA se encontró como 0.086. Como resultado del método utilizado para probar la validez, hubo una correlación negativa entre las puntuaciones de PEAS y ASRUD (r = -0,302; p <0,001). El coeficiente alfa de Cronbach fue 0,822 y el ICC fue 0,897. Este estudio sugiere que PEAS es una escala válida y confiable para evaluar las actitudes de mejora del desempeño en Turquía.

Palabras clave: dopaje, mejora del rendimiento, validez, fiabilidad, adaptación de escala.

ABSTRACT

According to the majority of researchers, “attitudes” are one of the main determinants in using doping substances. The Performance Enhancement Attitude Scale (PEAS), constituting one of the examples in this context, is a 17-item self-report scale. In the present study, it was aimed to determine the validity and reliability of the Turkish version of PEAS. The scale was conducted among 224 licensed athletes over the age of 18. A construct analysis was applied. Factor analysis was performed to assess the construct validity and to examine construct reliability. Intraclass Correlation Coefficient (ICC) test was carried out to evaluate test-retest reliability. Confirmatory factor analysis was performed to assess the factor structure of the scale. To assess the validity of the scale, The Attitude Scale Related to the Use of Doping (ASRUD) was used. In the exploratory factor analysis of 17 item one-dimensional scale, it was found that the factor loadings vary between 0.298 and 0.700, excluding items 1 and 7, which had low factor loadings. According to the confirmatory factor analysis, fit and fit indices of the scale were low in first and seventh items and acceptable in other items, as in exploratory factor analysis. RMSEA value was found as 0.086. As a result of the method used to test the validity, there was a negative correlation between PEAS and ASRUD scores (r=-0.302; p<0.001). Cronbach’s alpha coefficient was 0.822 and ICC was 0.897. This study suggests that PEAS is a valid and reliable scale to assess performance enhancement attitudes in Turkey.

Keywords: doping, performance enhancement, validity, reliability, scale adaptation.

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INTRODUCTION

In a competitive environment, people try to gain an advantage over their competitors in order to have the edge over them and win the competition. It has been known since the ancient Olympic games that athletes have used various methods to gain advantage (Ljungqvist, 2017; Holt et al., 2014). Ancient Greek Olympic athletes and Roman gladiators utilized mushrooms, wine, herbs and herbal mixtures to enhance their performance (Baron et al., 2007). Today, doping event is considered as one of the most improper behaviours in sports. Regarding the recent events, the use of illegal performance enhancing substances in professional and amateur sports has increased significantly since 1960s. In fact, the first death from doping was documented in 1960, and The International Olympic Committee banned doping in 1964 (Calfee and Fadale, 2006; Sjöqvist et al., 2008).

The word doping is derived from the word "dope", the name South African natives gave to an alcoholic drink that they used to increase their stamina during long hunting and dance rituals. This term, referring to performance enhancement, was adopted as doping in English language and doping was used as one of the performance enhancing substances and methods (Verroken, 2005). According to the World Anti-Doping Agency (WADA), doping behaviour is defined as the use of illegal performance enhancing drugs and methods (WADA, 2009). Even though the positive doping cases announced by WADA are around 2%, according to the relevant studies, this percentage does not exactly reflect the reality (Petroczi and Haugen, 2012; Pitsch and Emrich, 2011; Sottas et al., 2011; Striegel et al., 2010). As in all around the world, doping use is also a current issue in Turkey. The gravity of this issue was revealed by the detection of banned substances in 44 of 7810 doping control samples taken from footballers analysed between 1994-2010, and by the Journal of International Association of Athletics Federations (IAAF) published in January 2014, expressing that doping substances were found among 32 Turkish athletes (Atasu and Yucesir, 2011; IAAF, 2014). Another issue subjected to studies of research was the reason behind the tendency to doping behaviour among athletes. Many studies have stated that athletes' attitudes towards the use of prohibited performance enhancing substances are an important indicator of their intention to use these substances (Lucidi et al., 2004; Petroczi and Aidman, 2008; Wiefferink, 2008). In addition, it has been emphasized in studies that attitudes and intentions are one of the most relevant psychological determinants of doping use (Horcajo et al., 2019; Backhouse et al., 2016). Performance Enhancement Attitude Scale (PEAS), which is one of the international scales to determine athletes' attitudes, is a 17 item self-report scale (Petroczi and Aidman, 2009).

According to Akalin (2009), Turkish language is a world language spoken by 220 million people in an area of approximately 12 million square kilometres. In this sense, cross-cultural adaptation of PEAS in Turkish is an important step for studies on prevention of doping behaviour in terms of decision-making process related to avoiding and intervention. Therefore, the aim of this study was to determine the validity and reliability of the Turkish version of PEAS.

METHODS

Ethical Issues

The study was carried out in Ordu province in January 2016. The research was approved by Karadeniz Technical University (KTU), Faculty of Medicine, Clinical Research Ethics Committee.

Participants

The research was conducted with the participation of licensed athletes over the age of 18 within the Ordu Provincial Directorate of Youth Services and Sports. Participants were selected on a voluntary basis. The research sample was planned by using G*Power 3.1.5 Program with the participation of at least 200 athletes with alpha = 0.05, power = 95% and effect size = 0.25, and the final sample consisted of 224 athletes (Faul et al., 2009).

Scales

The Performance Enhancement Attitude Scale is a 17-item self-report instrument. For each item, participants were expected to respond on a 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree). The scale was developed by Petroczi (2002) and its validity-reliability assessment was performed. Scores of the scale ranges between the lowest 17 and the highest 102 points. Getting high scores from the scale supports the attitude of doping use.

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The permission of the author Petroczi related to validity and reliability study of the scale was obtained via e-mail. The PEAS was first translated into Turkish by a certified translator. Each translated item was reviewed by 3 public health experts to make comparison with the original ones and to determine if there were inconsistencies, and minor changes were made. In order to test the clarity of the scale, a pre-test was conducted among 10 athletes in Trabzon province. Following the small changes made according to the feedbacks, the final version of the scale was re-translated into English and sent to the author of the scale. The final scale (Table 1) was applied to 224 licensed athletes participated in the study. In order to assess the reliability, the scale was reapplied to the first 50 of the volunteer participants 2 weeks after the questionnaire.

Table 1. Translation of performance enhancement attitude scale items

1. Legalizing performance enhancements would be beneficial for sports.
1. Performans geliştiricilerin yasallaştırılması spor için yararlı olur.
2. Doping is necessary to be competitive.
2. Doping, rekabetçi olmak için gereklidir.
3. The risks related to doping are exaggerated.
3. Dopinge bağlı riskler abartılmaktadır.
4. Recreational drugs give the motivation to train and compete at the highest level.
4. Eğlence amaçlı kullanılan haplar, en yüksek seviyede antrenman yapabilme ve rekabet edebilme için motivasyon sağlar.
5. Athletes should not feel guilty about breaking the rules and taking performance-enhancing drugs.
5. Sporcular, kurallara karşı gelme ve performans artırıcı haplar kullanma konusunda kendilerini suçlu hissetmemelidir.
6. Athletes are pressured to take performance-enhancing drugs.
6. Sporcular, performans artırıcı haplar almak için baskı altındadırlar.
7. Health problems related to rigorous training and injuries are just as bad as from doping.
7. Zorlayıcı antrenmanlar ve yaralanmalardan kaynaklanan sağlık problemleri de tıpkı dopingden kaynaklanan sağlık problemleri kadar kötüdür.
8. The media blows the doping issue out of proportion.
8. Medya, doping meselesini şişirmektedir.
9. Media should talk less about doping.
9. Medya, doping hakkında daha az konuşmalıdır.
10. Athletes have no alternative career choices, but sport.
10. Sporcuların, spor dışında başka alternatif kariyer seçenekleri yoktur.
11. Athletes who take recreational drugs, use them because they help them in sport situations.
11. Eğlence amaçlı haplar kullanan sporcular, bunları, spor sırasında yardımcı olması için kullanırlar.
12. Recreational drugs help to overcome boredom during training.
12. Eğlence amaçlı kullanılan haplar, antrenman sırasındaki sıkıcılığın üstesinden gelmeye yardımcı olur.
13. Doping is an unavoidable part of the competitive sport.
13. Doping, rekabetçi sporun kaçınılmaz bir parçasıdır.
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.
14. Sporcular, yaralanmalar sebebiyle sıklıkla zaman kaybederler ve haplar, kaybedilen zamanın telafisine yardımcı olabilir.
15. Doping is not cheating since everyone does it.
15. Dopingi herkes yaptığından hile sayılmaz.
16. Only the quality of performance should matter, not the way athletes achieve it.
16. Sadece performansın kalitesi olmalıdır, sporcuların bunu hangi yolla elde ettiği değil.
17. There is no difference between drugs, fiberglass poles, and speedy swimsuits that are all used to enhance performance.
17. Performansı artırmak için kullanılan hapların, yüksek atlamada yardımcı fiberglas sırıklar ve hız mayolarından hiçbir farkı yoktur.

The Attitude Scale Related to the Use of Doping (ASRUD) was developed by Sapci (2010). The scale consists of 10 items in a 5-point Likert Scale. Positive attitude expressions range between "Totally agree" (5), "Agree" (4), "Neutral" (3), "Disagree" (2), "Strongly Disagree" (1) while the negative expressions are scored reversely as 1, 2, 3, 4, 5. The highest total score to be obtained from the scale is 50 and the lowest score is 10 points. Getting high scores from the scale demonstrate the attitude towards the use of doping.

Statistical Analysis

Statistical analysis was conducted using SPSS 23.0 software. Lisrel 8.50 Program was used in confirmatory factor analysis. Descriptive statistics were given as mean, standard deviation, median and maximum-minimum values.

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Validity Analysis

Factor analysis was performed to test the construct validity. Principal component analysis was applied as Exploratory Factor analysis. Factor analysis and scale compatibility were evaluated using the Kaiser-Meyer-Olkin test and Bartlett's Sphericity test. In confirmatory factor analysis, Comparative Fit Index (CFI), Root Mean Square Approximation Error (RMSEA), Goodness of Fit Index (GFI), and Corrected Fit Index (AGFI) were used between $\chi 2$ / df and fit indices (Harrington, 2009).

The ASRUD was used to determine validity. Spearman correlation test was applied to scale the relationship between the PEAS and ASRUD.

Reliability Analysis

Cronbach's alpha test was carried out to determine the internal consistency of PEAS. Item-total correlations were examined. Evaluating the Cronbach alpha test results, 0.7 cut-off value was taken into consideration (Kilic, 2016). Intraclass correlation (ICC) was used to determine test-retest reliability.

RESULTS

The study was carried out with the participation of 224 athletes, and the PEAS was reapplied among 50 athletes. The average age of the participants was 23.7 ± 6.3 and 88.4% of them were male. The highest rate among the active branches was in football and wrestling with 20.1% (n = 45). Descriptive characteristics were given in Table 2.

Table 2. Sociodemographic and descriptive characteristics of athletes

Characteristics		
	Mean ± Std	**Median (Min – Max)**
Age	23.7 ± 6.3	21 (19 – 51)
Licensed Sports Duration (year)	6.9 ± 5.7	5 (1 – 30)
	Frequency (n)	**Percentage (%)**
Gender		
Female	26	(11.6)
Male	198	(88.4)
Education Status		
Primary school graduate	1	(0.4)
Secondary school graduate	45	(20.1)
High school graduate	129	(57.6)
University graduate	49	(21.9)
Active branch		
Football	45	(20.1)
Wrestle	45	(20.1)
Handball	36	(16.1)
Boxing	20	(8.9)
Basketball	19	(8.5)
Volleyball	14	(6.3)
Judo	10	(4.5)
Athletics	9	(4.0)
Tae-kwon-do	7	(3.1)
Other	19	(8.5)
Being in the National Team Squad	37	(16.5)
Passing Doping Control	28	(12.5)

When the distribution of the responses was analysed, it was found that the participants mostly disagree with all items ("strongly disagree" or "disagree"). The mean value of all items, except for items 7 and 17, was less than 3 (Table 3).

Table 3. Summary of Correlations, Means, and Standard Deviations for the Responses of the 17 Items of the First Completion of the Questionnaire (n=224, *p<0.05; **p<0.01; ***p<0.001; I: item, M: mean, SD: standard deviation)

I	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1									
2	0.095								
3	0.201**	0.312***							
4	0.205**	0.419***	0.322***						
5	-0.091	0.336***	0.316***	0.238***					
6	-0.225**	0.092	0.134*	0.116	0.210**				
7	0.249***	0.013	0.088	0.029	-0.094	0.028			
8	0.126	0.219***	0.349***	0.418***	0.234***	0.155*	0.127		
9	-0.004	0.274***	0.330***	0.331***	0.295***	0.055	0.007	0.561***	
10	0.041	0.110	0.177**	0.182**	0.246***	0.157*	-0.011	0.309***	0.27***
11	0.096	0.164*	0.189**	0.394***	0.118	0.172*	0.139*	0.307***	0.16*
12	0.002	0.368***	0.301***	0.439***	0.325***	0.194**	0.062	0.439***	0.43***
13	-0.094	0.207**	0.198***	0.318***	0.299***	0.256***	-0.056	0.370***	0.35***
14	0.054	0.267***	0.325***	0.361***	0.338***	0.355***	0.064	0.433***	0.33***
15	-0.054	0.274***	0.271***	0.317***	0.397***	0.232***	-0.075	0.394***	0.46***
16	0.006	0.271***	0.210**	0.229**	0.322***	0.092	0.089	0.424***	0.43***
17	0.153*	0.135*	0.128	0.182**	0.242***	0.025	0.330***	0.181**	0.08
M	2.87	1.60	2.20	2.02	2.09	2.48	4.08	2.42	2.17
SD	2.07	1.26	1.71	1.57	1.69	1.81	1.91	1.71	1.66
I	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	
11	0.192**								
12	0.171*	0.503***							
13	0.233***	0.266***	0.425***						
14	0.336***	0.373***	0.482***	0.414***					
15	0.224**	0.193**	0.423***	0.365***	0.511***				
16	0.125	0.215**	0.406***	0.272***	0.414***	0.512***			
17	0.144*	0.140*	0.142*	0.152*	0.229**	0.266***	0.229**		
M	2.50	2.49	2.18	2.34	2.21	1.91	2.24	3.04	
SD	1.83	1.78	1.66	1.78	1.62	1.61	1.75	2.01	

The scores obtained from the PEAS scale were analysed and it was determined that the scores ranged between 17 and 92 and the mean score was 40.83±15.08.

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There was a poor correlation between the responses given to 17 items (Table 3), particularly item 1, and there was a significant correlation only in item 4 ($p<0.05$).

Kaiser-Meyer Olkin value of the data set was found as 0.848 and Barlett's test result was $p<0.001$ and it was determined as appropriate for factor analysis (Chi-square value = 1056.74, df = 136).

The model fit of the measurement model was addressed by the RMSEA, fit index goodness ratio ($\chi 2$) and the corresponding degree of freedom (df). The mean RMSEA value for independent samples was 0.086. This value was slightly higher than the acceptable value, <0.08, and $\chi 2$/df ratio was determined as 2.64 (acceptable value <5). Among the fit indices, the Comparative Fit Index (CFI) was found as 0.9188 and Normed Fit Index (NFI) as 0.8775; Goodness of Fit Index (GFI) as 0.8573; Adjusted Goodness of Fit Index (AGFI) as 0.8166 (Table 4).

Table 4. Fit Index Results in Confirmatory Factor Analysis

AGFI	GFI	CFI	$\chi 2$	df	RMSEA	p
0.817	0.857	0.919	315.42	119	0.086	<0.001

Exploratory and confirmatory factor analysis results are summarized in Table 5. Factor loadings for 17-item PEAS ranged between 0.28 and 0.72 except for first and seventh items (Figure 1). T values were found by dividing the standard errors corresponding to factor loads. T values were also higher than 1.96 which is the limit defined in the basic distribution of statistics, except for item 1 and 7. Cronbach's alpha coefficient of the first test was 0.822 while it was 0.810 in the last test. It was found in the first test that Cronbach's alpha values of the scale increased when items 1 and 7 were excluded (Table 5). As a result of the method used in testing the validity, a negative correlation was found between the PEAS and ASRUD scores ($r=-0.302$; $p<0.001$).

In the retest performed to test the reliability of the scale, Intraclass Coefficient value was determined as $r= 0.897$ ($p<0.001$). The result of the first test was 40.8 ± 15.1, and the result of the retest was 40.8 ± 14.0. There was no statistically significant difference between test-retest mean values ($p = 0.360$). Intraclass correlations of the 17 scale items are given in Table 6. All correlations are statistically significant ($p<0.001$).

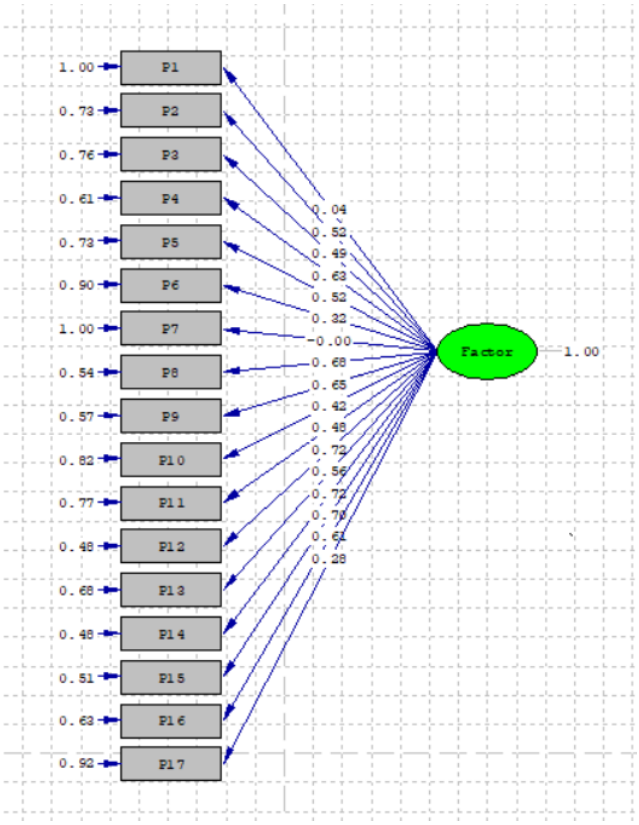

Figure 1. Standardized factor loadings in confirmatory factor analysis

Table 5. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) Results of the Scale (I: items, PCA: principal component analysis, ML: maximum likelihood, SFL: standardized factor loadings, CA: Cronbach Alpha's if item deleted)

	EFA		CFA				
I	PCA	ML	SFL.	SE	T values	R^2	CA
1	0.083	0.064	0.0354	0.0709	0.4992	0.0013	0.835
2	0.515	0.462	0.5170	0.0657	7.8729	0.2673	0.814
3	0.528	0.474	0.4921	0.0662	7.4359	0.2422	0.810
4	0.623	0.573	0.6263	0.0631	9.9267	0.3923	0.806
5	0.555	0.499	0.5201	0.0656	7.9270	0.2705	0.812
6	0.333	0.298	0.3177	0.0690	4.6059	0.1009	0.824
7	0.094	0.072	-0.0042	0.0709	-0.0590	0.0000	0.831
8	0.697	0.665	0.6790	0.0616	11.0172	0.4611	0.801
9	0.650	0.621	0.6529	0.0624	10.4673	0.4263	0.807
10	0.423	0.375	0.4208	0.0675	6.2350	0.1770	0.817
11	0.508	0.467	0.4828	0.0664	7.2749	0.2331	0.812
12	0.727	0.700	0.7242	0.0603	12.0145	0.5244	0.801

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13	0.597	0.557	0.5644	0.0646	8.7327	0.3185	0.809
14	0.727	0.693	0.7241	0.0603	12.0118	0.5243	0.800
15	0.691	0.661	0.7007	0.0610	11.4884	0.4910	0.805
16	0.619	0.588	0.6075	0.0636	9.5544	0.3690	0.807
17	0.348	0.300	0.2794	0.0694	4.0247	0.0781	0.819

Table 6. Intraclass Correlation Coefficients (n=50, *p<0.001)

Items	Correlation
Item1	0.939*
Item2	0.717*
Item3	0.878*
Item4	0.931*
Item5	0.817*
Item6	0.912*
Item7	0.719*
Item8	0.863*
Item9	0.898*
Item10	0.782*
Item11	0.938*
Item12	0.885*
Item13	0.809*
Item14	0.897*
Item15	0.828*
Item16	0.938*
Item17	0.903*

DISCUSSION – CONCLUSION

PEAS is a scale tested in terms of validity and reliability for languages such as English, French, Spanish, Hungarian, Polish, Lithuanian, Korean and utilized in many research projects conducted among sports students, athletes and elite athletes in countries such as United States, Canada and United Kingdom (Petroczi and Aidman, 2009; Hauw et al., 2016; Morente-Sánchez et al., 2014; Uvacsek, 2011; Sas-Nowosielski and Budzisz, 2018; Šukys, and Karanauskienė, 2020; Choi et at., 2019). It is an important step for the future to conduct a validity and reliability study on the Turkish version of this scale.

According to the general opinion of the athletes, the scale was easily applicable (<10 minutes). In the feedbacks, it was reported that the scale was clearly understandable.

In this study, the Turkish version of PEAS gave statistically satisfactory results in terms of validity and reliability, except for first and seventh items. Cronbach's alpha, the mean and standard deviation values of the scale were sufficient and similar to the values obtained in its original version and other studies. Test-retest reliability suggested that PEAS measures a stable construct. The values obtained from RMSEA, $\chi 2$/df ratio and other fit indices used in the confirmatory factor analysis were acceptable or almost acceptable. It was observed in the first test that the Cronbach's alpha values of the scale increased when items 1 and 7 were excluded. Regarding the item 6, its Cronbach's alpha value was at the limit and its R^2 value was at the acceptable limit. Since most of the performance enhancers mentioned in item 1 are not forbidden in our country, it is suggested that the use of item 1 is not appropriate for Turkey. Considering that the scale measures the attitudes of the participants related to doping, it is envisaged that the statement of "health problems caused by compulsive trainings and injuries are just as bad as the health problems/issues caused by doping" in the item 7 should be changed as "health problems/issues arising from doping are as bad as health problems caused by compulsory trainings and injuries". In this case, more efficient results can be obtained if certain items (particularly the items 1 and 7) are excluded and re-evaluated.

Several studies (Gucciardi et al., 2010; Elbe et al., 2012), had to exclude some items in order to make their analysis acceptable. In a study conducted by Hauw et al. (2016) on validity and reliability of the French version, it was reported that the item 10 (Athletes do not have alternative career options other than sports) was weakly correlated with other items. In this context, it was revealed that there may be cross-cultural differences between the responses given to the scale items. In addition, some studies stated that the short form of the scale showed better model fit (Sas-Nowosielski and Budzisz, 2018; Šukys, and Karanauskienė, 2020).

PEAS is a single-factor scale. Morente-Sánchez et al. (2014) argued in their study that there were correlations between recreational drugs and relevant substances, and there might be an additional hidden factor. It was stated that further research is required to totally explore the potential confounding effect of an attitude toward recreational drugs in doping context.

The validity and reliability study of the Turkish version of the scale was also carried out by Yildiz and Toros (2018). In the study conducted among licensed athletes (n=318), the Intraclass Coefficient value of the scale was 0.87; factor loads were between 0.40 and 0.65, and test-retest correlation was

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0.76. In the present study, Intraclass Coefficient value was r= 0.897, Cronbach's alpha coefficient was 0.822 and factor loads were between 0.28 and 0.72, excluding items 1 and 7. In this regard, it can be said that the results are similar.

This study suggests that PEAS is a valid and reliable scale to assess performance enhancement attitudes in Turkey. It may be useful to use short forms of the scale in future studies.

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