Original article

Adaptation of the Performance Enhancement Attitudes Scale to Individuals Doing Exercise Regularly in Turkey: A Cross-Sectional Study

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Abstract. *Study Objectives:* The aim of this study was to adapt the internationally accepted Performance Enhancement Attitude Scale to the Turkish culture and determine the reliability and validity of the adapted version. *Methods:* A total of 207 Turkish individuals, 110 males (mean age=39.33±2.45 years) and 97 females (mean age=38.91±1.51 years), aged 18 and over, who regularly engaged in exercise, participated in the study. In the analysis of the data, the exploratory factor analysis was used to determine the underlying structure of the scale items, and the confirmatory factor analysis was performed to test the compatibility between the model and the data. In addition, the Cronbach alpha reliability analysis was undertaken for reliability, and the Pearson product-moment correlation and test-retest values were obtained to examine for the item correlation analysis. *Results:* The cross-sectional multi-sample Performance Enhancement Attitude Scale consisted of 17 independent items under a single sub-dimension as in the original version. In our study, the internal consistency coefficient of the Turkish version was calculated as 0.88, the factor loads varied between 0.40 and 0.67, and the test-retest correlation was 0.79. *Conclusions:* These findings showed that the Turkish adaptation of the Performance Enhancement Attitude Scale can be reliably used for research purposes. It may be thought that is important to bring an internationally accepted instrument to the Turkish literature to be used in future research in order to investigate the performance-enhancing attitudes of exercise.

Key words: performance enhancement, scale, reliability, validity

Introduction

Performance-enhancing substances have been used in competitive and non-competitive sports for years, and the use of such substances or drugs constitutes not only a legal but also an ethical problem, especially in competitive sports (1,2). The World Anti-Doping Agency regularly updates the list of prohibited substances regarding the detection, prevention, and deterrence of doping on both national and international scales (3). However, when people are rivals, they sometimes use some performance-enhancing methods even when exercising and often resort to the use of drugs in order to gain superiority and advantage over each other (4,5).

Attitude has a mediating role between knowledge and behavior (6). By increasing knowledge, the development of attitude can also help develop behaviors that are repeated consciously or unconsciously (7). There are also studies reporting that developing

an awareness toward doping can prevent the use of performance-enhancing substances (8,9).

The aim of this research was to adapt the internationally accepted Performance Enhancement Attitude Scale (PEAS) to individuals doing exercise regularly in Turkey.

Materials and Method

Process of Translating the Scale into Turkish

The Performance Enhancement Attitude Scale (PEAS), which was first developed as a 97-item four-point Likert-type scale, was later modified by Petroczi (2009) and introduced into the literature as a 17-item six-point Likert type instrument. Responses to the items are evaluated as "strongly disagree", "disagree", "partially disagree", "partially agree", "agree", and "strongly agree". The score range of the scale is 17 to 102, with a high score indicating a positive attitude and a low score indicating a negative attitude toward doping. In previous international validity and reliability studies, the Cronbach's alpha value of the scale ranged from 0.71 to 0.91 (10,11).

During the translation process of the scale into Turkish, the content of the original scale was completely preserved, with no new statement being added or no statement being removed from the scale. The process of adapting the scale to Turkish consisted of three stages: First, the original scale was translated from English to Turkish. Then, the translated version was back-translated to English. Lastly, the understandability of the adapted statements for Turkish individuals who regularly engaged in exercise was tested. The details of these stages are given below.

Three experts working in the field of linguistics translated the scale from English to Turkish separately. These experts discussed each problematic item and reached a consensus to obtain the Turkish draft of the scale. Two experts working in the field of exercise checked this draft version, and after further discussing problematic items, they reached a consensus and prepared the final draft of the adapted scale. This draft version was then translated from Turkish into English by another specialist with a Ph.D. degree, who worked in the field of psychology and had foreign language proficiency. Considering the evaluations of the experts in both groups, the scale that was translated into English was compared with the original scale by the researchers, and it was seen that there was a high level of similarity between the two versions. In the last stage, the scale was administered to 40 individuals who regularly engaged in an exercise to test the understandability of the adapted scale. After confirming that there was no problem concerning the clarity of the scale, the main study was initiated.

Study Population

The scale was administered to individuals aged 18 years and over, who regularly exercised in fitness clubs in Mersin, Adana, Antalya, Gaziantep, and Van in Turkey. For the scale adaptation study, a total of 207 exercisers, 110 males (mean age = 39.33 ± 2.45 years) and 97 females (mean age = 38.91 ± 1.51 years), participated in the study.

Application of the Scale

The scale was completed with one-to-one interviews with the participants. The scale was applied in fitness clubs before the participants began their exercise. All the participants signed a voluntary consent form. Local ethics committee approval was obtained for the study (Date-Number: 04/10/2021-184).

Statistical analysis

In the analysis of the data, the exploratory factor analysis was used to determine the underlying structure of the scale items, and the confirmatory factor analysis was used to test the compatibility between the model and the data. SPSS v. 22.0 software package was used for the explanatory factor analysis, and LISREL 9.30 package program was used for the confirmatory factor analysis. In addition, the Cronbach alpha reliability test was conducted to analyze reliability, and the Pearson product-moment correlation and test-retest values were obtained for the analysis of item correlation.

Results

Table 1 and Table 2 show that findings related to the scale and findings regarding the construct validity of the scale are shown in Table 3.

In order to determine the scale items, factor analysis was performed, and it was seen that the items were collected under a single sub-dimension as in the original scale. The explanation of total variance for PEAS is also presented in Table 4.

Table 5 shows that the reliability value of the scale was found to be high. After the adaptation of the scale to Turkish, test-retest reliability was examined as a measure of the scale's ability to provide consistent results from one application to another. For test-retest reliability, the Turkish version of PEAS was administered to a total of 80 regularly exercising individuals, 40 females (37.03 ± 1.36 years) and 40 males (38.76 ± 1.87 years), twice at a three-week interval.

Table 6 shows that the test-retest reliability coefficient of the scale was high. In order to measure the criterion-related validity of the Turkish version of PEAS, its relationship with the Attitudes toward Doping Use Scale was examined based on the validity and reliability data provided by Petroczi (2009). The scales were applied to 50 individuals aged 18 years and older who exercised regularly. As a result of the Pearson product-moment correlation analysis performed to test the criterion-related validity, a positive and significant relationship ($p<.01$; $r=0.65$) was found between the Turkish version of PEAS and the Attitudes toward Doping Use Scale (Table 7).

Discussion and Conclusion

Translating a scale into another language causes the structure of the scale to change due to cultural differences. Examining the scale items in detail to minimize differences is the main rule of the adaptation process (12-14). Therefore, in this study, while determining the language equivalence of the scale, the translated scale was analyzed by comparing it with the

Table 1. Arithmetic mean and standard deviation values for the items of the scale

Item number	n	$\bar{X}$	*sd*
Item 1	207	1.79	1.23
Item 2	207	1.70	1.21
Item 3	207	2.83	1.43
Item 4	207	2.70	1.45
Item 5	207	2.11	1.56
Item 6	207	2.65	1.73
Item 7	207	2.09	1.49
Item 8	207	2.35	1.35
Item 9	207	2.18	1.23
Item 10	207	2.78	1.49
Item 11	207	2.65	1.48
Item 12	207	2.23	1.38
Item 13	207	2.78	1.37
Item 14	207	2.09	1.41
Item 15	207	2.21	1.60
Item 16	207	3.81	1.29
Item 17	207	2.88	1.88

$\bar{X}$: Arithmetic mean; sd: Standard deviation

Table 2. Item-item and item-general total test correlations

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17	Total
Item 1	1	.633**	.446**	.285**	.310**	.264**	.482**	.391**	.230**	.341**	.479**	.374**	.045	.350**	.307**	.392**	.299**	.667**
Item 2		1	.332**	.345**	.438**	.296**	.327**	.450**	.287**	.401**	.454**	.340**	.080	.283**	.250**	.319**	.383**	.670**
Item 3			1	.323**	.257**	.273**	.330**	.261**	.056	.282**	.295**	.275**	.329**	.247**	.301**	.296**	.272**	.501**
Item 4				1	.360**	.278**	.352**	.301**	.282**	.423**	.451**	.445**	.267**	.289**	.239**	.425**	.387**	.655**
Item 5					1	.256**	.275**	.272**	.346**	.451**	.483**	.367**	.295**	.257**	.283**	.285**	.353**	.509**
Item 6						1	.266**	.239**	.314**	.037	.444**	.251**	.061	.262**	.99	.368**	.258**	.379**
Item 7							1	.333**	.245**	.267**	.219**	.227**	.390**	.274**	.282**	.280**	.393**	.542**
Item 8								1	.249**	.286**	.300**	.393**	.338**	.269**	.320**	.385**	.300**	.586**
Item 9									1	.362**	.384**	.295**	.374**	.276**	.305**	.096	.322**	.409**
Item 10										1	.411**	.476**	.326**	.295**	.309**	.238**	.416**	.600**
Item 11											1	.435**	.278**	.249**	.352**	.296**	.329**	.651**
Item 12												1	.205**	.320**	.230**	.336**	.300**	.611**
Item 13													1	.263**	.269**	.393**	.372**	.400**
Item 14														1	.420**	.261**	.326**	.465**
Item 15															1	.388**	.332**	.408**
Item 16																1	.377**	.459**
Item 17																	1	.356**
Total																		1

**p < .01

Table 3. Exploratory and Confirmatory Factor Analysis Results of the Scale

Item	Explanatory Factor Analysis		Confirmatory Factor Analysis			
	Component Structure Pattern[a]	Factor Structure Pattern[b]	Standardized Factor Loadings	Standard Errors	t-values	R-square
1	.485	.456	.6756	.0721	8.8625	.4531
2	.544	.490	.5951	.0745	8.3496	.3545
3	.570	.515	.6498	.0710	8.1828	.4566
4	.494	.435	.6265	.0728	8.8494	.4097
5	.427	.409	.6119	.0724	8.5685	.3909
6	.670	.650	.5862	.0736	8.0800	.3545
7	.460	.419	.5202	.0789	7.1548	.2896
8	.612	.568	.4659	.0760	6.8709	.2334
9	.536	.517	.5279	.0746	7.2336	.2822
10	.420	.403	.5038	.7236	6.6579	.2450
11	.541	.526	.4340	.0749	5.6728	.1.828
12	.560	.490	.4069	.0720	5.0044	.1656
13	.400	.444	.4092	.0752	4.9074	.1662
14	.439	.420	.4047	.0745	5.0380	.1560
15	.621	.608	.4059	.0766	4.7309	.1498
16	.628	.603	.4016	.0787	5.4540	.1717
17	.530	.516	.4093	.0749	4.5640	.1174
R^2	1.000[c]	.812[c]				

Table 4. Explanation of total variance

	Total Eigenvalue	Percentage of Variance	Cumulative Percentage
Performance Enhancement Attitude Scale	5.060	48.779	48.779

Table 5. Internal consistency value of Performance Enhancement Attitude Scale

	Internal Consistency Value (Cronbach Alpha Value)
Performance Enhancement Attitude Scale	0.88**

**p < 0.01

Table 6. Test-Retest Reliability Coefficient for the Turkish Version of the Performance Enhancement Attitude Scale

	Test-Retest Confidence Coefficient
Performance Enhancement Attitude Scale	0.79

Table 7. Relationship between the Turkish Version of the Performance Enhancement Attitude Scale and the Attitudes toward Doping Use Scale

	Attitude towards Doping Use Scale
Performance Enhancement Attitude Scale	0.65**

**p < 0.01

original version, and after necessary corrections were made, expert opinion was obtained.

The confirmatory factor analysis was used in the construct validity of the adapted scale. This analysis is based on revealing latent variables (attitude, motivation, etc.) that affect the formation of an observed variable but cannot be observed. When the confirmatory factor analysis and concordance statistics were taken into account, it was found that the Turkish adaptation had a similar structure to the original scale, with the items being gathered under a single factor. The original PEAS consists of 17 items and has a single factor (10,11).

High internal consistency coefficients in scale studies indicate that the internal consistency of the scale is sufficient. In our study, the internal consistency coefficient of the adapted PEAS was 0.88. Petroczi (2009) reported the internal consistency coefficient of the PEAS as 0.85 (8,9). In another study conducted by Morente-Sánchez et al. (2014) the internal consistency coefficient of PEAS was found to be 0.71-0.85 (15), and the test-retest coefficient was calculated as 0.80 in. Considering that for use in research, the predicted reliability level of measurement tools should be 0.70, the reliability level of the adapted scale in our study was sufficient. In our study, an item analysis was carried out to determine to what extent the items constitute the measurement tool. Correlation coefficients were calculated for the item analysis. The high correlation coefficient of each item indicates that all the items of the adapted scale were effective and adequate in measuring the desired behavior. In the interpretation of the item-total correlation in the literature, it was seen that the item-total correlations were acceptable, considering that the items with a score of 0.40 and higher distinguish individuals well in terms of the measured feature.

The findings obtained from the validity and reliability studies conducted for the Turkish version of PEAS show that this version is a valid and reliable measurement tool. Therefore, we consider it important to introduce an internationally accepted instrument into the Turkish literature for use in further research to investigate the performance enhancement attitudes of exercisers. In addition, this study also presented data concerning the attitude levels of exercisers toward performance-enhancing drugs, which will contribute to future psychological studies to be carried out with exercisers.

Conflict of Interest: The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

References

1. Barkoukis V, Lazuras L, Tsorbatzoudis H, Rodafinos A. Motivational and social cognitive predictors of doping intentions in elite sports: an integrated approach. Scand J Med Sci Sports 2013;23(5), e330–e340. https://doi.org/10.1111/sms.12068
2. Palmi I, Berretta P, Tini A, Ricci G, Marinelli S. The unethicality of doping in sports. Clin Ter 2019;170(2). https://doi.org/10.7417/CT.2019.2117
3. WADA Ethics Panel: Guiding Values in Sport and Anti Doping at https://www.wada-ama.org/sites/default/files/resources/files/2021list_en.pdf (last accessed: November 02, 2021)
4. Burke LM. Caffeine and sports performance. Appl Physiol Nutr Metab 2008;33(6), 1319–1334. https://doi.org/10.1139/H08-130
5. Bird SR, Goebel C, Burke LM, Greaves RF. Doping in sport and exercise: anabolic, ergogenic, health and clinical issues. Ann Clin Biochem 2016;196–221. https://doi.org/10.1177/0004563215609952
6. Rennie DM. Health education models and food hygiene education. J Roy Soc Health. 1995;115(2):75–9. https://doi.org/10.1177/146642409511500203
7. Sanlier N, Baser F. The Relationship Among Food Safety Knowledge, Attitude, and Behavior of Young Turkish Women. J Am Coll Nutr 2020;39(3), 224–234. https://doi.org/10.1080/07315724.2019.1639084
8. Lucidi F, Zelli A, Mallia L, Grano C, Russo P and Violani C. The social-cognitive mechanisms regulating adolescents' use of doping substances. J Sports Sci 2008;26(5), 447-456. https://doi.org/10.1080/02640410701579370
9. Barkoukis V, Lazuras L, Tsorbatzoudis H, Rodafinos A. Motivational and social cognitive predictors of doping intentions in elite sports: an integrated approach. Scand J Med Sci Sports. 2013;23(5):e330-e340. https://doi.org/10.1111/sms.12068
10. Petróczi A, Heyes A, Thrower SN, Martinelli LA, Backhouse SH, Boardley LD. Understanding and building cleaner sport together: Community-based participatory research with elite athletes and anti-doping organisations from five European countries. Psychology of Sport and Exercise, 2021;55, 101932. https://doi.org/10.1016/j.psychsport.2021.101932

11. Petroczi A, Aidman E. Measuring Explicit Attitude Toward Doping: Review of the Psychometric Properties of the Performance Enhancement Attitude Scale. Psychology of Sport and Exercise, 2009;10(3), 390-396. https://doi.org/10.1016/j.psychsport.2008.11.001
12. Karacabey K, Seyhan S, Öntürk Y, Apur U, Akyel Y. Young athletes' knowledge, attitude and belief levels, which may be seen as possible explanations of doping in comparison with some other variables. Batman University Journal of Life Sciences, 2017;7 (2/2), 68-179. https://dergipark.org.tr/tr/pub/buyasambid/issue/33195/334306.
13. Turan I, Simsek U, Aslan H. The Use and Analysis of Likert Scales and Likert-Type Items in Educational Research. SUEFD 2015; 0 (30) ,186-203. https://dergipark.org.tr/tr/pub/sakaefd/issue/11235/134252.
14. Capik C, Gozum S, Aksayan S. Intercultural Scale Adaptation Stages, Language and Culture Adaptation: Updated Guideline. FNJN 2018; 26(3): 199-210. https://doi.org/10.26650/FNJN397481
15. Morente-Sanchez J, Mateo-March M, & Zabala M. Attitudes towards Doping and Related Experience in Spanish National Cycling Teams According to Different Olympic Disciplines. PLoS ONE, 2014;8(8). https://doi.org/10.1371/journal.pone.0070999

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