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Reliability and Validity of the Turkish Language Version of the Test of Performance Strategies

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ABSTRACT The aim of the present study was to examine the psychometric properties of the Test of Performance Strategies (TOPS; Thomas et al., 1999) on the Turkish population. The TOPS was designed to assess eight psychological skills and strategies used by athletes in competition (activation, automaticity, emotional control, goal-setting, imagery, relaxation, self-talk, and negative thinking) and the same strategies, except negative thinking is replaced by attentional control used in training. The sample of the study included athletes who were training and competing in a wide variety of sports across a broad range of performance standards. The final sample consisted of 433 males (mean ± s: age 22.47 ± 5.30 years) and 187 females (mean ± s: age 20.97 ± 4.78 years), 620 athletes in total (mean ± s: age 21.25 ± 4.87 years) who voluntarily participated; TOPS was administered to all participants. Afterward, Confirmatory Factor Analysis (CFA) was conducted by Analysis Moments of Structures (AMOS) 18. Comparative fit index (CFI), non-normed fit index (NNFI) and root mean square error of approximation (RMSEA) were used to verify whether the model fit the data. Goodness-of-fit statistics were CFI= .91, NNFI= .92 and RMSEA= .056. These values showed that the tested model is coherent at a satisfactory level. Moreover, results of confirmatory factor analyses revealed that a total of four items (two items from competition and two from practice) within the subscale of automaticity have been removed. The 28 items within the remaining seven subscales have been validated. In conclusion, Turkish version of TOPS is a valid and reliable instrument to assess the psychological skills and strategies used by athletes in competition and practices.

KEY WORDS Psychological Strategies, Psychological Skills, Confirmatory Factor Analysis.

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LANGUAGE VERSION OF TEST OF PERFORMANCE STRATEGIES
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Introduction

Research results have indicated that sport as a concept is nested with several disciplines, one of which is psychology. Research on psychology has shown that the time allocated to the psychological skills should be comparable to that allocated to physiological skills.

Psychological skills used in a sport environment, such as goal setting, imagery, concentration, emotional control, relaxation, etc., are helpful to athletes in reaching their training and competition goals and can be learned (Ritz, 2012; Malouff, 2008). All psychological skills have been confirmed to characterize successful and unsuccessful athletes (Katsikas, Argeitaki & Smirniotou, 2009). Due to the decisive role of psychological skills, along with training and competition techniques, it is evident that its effect on the performance of the athletes in the world is crucial.

Speaking broadly, the process of teaching the psychological skills used in sports is called psychological skill training. A more detailed description of practices includes combinations of individual or group work to attain psychological skill needs of athletes. These combinations of skills are for research and training purposes in general, and the skills specified in the training program are all inter-linked (Weinburg & Gould, 2007; Sindik, Botica & Fiskus, 2015).

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Many scientific research studies have indicated the contribution of psychological skill training in the performance and daily lives of the athletes in many social-psychological parameters (Tenenbaum & Eklund, 2007). One common way to test the effectiveness and efficacy of the psychological skill training on athletes is to identify psychological performance strategies used in psychological processes encountered in training and competitions. Sports psychologists aim to identify the strengths and weaknesses of athletes using the psychological assessment of athletes.

The efforts to identify the athletes' psychological performance strategies in a scientific context began with the Psychological Performance Scale (PPS), developed by Loehr in 1986. This scale was developed to improve the athletes' capacity to understand mental skills and their perceptions of those skills. The Psychological Performance Scale includes the sub-dimensions confidence, negative energy, attention control, visual and imagery control, motivation level, positive energy and attitude control. To determine the validity and reliability of the scale, a number of research studies have been conducted, the results of which were inconsistent with each other (Thomas, Murphy & Hardy, 1999). Consequently, PPS has not been used much as research parameters in psychological applications.

Later, Mahoney et al. (1987) developed the Psychological Skill in Sports scale, which has been used in several studies. It consists of 51 true-false questions that aim to determine and evaluate the psychological skills related to the performance of successful athletes. It was revised to a newer version with 45 items and six sub-sections with the performed statistical analysis in the development process of the scale. These are anxiety control, trust, concentration, motivation, team integrity, and mental preparation. The scale (scored with 5-point Likert) was successful in determining and classifying gender differences (White, 1993). However, researchers interested in the topic encountered some significant statistical problems, such as very low alpha coefficients (Chartrand et al., 1992), invalid factor structure (Tammen & Murphy, 1990), and confirmatory factor analysis results.

Another scale to determine strategies for using psychological skills is Athletic Coping Skills. The development process of this scale began in 1990, and the latest version was reached in 1995. The ACS started with 42 questions and eight sub-dimensions and then evolved to a version with seven sub-dimensions and 28 questions. The scale, which aims to examine the psychological skills used in the process of performance stabilization and development, has sub-dimensions including coping with adversity, goal setting/mental preparation, concentration, confidence and achievement motivation, coachability, freedom from worry, and ability to cope with difficulties (Smith & Christensen, 1995). The scale has the best statistical results regarding validity and reliability to date. The first significant problem with this scale was that confirmatory factor analysis and exploratory factor analysis was performed on the same participants. The second important critique was that even the scale comprises all the psychological skills in general, it only investigates stress management and its limited skills.

After all the scales mentioned above and their positive and negative points, Performance Strategies scale was developed by Thomas et al. in 1999. The critiques of the other methods disregarded the psychological processes the athletes go through while preparing for competitions and usage of psychological skills in competitions. According to Thomas et al., the psychological skills and their usage strategies are parts of the training process and this process has always been neglected. When an athlete in any branch is considered, he/she spends 90% percent of his/her sports time in training, which supports the significance of the previous statement (McCann, 1995).

In light of that information, Thomas et al. developed the scale that aims to determine the ratio of the psychological skill usage and ability with the aid of questions (which were answered by 472 athletes) specific to competition and training environments. Participating athletes who were training and competing from a broad range of different sports and categories created heterogeneity that revealed broad applicability across a wide variety of performance levels and ages (Lane et al., 2004). The ability to evaluate psychological strategies within the practice and its strong statistical infrastructure has caused it to become a recommended instrument to assess psychological strategies within the sport environment (Katsikus, 2011).

Because of its critical power, all responsible staff (athletes, coaches, sport psychologists) in the sport environment have accepted it as a valid and reliable instrument for evaluating psychological skills and strategies. Moreover, the TOPS has been approved as a research tool to evaluate the effectiveness of interventions to improve mental skills and to determine proper psychological skills for intact athletes in various countries. The first process of this type of adaptation studies was confirmatory factor analysis (CFA). Items of subscales and sub-domains can be understood differently within different communities, and one of the best ways is using CFA to verify the validity and reliability values of test models to confirm that the questionnaire used (TOPS) is a reliable instrument. In light of all the above information, the aim of the present study was to assess the psychometric properties of TOPS on the Turkish population.

Methods

This is a scale adaptation study. Within its context, the preliminary application of the scale that was tested its Turkish equivalence by experts, after that validity and reliability procedures have been practiced to the obtained data.

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Participants

The sample of the study consisted of 433 males (22.47 ± 5.30 years) and 187 females (20.97 ± 4.78 years); in total, 620 athletes (mean ± s: age 21.25 ± 4.87 years) volunteered to participate the current study. Those athletes were training and competing in a broad variety of sports and had different levels of competition experience. The participants were chosen from 17 different sports, including soccer, basketball, volleyball, handball, track and field, tennis, and swimming.

Measuring Instrument

The TOPS (Thomas et al., 1999) was used to evaluate the psychological skills used by athletes in various situations, including competition and practice. As described earlier, the TOPS is a 64-item instrument assessing 16 psychological skills in both practice and competition. All questions require that the participant respond to a five-point Likert-type frequency scale, with "1" meaning never and "5" always. The subscales of TOPS, their definitions, and example items are displayed in Table 1.

TABLE 1 All subscales of TOPS, their definitions, and example items.

Subscales	Definition	Example Item for Competition	Example Item for Practice
Goal Setting	Setting performance- and outcome-related goals or objectives	I set very specific goals	I set realistic but challenging goals for practice
Imagery	Visualizing sport movements prior to actual performance	I imagine a competitive routine before I do it	I rehearse my performance in my mind
Activation	Controlling an optimal arousal specific to the demands of the mission	I raise my energy level when necessary	I practice energizing during training sessions
Self-talk	Carrying on positive internal dialogue	I have specific cue words or phrases that I say to myself to help my performance during competition	I motivate myself to train through positive talk
Emotional Control	Control over athlete's emotions during tough situations	My emotions get out of control under the pressure of competition	When I perform poorly, I lose my focus in training
Automaticity	Occurring skills without conscious thought	I perform at competitions without consciously thinking about it	During practice sessions, seems to be in a flow
Relaxation	Applying strategies to remain calm before a challenge	I am able to relax if I get too nervous	Practice using relaxation techniques at workouts
Negative Thinking (competition only)	Entertaining thoughts of failure	I am able to keep my thoughts positive	
Attentional Control (practice only)	Focusing attention effectively		I am able to control distracting thoughts when training

Translation and Turkish-English Equivalency of the Scale

The Test of Performance Strategies survey was translated into Turkish by the author with the supervision of two experts in the English language. Afterward, the items of the instrument were examined by two Turkish language expert academics and one physical education and sport education academic who made an evaluation of the construction of the scale. Corrections were made according to these views.

Following the views and suggestions of the three experts, the initial form of the instrument was established. After that, items of the Turkish form of the instrument were translated into English by two bilinguals to compare the Turkish-English equivalency of the scale by item-by-item back-translation. Finally, an item-by-item comparison of the results revealed that the two forms are identical in terms of the items' meaning. These findings prove that the Turkish and English versions of the instruments can be regarded as being equivalent.

Statistical Analysis

Confirmatory Factor Analysis (CFA) was conducted by Analysis Moments of Structures (AMOS 18). Comparative fit index (CFI), non-normed fit index (NNFI) and root mean square error of approximation (RMSEA) were used to check if the model fit the data. Cronbach's Coefficient Alpha was computed to check for the internal consistency of adapted scale. The following Threshold Levels were used in order to prove model fits (Öcal, 2011).

TABLE 2 Fit Indices and Their Acceptable Threshold Levels

Fit Index	Acceptable Threshold Levels
Chi Square/df	$\chi^2 / df < 5$ (Wheaton et al, 1977)
CFI	CFI>0.90, acceptable (Maruyama, 1998)
NNFI(TLI)	NNFI>0.90 acceptable (Maruyama, 1998)
RMSEA	RMSEA<0.08, adequate model fit (Jaccard & Wan, 1996)

Results

Because the TOPS has two different sub-dimensions (Competition & Practice strategies) used together, the results of the analysis are given as separate subheadings for those sub-dimensions.

CFA Analysis of Competition Strategies Sub-dimension

CFA was used in order to test the factor structure that shows the Competition strategies sub-dimension of the Test of Performance Strategies over the data gathered from athletes. Firstly, for a model with eight factors (activation, automaticity, emotional control, goal-setting, imagery, relaxation, self-talk, and negative thinking) set in the original sub-dimension, goodness of fit (GOF) statistics were calculated. As a result of the analysis, $\chi 2$ (df=341, p=.00)=1520.01, $\chi 2$ 152/ df =4.46, RMSEA (Root Mean Square Error of Approximation)=.161, CFI (Comparative Fit Index)=0.86, NNFI (Non-Normed Fit Index)=0.85 indicated that the model was not fit with the expected level. Concerning these results, it was detected that two items' factor loading were low in their own factor, two items from automaticity subscale for competition strategies (item 30 (0.17) and item 41 (0.15)). Because of these results, the related items were taken out of the model and analysed again.

The second CFA results were $\chi 2$ (df=260, p=.00)=572, $\chi 2$ 572/ df =2.2, RMSEA (Root Mean Square Error of Approximation)=.061, CFI (Comparative Fit Index)=0.94, NNFI (Non-Normed Fit Index)=0.93 indicated that the model is coherent at a satisfactory level.

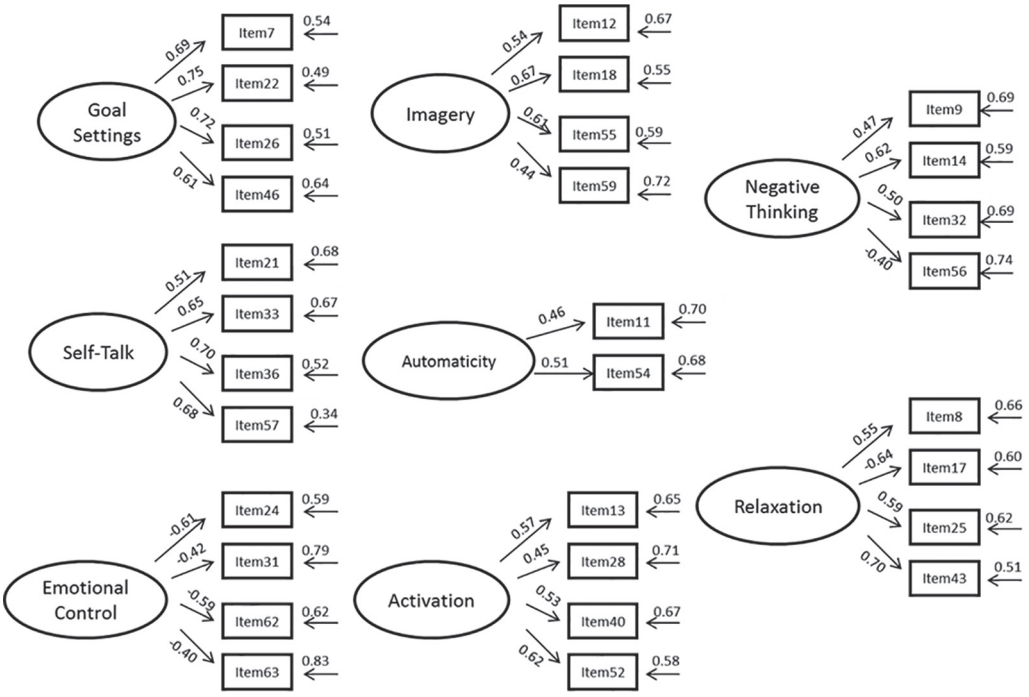

FIGURE 1 CFA Results for TOPS Competition Strategies

To estimate the reliability level of the competition sub-dimension, the Cronbach's alpha was used. Separately, the Cronbach's alpha level of each subscale and the overall of competition sub-dimension values were obtained. Per the results reported in the table below, the Cronbach's alpha coefficient for each variable is equal or greater than .58, and the Cronbach's alpha coefficient of competition sub-dimension was .81. Moreover, Analysis of "if item deleted" results did not yield any improvements.

TABLE 3 Cronbach's Alpha coefficients values of the competition sub-dimension

Values	No of Items	Items	Subscales
.64	4	21,33,36,57	Self-talk
.66	4	24,31,62,63	Negative Thinking
.58	2	11,54	Automaticity
.74	4	7,22,26,46	Goal Setting
.81	4	12,18,55,59	Imagery
.73	4	13,28,40,52	Activation
.78	4	9,14,32,56	Negative Thinking
.60	4	8,17,25,43	Relaxation
.88	30	8 subscales	Total alpha of competition

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The mean points taken from the competition strategies sub-dimension were 107.10 (S=23.29) for total, 15.34 (S=4.37) for the Self-Talk subscale, 13.67 (S=4.71) for the Emotional Control Subscale, 15.10 (S=4.05) for the Goal Setting subscale, 14.50 (S=4.64) for the Imagery subscale, 15.91 (S=3.99) for the Activation subscale, 15.07 (S=4.23) for the Relaxation subscale, 14.39 (S=4.64) for the Negative Thinking subscale, and 7.19 (S=2.42) for the Automaticity subscale.

CFA Analysis of Practice Strategies Sub-dimension

CFA was used to test the factor structure that shows the Practice strategies sub-dimension of the Test of Performance Strategies over the data gathered from athletes. Firstly, for a model with eight factors (activation, automaticity, emotional control, goal-setting, imagery, relaxation, self-talk and attention control) set in the original sub-dimension, goodness of fit (GOF) statistics were figured out. As a result of the analysis, $\chi 2$ (df=330, p=.00)=1392.6, $\chi 2$ 1392/ df =4.22, RMSEA (Root Mean Square Error of Approximation)=.195, CFI (Comparative Fit Index)=0.84, NNFI (Non-Normed Fit Index)=0.83 indicated that the model did not fit with the expected level. Concerning these results, it was detected the two items' factor loading were low in their own factor, two items that from automaticity subscale for competition strategies (item 23 (0.19) and item 48 (0.20)). Because of these results, the related items were taken out of the model and analysed again.

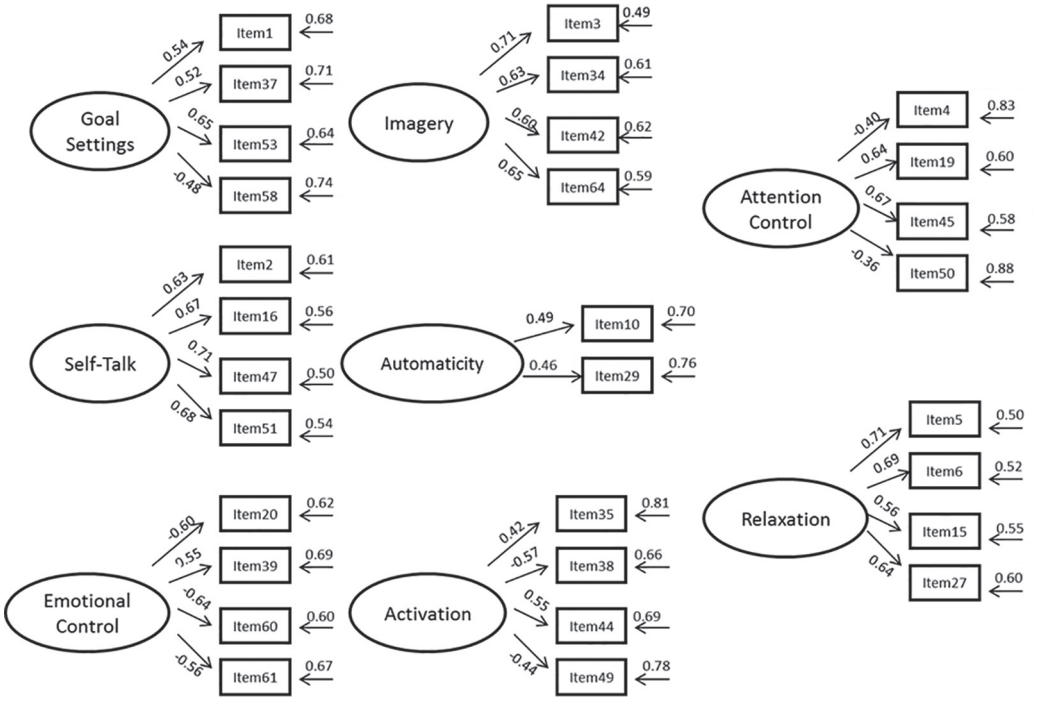

FIGURE 2 CFA Results for TOPS Practice Strategies

The second CFA results were $\chi 2$ (df=252, p=.00)=960.12, $\chi 2$ 960/ df =3.81, RMSEA (Root Mean Square Error of Approximation)=.138, CFI (Comparative Fit Index)=0.89 NNFI (Non-Normed Fit Index)=0.87 pointed out that the model did not fit with the expected level. Furthermore, modification indices were checked, and the pairs with high error covariances were connected (item 35, item 49 and item 4, item 50) and the model was revised again.

The third CFA results for practice strategies were $\chi 2$ (df=234, p=.00)=498.42, $\chi 2$ 498/ df =2.13, RMSEA (Root Mean Square Error of Approximation)=.054, CFI (Comparative Fit Index)=0.93, NNFI (Non-Normed Fit Index)=0.90 indicated that the model is coherent at a satisfactory level.

TABLE 4 Cronbach's Alpha coefficients values of the practice sub-dimension

Values	No of Items	Items	Subscales
.64	4	2,16,47,51	Self-talk
.74	4	20,39,60,61	Emotional Control
.55	2	10,29	Automaticity
.71	4	1,37,53,58	Goal Setting
.63	4	3,34,42,64	Imagery
.69	4	35,38,44,49	Activation
.76	4	4,19,45,50	Attentional Control
.76	4	5,6,15,27	Relaxation
.83	30	8 subscales	Total alpha of practice

To estimate the reliability level of the competition sub-dimension, Cronbach's alpha was used. Separately the Cronbach's alpha level of each subscale and the overall of practice sub-dimension values were obtained. According to the results reported in the table below, Cronbach's alpha coefficient for each variable is equal or greater than .55 and Cronbach's alpha coefficient of the practice sub-dimension was .83. Moreover, analysis of "if item deleted" results did not yield any improvements.

The mean points taken from the competition strategies sub-dimension were 112.36 (S=26.45) for the total, 15.81 (S=3.19) for the Self-Talk subscale, 13.64 (S=3.07) for the Emotional Control Subscale, 14.96 (S=3.04) for the Goal Setting subscale, 15.44 (S=3.03) for the Imagery subscale, 13.85 (S=3.17) for the Activation subscale, 14.18 (S=3.07) for the Relaxation subscale, 14.19 (S=3.00) for the Attentional Control subscale, and 7.36 (S=2.16) for the Automaticity subscale.

Discussion

In this study, the goal was to examine the psychometric properties of the Test of Performance Strategies (TOPS; Thomas et al., 1999) on a Turkish population. The confirmatory factor analysis was used and the data were collected from 620 athletes from 17 different sports. Confirmatory factor analysis results supported the initial structure of the inventory for the overall model. Cronbach's alpha values of competition sub-dimensions' subscales provided adequate scores for the internal consistency of the competition strategies. However, it should be noted that the subscale of automaticity demonstrated low factor loadings (item 11= .46 and item 54= .51) and the Cronbach's alpha values (.58). It can be attributed to the fact that this subscale has only two items and that amount is half the amount of others.

Moreover, there were seventeen sports with different features, and the environments (some of them with automatic execution; some of them with more focus to focus on technical aspects) of those sports can be the reason for that result. The items of automaticity for competition and practice strategies can confuse the participant's as they read them because of phrases like "automatic pilot", "flow naturally from one to another", "just seem to be in the flow" or "just let it happen". Those words are not commonly used in Turkish sport literature, so athletes could not understand clearly the exact meaning of the items.

The remaining items related with the automaticity subscale got acceptable but poor factor loading values (item 11= .46 and item 54= .51 for competition strategies and item1 0= .49 and item 29= .46); removing the subscale to protect the initial structure of the questionnaire was not considered. The general results of the reliability of competition and practice strategies separately confirmed the idea of not removing those subscales by having the Cronbach's alpha .88 for the competition and .83 for practice strategies sub-dimensions. In the study of Donti & Katsikas (2014), the automaticity subscale was in low factor loading; consequently, they decided to remove that subscale from the questionnaire. As a result, they reached acceptable model fit.

Furthermore, in their study Katsikas et al., (2011) despite having reached acceptable factor loadings for automaticity subscale, encountered difficulties regarding athletes clearly understanding the problem of automaticity items. In another study, Hardy et al. (2010) suggested giving more attention to the automaticity subscale items, and that they required re-examination and re-phrasing.

With the possible exception of four items, the present results show that the Turkish version of the Test of performance Strategies has quite strong psychometric properties: it is a valid and reliable test instrument to evaluate critical practice and competition strategies and to profile athletes' strengths and weaknesses in applied settings.

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