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To cite this article: Emine Iyigun, Sevinc Tastan, Hatice Ayhan, Gulsah Kose & Cengizhan Acikel (2016) Validity and reliability analysis of the planned behavior theory scale related to the testicular self-examination in a Turkish context, Postgraduate Medicine, 128:5, 496-501, DOI: 10.1080/00325481.2016.1182872

To link to this article: <https://doi.org/10.1080/00325481.2016.1182872>



Accepted author version posted online: 26  
Apr 2016.  
Published online: 10 May 2016.



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CLINICAL FEATURE  
ORIGINAL RESEARCH

## Validity and reliability analysis of the planned behavior theory scale related to the testicular self-examination in a Turkish context

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### ABSTRACT

**Objective:** This study aimed to determine the validity and reliability levels of the Planned Behavior Theory Scale as related to a testicular self-examination.

**Methods:** The study was carried out in a health-profession higher-education school in Ankara, Turkey, from April to June 2012. The study participants comprised 215 male students. Study data were collected by using a questionnaire, a planned behavior theory scale related to testicular self-examination, and Champion's Health Belief Model Scale (CHBMS).

**Results:** The sub-dimensions of the planned behavior theory scale, namely those of intention, attitude, subjective norms and self-efficacy, were found to have Cronbach's alpha values of between 0.81 and 0.89. Exploratory factor analysis showed that items of the scale had five factors that accounted for 75% of the variance. Of these, the sub-dimension of intention was found to have the highest level of contribution. A significant correlation was found between the sub-dimensions of the testicular self-examination planned behavior theory scale and those of CHBMS ( $p < 0.05$ ).

**Conclusion:** The findings suggest that the Turkish version of the testicular self-examination Planned Behavior Theory Scale is a valid and reliable measurement for Turkish society.

### ARTICLE HISTORY

Received 14 March 2016

Accepted 22 April 2016

Published online 11 May 2016

### KEYWORDS

Testicular cancer; testicular self-examination; planned behavior theory

### Introduction

Testicular tumors are the most frequently malignant tumors experienced by young adults between the ages of 15 and 35. Testicular tumors comprise 1–1.5% of all malignant tumors and 5% of urologic tumors in men. The possibility for a man to experience testicular tumors in their life is about 0.2% and this rate has been increasing.[1–3] If testicular cancer is diagnosed at an early stage, the survival rate becomes 96%.[4] The main factors enabling the success of treatment include: early diagnosis, careful staging at diagnosis, a multidisciplinary treatment approach at an early stage (surgery, chemotherapy, and radiotherapy), strict follow-up, and salvage therapies.[5] Therefore, early detection of testicular cancer is vital, especially for young adults.[6]

There is no consensus from the results of previous studies on early diagnosis of testicular cancer by testicular self-examination (TSE), specifically for prevention or reduction in mortality. Therefore, there are also differences in the widely used guidelines on the subject. The US Preventive Services Task Force (USPSTF) does not recommend TSE.[7] In addition, false positive test results of individuals with TSE increased anxiety, and the procedures and invasive interference from procedures that are performed to confirm the diagnosis may damage the individuals and increase cost. In comparison, the European Association of Urology indicates that staging and prognosis are directly associated with early diagnosis and

suggests TSE by individuals in the presence of clinical-risk factors.[5] Similarly, Rovito et al. [8] expressed that TSE is a useful behavior for diagnosing testicular cancer, promotes testicular health, and raises awareness. When men know the shape and structure of their testicles, abnormalities will be easily detected. Thus, it will create an opportunity for further evaluation of testicular cancer, such as by ultrasound scan and 'tumor markers.'

Although TSE is both inexpensive and easy to implement, young-adult males are known not to employ it very often.[4] Research suggests that knowledge and awareness by young-adult males about testicular cancer are lower and the rate of practicing TSE among them varies between 1% and 57.5%.[4,9–13] It has been reported that health-related attitudes and beliefs of individuals have an impact on health behaviors. Studies have shown that the frequencies of application to clinical examination of individuals with a positive attitude about self-examination are higher. [14,15]

There are various psychosocial models and theories dealing with these attitudes and beliefs. One of the most frequently used theories for this aim is the Theory of Planned Behavior (TPB). TPB argues that it is the individuals' intentions about certain actions which determine their behavior.[16,17] Behavioral intention of individuals refers to the tendency of individuals to do or not to do a specific act. The theory also argues that people's social acts are controlled by three main

belief factors: (1) behavioral beliefs are those about the possible outcomes of a specific act and the evaluation of these outcomes; (2) normative beliefs are those beliefs about individuals' normative expectations, and (3) control beliefs are those beliefs about the presence of the acts which could facilitate the acts or hinder it. Behavioral beliefs produce either positive or negative attitudes about the act. Normative beliefs offer a perceived subjective norm. Control beliefs lead to perceived behavioral control (PBC). In the development of behavioral intention attitudes, subjective norm and PBC play a significant role.[16,17] Another factor in this process is the concept of self-efficacy.[18–20]

There are numerous studies suggesting that individuals' intentions about certain acts and realizing them can be accounted for through TPB.[18–20] In recent years, this theory has been used in studies concerning health-related behaviors. In one such study, a planned behavior theory about TSE was developed based on TPB.[21] McClenahan et al. [21] examined the efficiency and use of both the Health Belief Model (HBM) and the TPB in predicting TSE behavior. After comparing both approaches, they concluded that the TPB is a better model than HBM in reports by individuals about their TSE experience and in predicting their intention to perform TSE.[21]

This past research suggested that valid and reliable data collection tools should be used in studies dealing with intention and attitudes toward using the TSE. In recent years, one such data collection tool developed based on the HBM was analyzed in terms of its reliability and validity in a Turkish context.[22] However, such studies were not carried out in relation to a scale based on the TPB for use in Turkey. Therefore, this study aims at determining the validity and reliability levels of the planned behavior theory scale related to TSE developed by McClenahan et al. [21] in a Turkish context.

## Method

### Study design and setting

The study was designed to determine the validity and reliability levels of the planned behavior theory scale related to the TSE developed by McClenahan et al. [21]. It was carried out in a health vocational higher education school in Ankara, Turkey on April 2012.

### Participants

The number of participants was determined based on the number of the items in the scale. More specifically, it was planned to have five times more participants than the number of items. (Given that there were 16 items in the scale, resulting in a total target of 160 participants, since this would be 10 times more than the number of items.) All volunteer students were included in the study. The number of the participants was 215 male students of whom 105 were first-year students and 110 were second-year students.

### Data collection tool

A data collection tool was developed by the authors based on the review of literature. It consisted of three sections. The first section included items for birthdate, grade level, information about testicular cancer and about TSE behavior. The second section included the planned behavior theory scale related to the TSE. The last section covered the HBM Scale, which was used to evaluate criterion validity for the TPB-based scale.

### Planned behavior theory scale related to TSE

The scale was developed by McClenahan et al. [21]. It consisted of 5 subdimensions and 16 Likert-type items. The subdimensions were as follows: intention (3 items), attitude (4 items), subjective norms (3 items), PBC (2 items), and self-efficacy (4 items). McClenahan et al. [21] found the internal consistency Cronbach's alpha coefficients of the subdimension to vary between 0.74 and 0.87.

### Champion's Health Belief Model Scale

Champion's Health Belief Model Scale (CHBMS) identifies beliefs and practices about the TSE following the modification of Champion's HBM.[22] Its reliability and validity analyses into Turkish were examined by Pinar et al. [22]. CHBMS is made up of 26 items and 5 subdimensions. The subdimensions are susceptibility: 5 items, severity: 7 items, benefits: 3 items, barriers: 5 items, and self-efficacy: 6 items. Pinar et al. [22] found the internal consistency Cronbach's alpha coefficients of the subdimension to vary between 0.64 and 0.92.

### Implementation

At the beginning of the study, permission was granted from Dr. Carol A. McClenahan through e-mail.

In order to establish the linguistic validity of the scale, it was independently translated into Turkish by three bilingual (Turkish and English) experts who are experienced clinical nurses and who have good English ability, as well as by a faculty member. The analyses of content validity were done by three other nurse trainers. Following consensus on the translated text, the scale was retranslated into English by three language specialists. All three translated texts were reviewed in terms of consistency based on the original text. After establishing that there were no significant semantic differences in the items, the scale was finalized.

In order to evaluate the comprehensibility of the scale, the researchers conducted face-to-face interviews with 10 students, who were excluded from the scope of the sample. During the interviews, the questions were discussed, and comprehensibility of the scale and the appropriateness of the items were evaluated. Next, an expert panel met to evaluate issues and decided not to make any changes to any of the items in the scale. The scale was administered to participants in their classes and the process lasted for approximately 15–20 min.

## Ethical considerations

Ethical and administrative permissions were granted from the ethical committee of the institution where the study was carried out (1491-12-12/1648-4256). The participants were informed about the study and their approval was also granted. They were told that their names would be kept confidential.

## Data analysis

Data analyses were carried out using SPSS version 15.0 (Chicago, IL, USA). Descriptive statistics were utilized for the analysis of the socio-demographic data (frequency, percent, mean, and standard deviation). The Kolmogorov–Smirnov test, which was conducted to test the distribution of the data for normality, found that the data corresponded to a normal distribution. As such, Pearson's correlation coefficient was used for item analysis. Cronbach's alpha coefficient was used to establish the internal consistency of the scale. Both exploratory factor analysis and varimax rotation were used to analyze construct validity. The Kaiser–Meyer–Olkin (KMO) test was employed to evaluate the appropriateness of the sample size. Factors that had Eigenvalues of more than 1 and that were located up to the place that the scree plot flattened were extracted. Pearson's correlation coefficient was used to test scale validity and to examine the correlation between mean score of the subdimension of the TSE TPB Scale and CHBMS. The significance level was set at  $p < 0.05$ .

## Results

### Characteristics of participants

The mean age range of males was  $20.20 \pm 1.02$ . Regarding grade levels, 48.8% of the participants were in their first year ( $n = 105$ ), while 51.2% were in their second year ( $n = 110$ ). In relation to knowledge about testicular cancer, 87.4% of the participants reported that they had no information about this ( $n = 188$ ), and 86.5% reported that they did not have any experience with TSE ( $n = 185$ ).

### Reliability

Table 1 shows the results of the item analysis and internal consistency analysis over the TSE TPB Scale. The results of the item analysis which was based on the corrected item-total correlation of the scale showed that the correlation coefficients of all items varied between 0.37 and 0.92. It was observed that exclusion of any item from the scale did not lead to any increase in Cronbach's alpha coefficient. Therefore, it was decided not to exclude any item from the scale based on the findings obtained from the item analysis.

Regarding internal consistency, Cronbach's alpha coefficients were found for the factors of intention 0.85, attitude 0.89, subjective norms 0.81, PBC 0.54, and self-efficacy 0.87.

Since, the PBC consisted of two items, Cronbach's alpha was not calculated if an item was deleted. Consequently, these two items are not shown in Table 1. Total Cronbach's alpha coefficient of the scale was 0.807.

**Table 1.** Item analysis and internal consistency of the theory of planned behavior scale related to the TSE.

Item	Corrected item-total correlation	Cronbach's alpha if item deleted	Cronbach's alpha
<b>Intention</b>			
I intend to perform testicular self-examination once a month	0.626	0.877	0.850
I will try to perform testicular self-examination in the next month	0.790	0.722	
I have decided to perform testicular self-examination in the next month	0.749	0.763	
<b>Attitude</b>			
My performing testicular self-examination in the next month would be extremely harmful–beneficial	0.662	0.886	0.885
My performing testicular self-examination in the next month would be extremely negative–positive	0.777	0.842	
My performing testicular self-examination in the next month would be extremely unpleasant–pleasant	0.828	0.822	
My performing testicular self-examination in the next month would be extremely bad–good	0.736	0.858	
<b>Subjective norm</b>			
Most people who are important to me think that I should perform testicular self-examination in the next month	0.589	0.798	0.805
Most people who are important to me would approve of me performing testicular self-examination in the next month	0.656	0.728	
Most people who are important to me would want me to perform testicular self-examination in the next month (7-point scale: extremely unlikely–extremely likely)	0.713	0.668	
<b>Self-efficacy</b>			
I am confident that I can perform testicular self-examination in the next month	0.821	0.786	0.866
I believe I have the ability to perform testicular self-examination in the next month	0.517	0.917	
I feel capable of performing testicular self-examination in the next month	0.747	0.817	
Performing testicular self-examination in the next month would be...	0.821	0.786	

TSE: testicular self-examination; PBC: perceived behavioral control; NA: not applicable.

### Validity

Tests showed that the sample size was sufficient for factor analysis (KMO = 0.804, Bartlett's test,  $p = 0.01$ ). The results of the exploratory factor analysis are given in Table 2. The items of the TSE TPB Scale were grouped under five factors of which

**Table 2.** Behavior theory scale related to the TSE factor loadings.

Item	Factor 1 Intention	Factor 2 Attitude	Factor 3 Subjective norms	Factor 4 PBC	Factor 5 Self- efficacy
I intend to perform testicular self-examination once a month	0.713	–	–	–	–
I will try to perform testicular self-examination in the next month	0.875	–	–	–	–
I have decided to perform testicular self-examination in the next month	0.822	–	–	–	–
My performing testicular self-examination in the next month would be extremely harmful–beneficial	–	0.808	–	–	–
My performing testicular self-examination in the next month would be extremely negative–positive	–	0.894	–	–	–
My performing testicular self-examination in the next month would be extremely unpleasant–pleasant	–	0.898	–	–	–
My performing testicular self-examination in the next month would be extremely bad–good	–	0.810	–	–	–
Most people who are important to me think that I should perform testicular self-examination in the next month	–	–	0.750	–	–
Most people who are important to me would approve of me performing testicular self-examination in the next month	–	–	0.824	–	–
Most people who are important to me would want me to perform testicular self-examination in the next month (7-point scale: extremely unlikely–extremely likely)	–	–	0.767	–	–
Whether or not I perform testicular self-examination in the next month is entirely up to me	–	–	–	0.745	–
Performing testicular self-examination in the next month is beyond my control ( <i>r</i> )	–	–	–	0.859	–
I am confident that I can perform testicular self-examination in the next month	–	–	–	–	0.784
I believe I have the ability to perform testicular self-examination in the next month	–	–	–	–	0.787

(Continued)

**Table 2.** (Continued).

Item	Factor 1 Intention	Factor 2 Attitude	Factor 3 Subjective norms	Factor 4 PBC	Factor 5 Self- efficacy
I feel capable of performing testicular self-examination in the next month	–	–	–	–	0.829
Performing testicular self-examination in the next month would be...	–	–	–	–	0.784
Eigenvalues	5.4	2.8	1.6	1.2	1.0
Total percentage and cumulative addition	33%	17%	10%	7%	6%
Total percentage of the model	–	–	–	–	75%

TSE: testicular self-examination.

core values were higher than one. Given that factor, loadings of the items in the scale were higher than 0.71, no item was excluded from the scale. More specifically, the items of the TSE TPB scale were grouped as follows: Items 1–3 belong to the factor of ‘intention,’ items 4–7 ‘attitude,’ items 8–10 ‘subjective norms,’ items 11–12 ‘PBC,’ and items 13–16 ‘self-efficacy.’ Five factors were found to account for 75% of the total variance. Of these factors, intention had the highest rate in this contribution (33%).

In evaluating the criterion validity of TSE TPB Scale, CHBMS was employed. The Pearson’s correlation coefficient was used to examine the correlation between mean score of the sub-dimension of the TSE TPB Scale and CHBMS (Table 3). The analysis showed that there was a significant correlation between the mean score of the subdimension of the TSE TPB scale and that of CHBMS ( $p < 0.05$ ). More specifically, the factor of intention in the TSE TPB scale and the factors of severity, benefits, and self-efficacy in the CHBMS were found to have a positive and significant correlation ( $p < 0.05$ ). The factor of attitude in the TSE TPB Scale and the factor of severity in the CHBMS were found to have a significant correlation ( $p < 0.05$ ). The factor of subjective norm in the TSE TPB Scale and the factors of severity and susceptibility in the CHBMS were found to have a significant correlation. The factor of PBC in the TSE TPB Scale and the factors of susceptibility and benefits in the CHBMS were found to have a significant correlation ( $p < 0.05$ ). Lastly, the factor of self-efficacy in the TSE TPB Scale and the factors of severity, benefits, and self-efficacy in the CHBMS were found to have a significant correlation ( $p < 0.05$ ).

### Discussion

Testicular cancer can be diagnosed at early stages, and if so, it can be successfully treated at a level of more than 90%. TSE is very significant in early diagnosis of testicular cancer, easy to apply, and is a cost-effective health-care behavior. However, it is rarely used by men.[23] The TPB is used in evaluating individuals’ intentions toward a specific behavior and in predicting the possibility of occurrence. In this study, the reliability and validity of the TSE TPB scale were analyzed in a

**Table 3.** Correlation analysis between the TPB scale's subscales and the CHBMS's subscales.

		Intention	Attitude	Subjective norm	PBC	Self-efficacy	Susceptibility	Severity	Benefit	Barriers	Self-efficacy
<b>Intention</b>	<i>r</i> *										
	<i>p</i>										
Attitude	<i>r</i> *	0.057									
	<i>p</i>	0.413									
Subjective Norm	<i>r</i> *	0.538	0.263								
	<i>p</i>	0.000	0.000								
PBC	<i>r</i> *	0.170	0.096	0.060							
	<i>p</i>	0.014	0.171	0.388							
Self-efficacy	<i>r</i> *	0.513	0.162	0.386	0.270						
	<i>p</i>	0.000	0.020	0.000	0.000						
Susceptibility	<i>r</i> *	0.000	0.081	0.166	0.172	0.027					
	<i>p</i>	0.996	0.250	0.016	0.012	0.703					
Severity	<i>r</i> *	0.442	0.664	0.841	0.096	0.375	0.153				
	<i>p</i>	0.000	0.000	0.000	0.170	0.000	0.029				
Benefit	<i>r</i> *	0.300**	0.027	0.089	0.181	0.195	0.004	0.098			
	<i>p</i>	0.000	0.706	0.201	0.009	0.005	0.953	0.167			
Barriers	<i>r</i> *	-0.102	0.095	0.050	-0.100	0.005	0.530	0.095	-0.146		
	<i>p</i>	0.145	0.177	0.471	0.150	0.941	0.000	0.177	0.036		
Self-efficacy	<i>r</i> *	0.180	0.049	0.131	0.059	0.228	0.052	0.164	0.342	0.093	
	<i>p</i>	0.009	0.485	0.058	0.395	0.001	0.451	0.020	0.000	0.181	

TPB: theory of planned behavior; CHBMS's: Champion's health belief model scale; PBC: perceived behavioral control.

\*Pearson correlation coefficient.

Turkish context. The scale was designed to evaluate individuals' intentions, attitudes toward and actions about TSE.

Concerning the reliability of the scale, both item analysis and analysis of internal consistency were used. In item analysis, the correlation of the item-total score should be at 0.30 to have a reliable scale. In general, items with less than 0.30 correlation values are regarded as problematic, and therefore, such items can be excluded from the scale.[24] However, in the current study, all items were found to have correlation values ranging between 0.37 and 0.92. Therefore, no items were excluded from the scale.

The test of internal consistency was carried out through calculation of Cronbach's alpha value. This test shows whether or not the items covered in the scale measure similar characteristics. In the current study, the Cronbach's alpha values of four subdimensions (namely, intention, attitude, subjective norms, and self-efficacy) were found to range between 0.81 and 0.89. The fifth subdimension, namely PBC, was found to have a Cronbach's alpha value of 0.54. Cronbach's alpha value is affected by the size of the subdimension. Given that the subdimension of PBC consisted of only two items, its Cronbach's alpha value may be lower.[25] In the original scale, the Cronbach's alpha values of the subdimensions of intention, attitude, subjective norms, and self-efficacy were between 0.74 and 0.87, but for the subdimension of PBC no Cronbach's alpha value was reported.[21] It may be argued that the Cronbach alpha values of the subdimensions are similar to those in the original study. Cultural beliefs and values influence the attitudes and behaviors of individuals regarding cancer and its treatment.[26] As such, intercultural differences for such scales are inevitable. Since TSE is not only concerned with a psychological dimension, but also with physical health, we believe that it may be applied to different cultures. The high internal consistency values found in this study appeared to be satisfactory.

The exploratory factor analysis showed that scale items were grouped under five factors. Items in the scale were

loaded with the same factors as in the original scale. All five factors were found to account for 75% of the total variance. The study found that the factor of intention accounts for 33% of the total variance. The factor of intention in the original scale was found to account for 50% of the total variance.[21] Armitage and Conner [27] reviewed a total of 185 studies dealing with the efficacy of the TPB. The reviewed studies commonly stated that the factor of intention had the highest rate in accounting for variance (39%). [27] Both previous and present findings clearly indicate that 'intention' is the best predictor accounting for behavior. CHBMS was used in the study to examine simultaneous criterion validity. The results showed that the mean scores of both scales were significantly correlated. Therefore, the scale has criterion validity.

### Study limitations

This study included some limitations, for example, the sample was comprised of students studying health care, which may limit generalizability. In addition, in order to increase the readability of the scale, it may be valuable to validate the scale with a population that has not received health-care education.

### Conclusion

The findings of the study suggest that the Turkish version of the TSE-planned behavior theory scale is a valid and a reliable measurement for Turkish society. Based on the findings obtained, it is acceptable to suggest that this scale can be employed to examine individuals' intentions and health-care behavior related to a TSE. Since the behaviors of individuals related to health are important for early diagnosis of cancer, we believe that the adaptation of this scale to different cultures may be beneficial as an important tool to determine the TSE behaviors of individuals. Moreover, TSE behaviors in different cultures may be compared and utilized to develop

health policies that promote appropriate positive health behaviors in the local community.

## Declaration of interests

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or a financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending or royalties.

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