The Reliability and Validity Analysis of The Turkish Version of the Test to Assess the Psychological Dependence on Smoking

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ABSTRACT

Aim: Psychological component of cigarette dependence is as important as its physical component. In addition to psychoactive material in the cigarette, factors such as happiness, joy, accompaniment with another activity, feeling self-confidence and social status play an effective role in smoking dependence. This signifies the fact that smoking dependence has to be dealt with in a multidimensional way. Test to Assess the Psychological Dependence on Smoking (TAPDS) published by Ponciano-Rodríguez et al, is developed to assess the psychological dependence on tobacco. This study aims to test the reliability and validity of the Turkish version of the Test to Assess the Psychological Dependence on Smoking in the Turkish population.

Methods: The Test to Assess the Psychological Dependence on Smoking (TAPDS) Turkish Version with 25 questions along with a sociodemographic form was handed out to volunteer participants. Data were collected from a total number of 420 voluntary participants, who were randomly selected and current smokers. Confirmatory Factor Analysis was performed and Cronbach's α and McDonald's ω coefficients were used to determine the reliability of the scores of the scale.

Results: The participants consisted of 263 males and 157 females, with an average age of 31.07 years, ranging from 20 to 85. The factor loadings of the scale for all items are observed to be more than 0.30 and all the items are statistically significant. Cronbach's α and McDonald's ω values calculated for the total score are 0.93.

Conclusion: The Turkish version of TAPDS appears to be effective for assessing psychological dependence of smoking and it can be recommended as a sufficient and highly reliable and valid scale to be used.

Keywords: smoking, validity, reliability, psychological dependence

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Introduction

The use of cigarettes/tobacco is one of the main causes of mortality and morbidity all over the world which can be prevented. According to data from WHO (World Health Organization), nearly 8 million people die of causes related to smoking all over the world every year. More than 7 million of which are closely related to active smoking, and almost 1,2 million are those people that are passively exposed to cigarette smoke (1,2). Smoking is the main cause of chronic obstructive pulmonary disease (COPD), lung cancer, and atherosclerosis and is directly related to many fatal diseases. Besides, the use of tobacco leads to unhealthy life as well as loss of workforce and money (3,4).

Nicotine in the cigarette creates dependence since it changes the equilibrium of the two chemicals called dopamine and noradrenalin by activating the rewarding system of the brain (5). Physical dependence means compulsive use of nicotine, and nicotine leads to physical symptoms called "withdrawal syndrome" after consuming the cigarette (6,7). The psychological component of cigarette dependence is as important as its physical component. In addition to psychoactive material in the cigarette which causes addiction, it is considered that factors such as happiness, joy, accompaniment with another activity, feeling self-confidence and social status play an effective role in smoking dependence. This signifies the fact that smoking dependence has to be dealt with in a multidimensional way (7,8).

Cigarette/tobacco dependency is handled in detail within the chapter of Disorders of Drugs Use in the 5th edition of The Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Within 12 months, diagnosis can be established based on the intolerance and withdrawal symptoms, considering whether or not it causes deterioration and trouble in the functionality of the person (9).

A great number of tests and scales have been formed and used to assess smoking dependence. Each one of these scales has different advantages and disadvantages to identify and analyze the parameters of physical and psychological dependence on smoking. Thus, the most suitable one could be preferred according to the purpose (7,9).

Test to Assess the Psychological Dependence on Smoking (TAPDS) is a scale that was developed and published by Ponciano-Rodríguez and his colleagues, to test psychological dependence on tobacco for smokers in the Mexican population (7). This scale, which will be helpful both in clinical research and in the treatment of smoking dependence, is consisted of 25 questions. During outlining the scale items, 100 smokers out of those who came to apply for a "Tobacco Cessation Clinic" in Mexico were asked to write down 5 words that come into mind in order of importance when the word "cigarette" is pronounced to them, and 23 words they named the most were identified. Additionally, letters called "farewell to cigarette", which is part of tobacco cessation treatment were read thoroughly. Keywords conveying emotional content in these letters were chosen by four psychologists who contributed to the treatment. 40 words obtained were used to form The Test to Assess the Psychological Dependence on Smoking (TAPDS). The scale eventually turned into its final form of 25 items in total which has adequate information about the four subscales that include emotional modulator, image/self-rewarding, indifference, and social acceptance (7,9).

This study is aimed at testing the reliability and validity of the Turkish version of the Test to Assess the Psychological Dependence on Smoking (TAPDS) in the Turkish population.

Methods

To adapt TAPDS to Turkish culture and to make a validity and reliability analysis of the Turkish version of the scale, the original version was received from the original researcher Guadalupe Ponciano-Rodríguez, along with his permission. Later, it was translated into Turkish and re-translated into English by two English native speakers plus two English teachers and thus it was made sure that the translated one was suitable in meaning for use.

As of March 2021, the Test to Assess the

Psychological Dependence on Smoking (TAPDS) Turkish Version (Figure 1) with 25 questions was handed out to volunteer participants. Data were collected from a total number of 420 voluntary participants, who were randomly selected and current smokers.

Sigaranın Psikolojik Bağımlılığı Değerlendirme Ölçeği (SPBDÖ)

	Oldukça Sık (3)	Bazen (2)	Hiçbir zaman (1)
1. Sigara içtiğimde başkaları tarafından kabul gördüğüme inanıyorum			
2. Sigara beni rahatlatıyor			
3. Ancak sigara içersem iyi vakit geçirebiliyorum.			
4. Sigara içtiğim zaman daha iyi odaklanabiliyorum.			
5. Sigara içtiğimde kendime güveniyorum.			
6. Sigara içmek, ihtiyacım olan enerjiyi bana veriyor.			
7. Sigara benim en iyi arkadaşım/yoldaşım.			
8. Sigara içmek, olmak istediğim karaktere bürünmemi sağlıyor			
9. Sigara içmek çekici görünmemi sağlıyor			
10. Sigara içtiğim zaman daha iyi düşünebiliyorum			
11. Bence sigara içmek karşı konulmaz bir istek/arzu			
12. Parti ve arkadaş toplantılarında sigara içmek ortamı daha keyifli yapıyor			
13. Alkollü içki içerken sigaradan daha çok keyif alıyorum			
14. Üzgün veya bunalımda olduğum zaman sigara içmek kendimi daha iyi hissetmemi sağlıyor			
15. Sigara içmek stresimi kontrol etmeme yardım ediyor			
16. Sigara içmek kızgınlığımı dizginlememe yardım ediyor.			
17. Sigara içmek bana büyük bir keyif veriyor.			
18. Sigara içmek endişemi kontrol etmeme yardım ediyor			
19. Sigara içmek sakinleşmeme yardım ediyor			
20. Sigara içmek beni tatmin ediyor			
21. Sigara içmek hastalık, kanser ve ölümle ilişkili bir bağımlılıktır.Yine de ben sigara içmeye devam etmeye karar verdim.			
22. Sigara kötü bir şey ve nikotin de bir uyuşturucu. Yine de ben sigara içmeye devam etmeye karar verdim.			
23. Başka şeyler için harcayabileceğim parayı sigaraya harcıyorum. Ama bence buna değer.			
24. Ailemin yanında sigara içmek onların sağlığını etkiliyor. Yine de sigaraya devam edeceğim.			
25. İşyerimde sigara içmek mesai arkadaşlarımı etkiliyor ve rahatsız ediyor. Ama ben sigaraya devam edeceğim.			
Puanlama : 25-41 arası puan: hafif bağımlılık; 42-55 arası puan: orta bağımlılık; 59-75 arası puan: şiddetli bağımlılık			

Figure 1. The Turkish Version of Test to Assess the Psychological Dependence on Smoking (TAPDS)

Confirmatory Factor Analysis was used to show that the original structure of TAPDS is similar to Turkish culture. The items in the scale were structured using three gradations (Very frequently=3, Sometimes=2, Never=1). Therefore, the answers given to the items were identified categorically for confirmatory factor analysis, and WLSMV (Weighted Least Square Mean and Variance Adjusted Estimators) was used for that purpose. In the evaluation of model data compatibility, the CFI (Comparative Fit Index), TLI (Tucker Lewis index), NFI (Normed Fit Index) ve RMSEA (Root Mean Square Error of Approximation) index was used. Statistics were done using lavaan package of R 4.0.5 (R Core Team, 2018). Moreover, Cronbach's α and McDonald's ω coefficients were used to determine the reliability of the scores of the scale.

Results

Data were collected from a total number of 420 participants consisted of 263 male and 157 female smokers for the TAPDS scale. Out of 420 participants, 237 were single, 171 were married and 12 divorced. The ages of the participants range from 20 through 85. The average age is 31,07.

TAPDS is composed of 25 questions and four subscales. In the course of making confirmatory factor analysis, model data compatibility was assessed by studying factor loadings and fit index. Factor loadings and the values of significance are given in Table 1.

Table 1. Factor loadings obtained as a result of confirmatory factor analysis

Item No	Emotional modulator	Image/Self rewarding	Indifference	Social Acceptance	Z	p
2	0.790					
14	0.763				19.601	<0.05
15	0.898				23.316	<0.05
16	0.869				22.762	<0.05
17	0.817				19.831	<0.05
18	0.851				22.812	<0.05
19	0.912				23.376	<0.05
20	0.835				21.531	<0.05
3		0.777				
4		0.757			20.018	<0.05
5		0.809			22.586	<0.05
6		0.803			21.463	<0.05
7		0.828			21.981	<0.05
8		0.797			17.543	<0.05
9		0.638			12.772	<0.05
10		0.825			23.546	<0.05
21			0.957			
22			0.943		34.712	<0.05
23			0.859		29.700	<0.05
24			0.821		24.024	<0.05
25			0.820		30.318	<0.05
1				0.473		
11				0.709	7.861	<0.05
12				0.572	7.744	<0.05
13				0.366	5.531	<0.05

According to Table 1, the factor loadings of the scale for all items are observed to be more than 0.30 and all the items are statistically significant (p<0,05).

Fit index obtained as a result of confirmatory factor analysis is presented in Table 1. In addition, the measurement model obtained as a result of the analysis is given in Figure 2.

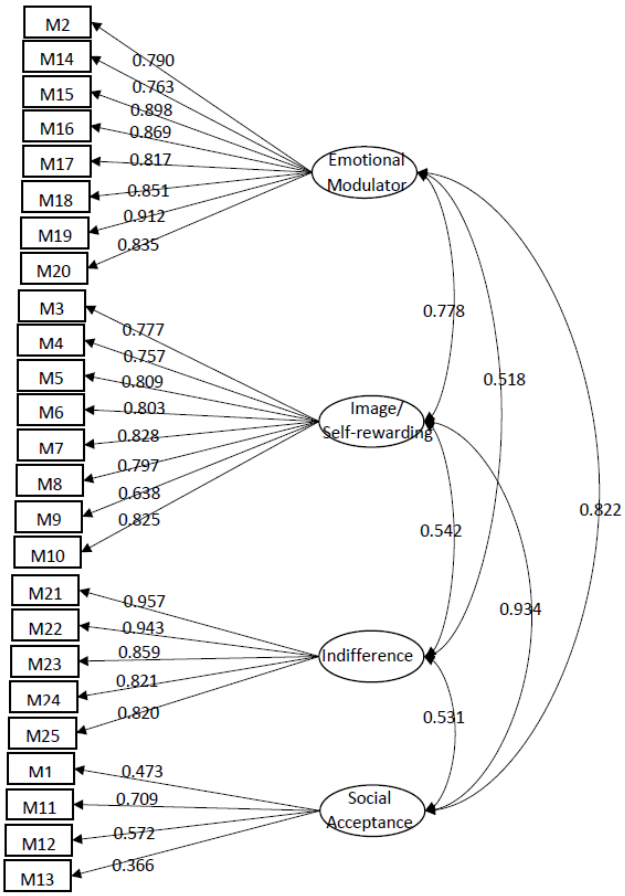

Figure 2. Measurement model of The Test to Assess the Psychological Dependence on Smoking (TAPDS) for Confirmatory Factor Analysis (Note that "M2-M14-M15-…" refer to "Item2-Item14-Item15-…")

Examining Table 2, χ^2/sd value is seen to be between 3 and 5. CFI (Comparative Fit Index) value is determined as 0.95, TLI (Tucker Lewis index) value as 0.94, and NFI (Normed Fit Index) as 0,93. RMSEA (Root Mean Square Error of Approximation) index is determined to be 0,086 for this model. Cronbach's α and McDonald's ω values for the total score are calculated as 0.93.

Table 2. Fit index results of confirmatory factor analysis of the test to assess the psychological dependence on smoking (TAPDS)

	χ^2	χ^2/sd	p	CFI	TLI	NFI	RMSEA
Scale	1111.067	4.13	0,00	0.95	0.94	0.93	0.086
Reference		χ^2/sd≤3		≥90	≥90	≥90	≤0,080

To determine the reliability of the scores of TAPDS, the reliability values of Cronbach's α and McDonald's ω were calculated. The results are shown in Table 3.

Table 3. Assessment of TAPDS scores' reliability

	Number of items	Cronbach's α	McDonald's ω
Emotional modulator	8	0.90	0.90
Image/Self rewarding	8	0.86	0.86
Indifference	5	0.87	0.88
Social Acceptance	4	0.51	0.53

As shown in Table 4, α and ω values for the emotional modulator subscale is 0.90, α and ω values for image/self-rewarding subscale is 0,86, for indifference α value is 0,87 and ω value is 0.88, for social acceptance α value is 0,51 and ω value is 0.53.

Table 4. Factor loadings obtained from the results of second-level confirmatory factor analysis

Item No	Emotional modulator	Image/Self rewarding	Indifference	Social Acceptance	TAPDS	Z	p
2	0.790						
14	0.764					19.611	<0.05
15	0.898					23.329	<0.05
16	0.869					22.766	<0.05
17	0.817					19.847	<0.05
18	0.851					22.830	<0.05
19	0.912					23.394	<0.05
20	0.835					21.537	<0.05
3		0.778					
4		0.757				20.002	<0.05
5		0.809				22.538	<0.05
6		0.803				21.443	<0.05
7		0.828				21.956	<0.05
8		0.797				17.501	<0.05
9		0.637				12.712	<0.05
10		0.825				23.543	<0.05
21			0.957				
22			0.943			34.640	<0.05
23			0.859			29.709	<0.05
24			0.821			24.044	<0.05
25			0.820			30.345	<0.05
1				0.473			
11				0.711		7.757	<0.05
12				0.573		7.665	<0.05
13				0.367		5.497	<0.05
Emotional modulator					0.848		
Image/Self-rewarding					0.922	15.542	<0.05
Indifference					0.593	13.029	<0.05
Social Acceptance					0.979	7.584	<0.05

In Figure 2, correlation values between the subscales of TAPDS are seen to vary between 0.518 and 0.931. While doing second-level confirmatory factor analysis, model data compatibility was evaluated by studying the factor loadings and fit index. Factor loadings and the values of significance are given in Table 4.

According to Table 4, the factor loadings of the scale for all items are observed to be more than 0.30 and all items are statistically significant (p<0,05). In addition, factor loadings related to the total TAPDS score, which was defined upper to the subscales, are determined to vary between 0.593 and 0.979. Fit index obtained as a result of second-level confirmatory factor analysis is given in Table 4. Besides, the measurement model drawn out of the analysis is shown in Figure 3.

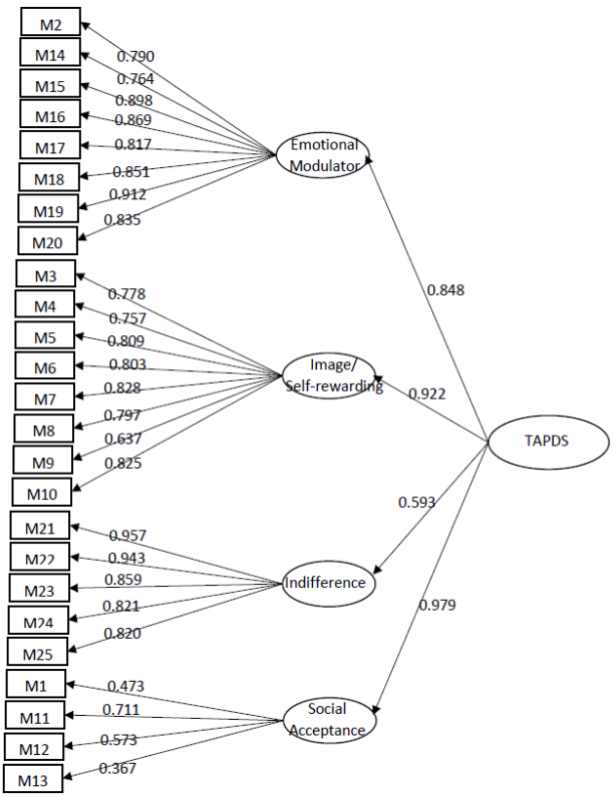

Figure 3. Measurement model of The Test to Assess the Psychological Dependence on Smoking (TAPDS) for Second Level Confirmatory Factor Analysis (Note that "M2-M14-M15-…" refer to "Item2-Item14-Item15-…")

Table 5 shows that χ^2/sd value is located between 3 and 5. CFI value is determined to be 0.95, TLI value 0.94, and NFI value is 0.93. In terms of RMSEA index evaluation, this index was seen to be 0.085. Cronbach's α and McDonald's ω values calculated for scale total score determined at second level is 0.93.

Table 5. Fit index results of confirmatory factor analysis of the test to assess the psychological dependence on smoking (TAPDS)

	χ^2	χ^2/sd	p	CFI	TLI	NFI	RMSEA
Scale	1093.508	4.04	0.00	0.95	0.94	0.93	0.085
Reference		χ^2/sd≤3		≥90	≥90	≥90	≤0.080

Discussion

In our study, factor loadings for all of the items are seen to be high and statistically significant (p<0,05). Thus, it can be said that the items do serve to measure the structure in the factor they belong to (10).

In our research, χ^2/sd values are seen to be between 3 and 5. So it can be derived from this result that the model is compatible with the data at a medium level. With a CFI value of 0.95, TLI value of 0.94, and NFI value of 0.93, it can be inferred that the model is compatible with the data quite well since all of these values are over 0.90. The RMSEA index is 0.085, and it is fairly close to the accepted value of 0.080 for good model compatibility according to the RMSEA index. In a general view of all the compatibility indexes at hand, the four subscale model is seen to be compatible with the data (11).

According to the results of our study, α and ω values for the emotional modulator subscale is 0.90, α and ω values for image/self-rewarding subscale is 0.86, for indifference α value is 0.87 and ω value is 0.88, for social acceptance α value is 0.51 and ω value is 0.53. Since the values under 0.50 are regarded as low reliability, values between 0.50 and 0.80 indicate medium reliability and those over 0.80 mean high reliability, it can be concluded that scores obtained from the emotional modulator, image/self-rewarding, and indifference subscales are highly reliable, and the scores from social acceptance subscale are reliable at a medium level (12).

TAPDS is evaluated in terms of its total score. For that reason, the total TAPDS score is defined over four subscales. The fact that correlation values between the

subscales of the TAPDS are varying between 0.518 and 0.931 may imply that an upper-level structure exists above the one at the first level. While doing second-level confirmatory factor analysis, model data compatibility was evaluated by studying the factor loadings and fit index.

Factor loadings for all the items are seen to be higher than 0.30 and all the items are statistically significant ($p<0,05$). As a result, it can be said that items do serve to measure the structure that they belong to. In addition, factor loadings related to the total TAPDS score which was defined upper to the subscales are determined to be varying between 0.593 and 0.979 and these values are higher than 0.30 (10).

The total scale score of our study, with a Cronbach's α and McDonald's ω values of 0.93, is seen to be compatible with the internal reliability analysis results (Cronbach's α=0.84) of the original scale developed by Ponciano-Rodríguez et al (7).

An increase in the number of scales on smoking dependence that can assess different criteria and that can be preferred accordingly will provide more opportunity to the health care professionals in determining smoking dependence and also in their treatment choice.

Conclusion

According to our study results, factor loadings of all the 25 items of the Turkish version of TAPDS were higher than 0.30 and all the items were statistically significant. Cronbach's α and McDonald's ω values were calculated as 0.93 for the total score of the scale and therefore the total score obtained from TAPDS was found to be reliable. The Turkish version of TAPDS appears to be effective for assessing psychological dependence of smoking and it can be recommended as a sufficient and highly reliable and valid scale to be used.

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