Translation and Psychometric Evaluation of Short-Form Decisional Balance Scale for Smoking Cessation among Iranian Workers

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Abstract

Aim: Smoking is the first factor of diseases, and death, and one of the major health problems all over the world.
The aim of this study was validating the Persian version of short-form decisional balance scale to smoke cessation in Iranian workers.

Method: This cross-sectional study was conducted among 218 workers from automobile manufactory in Bam City (Iran) in 2016 using convenient sampling.

Findings: The total of 218 male workers with (mean age 30.52±6.66 years) participated in this study. The results showed two factors (Barriers, and Benefits, or Cons and Pros) with good explanatory (KMO=66%; Cumulative of Variance= 58.94), confirmatory (REMSEA= 0.000; GFI= 0.995, AGFI= 0.983; P-value= 0.775) factor analysis and reliability index (ICC =0.65 95% CI (0.57, 0.72)).

Conclusion: This study showed the Persian version of the short-form decisional balance scale for smoking cessation was valid and reliable tool to measure decisional balance for smoking cessation.

Keywords: Validity, Reliability, Smoking, Worker.

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Introduction

Tobacco consumption is one of the contributory factors in increasing the burden of diseases, which annually causes four million death around the world [1]. Epidemiological studies worldwide have demonstrated that smoking is highly associated with the incidence of non-communicable and chronic diseases such as cardiovascular diseases, respiratory diseases, cancer and strokes [2].

A model that has been utilized in smoking cessation [3], and is increasingly being used for effective relapse prevention [4] in western societies is the Trans Theoretical Model (TTM). It is a behavioral change process that has been validated and popularized by Prochaska and colleagues over 20 years ago [5-7]. The TTM consists of four constructs. Stage of Change (SOC) explains an individual's thoughts and behaviors regarding changing behaviors, Processes of Change (POC) explains what methods are used by the individual while changing behaviors, Self-Efficacy (SE) explains the self-confidence of the individual regarding how long she/he will bear against the desire of smoking, and Decisional Balance (DB) explains pros and cons of changing to the target behavior [8, 9]. A critical aspect for testing and implementing a theoretical model involves operationalizing the constructs in terms of psychometrically sound measures [10]. The TTM [11, 12] is an influential theoretical model in health psychology, particularly in its application to smoking cessation research. Decisional balance refers to an individual's relative benefit of the pros and cons of smoking [11]. The TTM posits that as individuals progress through the stages of change, their relative weighing of the pros and cons of the behavior shifts (i.e., the decisional balance), so that the pros of the behavior change gain importance while the cons diminish [13, 14]. This idea is in accordance with decision theory [15, 16] and social cognitive theory [17]. It has been demonstrated that pros and cons of smoking could successfully differentiate five stages of change in the quitting process. Velicer indicated that decisional balance is a powerful construct in predicting smoking status [18]. However, the results on pros and cons of smoking are inconsistent. Schumann et al. (2005) found that pros of smoking change but the cons of smoking change were not correlated with stage change [19]. Carlson et al. (2003) found only cons of smoking could be predictive of smoking cessation success. Given the fact that pros and cons are like different aspects of smoking change, decisional balance is an important predictor for smoking stage change [20]. Appropriate operationalizing of theoretical constructs into

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psychometrical measures is critical for implementing and testing a theoretical model. Several TTM-based smoking cessation measures have been tested in adult smokers, with good psychometric validity [10, 21]. The decisional balance inventory represents one of the key constructs of the TTM [18]. The initial measure was based on the work of Janis and Mann [16], and consisted of two scales: pros of smoking (10 items) and cons of smoking (10 items). Most recent applications have employed a short-form of this inventory, consisting of 3 items to measure the pros and cons. However, no published study has investigated the psychometric properties of the short-form. Although the Decisional Balance Scale (DBS) has been established to have sound psychometric properties, the reliability and validity of an instrument are fundamental to the research results [22]. Establishing the reliability and validity of an instrument can be a complex process when an existing instrument is used in a sample from a different culture that speaks a language different from the original population [23, 24]. The purpose of this study was to conduct psychometric testing on the Persian version of the Decisional Balance Scale (CDBS), which has been designed to measure the positive and negative aspects of smoking addiction behavior among Iranian workers.

Materials and Methods

This cross-sectional study was conducted among an automobile manufacture factory in Bam City, Iran in 2016. Totally, 218 participants were recruited. The subjects underwent an expiratory CO concentration measurement to confirm their smoking status. Inclusions criteria for this study were being male gender, current smoker with the history of smoking at least 100 cigarettes, being in preparation stage of TTM, and being able to speaking and reading Farsi language. Also being involved in any smoking quit attempt, and having any plan on quitting smoking in the next 30 days were considered as exclusion criteria. The Ethics Committee of Tarbiat Modares University (Tehran, Iran) approved the study. Informed consent was obtained from all participants. Decisional balance construct was evaluated using the short-form questionnaire of Velicer and colleagues [18]. This construct consists of 6 questions, with two subgroups of smoking pros (3 questions) and smoking cons (3 questions) (i.e. “Smoking cigarettes relieves tension”). Response to the questions of this construct was based on a 5-part Likert spectrum from “not important” to “extremely important” with the scores from 1 to 5, respectively. Then the total score of each individual was divided by the number of questions so that the range of scores was

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calculated between the minimum of 1 and the maximum of 5. Firstly, this subscale was translated from English into Persian by two translators and back translated by two other independent translators. To assess the content validity, a panel of experts including 10 health professionals (seven specialists in health education and three experts in tobacco control) evaluated the questionnaire for technical issues and wordings. Item allocation and scaling was also checked. Accordingly, a few minor changes were made. The face validity of the instrument was assessed by 15 male smokers to insure that they understood the questions and had no difficulties in responding to the questions [25]. In this study, all statistical analyses were carried out with SPSS18 (SPSS Inc., Chicago IL) and AMOS21. Data for continuous variables were expressed as Mean ± SD while categorical variables were shown as frequency (percent). Normality distributions of the numeric variables were assessed with Kolmogorov-Smirnov's test. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used. Cumulative Variance (CV) >0.4 and Kaiser–Meyer– Olkin (KMO) >0.7 were considered as a good fit index in EFA. REMSEA <0.05, GFI>0.9, AGFI>0.9; P-value>0.05 were considered as a good fit index in EFA. For reliability, Inter Class Correlation (ICC) >0.7 was considered as a good fit index.

Results

Participate presentation:

Totally, 218 male participants with the mean age of 30.52±6.66 took part in this study. The demographical variables are presented is shown in Table 1. As shown, most of the participants (86.2%) were married (N=188) and 73.9% of the participants (N=161) earned diploma education. After checking the CVI and CVR indexes, the construct validity was measured using EFA and CFA. The result of EFA with principal component approach showed two factors (F1= Barriers, F2= Benefits or Cons and Pros) with 58.94% cumulative variance. KMO was equal to 66%, which is a good fit index in CFA. In the area of CFA (Table 1 and Figure 1), the results showed REMSEA <0.0001, GFI=0.995, AGFI=0.983; P value =0.77 (Table 1), which is a good fit index in CFA. ICC was used to measure reliability. With 95% confidence interval, ICC= 0.7 was obtained, which is a good measure for reliability.

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Table 1: Distribution of demographic variables of the studied participants

Variables		**N**	**%**
Age (years)	<= 25	41	18.8
	26- 30	94	43.1
	31- 35	55	25.2
	>35	28	12.8
Marriage status	Single	30	13.8
	Married	188	86.2
Education level	Under Diploma < 12 years	33	15.2
	Diploma =12 years	161	73.9
	Upper Diploma >12 years	24	11.0
Number of cigarette smoking per day	<=10	152	69.7
	>10	66	30.3

Table 2: EFA, CFA and ICC for Short-Form Decisional Balance Scale to Smoke Cessation

Questions	**Item Weight base on EFA**		**Item Weight base on CFA**	
	F1	**F2**	**F1**	**F2**
T1 Smoking relieves tension.	0.57	0.41	0.38	0.32
T2 I am embarrassed to have to smoke.		0.76		0.59
T3 Smoking helps me concentrate and do better work.	0.80		0.59	
T4 My cigarette smoking bothers other people.		0.76		0.68
T5 I am relaxed, and therefore, more pleasant when smoking.	0.79		0.66	
T6 People think I am fool for ignoring the warnings about cigarette smoking.		0.78		0.66
EFA Goodness of Fit Index: KMO=66%; % Cumulative of Variance=58.94%				
CFA Goodness of Fit Index: REMSEA=0.000; GFI=0.995, AGFI=0.983; P- value=0.775				
ICC- 95% CI	65 % (57%, 72%)			

F1: Barriers, F2:Benefits or Cons and Pros; EFA: Exploratory Factor Analysis; CFA: Confirmatory Factor Analysis; KMO: Kaiser-Meyer-Olkin

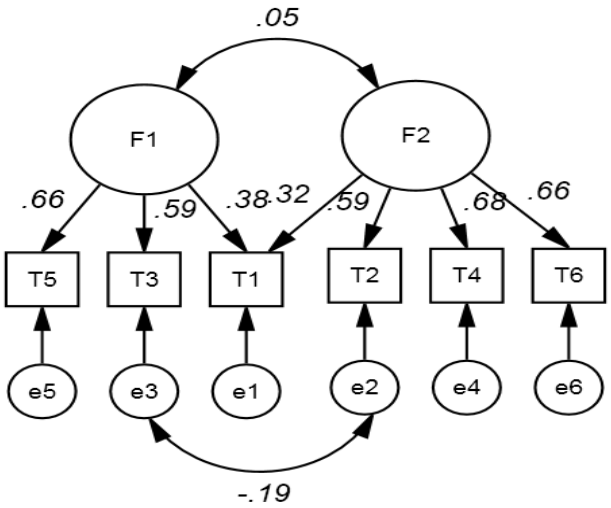


Figure 1: Path model through using confirmatory factor analysis

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Discussion

In the present study, reliability and validity procedures were used to validate the translated Persian version of TTM questionnaire based on decisional balance construct. In order to measure reliability, we used Cronbach's alpha, which ranged from 0 to 1. The greater alpha level meant the more reliable scale [26]. An alpha value of 0.70 and above has been reported as acceptable, and some explorative research took 0.60 as the cut-off value [27]. The item correlations and Cronbach's alphas of each item in Smoking Decisional Balance showed fair to good correlation. Items showed fair to good correlation (range: 0.40-0.77). In general, the Cronbach's alpha coefficient was acceptable for decisional balance (0.92- 0.69) that is in line with results [28]. However, the Cronbach's alpha coefficients were low (57%, and 72%), may be due to small sample size of this study. Item-to-subtotal correlation coefficients for the two subscales, the Pros and Cons, were greater than 0.50, and their reliability was supported by the Cronbach's alpha coefficients of 0.87 and 0.91, respectively [29]. The alpha coefficients in the US teens were 0.79 for the Social Pros Scale, 0.87 for the Coping Pros scale, and .88 for the Cons scale for smokers [30]. In our study, coefficient alphas for cons items including T1, T3 and T5 were 0.38, 0.59 and 0.66 and for pros items including T2, T4 andT6 were 0.59, 0.68 and 0.66 respectively. In the study of Lafferty et al. (1999), Cronbach's coefficient of 0.82 was obtained for each item of decisional balance [31]. Decisional balance subscales were found to be internally consistent (α = 0.91 for pros and 0.93 for cons) [32]. The results are consistent with other studies [33-38].

Internal Consistency Coefficients for Decisional Balance sub-scales were as 0.87 for pros and 0.90 cons [14]. In our study, alpha coefficient for Pro and Con scales in comparison with other studies was low, which could possibly be due to small sample size and that the samples were workers from different socio-economic levels. However, in general, in this study, the Cronbach's alpha coefficients were acceptable for decisional balance.

The results regarding the cons and pros associated with smoking showed that these constructs have low size effect, which may be related to the smokers who have not considered the disadvantages and advantages of smoking significant. However, these variables showed that the participants did not believe smoking had many benefits and costs. The Iranian version of the DBS was found to be a reliable and valid tool and appropriate for use. Further validation of the CDBS with different populations and larger sample size is suggested. In sum, the short version of DBS is a new instrument with acceptable factorial

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validity and internal consistency. The major strengths of this study were the accuracy and reproducibility of the results ensured by utilizing several validity and reliability methods.

Some limitations should be noted. Small sample size was the first. Furthermore, the majority of the participants were male smokers, and the majority of the smokers were in the PC stage. Nevertheless, the small sample size for specific stages of change limits the generalizability of the results. The sample was a convenience sample of smokers, so it could not be a representative (random) sample of smokers. Thus, it might not represent smokers from different socio-economic characteristics. Furthermore, as in most investigations of smoking studies, the self-report nature of the study may be subject to self-report bias, resulting in some unspecified amount of misclassifications as to the respondents' actual state of readiness.

Conclusion

This study showed that the Persian version of short-form decisional balance scale to smoke cessation is a valid and reliable scale to measure decisional balance to smoke cessation among Iranian workers. However, the reliability and validity of this scale should be confirmed in more future psychometric studies.

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