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ORIGINAL ARTICLE

The Turkish Validity and Reliability Study of the Partner Interaction Questionnaire (PIQ-20-Tr)

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Main Points

- There were no statistical differences between the negative and positive mean scores of PIQ-20-TR between the genders.
- Both genders provide more positive support compared to the negative support.
- The total value of Cronbach's alpha for PIQ-20-TR was found as .923.
- The CFA fit indexes RMSEA, GFI, AGFI, NFI, and IFI for PIQ-20-TR were found excellent.
- The Turkish version of the PIQ-20 was found as a valid and reliable tool.

Abstract

We aimed to adapt The Partner Interaction Questionnaire developed by Cohen and Lichtenstein (1990) to Turkish in this study. The inventory is originally in English, and it consists of 24 items in the original form. The Partner Interaction Questionnaire has two subscales (Negative Behaviors and Positive Behaviors). A team of two academics (a family physician and a clinical psychologist) translated the original to the Turkish language, and 11 qualified experts who have a good command of English and are studying in the field of smoking cessation created an expert opinion form (Krippendorff's alpha = .93). A total of 611 smokers who had admitted to the Ondokuz Mayıs University Family Medicine Smoking Cessation Clinic filled the Partner Interaction Questionnare-20 in Turkish (PIQ-20-TR) at their first visit. One month later, the PIQ-20-TR was re-administered to these participants (re-test, $n = 598$). Cronbach's alpha for the total PIQ-20-TR was .92; for the negative subscale it was .85; and for the positive subscale it was .87. There was a statistically significant relation between the re-test and test scores of both the positive and negative subscales ($p < .001$). The confirmatory factor analyses and fit indexes revealed a high validity of the PIQ-20-TR (X^2/sd = 2.131; root mean square error of approximation = 0.054; goodness of fit index = 0.902; adjusted goodness of fit index = 0.933; normed fit index = 0.963, incremental fit index = 0.971; and the comparative fit index = 0.97).
Keywords: Smoking, partner interaction, questionnaire, spouse, social support, validity and reliability

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Introduction

Smoking has become a serious public health problem in recent decades in Turkey (The Tobacco Atlas, 2021). Recent figures show that 41.8% of men, 17.7% of women, and 29.6% of the overall population (18 million adults) in Turkey currently smoke every day (WHO, 2019). Nicotine causes very severe physical and psychological addiction, and smoking cessation interventions need to be well organized, evidence-based, and individualized (CDC, 2017). Social factors are one of the key components that may affect smoking addiction and cessation (Mermelstein et al., 1986). Social support is typically defined as "the social resources that persons perceive to be available or that are actually provided to them by non-professionals in the context of both formal support groups and informal helping relationships (Cohen, 2004). An individual's social circle varies, including such members as relatives, acquaintances, work colleagues, and people at school. Addicts' relationships with their social environment may be at different

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intensities and affectivities with different individuals. With a few exceptions, individuals tend to establish the most intensive social relationships with their own families. A spouse, child, or parent who is worried that a loved one will be harmed by smoking can be very effective in helping that person to quit (Yalcin & Unal, 2019). From that perspective, spouses occupy a special place in the social support that smokers receive (Cohen et al., 1988). Spouse or partner behaviors may have a positive or negative impact on smoking cessation (Faseru et al., 2018). Spouses of cigarette addicts can persuade partners who have never previously thought of quitting to do so through the social support they provide (Bowes, 2015). Moreover, they can help the addict to cope with physiological and psychological symptoms that may occur due to nicotine withdrawal reactions during the cessation process. After the smoking cessation period, the social support provided by spouses is also important in terms of preventing resumption (Yalcin & Unal., 2019). In contrast, negative motivation by spouses will undermine the smoker's efforts to quit from the very beginning (Mermelstein et al., 1983). Negative discourses such as discouraging behaviors, criticizing, scolding, and grumbling will reduce the probability of partners quitting.

Quantitative measurement of social support provided by spouses, which is so important qualitatively, is not an easy task. Few instruments are available for professionals working in the field of smoking cessation to measure the amount of support that spouses or partners provide for their smoker spouses or partners. Cohen and Lichtenstein (1990) developed The Partner Interaction Questionnaire-20 (PIQ-20) in order to provide a valid and trusted tool for this purpose. This measures the support by evaluating both the positive and negative behavior subscales. The present study is intended to determine the reliability and validity of the Turkish version of the PIQ-20 (PIQ-20-TR).

Methods

Study Design

This descriptive research was intended to adapt the PIQ developed by Cohen and Lichtenstein to Turkish culture by investigating its validity and reliability.

Translation and Preparation of the Partner Interaction Questionnaire-20 in Turkish

We followed the steps described by Hambleston and Patsula (1999) to conduct an appropriate adaptation. A brief summary of the adaptation is given below:

- Permission was obtained from the developers of the original inventory.
- A team of two academics (a family physician and a clinical psychologist), both active in the field of smoking cessation, first translated the PIQ into Turkish. The sociological and cultural suitability of the questionnaire was discussed, and several studies were reviewed in the light of the current literature.
- An independent researcher translated the Turkish version back into English.
- An expert opinion form was created. This consisted of the original item in English, the item translated into Turkish, and the back-translated version. We sent this form to 11 researchers working in the field of smoking cessation. They evaluated each item on the questionnaire as either "Suitable" or "Not Suitable," with a "Suggestions" option being available for those who wished to express their opinions. The consistency between the expert opinions received was calculated using Krippendorff's alpha method (Krippendorff, 2004). The value was determined as .93.
- In addition, the items were given a final review in line with the recommendations of the specialists, and the final form was thus obtained.
- The final form of the questionnaire was tested on 15 smokers admitted to the Ondokuz Mayıs University Medical Faculty Department of Family Smoking Cessation Clinic, Samsun, Turkey, and was checked for any problems.
- The PIQ-20-TR was administered to the participants on their first visit to our clinic (pre-test) (n = 611).
- Confirmatory factor analysis (CFA) was conducted to investigate the factor structure of the final version.
- The PIQ-20-TR was again applied to the study population after the first visit (n = 598).

The Study Population

Several studies have investigated the appropriate size of the research group in scale development studies. Cattell (1978) emphasized that the number of participants in factor analysis should be three to six times greater than the number of items in the scale. Everitt (1975) stated, "the number of participants should be at least 10 times greater than the number of items" (Arrindell & van der Ende, 1985). The number of participants in this study was therefore set at 10 times or more the number of items in the scale. We decided that at least 200 participants would be necessary for the purposes of this study.

Of the 765 smokers admitted to our cessation clinic from January 1, 2018 to December 1, 2018, those older than 18 years, married or living with a partner (for at least one year), whose spouse or partner was a non-smoker or ex-smoker, with no psychiatric disease (based on the DSM-V-TR diagnostic criteria), not using any psychiatric drugs, and whose medical data were available, were added to the study group. Several couples who were both smokers, who had decided to quit together, and who were both admitted to our clinic (n = 28) were excluded from the study. The remaining 611 smokers were enrolled once written consent had been received. These 611 subjects were selected as the study population and we conducted CFA on them. The sociodemographic data (age, marital status, monthly income, and education level), body mass index (BMI), and smoking status (FTND, packs/year, etc.) were recorded onto patient files during each subject's first visit. All the participants completed the pre-test PIQ-20-TR during their first visit. The PIQ-20-TR was administered again (re-test) 1 month after the first visit to all of the remaining participants (n = 598).

The Tools

The Partner Interaction Questionnaire-20

The original PIQ, based on 76 items, was designed by Mermelstein, Lichtenstein, and McIntyre (1983). This tool is basically designed to evaluate the spouse's/partners' positive or negative behaviors toward cessation. It investigates the support for quitting provided by a spouse or partner. After this questionnaire had been designed, Cohen and Mermelstein (1990) studied the validity and reliability of a shorter version containing 20 items (PIQ-20). The PIQ-20 has two subscales, half the questionnaire involving

positive (motivation-enhancing) and the other half negative (motivation-reducing) approaches. For each item, the participants responded on a five-point scale: never (0), almost never (l), sometimes (2), fairly often (3), or very often (4). Separate scores were calculated for positive and negative behaviors by summing the responses to the 10 items within each subscale. The expected positive score in the original form of the questionnaire is 28.70, and the expected negative score is 17.35. In the reliability analyses, the internal consistency values (Cronbach's alpha) for the PIQ were .89 for the positive subscale and .82 for the negative subscale. These subscales reflect the positive and negative behaviors of spouses and partners while the smoker is undergoing the quitting process. No definitive cut-off point is described for either subscale of the PIQ-20 or for the total score. The scores are compared within each individual case.

Fagerström Test for Nicotine Dependence

The Fagerström test for nicotine dependence (FTND) was developed by Fagerström et al. (1996) and contains six questions intended to determine the level of physical smoking addiction. The questions can either be applied face-to-face or else can be completed individually. Possible scores range between 1 and 10, higher scores indicating higher dependence levels.

Statistical Analyses

The data were entered onto the Statistical Package for Social Sciences, version 15.0 software (SPSS Inc.; Chicago,IL, USA) for analysis. Independent variables were investigated using Pearson's correlation analysis and the independent samples *t*-test. The CFA were performed with IBM-AMOS 23. Statistical significance was set at $p < .05$.

Results

Demographic Features

The subjects' demographic, anthropometric, and smoking characteristics by gender are presented in Table 1. The men were older, had been married for longer, had higher FNDT and pack/year scores, and higher BMI measurements ($p < .001$).

Mean Scores and Reliability of the Turkish Partner Interaction Questionnaire-20

The mean pre-test and test scores on the positive and negative scales of PIQ-20-TR between the genders are presented in Table 2.

Table 1.
Participants' Demographic and Smoking Characteristics

Variables	Men, 410 (62%)	Women, 201 (38%)	*p*; *t*
Age (Mean)	36.58 ± 12.04	34.27 ± 13.42	.004; 2.247
Duration of marriage/ relationship	10.21 ± 1.57	9.7 ± 1.8	.001; 1.987
FNDT	5.4 ± 1.9	4.6 ± 1.7	<.001; 2.284
Packs/year	15.1 ± 2.8	12.7 ± 2.7	<.001; 2.784
Number of quit attempts	0.8 ± 0.7	0.7 ± 0.9	.412; 1.784
BMI (kg/m^2)	28.58 ± 2.74	26.12 ± 1.99	<.001; 12.588

FNDT = Fagerström test for nicotine dependence.
Independent samples *t*-test was performed.

Table 2.
Mean PIQ-20-TR Test and Retest Scores by Gender (n = 598)

	Subscales	Men	Women	*p*; *t*
Test*	Positive	29.54	30.25	.342; .952
	Negative	18.14	18.54	.110; .547
Retest**	Positive	30.01	30.12	.527; .634
	Negative	17.36	18.12	.052; .448

Note: *At the first visit.
**One month after quit day.
Independent samples *t*-test was performed.

There was no statistical gender difference between either the positive and negative subscale re-test or the test scores ($p > .05$). Both men ($t = 9.547$, $p < .001$) and women ($t = 7.567$, $p < .001$) participants provided more positive support compared to the negative support.

Reliability was tested in two ways. First, Cronbach's alpha reliability coefficient, which determines reliability in terms of internal consistency, was calculated. Cronbach's alpha and the additivity test results for the PIQ-20-TR by subscales are presented in Table 3. Cronbach's alpha values for the positive and negative subscales of PIQ-20-TR were found to be relatively high (.877 and .858). In addition, the total score of the PIQ-20-TR also had a high Cronbach's alpha value (.923). There was a statistically significant relationship between the re-test and test scores on both the positive and negative scales, as presented in Table 4 ($p < .001$).

Validity of the Turkish Partner Interaction Questionnaire-20

The CFA analyses of PIQ-20-TR are presented in Figure 1. The original version of the questionnaire has two subscales, the first related to negative and the second to positive behaviors. There are 10 items in each sub-dimension. In the Turkish version, the items belonging to these factors were arranged in the form in a random manner. Whether the applied CFA was verified or not was decided by the fit indexes yielded by the analysis. The fit indexes are summarized in Table 5. For RMSEA, a value between $.05 \leq \text{RMSEA} \leq .08$ is defined as acceptable, and $0 \leq \text{RMSEA} \leq .05$ is defined as perfect. Values of .90 or above for GFI, .90 and above for AGFI, .95 and above for NFI, .95 and above for IFI, and .95 and above for CFI are considered excellent. A value of $2 < X^2/SD \leq 5$ is acceptable for X^2/SD, and values of $2 \leq X^2/SD \leq 5$ as excellent (Anderson & Gerbing, 1984; Bentler, 1990; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Kline, 2005; Marsh, Balla, & McDonald, 1988; Tabachnick & Fidell, 2013, Vieira, 2011).

Discussion

To the best of our knowledge, this is the first study of the validity and reliability of PIQ-20 in a language other than the original, English. The PIQ-20-TR is a very useful and potent questionnaire in the context of smoking cessation and is used widely in studies investigating the effects of spouse/partner behaviors on cessation (Park et al., 2012). This study revealed that the PIQ-20-TR is a valid and reliable instrument for measuring smoking cessation activities in Turkey. We first analyzed the language equivalency through the consistency between the expert opinions, yielding

Table 3.
Cronbach's Alpha and Additivity Test Results of the PIQ-20-TR by Subscales

Subscale	Cronbach's Alpha	Source of Variance	Sum of Squares	Mean Square	F	*df*	*p*
Positive	.877	Non-additivity	2.118	2.118	1.806	1	.179
Negative	.858	Non-additivity	.017	.017	.012	1	.914
PIQ total score	.923	Non-additivity	1.870	1.870	1.397	1	.237

.93 as Krippendorff's alpha, indicating high consistency. We also performed several statistical analyses to investigate the validity and reliability of the PIQ-20-TR. The reliability of the PIQ-20-TR was tested in two ways. Based on the Cronbach's alpha and additivity test results, the reliability value of the first subscale was .877, while that of the second subscale was .858, with a total PIQ value of .923. Any level greater than .70 is regarded as high reliability for the scales (Özdamar, 2013). These subscales have a high-reliability level and are also Likert-type scales in terms of additivity (Tukey's non-additivity $p > .05$). Interestingly, the values of Cronbach's alpha for both subscales on our PIQ-20-TR were very close to the original. For the validity of PIQ-20-TR, we studied CFA and its fit indexes. The acceptance and compliance limits of CFA fit indexes are already specified in the literature. Based on the above figures, some of the fit indexes calculated in this study correspond to acceptable and some to excellent fit values. The data obtained showed that valid and reliable data can be obtained in the application of PIQ-20-TR in Turkish culture.

Limitations and Directions/Suggestions for Future Research

The present study has a number of strengths and weaknesses. In particular, the number of participants exceeded the minimum levels proposed by Cattel (2018), Everitt (1975), Arrindell and van der Ende (1985). This represents an advantage in adaptation studies (Ozdamar, 2013). In addition, we assembled a high percentage of participants to complete the test and re-tests (97.8%). One factor that may have affected our results is the high level of motivation among our participants. They were admitted to a special cessation clinic that specializes in helping smokers to quit and has a high level of relevant experience. After we confirmed the first level of CFA for the PIQ-20-TR, the second level CFA was not confirmatory in our Turkish sample. However, this scale is an international scale and a general total score can be obtained in its foreign

Table 4.
The Mean Scores of Test and Retest** PIQ-20-TR With Test Correlations (n = 598)*

Questionnaire Dimension	Test*, Mean ± SD	Retest**, Mean ± SD	Test and Retest Correlation	
			R	*p*
Positive	29.85±3.12	28.91±3.45	.868	<.001
Negative	18.75±2.91	17.84±3.12	.852	<.001

SD = standard deviation.
*At the first visit.
**One month after quit day.
Pearson moments correlation test was performed.

Table 5.
The Fit Indexes for PIQ-20-TR CFA

X^2/SD	RMSEA	GFI	AGFI	NFI	IFI	CFI
2.131	0.054	0.902	0.933	0.963	0.971	0.956

CFA = Confirmatory factor analysis; RMSEA = root mean square error of approximation; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; NFI = normed fit index; IFI = incremental fit index; CFI = comparative fit index.

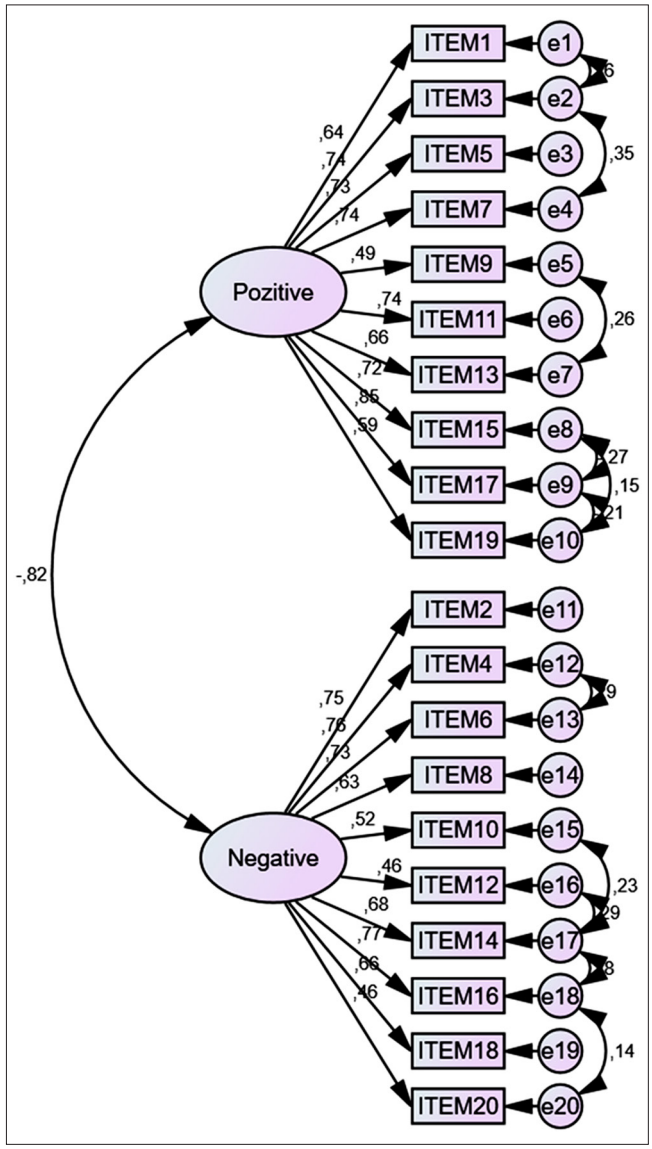

Figure 1. Confirmatory Factor Analysis Model Regarding the PIQ-20-TR

version. Moreover, we wanted our publication to be analyzed in comparison with the publications in the international literature. We decided it best to keep the total score of the test for this reason.

Too many modifications to the CFA fit assays are also undesirable. Modification indexes and standardized residual analysis can be done to increase model fit in CFA models. Modifications can be made to the model to avoid contradicting the theory. Ulman (2006) recommends that the modifications be made in small numbers, and the validity of these modifications be tested by repeating them on other samples in other studies. Modifications were made in the CFA applied in current study. Modifications to the model were usually made over the substance residuals (ε [residuals]). In this case, it can be said that there is a relationship in the error (residual) terms of the items.

In conclusion, the present study confirms that PIQ-20-TR is a valid and reliable tool for use by smoking cessation professionals in Turkey. More studies are now needed to investigate the detailed behaviors and factors affecting spouse/partner smoking cessation-related behavior.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics committee of Ondokuz Mayıs University (Approval No: 000302-1-2021/302).

Informed Consent: Informed consent was obtained from all individual participants.

Peer-review: Externally peer-reviewed.

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