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Psychometric properties of Persian version of Dutch Eating Behavior Questionnaire

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Abstract

Introduction: The aim of this study was to assess the psychometric properties of Persian version of Dutch Eating Behavior Questionnaire in Iranian society.

Materials and Methods: In this descriptive study, among all students are educated population Beheshti and Kharazmi University in Tehran (Mar-May 2016), 440 people targeted sampling method were selected considering Inclusion and exclusion criteria, Dutch Eating Behavior Questionnaire, food cravings (Form Trait) and food cravings awareness and acceptance scale used to collect data. Dutch Eating Behavior Questionnaire was studied by methods of internal consistency, test-retest correlations, and correlations with each other. In addition to verify the validity, confirmatory factor analysis model, correlations between subscales and criterion validity were used.

Results: Cronbach's alpha range (77% to 83%) revealed that Persian version of Dutch Eating Behavior Questionnaire scale and subscales had good internal consistency. Also, the total score and subscales were significantly correlated with each other. The test-retest coefficients (72% to 83%) represent the stability scale. Confirmatory factor analysis model supported of Persian version of Dutch Eating Behavior Questionnaire. Finally, there are certain patterns of correlation coefficients between subscales Persian version of Dutch Eating Behavior Questionnaire scale with body mass index, food craving and cravings awareness and acceptance, showed good criterion validity of the scale.

Conclusion: Dutch Eating Behavior Questionnaire appropriate psychometric properties in Iranian society, Due to the lack of internal tools in this area And the importance of this questionnaire specifying the type of response and behavior toward overeating And issues related to the obesity treatments and psychological consequences of obesity, this tools can be widely used in clinical and research domains.

Keywords: Eating behavior, Obesity, Psychometric

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Introduction

Obesity is one of the general health problems that have now been prevalent. There are many definitions for that but based on Body Mass Index, World Health Organization (WHO) has suggested the most widely used definition. Obesity is also associated with a variety of psychological and medical problems such as diabetes, cardiovascular problems, mood disorders and eating disorders and even addiction, because some people in order to lose weight turn to stimulating drugs or they smoke to control food cravings (1).

Overweight, obesity and overeating can be studied in various aspects of genetic, physiological, metabolic, behavioral and psychological aspects (2). From behavioral and psychological point there are three theories that address obesity: extrovert theory, psychoanalytic theory, and self-restraint theory (3). Each of these theories describes a person's behavior towards eating, psychosomatic theory addresses emotional eating and overeating and obesity make people respond to emotional stimuli such as fear, anxiety, and any other psychological distress (4). According to this theory, obesity is the result of facing the individual with situations and unpleasant emotional stimuli such as depression, anxiety etc. (5). In contrast, the extroverted theory considers eating the result of internal physiological changes such as digestive system activity due to external stimuli. This theory focuses on the external and environmental signals and points out that over eaters actually respond to environmental stimuli such as taste, smell, sound and images and after the stimuli they go for eating (6). In contrast to theories, self-restraint theory or restrictive theory address the extreme and rigorous efforts of the individual to control food and prevention of food (7). According to this model, the individual significantly reduces calorie intake, fear of obesity can lead to extreme control of eating, unfortunately in most cases this limitation comes with later periods of overeating and the person who uses this mechanism is constantly fluctuates between extreme control and overeating (8).

Although in today's world, given the abundance of high-calorie foods, this mechanism seems to be a good choice, the studies show that the people who get high scores on this scale will gain significant overweight after a while (9,10). Various explanations have been presented, including metabolic changes in these individuals as well as the excessive reliance on cognitive control to limit food intake which will weaken this cognitive control in the long run and in times of emotional and psychological distress has the highest vulnerability to start the overeating (11). Brain imaging studies have shown that those who gain high scores on eating limitation scale have more activity in brain circuits related to pleasure including the frontal operculum, parietal operculum, Rolandic operculum, lateral orbito-frontal cortex, and the amygdala when confronted with stimuli related to food self-indicate (12,13), in fact restricting and strictly controlling food intake enhances the brain-related circuits associated with eating rewards and doubles the vulnerability of a person that can predict subsequent periods of overeating and overweight (10). Thus, the Dutch Eating Behavior Questionnaire (DEBQ) that was designed on Van Strein et al. (3) on the basis of development of these 3 theories related to eating, the 33 questions having three subscale of emotional style, external style and restraint style. The scale has been translated into several languages, including English (3), Italian (14), German (15), French (16), Turkey (17), Chinese (18), Australia (19), in all these translations which have been compatible with standardization in the concerned countries show that the questionnaire has good

validity and reliability; the questionnaire can be used in both sexes and in all age domains (20), the subscales of this questionnaire have a meaningful relationship with different psychological variables such as anxiety, depression, self-esteem or physical image (21) and BMI (22,23). Considering the presented issues and applicability of this scale in health interventions, prevention and diagnosis of vulnerable people for overeating, overweight and obesity, as well as coverage of three psychological validated theories in the area of pathology of obesity, the purpose of present study is to investigate the psychometric characteristics of this scale for the first time in Persian version in Iranian society.

Materials and Methods

The present study is conducted within the framework of a descriptive and psychometric characteristics based on correlation. The study population consist of all the students in Shahid Beheshti and Kharazmi University of Tehran who were studying during educational year of 2015-2016, therefore in April and May 2015, the maximum number of 440 people were selected as the sample (sample size was determined according to the adequacy of 5 to 10 subjects for each item in the standarizaton of the scale (24). Samples with informed consent were purposefully selected according to inclusion and exclusion criteria including non-use of psychiatric drugs prescribed by the psychiatrist, non-existence of physical illness including any medical condition, such as diabetes, heart disease and any disease that could affect the outcome of the test. The questionnaires of food response styles, craving for food in obesity (trait form), and knowledge and acceptance craving scale were used to collect data, the collected data using Confirmatory Factor Analysis (LISREL 8) and descriptive and inferential statistics (SPSS 22). It is worth mentioning that this study was conducted by coordinating and obtaining a research license from the Education and Research Branch of Kharazmi and Shahid Beheshti Universities in Tehran. Also, in order to observe the ethical considerations of research, items such as confidentiality of information of subjects, obtaining informed consent of the subjects and writing and observance of the trust principle in mentioning the content from the literature review were followed.

Research instrument

A) Responsive Food Scale: This questionnaire was designed by Van Strain et al. (3). Questions have Likert response options of 5 degrees. The questionnaire has three subscales of emotional style (13 items), external style or eating under environmental stimuli (10 items), and restraint style (10 items). This questionnaire has been translated into different languages in different countries and has been standardized. A double translation technique was used to prepare the Persian form of this scale. The questionnaire was first translated into Persian. The translation was then reviewed by one specialist of Persian language literature, one expert in English and two psychologists and possible mistakes were corrected. In the next step, the translated version was reinstated in English by a PhD student in English language literature. After the translated version and the original version were matched, existing mistakes were revised and the questionnaire was prepared. Prior to the original implementation, a prepared version in the form of a preliminary study was conducted on 30 students selected by sampling. The purpose of the preliminary study was to get feedback from the participants on the questionnaire's instructions to understand the content of the questions and to resolve possible issues in the items.

B) Food cravings scale (Trait form): This questionnaire was developed by Cepeda et

al. (25) evaluates craving for food in nine traits, options have a six-point Likert response spectrum (1= always, 2= most of the times, 3= usually, 4= occasional, 5= seldom, 6= never). The questionnaire has nine subscale (expecting positive rewards from food, expecting the release of negative thoughts and states after eating, having the eating habits, inducing symptoms of craving, thoughts and mindfulness of food, raving for hunger, lack of control in eating, excitement before or during craving, feeling guilty of having craving). The scores of each person in this 39-item questionnaire; in order to prepare the Persian version of the scale, a process like coping patterns of eating was prepared.

C) Knowledge and Acceptance Scale of Craving: This scale was designed by Jurassic et al. (26) based on the questionnaire of awareness and acceptance of pain (27). Based on the previous questionnaire on correctional issues, according to theoretical discussions and consultation with obesity therapists, they have gathered this scale.

D) Food Cravings Awareness and Acceptance Scale: This scale was designed by Juarascio et al. (27) based on the questionnaire of awareness and acceptance of pain (27), based on the former questionnaire they revised and collected the items according to theoretical discussion and consultation with obesity therapist. The questionnaire consists of 10 items in the 7-point Likert scale (1= completely disagree, 2= somewhat disagree, 3= slightly disagree, 4= no opinion, 5= I agree a little, 6= I agree, 7= I completely agree). The question numbers of 3, 4, 6, 7, 9 related to the subscale of willingness and questions 1, 2, 5, 8, 10 of the subscales of acceptance. Total score of the individual answers to questions is considered to be a student's score. A high score indicates accepting craving for food and a willingness to change which is a suitable and desirable concept. Cronbach's alpha of the subscales of this questionnaire was obtained in the present study in the range (0.44 to 0.82).

Results

In the variable of sex, 43.1% of the subjects were male and 56.9% of the subjects were female. 76.3% of the subjects were single and 24.3% were married. The distribution of education was as follows: 11.5% diploma, 26.8% undergraduate, 26.2% undergraduate and 34.6% master's degree.

To test the stability of the questionnaire, a re-test method was used. To this end, 55 participants responded to the food response questionnaire again within one month. The Pearson correlation coefficient was calculated between two scales of implementation of the questionnaire. In Table 1, the mean, standard deviation, Cronbach's alpha coefficients, and subsampling re-testing are included.

Table 1. The mean, standard deviation and Cronbach's alpha coefficients and subscale re-test of questionnaire in responsive styles to food

Subscale	(SD) M	Cronbach's alpha	Coefficients
Emotional style	(6.30) 18.77	0.79	0.72***
Restrained style	(3.25) 12.92	0.83	0.79 ***
External style	(3.04) 11.93	0.75	0.83 ***

*** $P<0.001$

The results of Table 1 show that the Cronbach's alpha coefficients are psychologically satisfactory for all subscales of food-response styles test. Also, all re-test coefficients are meaningful and desirable. Therefore, we can say that the scale of food response styles has a good validity.

In order to study the factor structure (construct validity) of food responsiveness styles, confirmatory factor analysis was used with maximum likelihood method at the level of variance covariance matrix (Joreskog and Sorbom, 2003). Kaiser-Meyer-Olkin Measure of Sampling

Adequacy test results (KMO) (68%) and Bartlett's Test of Sphericity (Chi-square (528) = 4532; *P*<0.001) indicating the desirability of sample size and the ability to factorize the scale material. To perfectly fit the model with data, we tried to improve the model by releasing some parameters based on the adjustment indicators. To this end, based on the proposed indices of the model, the results of confirmatory factor analysis based on variance rotation and considering the correlation between the obtained factors, several parameters were released. Path diagram of confirmatory factor analysis after the release of these parameters, along with path coefficients and initial fit indices is seen in Fig. 1.

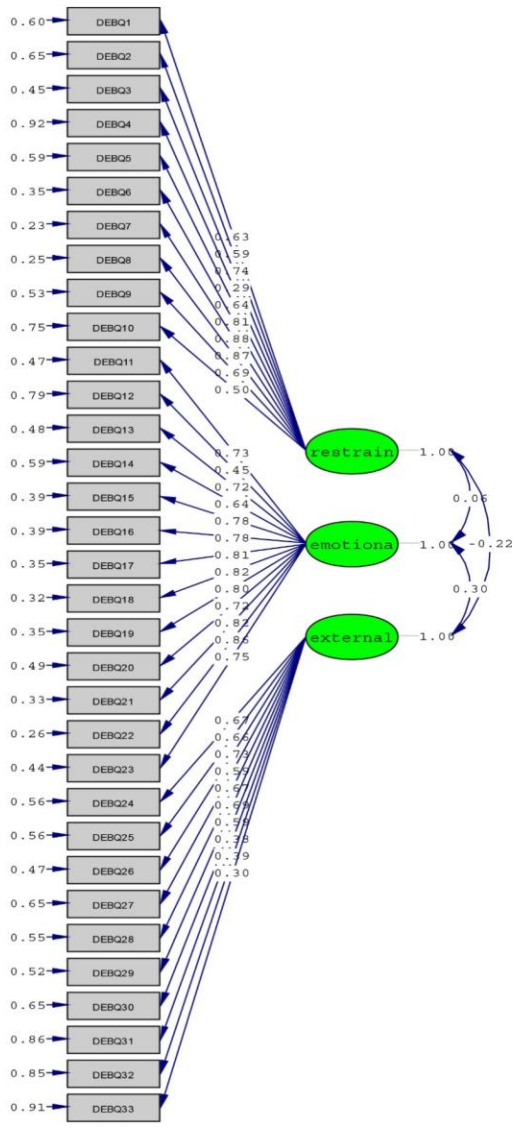
In the next step, goodness of fit based on Chi-square index, Comparative fitness index (CFI), normalized fit index (NFI), relative fit index (RFI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Akaike Information Criterion (AIC) were examined that results are shown in table 2.

Table 2. Persian version indices of confirmatory factors analysis of responsive food styles

Chi-Square	Df	CFI	NFI	RFI	GFI	SRMR	REMSEA	AIC
1428.00	528	0.91	0.90	0.85	0.87	0.072	0.082	1122.48

Comparative Fit Index (CFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Goodness of Fit Index (GFI), as close as one indicate the optimal fit of the pattern. Though chi-square is used to check the goodness of fit, Chi-square is increasing with sample size and degree of freedom. For this reason, Hu and Bentler (1999) have recommended using the two fitness indices of Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA). According to Schermelleh-Engel et al. (2003) the standard root mean square residual (SRMR) values between 0.05 and 0.05 indicate a good fit and 0.05 to 0.10 represents a good fit for the model. Also, Root Mean Square Error of Approximation (RMSEA) values range from 0 to 0.05 represent good fit and 0.05 to 0.08 represents acceptable fitness. Thus, according to the numbers in Table 2, the standardized coefficients and the T index, we can say that the confirmation model has an acceptable fit.

Figure 1. Chart of path coefficients mapping of confirmatory factor structure of responsiveness to food styles



In Table 3, the results of the confirmatory factor analysis are presented with standardized coefficients and t-scores.

Table 3. Standard coefficients and t indicator of factor analysis of food response styles

Subscale	Items	Standard coefficient	Determination coefficient	T index
Restrained style	1	0.63	0.44	10.28
	2	0.59	0.35	9.47
	3	0.74	0.55	12.76
	4	0.29	0.09	4.31
	5	0.64	0.41	10.45
	6	0.81	0.65	14.36
	7	0.88	0.77	16.48
	8	0.87	0.75	16.11
	9	0.69	0.47	11.50
	10	0.50	0.25	7.81
Emotional style	11	0.73	0.53	12.61
	12	0.45	0.21	7.05
	13	0.72	0.52	12.33
	14	0.64	0.41	10.53
	15	0.78	0.61	13.92
	16	0.78	0.61	13.82
	17	0.81	0.65	14.53
	18	0.82	0.68	15.04
	19	0.80	0.65	14.45
	20	0.72	0.51	12.29
	21	0.86	0.67	14.89
	22	0.75	0.74	16.15
	23		0.56	12.96
External style	24	0.67	0.44	10.61
	25	0.66	0.53	10.53
	26	0.73	0.35	12.00
	27	0.59	0.45	9.11
	28	0.67	0.48	10.74
	29	0.69	0.35	11.14
	30	0.59	0.14	9.15
	31	0.38	0.15	5.49
	32	0.39	0.10	5.67
	33	0.30		4.31

Validity of food response scale was assessed through criterion validity and correlation between subscales. In evaluating the validity of the criterion, simultaneous validity was used (simultaneous implementation of Obesity Craving Questionnaire Form and knowledge and acceptance craving scale). Table 4 presents the results of correlation between subscales of food responsiveness styles with body mass index and awareness and acceptance scale of craving.

Table 4. Matrix of correlation coefficients between subscales of food response styles and their correlation with body mass index, and knowledge and acceptance test of craving

Subscale	1	2	3	BMI (Body Mass Index)	Awareness and acceptance		
					Willingness	Acceptance	Overall score
Emotional style	_	_	_	* 0.242	- 0.010	0.065	- 0.039
External style	** 0.359	_	_	0.020	- 0.070	- 0.144	- 0.116
Restrained style	0.050	* - 0.223	_	* 0.159	- 0.081	- 0.017	- 0.061

As shown in Table 4, the pattern of correlation coefficients of subscales with body mass index and awareness and acceptance scale of craving indicate the simultaneous concurrent criterion validity of the Persian version of the tool for measuring response to food. In the following, the results of the correlation between subscales of food response styles and obesity questionnaire (trait form) are presented. In the following, the results of the correlation between subscales of food response styles and obesity questionnaire (trait form) are presented.

Table 5. The results of correlation between subscales of food response styles and Obesity Craving Questionnaire (Trait Form)

Subscale	Craving								
	Expectation of reward	Expectation of release	Have a plan	Provocative signs	Mind obsessions	Equal craving	Lack of control	Antecedents emotions	Guilt feeling
Emotional style	** 0.236	** 0.403	** 0.165	** 0.439	** 0.330	** 0.187	** 0.295	** 0.586	** 0.217
External style	** 0.444	** 0.451	** 0.397	* 0.307	** 0.260	** 0.425	** 0.401	** 0.319	-0.104
Restraint style	-0.015	0.062	-0.043	0.001	0.103	-0.007	-0.049	0.023	**0.431

As shown in Table 5, the pattern of correlation coefficients of subscales with the Tea Craving Questionnaire (Trait Form) indicates the simultaneous concurrent criterion validity of the Persian version of the tool for measuring food response styles.

Discussion

The purpose of the present study was to prepare a Persian version of the food-response styles questionnaire and to examine the psychometric properties, factor structure and validity of the questionnaire. In the validity of the questionnaire, the range of Cronbach's alpha coefficients (0.75-0.83) and correlation coefficients (0.22 to 0.35) indicated the optimum internal consistency of the scale. These findings are consistent with the findings of Van Strain (3), Dakanalis et al (14), Loffler et al. (15), Luch et al. (16), Bozan et al. (17), Chong et al. (18), Mallan et al. (19). It is also in line with the findings of Dakanalis et al. (14), Ellickson et al. (28) and Shloim et al. (29), Juarascio et al. (26) and Rodriguezet al. (30).

The present questionnaire covers three of the important sub stages associated with obesity and overeating, in situations where a person confronts with emotional distress and stressful situations emotional eating can lead him to overeating. Also the external style in today modern life can greatly push people to overeating and getting high-calorie foods, also the restraint style, although it is a way to lose weight and continue to lose weight, it cannot last a long time, and according to studies, this style of eating has a significant ability to predict overweight and obesity in the future (29), In this study, the factor structure and the validation of Persian version of the Persian version of food response styles questionnaire, confirmatory factor analysis and correlation between subscales were used. The results of factor analysis showed that the Persian version of the questionnaire of food responsiveness styles consists of three main factors and the distribution of subcategories is consistent with the main test. Also, the observed correlation pattern between the subscales of the questionnaire indicated that the questionnaire was a multidimensional questionnaire of food response styles and its relative independence of subscales. In addition, the correlation coefficient model of the Persian version of the food response styles questionnaire, with body mass index, food craving (trait form) and awareness and acceptance scale of craving showed that it has acceptable criterion validity.

This research has some limitations, including the fact that the sample of this study has been selected by the student community and therefore we are confronted with generalization of the results. The use of self-report tool for calculating BMI is one of the other limitations of this study. Also, the use of self-reporting tool to calculate BMI is one of the other constraints of this study. In future studies it is suggested that overweight populations, eating disorders, and obesity treatments be used.

Conclusion

Finally, based on the findings of this study, it can be concluded that Persian version of food response styles be compatible with appropriate psychometric properties, conditions of use in different research and clinical situations, using the questionnaire in different groups of normal and morbid and its correlation with other scales.

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