



Validity and Reliability Study of Mental Vulnerability Questionnaire in Turkish Community Sample

ABSTRACT

In this study, it was aimed to make the validity and reliability study of the Mental Vulnerability Questionnaire (MVQ) in the Turkish community. Data were collected from 722 participants (51.25% women, 48.75% men), aged 18-68 (M = 34.52, SD = 11.34). For construct validity Confirmatory factor analysis (CFA) was conducted using a tetrachoric correlation matrix and Diagonal Weighted Least Squares (DWLS) method. The bifactor model showed the best fit ($\chi^2/df = 1.11$, CFI = 0.99, RMSEA = 0.012, SRMR = 0.048, TLI = 0.99). For convergent validity Mentalization Scale (MS) was used, and for incremental validity Brief Symptom Inventory (BSI) and the Eysenck Personality Questionnaire Short Form (EPQ-SF) were used. As a result of multiple regression analysis it was found that all MVQ subscales predicted depression, anxiety, somatization, and obsessive symptoms. As a result of test-retest the correlations were found to be in range of 0.69 to 0.88. Kuder Richardson-20 (KR-20) coefficients were calculated for internal consistency and the values were determined between 0.60 to 0.86. In split-half reliability analysis (Spearman-Brown) the coefficients were found between 0.61 to 0.77. In conclusion, it was determined that the MVQ is a valid and reliable tool to measure the mental vulnerability in the Turkish community.

Keywords: Mental Vulnerability, Psychosomatic, Mental, Interpersonal Relationships, Validity, Reliability

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INTRODUCTION

Biological, psychological and social factors (Nielsen, 2018) and also the interactions between these factors (Jenkins, 2015) play an important role in the emergence of mental disorders. When the etiology of mental disorders is examined, it is seen that the term of "mental vulnerability" is a risk factor for mental disorders (Elpov et al., 2010). Mental vulnerability is defined as individuals' capacity to cope with the stressful situations depending on psychological, social and biological factors and also the predisposition level to psychological disorders (Østergaard et al., 2011).

The term of "mental vulnerability" was firstly introduced by Danish National Institute for Social Research, and the first scale that measures mental vulnerability was created to identify the individuals who were prone to mental illness but were not diagnosed with a mental illness. At the end of study, it was found that the individuals with a high level of mental vulnerability constituted 10% of the population. These individuals had no mental illness diagnosis, however they had passive behaviour patterns, were hypersensitive and showed abnormal reactions in social conflict situations (Kühl & Martini, 1981).

Mental vulnerability was defined with three subdimensions as "psychosomatic symptoms", "mental symptoms", and "interpersonal problems" (Østergaard et al., 2011). When the literature is examined it is seen that there are several studies investigating the relationship between mental vulnerability and psychosomatic symptoms (Elpov et al., 2005; Elpov et al., 2006; Kay & Jørgensen 1994; Kay et al., 1994; Rosenstock, 1996). In the study conducted by Kay and Jørgensen (1994) it was found that mental vulnerability is associated with indigestion. In addition, there are other studies that evidence for the relationship between mental vulnerability and peptic ulcer (Rosenstock, 1996), irritable bowel syndrome (Kay et al., 1994), and heart diseases (Elpov et al., 2005; Elpov et al., 2006) was stated.

In addition to the findings on the relationship between mental vulnerability and psychosomatic symptoms in the literature there are also other results showing that antidepressant use reduce the symptoms of gastrointestinal diseases (Jackson et al., 2000). This study could be shown as evidence for the relation between

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depression and gastrointestinal diseases. In another study conducted by Lin and his colleagues (2014) it was found that gastroesophageal reflux disease is also high in the individuals with bipolar disorder (Lin et al., 2014). Jørgensen and colleagues (2020) found that cardiovascular patients with high mental vulnerability also had high levels of depression. These findings are consistent with the results of the study in which mental vulnerability was found as a risk factor for depression (Østergaard et al., 2011). From these results, it can be said that individuals' ability to cope with stressful events may be reduced due to high level mental vulnerability, and then the risk of developing psychological disorders could be increased.

Tidmand (2018) found that especially in stressful situations, anxiety is associated with self-harm behaviors in individuals with high mental vulnerability. Moreover, it is stated that burnout has common characteristics with mental vulnerability (Funahashi, 2013). Sørensen and his colleagues (2017) determined that young adults struggle to cope with workplace competition and they feel generally isolated which may be linked to mental vulnerability. In addition, it was determined that individuals with mental vulnerability often have difficulties in interpersonal relationships (Jess et al., 1998).

In the literature there are several scales related to mental vulnerability, however except Mental Vulnerability Questionnaire (MVQ) none of could measure mental vulnerability exactly. The Mental Vulnerability Questionnaire (MVQ) was firstly developed by the Danish Military Psychological Services in the 1960s and it had 27 items (Jørgensen et al., 2020; Østergaard et al., 2011). The scale was later revised in the 1970s by the Danish National Institute of Social Research and the 22-item version was developed. Finally, in 1979 a 12-item short form was created (Andersen & Sørensen, 1979). Today, 22-item version is the most common used version of the MVQ. It includes three subscales: psychosomatic symptoms, mental symptoms, and interpersonal problems. Individuals who have higher scores on MVQ are considered to be mentally sensitive to stressful events and they could have psychosomatic problems or mental dysfunctions (Kühl & Martini, 1981).

When the other scales related to mental vulnerability are examined, one of the scale is the Interpersonal Sensitivity Scale (ISS) (Boyce & Parker, 1989), adapted into Turkish by Doğan and Sapmaz (2012), which evaluates sensitivity in interpersonal relationships through subscales of "anxiety and dependency," "lack of social confidence," and "non-assertive behaviors." The Emotional Vulnerability Scale (Yamaguchi et al., 2022), which measures emotional sensitivity and avoidance behaviors within interpersonal relationships and life experiences, is also similar to the MVQ. However, the Emotional Vulnerability Scale is lack of measuring mental vulnerability. The Psychological Vulnerability Scale (PVS) developed by Sinclair and Wallston (1999) assesses dysfunctional beliefs and thoughts in response to stress. These scales primarily focus on interpersonal relationships and psychological resilience, without addressing the relationship between psychosomatic disorders and psychological disorders. It is seen that the MVQ concurrently addresses the issues related to psychosomatic disorders, mental disorders, and interpersonal problems which are the dimensions of mental vulnerability. Therefore, this study aims to adapt the MVQ, which evaluates psychosomatic symptoms, interpersonal relationships, and mental symptoms underlying mental vulnerability, to the Turkish population.

METHOD

Participants

The sample consisted of 722 individuals, aged 18-68 ($M = 34.52$, $SD = 11.34$), of whom 370 (51.2%) were women and 352 (48.8%) were men. The participants reported their education levels as follows: 99 (13.7%) had completed primary education, 228 (31.6%) had completed high school, 59 (8.2%) had an associate degree, 267 (37%) had a bachelor's degree, 56 (7.8%) had a master's degree, and 13 (1.8%) had a doctoral degree. Regarding marital status, 339 participants (47%) were single, 357 (49.4%) were married, 24 (3.3%) were divorced, and 2 (0.3%) were widowed. Additionally, 224 participants (31%) reported having received psychological or psychiatric help in the past, while 498 (69%) had not; 332 (46%) reported feeling the need for psychological or psychiatric help, whereas 390 (54%) did not.

For the reliability analysis, a test-retest study was conducted with a sample of 76 participants aged 18-35 ($M = 21.73$, $SD = 3.47$), of whom 67 (88.2%) were women and 9 (11.8%) were men. All participants were undergraduate students, with 73 (96.1%) identifying as single and 3 (3.9%) as married. Among these participants, 27 (35.5%) had previously received psychological or psychiatric help, while 49 (64.5%) had not; 54 (71.1%) reported feeling the need for psychological or psychiatric help, while 22 (28.9%) did not.

Data Collection Tools

Demographic Information Form

In the demographic form used in this study, the questions about gender, age, education, marital status, socioeconomic status, and whether the participants received psychological or psychiatric help or feel the need for help were asked.

Mental Vulnerability Questionnaire (MVQ)

The Danish version of Mental Vulnerability Questionnaire (MVQ) was developed by the Military Psychological Services in Denmark in the 1960s and was used as a determine the mental suitability of individuals for military work (Eplöv et al., 2010). The questionnaire has 22 items with yes/no answers. Six items in the scale are filler items, and the assessment is conducted based on 16 items. The scores of the participants are calculated by summing the "yes" answers given to the questions in the scale. There are three subscales, also the total score could be used. The subscales are "psychosomatic" which evaluates the physical signs and psychosomatic symptoms; "mental" that determines the effects of situations on mental functions; and "interpersonal problems" which is used to detect the interpersonal problems due to mental vulnerability. In the original study of the scale, the internal consistency coefficients were found to be 0.58 for psychosomatic symptoms, 0.62 for mental symptoms, 0.62 for interpersonal problems, and 0.80 for the total score. In our study, the internal consistency coefficients were found to be 0.60 for psychosomatic symptoms, 0.69 for mental symptoms, 0.64 for interpersonal problems and 0.86 for the total score.

Eysenck Personality Questionnaire - Revised Short Form (EPQ-RS)

The original form of the Eysenck Personality Questionnaire (EPQ) was developed by Eysenck and Eysenck (1975). The first version of the scale has 101 items, however later a short form was created with 24 items. The scale consists of four subdimensions (neuroticism, extraversion, psychoticism, lying). The scale is dichotomous items with "yes" and "no" answers. The neuroticism subdimension evaluates the the level of enxiety, the extraversion subdimension assesses individuals' relationship with others, being enegetic, social, and talkative, the psychoticism subdimension measures the tendency of individuals to aggressive behaviours, and the lie subdimension assesses the level of social desirability of the participants. The Turkish adaptation of the EPQ-RS was conducted by Karancı and her colleagues (2007). In the scale 12 questions are evaluated as reverse items. The "yes" answers are calculated as 1 point and "no" answers are calculated as 0 points. In the Turkish adaptation study, the internal consistency coefficients of the scalr were found to be 0.78 for extraversion, 0.65 for neuroticism, 0.42 for psychoticism and 0.64 for the lie subdimension. In our study, the internal consistency coefficients were determined to be 0.80 for extraversion, 0.73 for neuroticism, 0.35 for psychoticism and 0.61 for the lie subdimension.

Brief Symptom Inventory (BSI)

The Brief Symptom Inventory (BSI) was developed by Derogatis (1992) to determine psychological problems. The scale is 5-point Likert type and has 53 items. It includes five subscales, three global indices, and additional items. The 5 subscales are anxiety, somatization, depression, hostility, and negative self. The additional items are about sleep disorders, eating disorders, thoughts about death, and feelings of guilt. The 3 global indices are the Global Severity Index, Posiitive Symptom Distress Index, and Positive Symptom Total. In the scale, participants are requested to choose the most appropriate option for themselves from "not at all" to "extremely". Each item is scored from 0 to 4, and the evaluation is made by sum of he scores. The higher scores are considered as they indicate increase in psychological symptoms. In our study, four subdimensions of BSI were included: depression, somatization, anxiety, and obsessive -compulsive. The Turkish adaptation of BSI was conducted by Şahin and Dural (1994). In the Turkish validity and reliability study, Cronbach's Alpha values were determined as 0.81 for depression, 0.78 for somatization, 0.64 for anxiety, and 0.72 for obsessive-compulsive. In our study, Cronbach's Alpha values were found as 0.86 for depression, 0.83 for somatization, 0.84 for anxiety, and 0.81 for obsessive-compulsive.

Mentalization Scale (MS)

The Mentalization Scale (MS) was developed by Dimitrijević and his colleagues (2018). The scale is 5-point Likert type (1=completely false, 5=completely true) and has 28 items. The scale includes three subscales: the Self subscale, which assesses understanding one's own emotions and thoughts; the Others subscale, which evaluates understanding others' emotions and thoughts; and the Motivation subscale, which measures the

motivation to engage in relationships with others. The Turkish adaptation of MS was conducted by Törenli Kaya and her colleagues (2023), and in the Turkish adaptation study a three-factor structure was obtained in accordance with the original study. However, it was determined that the factor loadings of three items were below 0.30 and these items were removed from the scale. As a result, the Turkish version of scale had a structure consisting of 25 items with three factors. In the Turkish adaptation study, the Cronbach's alpha internal consistency coefficients were found to be 0.78 for Self, 0.80 for Others, 0.79 for Motivation, and 0.84 for the total score. In our study, Cronbach's alpha values were determined to be 0.80, 0.84, 0.74, and 0.86, respectively.

Procedure

Ethical approval for the study was obtained from the Istanbul Sabahattin Zaim University Ethics Committee on 16.02.2024, with approval number 2024/01. Necessary permissions were obtained from the corresponding author of original study for the Turkish adaptation of the scale, and the translation into Turkish was conducted by three individuals proficient in English. The scale was then back-translated into English, and the expressions that best represented the original items were selected. Data were collected online through Google Forms. Participation in the study was entirely voluntary, and an informed consent form was provided on the first page of the form. Participants were recruited using a convenience sampling method based on accessibility.

Data Analysis

For determining the construct validity of MVQ, confirmatory factor analysis was applied. In scale adaptation studies, it is recommended to conduct CFA rather than exploratory factor analysis (EFA) (Seçer, 2015). The preference for CFA over EFA in scale adaptation studies is due to the goal of validating an existing theoretical model and structure in another culture. CFA is used to test how well the theoretical model fits the data and whether the original structure of the scale is valid in the new culture. In contrast, EFA aims to identify latent factors within the dataset. Therefore, the factor structure of the Mental Vulnerability Questionnaire (MVQ) was tested using CFA. Since the MVQ includes items with 0-1 responses, CFA was conducted using the tetrachoric correlation matrix and the Diagonal Weighted Least Squares (DWLS) method, appropriate for dichotomous items, with the lavaan package in R Studio 4.1.3. The fit of the proposed model was evaluated using absolute fit indices. Acceptable fit indices were defined as $\chi^2/df < 3$, RMSEA (Root Mean Square Error of Approximation) and SRMR (Standardized Root Mean Square Residual) < 0.08 , and CFI (Comparative Fit Index) and TLI (Tucker Lewis Index) > 0.90 (Şimşek, 2007).

To determine whether the total score and subscale scores of the MVQ differed by gender, an independent samples t-test was conducted. For reliability analysis, Kuder-Richardson - 20 (KR-20) reliability coefficients were calculated for internal consistency. Additionally, the Spearman-Brown coefficient was calculated for split-half reliability analysis. A test-retest procedure was conducted. For convergent validity analysis, Pearson product-moment correlation coefficients were calculated between the total and subscale scores of the MVQ and the subscales of the Brief Symptom Inventory (BSI) (depression, somatization, anxiety, and obsessive-compulsive symptoms). For incremental validity, hierarchical multiple regression analysis was conducted to determine the contribution of the MVQ in predicting depression, somatization, anxiety, and obsessive-compulsive symptoms, beyond the effects of personality traits and mentalization. Statistical analyses were performed using SPSS v25.0 and R Studio programs.

RESULTS

Validity Analysis

Construct Validity

In the confirmatory factor analysis (CFA), the lavaan package in R Studio 4.1.3 was used, applying a tetrachoric correlation matrix and the Diagonal Weighted Least Squares (DWLS) method. Three separate models were tested for the scale as part of the construct validity analysis. In the first model, a single-factor structure was tested, where the total score was calculated, and all items were evaluated together. The analysis results were $\chi^2/df = 3.08$, CFI = 0.97, RMSEA = 0.054, 90% CI [0.047, 0.060], SRMR = 0.087, TLI = 0.97. In the second model, a first-order CFA was conducted, evaluating only the subscales, and the results were found as $\chi^2/df = 2.27$, CFI = 0.98, RMSEA = 0.042, 90% CI [0.035, 0.049], SRMR = 0.075, TLI = 0.98. In the third model, a bifactor CFA was performed, evaluating both the subscales and the total score together. The analysis results were found as $\chi^2/df = 1.11$, CFI = 0.99, RMSEA = 0.012, 90% CI [0.000, 0.025], SRMR = 0.048, TLI = 0.99. The analysis showed that the goodness-of-fit index values for all three models were within acceptable limits (Şimşek, 2007). Upon examining the goodness-of-fit index values of the models, it was determined that the most suitable model was Model 3, where the bifactor analysis was conducted (Table 1).

Table 1: Goodness-of-fit indices used in structural equation modeling research and the acceptable thresholds and indices obtained in the study

Fit Indices	Good Fit Criteria	Acceptable Fit Criteria	Indices obtained in the study		
			Model 1	Model 2	Model 3
χ^2/df^1	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/df \leq 5$	3.08	2.27	1.11
RMSEA ²	$0.00 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.054	0.042	0.012
SRMR ³	$0.00 \leq SRMR \leq 0.05$	$0.05 \leq SRMR \leq 0.08$	0.087	0.075	0.048
TLI ⁴	$0.95 \leq TLI \leq 1.00$	$0.90 \leq TLI < 0.95$	0.97	0.98	0.99
CFI ⁵	$0.95 \leq CFI \leq 1.00$	$0.90 \leq CFI < 0.95$	0.97	0.98	0.99

Note: ¹ χ^2/df : Chi-square divided by degrees of freedom; ²RMSEA: Root Mean Square Error of Approximation; ³SRMR: Standardized Root Mean Square Residual; ⁴TLI: Tucker Lewis Index; ⁵CFI: Comparative Fit Index
 Model 1: First-order CFA analysis; Model 2: Second-order CFA analysis; Model 3: Bi-factor CFA analysis

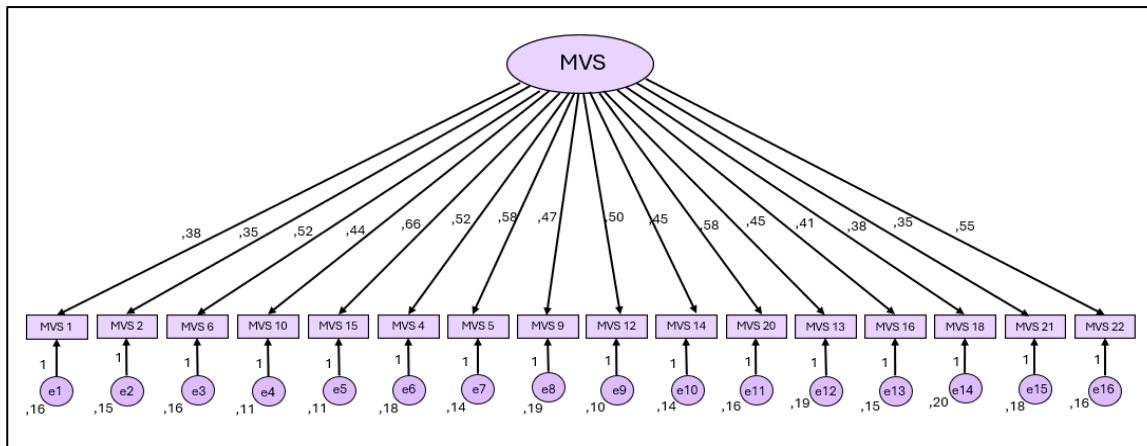


Figure 1: The result of CFA analysis for the single-factor model - Model 1

Note: The standardized coefficients are shown in the figure.

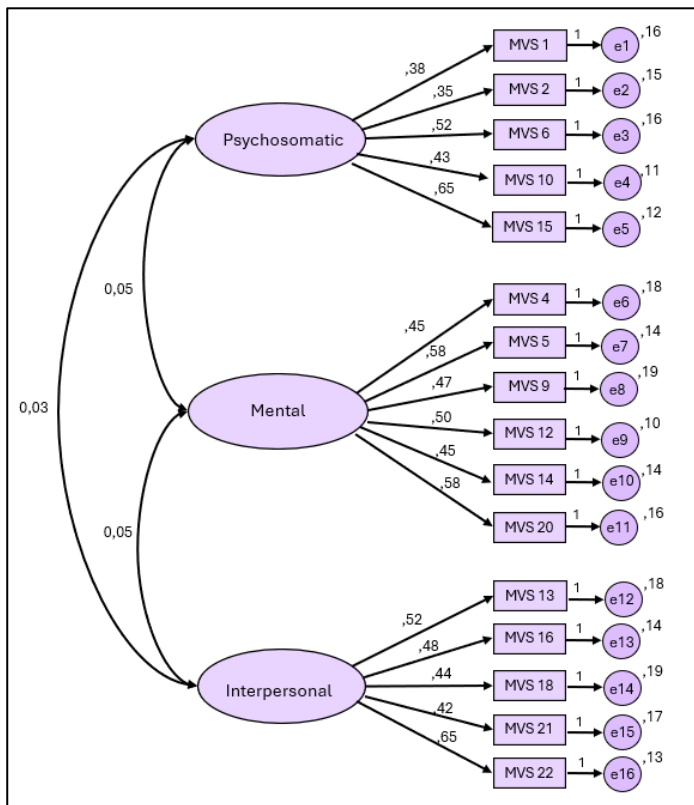


Figure 2: The result of first level CFA analysis - Model 2

Note: The standardized coefficients are shown in the figure.

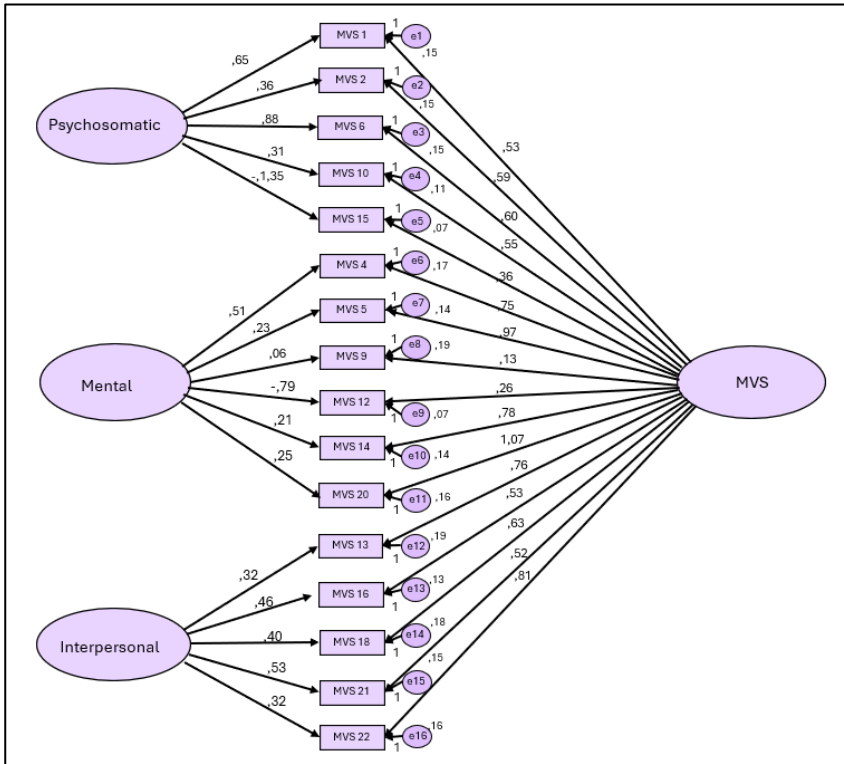


Figure 3. The result of bifactor CFA analysis - Model 3
Note: The standardized coefficients are shown in the figure.

Convergent Validity

The results of the convergent validity study indicated that there were correlations between the total score and subscales of the Mental Vulnerability Questionnaire (MVQ) and the subscales of the Mentalization Scale (MS) ($r = 0.07$ to $r = 0.40$, $p < 0.05$), the subscales of the Eysenck Personality Questionnaire - Revised Short Form (EPQ-RS) ($r = -0.13$ to $r = 0.69$, $p < 0.05$), the Somatization subscale of the Brief Symptom Inventory (BSI-Somatization) ($r = 0.58$ to $r = 0.65$, $p < 0.01$), the Obsessive-Compulsive subscale of the BSI ($r = 0.53$ to $r = 0.66$, $p < 0.05$), the Depression subscale of the BSI ($r = 0.58$ to $r = 0.67$, $p < 0.01$), and the Anxiety subscale of the BSI ($r = 0.63$ to $r = 0.70$, $p < 0.01$) (Table 2).

Table 2: The results of correlation analysis

	MVQ Total	Psychosomatic	Mental	Interpersonal	Motivation	Others	Self	Neuroticism	Extraversion	Psychoticism	Lie	Depression	Somatization	Anxiety	Obsessive-compulsive
MVQ Total	1														
Psychosomatic	0.83**	1													
Mental	0.87**	0.69**	1												
Interpersonal	0.72**	0.46**	0.48**	1											
MS Motivation	0.09*	0.08*	0.07*	0.10**	1										
MS Others	0.01	0.02	0.03	-0.07	0.62**	1									
MS Self	-0.40**	-0.29**	-0.32**	-0.35**	0.25**	0.25**	1								
Neuroticism	0.69**	0.54**	0.66**	0.52**	0.05	-0.03	-0.41**	1							
Extraversion	-0.25**	-0.13**	-0.14**	-0.44**	0.12**	0.25**	0.20**	-0.24**	1						
Psychoticism	-0.01	0.02	0.03	-0.08*	-0.25**	-0.19**	-0.13**	-0.01	0.06	1					
Lie	-0.22**	-0.21**	-0.23**	-0.12**	0.02	0.04	0.20**	-0.28**	0.04	-0.20**	1				
Depression	0.67**	0.58**	0.62**	0.51**	0.06	-0.06	-0.36**	0.61**	-0.24**	0.07*	-0.31**	1			
Somatization	0.65**	0.62**	0.58**	0.37**	0.04	-0.01	-0.32**	0.46**	-0.13**	0.08*	-0.23**	0.62**	1		
Anxiety	0.70**	0.63**	0.65**	0.47**	0.07	-0.05	-0.36**	0.61**	-0.14**	0.09*	-0.29**	0.79**	0.76**	1	
Obsessive-compulsive	0.66**	0.53**	0.59**	0.51**	0.08*	-0.01	-0.39**	0.55**	-0.23**	-0.01	-0.28**	0.72**	0.63**	0.70**	1

Note. MVQ = Mental Vulnerability Questionnaire; MS = Mentalization Scale;
 * $p < 0.05$, ** $p < 0.01$

Incremental Validity

Hierarchical multiple regression analysis was conducted to determine the contribution of the Mental Vulnerability Questionnaire (MVQ) in predicting psychological symptoms (depression, somatization, anxiety,

obsessive-compulsive). In the hierarchical multiple regression analysis, the subscales of the Eysenck Personality Questionnaire (EPQ) (Neuroticism, Extraversion, Psychoticism, Lie) were entered in the first block, the subscales of the Mentalization Scale (MS) (Self, Others, Motivation) were added in the second block, and the subscales of the MVQ (Psychosomatic, Mental, Interpersonal) were included in the third and final block.

For predicting depression, the analysis showed that the first model, including Neuroticism ($B = 1.581$, $SE = 0.090$, $\beta = 0.545$, $t = 17.607$, $p < 0.001$), Extraversion ($B = -0.303$, $SE = 0.083$, $\beta = -0.109$, $t = -3.649$, $p < 0.001$), Psychoticism ($B = 0.267$, $SE = 0.140$, $\beta = 0.056$, $t = 1.908$, $p = 0.057$), and Lie ($B = -0.487$, $SE = 0.107$, $\beta = -0.139$, $t = -4.543$, $p < 0.001$), explained 40.5% of the variance in depression ($R^2 = 0.405$, $F(4, 717) = 122.207$, $p < 0.001$). In the second model, the MS subscales (Motivation: $B = 0.136$, $SE = 0.040$, $\beta = 0.127$, $t = 3.391$, $p = 0.001$; Others: $B = -0.051$, $SE = 0.038$, $\beta = -0.050$, $t = -1.334$, $p = 0.183$; Self: $B = -0.115$, $SE = 0.030$, $\beta = -0.127$, $t = -3.842$, $p < 0.001$) were added, and the variance explained in depression increased to 42.4% ($R^2 = 0.424$, $F(7, 714) = 75.004$, $p < 0.001$). In the third model, the MVQ subscales (Psychosomatic: $B = 0.834$, $SE = 0.155$, $\beta = 0.195$, $t = 5.383$, $p < 0.001$; Mental: $B = 0.748$, $SE = 0.132$, $\beta = 0.228$, $t = 5.678$, $p < 0.001$; Interpersonal: $B = 0.496$, $SE = 0.130$, $\beta = 0.133$, $t = 3.813$, $p < 0.001$) were included, and the variance explained in depression increased to 53.4% ($R^2 = 0.534$, $F(10, 711) = 81.633$, $p < 0.001$). As a result, the MVQ contributed an additional 11% to the variance explained in depression.

For predicting somatization, the analysis showed that the first model, including Neuroticism ($B = 1.216$, $SE = 0.101$, $\beta = 0.424$, $t = 12.023$, $p < 0.001$), Extraversion ($B = -0.066$, $SE = 0.093$, $\beta = -0.024$, $t = -0.711$, $p = 0.477$), Psychoticism ($B = 0.322$, $SE = 0.158$, $\beta = 0.069$, $t = 2.044$, $p = 0.041$), and Lie ($B = -0.345$, $SE = 0.121$, $\beta = -0.100$, $t = -2.858$, $p = 0.004$), explained 22.6% of the variance in somatization ($R^2 = 0.226$, $F(4, 717) = 52.450$, $p < 0.001$). In the second model, the MS subscales (Motivation: $B = 0.065$, $SE = 0.045$, $\beta = 0.061$, $t = 1.434$, $p = 0.152$; Others: $B = 0.030$, $SE = 0.043$, $\beta = 0.030$, $t = 0.690$, $p = 0.491$; Self: $B = -0.143$, $SE = 0.034$, $\beta = -0.160$, $t = -4.245$, $p < 0.001$) were added, and the variance explained in somatization increased to 24.7% ($R^2 = 0.247$, $F(7, 714) = 23.458$, $p < 0.001$). In the third model, the MVQ subscales (Psychosomatic: $B = 1.651$, $SE = 0.166$, $\beta = 0.391$, $t = 9.936$, $p < 0.001$; Mental: $B = 0.783$, $SE = 0.141$, $\beta = 0.242$, $t = 5.543$, $p < 0.001$; Interpersonal: $B = 0.074$, $SE = 0.140$, $\beta = 0.020$, $t = 0.529$, $p = 0.597$) were included, and the variance explained in somatization increased to 45.1% ($R^2 = 0.451$, $F(10, 711) = 87.846$, $p < 0.001$). As a result, the MVQ contributed an additional 20.4% to the variance explained in somatization.

For predicting anxiety, the analysis showed that the first model, including Neuroticism ($B = 1.513$, $SE = 0.082$, $\beta = 0.580$, $t = 18.499$, $p < 0.001$), Extraversion ($B = 0.016$, $SE = 0.076$, $\beta = 0.006$, $t = 0.207$, $p = 0.836$), Psychoticism ($B = 0.316$, $SE = 0.127$, $\beta = 0.074$, $t = 2.483$, $p = 0.013$), and Lie ($B = -0.347$, $SE = 0.098$, $\beta = -0.110$, $t = -3.551$, $p < 0.001$), explained 39% of the variance in anxiety ($R^2 = 0.390$, $F(4, 717) = 114.731$, $p < 0.001$). In the second model, the MS subscales (Motivation: $B = 0.130$, $SE = 0.036$, $\beta = 0.135$, $t = 3.572$, $p < 0.001$; Others: $B = -0.065$, $SE = 0.035$, $\beta = -0.071$, $t = -1.857$, $p = 0.064$; Self: $B = -0.104$, $SE = 0.027$, $\beta = -0.128$, $t = -3.824$, $p < 0.001$) were added, and the variance explained in anxiety increased to 41% ($R^2 = 0.410$, $F(7, 714) = 70.899$, $p < 0.001$). In the third model, the MVQ subscales (Psychosomatic: $B = 1.014$, $SE = 0.136$, $\beta = 0.264$, $t = 7.463$, $p < 0.001$; Mental: $B = 0.717$, $SE = 0.116$, $\beta = 0.242$, $t = 6.206$, $p < 0.001$; Interpersonal: $B = 0.383$, $SE = 0.114$, $\beta = 0.114$, $t = 3.356$, $p = 0.001$) were included, and the variance explained in anxiety increased to 55.7% ($R^2 = 0.557$, $F(10, 711) = 78.730$, $p < 0.001$). As a result, the MVQ contributed an additional 14.7% to the variance explained in anxiety.

For predicting obsessive-compulsive symptoms, the analysis showed that the first model, including Neuroticism ($B = 1.350$, $SE = 0.090$, $\beta = 0.489$, $t = 14.155$, $p < 0.001$), Extraversion ($B = -0.272$, $SE = 0.084$, $\beta = -0.103$, $t = -3.262$, $p = 0.001$), Psychoticism ($B = -0.122$, $SE = 0.141$, $\beta = -0.027$, $t = -0.691$, $p = 0.387$), and Lie ($B = -0.480$, $SE = 0.108$, $\beta = -0.144$, $t = -4.443$, $p < 0.001$), explained 33.4% of the variance in obsessive-compulsive symptoms ($R^2 = 0.334$, $F(4, 717) = 90.066$, $p < 0.001$). In the second model, the MS subscales (Motivation: $B = 0.122$, $SE = 0.040$, $\beta = 0.120$, $t = 3.075$, $p = 0.002$; Others: $B = 0.008$, $SE = 0.038$, $\beta = 0.008$, $t = 0.208$, $p = 0.835$; Self: $B = -0.186$, $SE = 0.030$, $\beta = -0.216$, $t = -6.276$, $p < 0.001$) were added, and the variance explained in obsessive-compulsive symptoms increased to 37.4% ($R^2 = 0.374$, $F(7, 714) = 60.944$, $p < 0.001$). In the third model, the MVQ subscales (Psychosomatic: $B = 0.545$, $SE = 0.156$, $\beta = 0.134$, $t = 3.492$, $p < 0.001$; Mental: $B = 0.765$, $SE = 0.133$, $\beta = 0.245$, $t = 5.765$, $p < 0.001$; Interpersonal: $B = 0.631$, $SE = 0.131$, $\beta = 0.177$, $t = 4.808$, $p < 0.001$) were included, and the variance explained in obsessive-compulsive symptoms increased to 47.9% ($R^2 = 0.479$, $F(10, 711) = 47.605$, $p < 0.001$). As a result, the MVQ contributed an additional 10.5% to the variance explained in obsessive-compulsive symptoms (Figure 4).

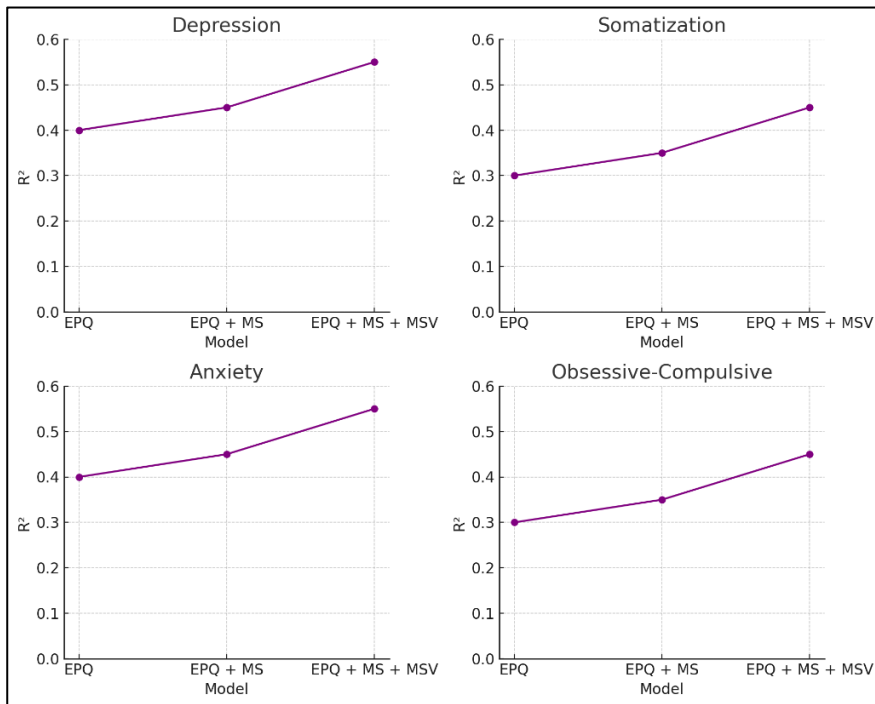


Figure 4: The results of incremental validity analysis

Reliability Analysis

Internal Consistency Reliability

The reliability coefficients, means, standard deviations, skewness, and kurtosis values for the total score and subscales of the Mental Vulnerability Questionnaire (MVQ), as well as the subscales of the Mentalization Scale (MS), the Brief Symptom Inventory (BSI), and the Eysenck Personality Questionnaire - Revised Short Form (EPQ-RS), are presented in Table 3. The analysis revealed that the Kuder Richardson-20 (KR-20) internal consistency reliability coefficients were 0.60 for the Psychosomatic subscale, 0.69 for the Mental subscale, 0.64 for the Interpersonal subscale, and 0.86 for the total score of the MVQ.

Table 3: Internal consistency coefficients, mean, standard deviation, skewness and kurtosis values for the subscales of MVQ, MS, EPQ, and BSI

Scale	Subscales	α	Mean	Sd.	Skewness	Kurtosis
MVQ	Psychosomatic	0.60	1.56	1.32	0.72	-0.22
	Mental	0.69	2.17	1.73	0.35	-0.92
	Interpersonal	0.64	1.84	1.51	0.43	-0.83
	Total	0.86	8.02	5.08	0.32	-0.72
MS	Motivation	0.74	28.81	5.29	-0.50	0.57
	Others	0.84	34.83	5.54	-0.76	1.77
	Self	0.80	26.91	6.24	-0.27	-0.22
EPQ	Neuroticism	0.73	2.85	1.95	0.03	-1.15
	Extraversion	0.80	3.70	2.03	-0.47	-1.05
	Psychoticism	0.35	1.54	1.19	0.49	-0.24
	Lie	0.61	3.94	1.62	-0.54	-0.59
BSI	Depression	0.86	12.38	5.65	0.87	-0.05
	Somatization	0.83	12.47	5.58	1.17	1.04
	Anxiety	0.84	11.32	5.08	1.15	0.81
	Obsessive-compulsive	0.81	13.61	5.38	0.61	-0.19

Note. MVQ = Mental Vulnerability Questionnaire, MS = Mentalization Scale, EPQ = Eysenck Personality Inventory, BSI = Brief Symptom Inventory

Test-Retest Reliability

The test-retest analysis was conducted with 76 university students aged 18-35 ($M = 21.78$, $SD = 3.46$), including 68 women (89.5%) and 8 men (10.5%), with a 4-week interval between tests. The correlation coefficients were found to be $r = 0.81$ ($p < 0.01$) for the Psychosomatic subscale, $r = 0.79$ ($p < 0.01$) for the Mental subscale, $r = 0.69$ ($p < 0.01$) for the Interpersonal subscale, and $r = 0.88$ ($p < 0.01$) for the total score of the MVQ.

Split-Half Reliability

The split-half reliability analysis yielded Spearman-Brown coefficient values of 0.61 for the Psychosomatic subscale, 0.73 for the Mental subscale, 0.64 for the Interpersonal subscale, and 0.84 for the total score of the MVQ.

Comparison Analysis By Gender

An independent samples t-test was conducted to determine whether the mean scores of the MVQ total score and subscales differed by gender. The analysis revealed that the scores for women were statistically significantly higher than those for men in the MVQ total score ($t(718.663) = 5.80, p < 0.001$), Psychosomatic subscale ($t(716.218) = 5.38, p < 0.001$), Mental subscale ($t(720) = 3.83, p < 0.001$), and Interpersonal subscale ($t(720) = 3.96, p < 0.001$) (Table 4).

Table 4: The results of independent samples t-test analysis for comparing MVQ subscales by gender

Scale	Female N=370		Male N=352		<i>t</i>	<i>sd</i>	<i>p</i>	95% Confidence Interval		
	Mean	Sd.	Mean	Sd.				Lower	Upper	
MVQ	Psychosomatic	1.81	1.37	1.29	1.21	5.382	716.218	<0.001	0.329	0.707
	Mental	2.41	1.75	1.92	1.66	3.833	720	<0.001	0.238	0.738
	Interpersonal	2.06	1.54	1.62	1.45	3.956	720	<0.001	0.222	0.659
	Total	9.06	5.19	6.92	4.73	5.798	718.663	<0.001	1.417	2.867

Note. MVQ = Mental Vulnerability Questionnaire

DISCUSSION

In this study, it was aimed to conduct a Turkish validity and reliability study of the Mental Vulnerability Questionnaire (MVQ), which assesses mental vulnerability in terms of psychosomatic symptoms, interpersonal problems, and mental symptoms. For this purpose, a CFA analysis was applied to test the construct validity; Mentalization Scale for convergent validity, a correlation analysis was applied with the subscales of the Mentalization Scale-MS, Brief Symptom Inventory-BSI, and the Eysenck Personality Questionnaire-Revised Short Form-EPQ-RS; and for incremental validity, hierarchical multiple regression analysis was performed to determine the predictive levels of the subscales of the MVQ for depression, anxiety, somatization, and obsessive symptoms in the BSI. For the reliability analysis, KR-20 reliability coefficients were evaluated for the total score and subscales of the MVQ, and test-retest analysis was performed. In addition, Spearman-Brown coefficient values were calculated with two-half test reliability analysis. In the study, the independent samples t-test was used to examine whether the total score and subscales of the MVQ differed according to gender.

Confirmatory factor analysis (CFA) was applied to test the appropriateness of the factor structure obtained in the original study for the Turkish population. Three models were tested in the CFA since the scale has three sub-dimensions and can be evaluated over the total score. In the first model, a single-factor CFA was performed. As a result of the analysis, it was found that the goodness of fit index values were acceptable (Şimşek, 2007). According to this result, it can be said that the scale could be evaluated over the total score. In the second model, a first-level CFA analysis was performed and in this model the sub-dimensions were evaluated separately in relation to each other. As a result of first-level CFA analysis, it was found that the goodness of fit index values were acceptable, and the sub-dimensions were correlated with each other. In the third model, a bi-factor CFA analysis was performed and it was determined that the best goodness of fit index values were obtained for this model. According to these findings, it is seen that the bi-factor model for the MVQ is the most appropriate model, and the findings are consistent with the theoretical basis and the results obtained in the original study (Elpov et al., 2010). The results of Portuguese adaptation study of MVQ (Nogueira, 2017) are also consistent with the original study and Turkish adaptation study.

As the results of convergent validity analysis, it was determined that the total score and the subscales of the MVQ were positively correlated with MS-Motivation and negatively correlated with the MS-Self. According to this result, it can be said that as the level of mental vulnerability increases, the motivation to communicate with other people increases. When this situation is evaluated from a psychoanalytic point of view, it can be thought that there is a fixation about the situation or place or people that the person has been harmed and therefore the motivation to communicate with others increases with the effort to compensate. The MS-Self subscale is related to the ability to understand one's own thoughts and feelings; accordingly, it can be said that people with high levels of mental vulnerability have difficulty in understanding their own thoughts and feelings. When the correlation between the EPQ-RS subscales and the total score and subscales of the MVQ was examined, it was found that there was a positive correlation between all MVQ subscales and total score

and neuroticism, and a negative correlation with the extraversion dimension. According to this finding, it can be said that individuals with high levels of mental vulnerability also have high levels of anxiety. At the same time, the negative correlation with extraversion dimension can be evaluated as a positive relationship between mental vulnerability and introversion. Accordingly, it can be thought that people with high levels of mental vulnerability prefer to be alone more. Considering the positive correlation value obtained with the MS-motivation scale, it can be said that people with high levels of mental vulnerability want to communicate with others, but they avoid communicating with others due to their mental vulnerability and introversion personality traits. When the correlation values between the total score and subscales of the MVQ and the subscales of the BSI (depression, anxiety, somatization, obsessive symptoms) are examined, it is seen that all subscales have a strong positive correlation with psychological symptoms. It can be said that the findings obtained in our study support the relationship between mental vulnerability and psychological disorders in line with the studies in the literature (Elpov et al., 2005).

When the results of the hierarchical multiple regression analysis used within the scope of incremental validity were examined, it was seen that all subscales of the MVQ were predictive variables for depression, anxiety, somatization, and obsessive symptoms. As a result of the analysis, it was determined that the level of predicting psychological symptoms increased when mental vulnerability was included in the model. In a study conducted by Østergaard et al. (2011), a positive relationship was found between mental vulnerability and depression. According to the findings obtained in our study, people with high levels of mental vulnerability are more likely to show anxiety symptoms. In a study investigating the relationship between anxiety and panic disorder and agoraphobia, it was stated that avoidance of harm behaviors may be related to mental vulnerability (Saviotti et al., 1991). In a study applied with patients with somatic complaints such as fatigue, dizziness and tinnitus, a positive correlation was found between harm avoidance behavior and depression and anxiety (Russo et al., 1994). In addition, Kühl and Martini (1981) found that mentally vulnerable individuals reported more somatic symptoms than the control group. In this context, it can be said that somatic symptoms are associated with an increase in the level of mental vulnerability. In addition, studies revealing the relationship between anxiety and obsessive-compulsive disorder (Rector et al. 2005) support the positive correlation between mental vulnerability and obsessive symptoms. As a result, it is seen that findings are in accordance with studies in the literature within the scope of predictive validity (Cuijpers et al., 2005; Rector et al., 2005; Russo et al., 1994; Saviotti et al., 1991) and it can be said that mental vulnerability may be a risk factor for depression, anxiety, somatization, and obsessive symptoms.

As a result of reliability analysis, it was determined that the Kuder-Richardson - 20 (KR - 20) internal consistency coefficients for the total score and the subscales of MVQ were found between 0.60 and 0.86. According to these results, it is seen that the total score and the subscales of MVQ have acceptable reliability coefficients. In the test-retest analysis, it was determined that the correlation values between two applications were statistically significant. This result could be accepted as evidence that the results of MVQ do not change over time. In addition, the result of split-half analysis showed that the Spearman-Brown values for the total score and subscales of MVQ were acceptable and reliable.

According to the analysis of comparison of the total score and the subscales of the MVQ by gender, it was determined that women's score were higher than the men's scores in all subscales and the total score. It is known that anxiety levels are also high in people with high levels of mental vulnerability (Ouimet et al., 2009). In the literature, many studies showed that women are more anxious than men (Bahrami & Yousefi, 2011). Therefore, the higher mental vulnerability in women could be explained with the higher level of anxiety.

In this study, the sample did not include clinical sample, and this fact could be considered as one of the important limitations. It is thought that studies including clinical samples can allow the investigation and also understanding the relationship between psychopathology and mental vulnerability. This could lead to find more appropriate intervention methods.

CONCLUSION

In this study, validity and reliability analyses of the Turkish version of MVQ were conducted. Confirmatory factor analysis (CFA) indicated that three-dimensional structure is suitable for use in Turkish community. In addition, it is seen that the total score could be used also. The results of convergent validity and incremental validity showed that MVQ has strong correlations with psychological symptoms and personality traits. As a result of the reliability analysis, it was seen that MVQ had a high internal consistency and also did not change over time. These findings show that MVQ is a reliable and valid measurement tool for evaluating mental vulnerability in Turkish community.

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ZİHİNSEL KIRILGANLIK ÖLÇEĞİ

Bu sorular hayattaki tutumlarınız hakkındadır. Her bir soru için sizin durumunuza uyan evet veya hayır seçeneğini işaretleyiniz. Sorulardan bazıları sağlık durumunuzla ilgilidir. Lütfen elinizden geldiğince gerçeğe uygun yanıt veriniz. Yanıtlarınız gizli tutulacaktır.

1.	Ellerinizi kolayca titrer mi?	Evet	Hayır
2.	Kendinizi sık sık iştahsız hisseder misiniz?		
3.	Başınız sık sık ağrır mı?		
4.	Sık sık uykusuzluk çeker misiniz?		
5.	Sık sık kaygı ataklarınız olur mu?		
6.	Kendinizi sık sık çok yorgun hisseder misiniz?		
7.	Sık sık baş ağrısı ilacı, uyku hapi, sakinleştirici veya benzeri ilaçlar kullanır mısınız?		
8.	Mideniz, boynunuz, sırtınız veya göğsünüz gibi vücudunuzun değişik yerlerinde sıklıkla ağrılarınız olur mu?		
9.	Kendinizi asabi hisseder misiniz?		
10.	Başınız sık sık döner mi?		
11.	Gürültünün sizi diğer birçok kişiden daha fazla rahatsız ettiğine inanır mısınız?		
12.	Nerdeyse her zaman kötü bir duygu halinde misiniz?		
13.	Birisi sizi izliyorken işinize odaklanmak size zor gelir mi?		
14.	Kalbiniz sıklıkla belli bir sebep olmadan da çok hızlı atar mı?		
15.	Kendinizi sık sık kötü hisseder misiniz?		
16.	Arkadaş edinmek size zor gelir mi?		
17.	Başkalarının sizin hakkınızdaki fikirlerini kabul etmekte zorlanır mısınız?		
18.	Fikirlerinizi kendinize saklamayı mı tercih edersiniz?		
19.	Küçük şeyler sinirlerinizi bozar mı?		
20.	Sizi sıkan ve endişelendiren süreğen düşünceleriniz var mıdır?		
21.	Çok utangaç veya hassas biri misiniz?		
22.	Genellikle yanlış anlaşıldığınızı hisseder misiniz?		