

# The Reliability and Validity of Turkish Brief Measure of Worry Severity based on Turkish University Students

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## Abstract

**Objective:** The aim of this study was to examine reliability and validity of the Turkish Brief Measure of Worry Severity (BMWS) for assessing the level of dysfunctional worry.

**Method:** The study sample consisted of two different student groups from various faculties of Hacettepe University (age range: 17-25 years). First, data were collected from the group, composed of 210 female and 170 male students to evaluate the scale's test re-test correlation, Cronbach's alpha coefficient, and criterion and convergent validity. Next, the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) were administered to the other group, composed of 805 students to assess distinctive validity of the Turkish BMWS. Students that scored over a quarter on median of BDI were regarded as having severe depression symptoms and the students that scored > 26% on BAI were regarded as having severe anxiety symptoms. In this manner anxiety (12 male, 38 female) and depression groups (4 male, 10 female) were formed.

**Results:** Following a series of analyses, test-retest correlation ( $r = 0.76$ ) and internal consistency (Cronbach's alpha 0.88) of the Turkish BMWS was determined to be statistically high. While the Turkish BMWS showed unifactorial construct, the scores of the scale differentiated between the depression group and the anxiety group (depression group:  $X = 8.14$ ,  $SS = 4.03$ ; anxiety group:  $X = 11.56$ ,  $SS = 5.11$ ). Furthermore, the Turkish BMWS's correlations with the Penn State Worry Questionnaire ( $r = 0.75$ ) and Trait State Anxiety Inventory (State Anxiety Inventory:  $r = 0.42$ ; Trait Anxiety Inventory  $r = 0.72$ ) were statistically significant and supported the scale's construct validity.

**Conclusion:** The results show that the Turkish BMWS is a reliable and valid scale for use with Turkish university students.

**Key words:** The Turkish Brief Measure of Worry Severity, reliability, validity.

## INTRODUCTION

The concept of worry, which is described as a normal cognitive process, is suggested to be an important variable for understanding the nature of generalized anxiety disorder (GAD), depending on its severity. Worry activity, was conceptualized as only cognitive component of anxiety in initial studies, so it was considered to be redundant to separately conceptualize it. (O'Neill, 1985). Over the course of time researchers came to realize that anxiety and worry were different from each other conceptually (Davey et al., 1992).

Together with the conceptualization of worry and

anxiety as separate notions; studies, which focused on the etiology of GAD is increased and made an important contribution to the knowledge of pathological worry. According to these studies, uncontrollability of worry, its prevalence, its frequency, its level of disruption to daily functioning, and the presence of meta-worry, etc. are defined as pathological or more severe symptoms of worry (Craske et al., 1989; Wells and Carter, 1999; Dubuy et al., 2001; Francis and Dugas, 2004; Dugas et al., 2005; Gladstone et al., 2005).

It has been reported that worry plays a role in mood disorders as well as in anxiety disorders (Nolen-Hoekse-

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ma and Morrow, 1993; Starcevic, 1995; Borkovec et al., 1998; Mould and Mackintosh, 2005). Recently, differentiation of the severity of worry in symptoms of depression and anxiety have attracted the attention of researchers (Starcevic, 1995; Chelminski and Zimmelman, 2003; Gladstone et al., 2005), and the importance of the severity of worry for understanding the cause of the comorbidity of depression and anxiety disorders was emphasized (Diefenbach et al., 2001; Gladstone et al., 2005).

Furthermore, the subject of the severity of worry has drawn interest in many other aspects in the related literature. Researches have reported that some subjects had high levels of worry severity even though they didn't meet the criteria for GAD, bringing into question if GAD was synonymous with pathological worry. (Ruscio et al., 2001) In this respect, recent studies have investigated if the difference between normal worry and pathological worry implies a qualitative difference between the 2 experiences of worry, or if they differentiate between low and high levels of 1 continuum. Research findings indicate that worry severity that is experienced as low or high should be taken into consideration instead of differentiating worry as normal and pathological (Ruscio et al., 2001; Ruscio, 2002).

On the other hand, to better understand and to treat pathological worry, different self-evaluation scales are developed as well. Some instruments focus on what people are worried about, such as the Worry Domains Questionnaire (WDQ) (Tallis et al., 1992) and Student Worry Scale (SWS) (Davey et al., 1992), while others evaluate the severity and frequency of worry, including the Penn State Worry Questionnaire (PSWQ) (Meyer et al., 1990). Nevertheless, there isn't any short questionnaire in literature that measure the main differential characteristics of dysfunctional and pathological worry, such as uncontrollability, difficulties with problem solving, mood disorders, meta-worry, etc. (Gladstone et al., 2005). Consequently, Gladstone et al. (2005) developed the Brief Measure of Worry Severity (BMWS). The present study aimed to assess the reliability and validity of the Turkish version of BMWS among a sample of Turkish university students.

### **The Psychometric Properties of The Brief Measure of Worry Severity (BMWS)**

The original BMWS was developed to measure the differential severity of worry in depression and anxiety disorders, and the clinical characteristics of individuals suffering from excessive worry.

Gladstone et al. (2005) developed a set of 26 questions, after reviewing the existing literature on worry. Initially, 4 global worry questions, which are about acceptability, severity and uncontrollability of worry, require subjects to rate on different Likert type scales. Likewise, remaining 22 questions, which include pathological characteristics of worry, are all rated on a 4-point Likert type scale.

Afterwards, different methods are used to reduce the 22-item set. First of all, correlations of 26 questions with each other and with the total score are determined in order to assess the degree of commonality between items and total, so the ones correlated weakly with other questions are took out. Moreover, the acceptability of worry is considered a dependent variable and the items that don't differentiate groups are eliminated. As a result of this procedure, 16 items that explain 61% of total variance are assigned. Subsequently, 8 items with higher factor loads that best predict the status of the participant (patient-student), the uncontrollability of worry, the severity of worry, and the perceived uncontrollability of worry according to regression analysis are selected.

On the following stage, the depression group and the prepartum group are used to test the validity of the scale. The depression group included 184 participants (110 female, 60%) with a mean age of 39.6 (SD = 12.7); the prepartum group included, in another longitudinal study, which is built to assess postpartum depression risk, 748 women with a mean age of 30.5 (SD = 5.23). The participants in the depression group, completed Neo Personality Inventory (NEO PI-R) (Costa and McCrae, 1985), Penn State Worry Questionnaire (PSWQ) (Meyer et al., 1990), The Seven-Factor Personality Inventory (Cloninger et al., 1993) and Personality Inventory (Parker et al., 2000) as well as with the latest version of BMWS; the participants in the prepartum group completed Trait Anxiety Inventory (TAI).

The internal reliability coefficient of the scale is found to be 0.92 as the result of the analysis. The correlation coefficient of BMWS and PSWQ is found to be 0.75 and of BMWS and TAI is found to be 0.68. The only factor of the study explained 67% of total variance in depression group and 56% in prepartum group. Moreover, excessive worry is found to be related to histrionic, obsessive and introverted personalities.

The convergent validity scores of the scale indicated that worry severity scores of the ones who are only experiencing depression were higher compared to the ones who are only suffering from anxiety disorders. In con-

**TABLE 1.** Mean scores and standard deviations of research sample from BDEa and BAEb.

	Female (n = 659)		Male (n = 146)		Total	
	M.	SD	M.	SD	M.	SD
BAI	17.13	11.02	13.76	8.99	16.55	10.77
BDI	10.97	7.13	11.38	8.07	11.04	7.29

aBDI: Beck Depression Inventory.  
bBAI: Beck Anxiety Inventory.

clusion, the results obtained by Gladstone et al. (2005) indicated that BMWS is a psychometrically convenient instrument.

As previously mentioned, the present study's aim is to assess the reliability and the validity of BMWS. When the related literature is studied carefully, the worry severity is obviously an important component to better understand GAD, other anxiety disorders and depression. Besides, as the worry severity is considered to be a dimensional characteristic of worry, it is remarked that the studies should focus on worry severity rather than normal/pathological differentiation. The adaptation of BMWS to the Turkish population and its availability in studies conducted in Turkey is important in terms of above mentioned remarks.

## METHOD

### Pre-study

#### a. Translation study

At first, BMWS is translated to Turkish by four translators consisting of instructors in Department of Translation and Interpretation and English Linguistics of Hacettepe University and afterwards, researchers agreed on the final translations of items, which were translated differently. Subsequently, the form, which is translated to Turkish, is psycho-linguistically corrected by three clinical psychologist judges. After being corrected with the suggestions of judges, the scale is completed by a group of students from different departments of Hacettepe University. During this administration, students evaluated the scale in terms of comprehensiveness. After the administration, items that caused difficulties in understanding are changed and the scale was corrected.

#### b. Content Validity

Items are presented to three specialists in clinical psychology and they were asked which item corresponded to which characteristic of pathological worry. The data obtained from the specialists indicated that 6 items had a full match and 2 items had a match of 66%. The data

obtained from three judges are calculated with the intraclass correlation coefficient with Absolute Agreement Definition method to determine the level of agreement between judges. The result of the analysis indicated that the level of agreement was 0.82,  $P < 0.05$ .

## The Original Study

### Sample

380 students from Hacettepe University (210 female, 55.3%; 170 male, 44.7%) participated to test-retest reliability, internal reliability, criterion validity, and concurrent validity studies, which is the first step of BMWS study. The mean age of participants was 20.17 (SD = 3.52). 805 participants (659 female, 82%; 146 male, 18%) with a mean age of 20.70 (SD = 1.47) were administered Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) to study the convergent validity of the scale, in the following step. Table 1 presents the mean scores obtained from BDI and BAI and their standard deviations by the sample, which is used to determine depression and anxiety groups.

After the scores obtained from BDI and BAI are determined, the ones who are one quarter above the median in BDI are considered to be the group with depression symptoms and the ones who are 26% over the group are considered to be the group with anxiety symptoms and that's how the groups of depression and anxiety were created. As a result, the sample that is used to test convergent validity of the scale consisted of 64 participants and two different groups; 50 of them (38 female) were in the anxiety group and 14 of them (10 females) were in the depression group.

## Data Collecting Instruments

### Beck Depression Inventory (BDI)

BDI is used to determine the depression and anxiety groups in the present study. BDI was developed by Beck et al. (1978) and was adapted to the Turkish population by Hisli (1988, 1989). The scale is found to be psychometrically valid and reliable.

**TABLE 2.** Reliability analysis results.

Items	Item Means	Mean score when item eliminated	Variance when item eliminated	Item Sum-Score Correlation Coefficient	Mean Alpha value when item eliminated
1	8.17	16.89	0.63	0.43	0.86
2	8.76	17.65	0.51	0.32	0.87
3	8.12	16.25	0.67	0.53	0.85
4	8.11	16.43	0.62	0.45	0.86
5	7.89	16.33	0.70	0.58	0.85
6	8.83	16.7	0.63	0.44	0.86
7	9.05	17.37	0.57	0.44	0.86
8	8.31	15.7	0.70	0.53	0.85

### Beck Anxiety Inventory (BAI)

BAI is used to determine the depression and anxiety groups in the present study. BAI was developed by Beck et al. (1988) and was adapted to the Turkish population by Ulusoy et al. (1993). The scale is found to be psychometrically valid and reliable.

### Penn State Worry Questionnaire (PSWQ)

PSWQ is used to evaluate the criterion validity of BMWS in the present study. This questionnaire is developed by Meyer et al. (1990). The adaptation study of the questionnaire is being carried on by E. Yılmaz (2006) within PhD. thesis. The questionnaire has psychometrically acceptable levels of reliability and validity.

### State-Trait Anxiety Inventory (STAI)

STAI is used to evaluate the compound validity of BMWS in the present study. This inventory is developed by Spielberg et al. (1970) and adapted to the Turkish population by Öner and Le Compte (1985). The inventory has psychometrically acceptable levels of reliability and validity.

### Process

The data is collected during the class hours of students and they were informed that the reliability and validity of a scale was being studied before the scales were administered. The first group was administered BMWS, PSWQ and STAI together with a demographical information questionnaire and subsequently a different group was administered BDI, BAI and BMWS. Both administrations were completed in 20 minutes.

### Statistical Analysis

Statistical analysis was conducted by using SPSS for Windows 9.05. To test the stability of BMWS's scores, the correlation between test-retest scores within 3 weeks

were considered and Cronbach's Alpha reliability coefficient is calculated to test internal reliability of the scale. Construct validity of the scale is, at first evaluated with the factor analysis. On the second stage, its correlation with STAI is examined to assess its compound validity and on the third stage its correlation with PSWQ is examined to evaluate criterion validity. Additionally, on the fourth stage, t-test comparisons of BMWS's scores in depression and anxiety groups are conducted.

## RESULTS

### Reliability Results

#### a. Test-Retest Reliability

The scale was re-administered to 214 participants after 3 weeks, to determine the test-retest reliability of the Brief Measure of Worry Severity. The group to which the scale was re-administered consisted of 129 females (60.3%) and 85 males (39.7%). The mean age of the group was 18.17 (SD = 5.15). The results indicated a  $r = 0.76$ ,  $P < 0.05$  correlation between two administrations.

#### b. Internal Reliability

Cronbach's Alpha and Item Sum Score Correlation Coefficients are calculated to determine the internal reliability of the scale. The Item Sum Score Correlation Coefficient results are presented at the Table 2.

As presented at the Table 2; The Item Sum Score Correlation Coefficients range between .32 and .58; Cronbach's Alpha internal reliability coefficient is 0.88  $P < 0.05$  ( $n = 380$ ).

### Validity Results

#### Construct Validity

##### a. Factor Analysis

The construct validity of Brief Measure of Worry Se-

**TABLE 3.** WSS<sup>a</sup> factor structure.

Items	Factor Loads
1	0.54
2	0.38
3	0.61
4	0.54
5	0.65
6	0.52
7	0.48
8	0.64
Self Value	4.46
Explained Total Variance %56	

<sup>a</sup>WSS: Worry Severity Scale.

verity is at first assessed with factor analysis. Principal Component Analysis is applied to the correlation matrix obtained from BMWS items and one factor that its eigenvalue higher than 1 is obtained. This factor explains 56% of the scale. Since one factor is obtained after the first analysis, no further analysis was done. BMWS's factor construct is presented at Table 3.

### b. Compound Validity

On the second stage, Worry BMWS's correlation with STAI is assessed in order to test its compound validity. The results indicated that the relationship between STAI and BMWS is found to be  $r = 0.72$ ,  $P < 0.05$  and the relationship between DAE is found to be  $r = 0.46$   $P < 0.05$ . (Table 4)

### c. Criterion Validity

BMWS's correlation with PSWQ is assessed in order to evaluate its criterion validity. The results indicated that the relationship between PSWQ and WSS was  $r = 0.75$  ( $P < .05$ ). (Table 4)

### d. Convergent Validity

On the fourth stage, to test the convergent validity of the scale, paired samples t test is applied to test whether

depression and anxiety groups' scores obtained from BMWS differed or not.

The results indicated that the scores of anxiety group obtained from BMWS ( $X = 11.56$ ,  $SS = 5.11$ ), was significantly higher  $t(63) = -12,84$ ,  $P < 0.05$  than the scores of depression group obtained from BMWS ( $X = 8.14$ ,  $SS = 4.03$ ).

## DISCUSSION

When the reported results are evaluated in general, in terms of the sample of the study, BMWS is found to be valid and reliable.

The reliability of Brief Measure of Worry Severity is calculated with two different methods: internal reliability and test-retest reliability. The test-retest correlations of the scale are statistically significant; this result indicates that the scores are reliable over time. On the other hand, another result, which supported the reliability of the scale, is the statistically significant internal reliability coefficient. The obtained internal reliability coefficient indicates that the scale is consistent with the original version of the scale and the items resemble highly. However, the scale's item sum score correlation coefficient is lower than the score in the original version. When the characteristics of the BMWS's items about pathological worry, such as meta-worry and uncontrollability, the qualitative difference between two studies can be explained by the present study's clinical sample selection.

In terms of validity studies, when the content validity is evaluated at first, it is seen that the items are assigned to the related characteristics of pathological worry by the judges with a high percentage of accord. The mentioned accord between the judges can be interpreted as a support to the content validity.

On the other hand, as previously mentioned, evidences about the validity of BMWS are evaluated in four stages. On the first stage, in term of construct validity, the relationship between BMWS and PSWQ is observed. The obtained results indicated that there is a

**TABLE 4.** WSS<sup>a</sup> relationship to PSWQ<sup>b</sup>, TAI<sup>c</sup>, and SAI<sup>d</sup>.

	WSS	PSWQ	TAI	SAI
WSS	1.00	0.75**	0.46**	0.72**
PSWQ		1.00	0.52**	0.75**
TAI			1.00	0.60**
SAI				1.00

<sup>a</sup>WSS: Worry Severity Scale., <sup>b</sup>PSWQ: Penn State Worry Questionnaire., <sup>c</sup>SAE: State Anxiety Inventory., <sup>d</sup>TAI: Trait Anxiety Inventory.

\*\* $P < 0.01$



statistically significant correlation between two instruments. These results are consistent with the results of the original study (Gladstone et al., 2005).

On the second stage, the scale's relationship with STAI is evaluated in terms of compound validity. Accordingly, the results indicate that the scale's correlation coefficient with STAI is greater than its correlation coefficient with TAI. These results are consistent with the studies, which used different worry scales (Borkovec et al., 1983; Meyer et al., 1990; Tallis et al., 1992). Consequently, we can say that worry is a stable trait rather than a situational emotional response (Gladstone and Parker, 2003).

Principle components analysis is conducted on the third stage, in order to analysis the construct validity of the scale. It is accordingly revealed that the scale has a single factor construct and that this factor explains 56% of the total variance. This single factor is consistent with the factor structure of the scale's original version (Gladstone et al., 2005). This result indicates that a single worry factor explains most of the total variance. So, we can say that each 8 item evaluates the characteristics of pathological or dysfunctional worry.

On the fourth stage, t-test results, which evaluate the differentiation power of the scale, indicate that the anxiety group's BMWS scores are significantly higher than the depression group's BMWS scores. Consequently, worry is greater in the anxiety group compared to depression group. This is an expected result but it is not consistent with the Starcevic's (1995) study, which suggested that worry severity of depression and anxiety groups didn't

differ when PSWQ is used. One of the possible reasons of the difference of the two studies can be the administration of different scales. It is known that PSWQ isn't as sensitive to worry severity as BMWS (Gladstone et al., 2005). On the other hand, the results of convergent validity are consistent with the original version of the scale. Moreover, Chelminski and Zimmerman (2003) suggested that worry is a greater problem for anxious individuals than depressive individuals.

In conclusion, four staged observations indicate that BMWS's construct validity is at an acceptable level.

When the study is evaluated in terms of limitation, the inequality of gender groups in number and the fewness of the depression group can be considered as a limitation.

As result, when the reliability and validity studies are evaluated together, it is seen that BMWS's validity and reliability scores are at acceptable levels. Results of the study indicate that severe worry has a greater part in anxiety disorders compared to depression. This scale can be used in studies and applications related to differentiate depression and anxiety disorders. Besides, this scale can be useful during the process of treatment. Since the worry is suggested to have a dimensional feature, therapeutical change can cause a slow decrease in worry severity in depression and anxiety disorders. This instrument, which evaluates worry as a trait, can be used to evaluate the efficiency of therapies. Moreover, the scale is easy to understand, it is simple and short; this can increase its usefulness. However, since this is the first study conducted in Turkey, the reported results should be compared to the future studies' results.

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