



Reliability and validity of Mee-Bunney Psychological Pain Assessment Scale Turkish version

Mehmet Emin Demirkol¹ · Hüseyin Güleç² · Lut Tamam^{1,3} · Medine Yazıcı Güleç² · Sertaç Alay Öztürk² · Kerim Uğur⁴ · Mahmut Onur Karaytuğ⁵ · Meliha Zengin Eroğlu⁶

Published online: 7 August 2019

© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract

In this study, we aimed to investigate the validity and reliability of the Turkish version of the Mee Bunney Psychological Pain Assessment Scale (MBPPAS), which questions the frequency, intensity and acute period of psychological pain. We also aimed to investigate whether psychological pain allows measuring acute suicidal behavior; and whether there were different levels of psychological pain in suicide-related disorders. The study included 73 patients with major depressive disorder, 50 patients with bipolar disorder and 77 healthy controls. MBPPAS, Beck Depression Inventory, Beck Scale for Suicidal Ideation, Beck Hopelessness Scale, Physical Pain Scale, and Psychache Scale were filled by the participants. In the internal consistency, the Cronbach's alpha coefficient was found to be 0.95 and the item-total score correlation coefficients were between 0.51 and 0.89. Explanatory factor analysis showed that the scale was loaded under the single factor, which had an eigenvalue of 7.02, explaining 70.23% of the total variance. Factor loads of the items were found between 0.57 and 0.92. Discriminant function analysis showed that the scale classified the patient group and the healthy group, also the patients with and without suicide attempt, and each group was classified as successfully when the three groups were considered together. Besides the fact that the Turkish version of the scale is valid and reliable, it has been shown that it can be useful (partially) in the studies conducted with patients in the acute phase and in distinguishing disorders from each other in suicide-related entities such as mood disorders.

Keywords Suicide · Acute period · Psychological pain · Depression · Bipolar disorder · Diagnostic validity

Introduction

Every year nearly 800.000 people commit suicide worldwide (World Health Organization 2018). Nevertheless, it is argued

that the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5; American Psychiatric Association 2013), the gold standard classification system of mental disorders, is insufficient to identify those who have suicidal

✉ Lut Tamam
ltamam@gmail.com

Mehmet Emin Demirkol
emindemirkol@gmail.com

Hüseyin Güleç
huseyingulec@yahoo.com

Medine Yazıcı Güleç
yazicimedine@yahoo.com

Sertaç Alay Öztürk
sertacalay_88@yahoo.com

Kerim Uğur
premirek@gmail.com

Mahmut Onur Karaytuğ
mokaraytug@gmail.com

Meliha Zengin Eroğlu
melihazengin@gmail.com

¹ Department of Psychiatry, Çukurova University Hospital, Adana, Turkey

² Department of Psychiatry, Erenköy Hospital for Mental and Nervous Diseases, İstanbul, Turkey

³ Psikiyatri Anabilim Dalı, Çukurova Üniversitesi Tıp Fakültesi, Balcalı Kampüsü 01330 Sarıçam, Adana, Turkey

⁴ Department of Psychiatry, Malatya Training and Research Hospital, Malatya, Turkey

⁵ Department of Psychiatry, Dr Ekrem Tok Hospital for Mental and Nervous Diseases, Adana, Turkey

⁶ Department of Psychiatry, Haydarpaşa Training and Research Hospital, İstanbul, Turkey

ideation and/or attempts (Aleman and Denys 2014). There is no diagnostic psychiatric subheading specific to suicide in DSM-5 yet (Oquendo and Baca-García 2014). Although DSM-5 included Suicidal Behavioral Disorder (SBD), the SBD was taken as a “Conditions for Further Study” only in the annex (American Psychiatric Association 2013). The SBD is limited because it considers suicidal behavior as a result without classifying the phenomenology of the suicide event as an acute crisis. The SBD identifies the current suicidal behavior as the event that occurred in the last 24 months. History of past suicidal attempt gives an idea about suicide risk management but do not provide sufficient clinical information about the acute risk of an individual. Self-harm thoughts and behaviors in the past have been found to be insufficient to predict future suicidal thoughts and behaviors (Ribeiro et al. 2016). The researchers emphasized that long-term follow-up weakens predictive validity and should focus on the acute short-term prediction of suicide risk (Ribeiro et al. 2016).

Although many biological, psychological and environmental risk factors like aggression, impulsivity, solitariness, unemployment, previous suicide attempts, and communication problems have been proposed to predict suicide (Dennehy et al. 2011; Gvion et al. 2014), psychological pain is thought to play a central role in suicidal behavior (Mee et al. 2011). Psychological pain is defined as the “introspective experience of negative emotions such as fear, despair, grief, shame, guilt, blocked love, loneliness and loss” (Shneidman 1993, 1996, 1998; Bunney et al. 2002; Pompili et al. 2008; Verrocchio et al. 2016). It is thought that psychological pain is much more than the sum of negative feelings, which makes psychological pain a unique unacceptable experience (Orbach et al. 2003). Shneidman (1993) suggested that psychological pain was the most important predictor of suicidal behavior; however, he also claimed that psychological variables associated with suicidal behavior were only associated with psychological pain. The results of a recent study conducted using a 4-years follow-up design that investigated Shneidman’s model provided partial support for this model and showed that other psychological factors were important for suicide only when they were related with psychological pain (Montemarano et al. 2018). According to the Cubic Model, suicidal behavior occurs as a result of the interaction of three psychological factors: psychological pain, uneasiness and stress (Shneidman 1987; Jobes and Drozd 2004). Another model has suggested that when a person experiences unbearable psychological pain, he/she can perceive his/her body as an easier target to attack (Orbach et al. 2001). According to the stress-diathesis model, distal risk factors including developmental, familial, biological and genetic factors create a predisposition to suicide (Mann 2003). When combined with proximal risk factors including life events, acute alcohol or substance related disorders, acute

episodes of mental disorders they increase the risk of suicide (Roy et al. 2009). Psychological pain in this process seems to be an emotional and motivational feature with special importance (Troister and Holden 2010). The interpersonal suicide theory proposes that apparent social withdrawal represents a violent form of the desire for suicide, which is characterized by the disappearance of a sense of perceived ‘belonging’ and ‘being burden on others’ (Van Orden et al. 2010). The three-step theory suggests that suicide ideation in the first step is caused by a combination of pain (usually psychological pain) and hopelessness. In the second step, it is stated that commitment is an important preventive factor against increased suicidal ideation in those experiencing pain and hopelessness. In the third step, it is stated that the acquired suicide ability is effective in converting suicidal ideation into suicide attempt (Klonsky and May 2015).

Some scales related to psychological pain have been developed, such as the Psychological Pain Assessment Scale (PPAS; Shneidman 1993), the Orbach and Mikulincer Mental Pain Scale (OMMP; Orbach et al. 2003), and the Psychache Scale (PAS; Holden et al. 2001). Each of these scales has been developed from a conceptual point of view that psychological pain is an important aspect of suicide. The application of PPAS and OMMP requires more time than other scales. PAS (Holden et al. 2001) is structured on the basis of chronic, free-floating, non-state-specific psychological pain resulting from failure to meet vital psychological needs (Mee et al. 2011). The Mee-Bunney Psychological Pain Assessment Scale (MBPPAS) has been designed to meet the need for an easy to understand and short scale to assess both the frequency and intensity of psychological pain. MBPPAS is a 5-point Likert-type, 10-item self-report scale that measures the intensity of psychological pain (ranging from ‘none’ to ‘unbearable’) and its frequency (ranging from ‘never’ to ‘always’). This scale enables the clinician to evaluate the psychological pain in populations with and without psychiatric disorders quickly and reliably. Although PAS and MBPPAS are short and easy to implement, MBPPAS differs by the assessment of the frequency and intensity of psychological pain, both now and during the past 3 months (Mee et al. 2011). Psychological pain can provide a valid dimension to predict suicide in the acute / crisis period of the SBD.

The theoretical structure of psychological pain in disorders such as mood disorders also implies that there may be phenomenological or etiological core construct. Psychological pain, as a trait structure, can take place at distinct levels in related disorders and may be the reason for suicidal behaviors at different rates in various clinical samples (Pompili 2018). In this study, we aimed to show the reliability and validity of the Turkish version of MBPPAS which can be used in clinical practice and research and which has the advantages of core construct (trait) to question the disorder and suicide state for past and present in a fast and reliable way.

Method

Sample Population

The minimum required sample size in the study for medium effect size (Cohen's $d = .50$), power of $.80$, and $p = .05$ was 128. Power analysis was made by “pwr” package in R version 3.5.2 (<https://cran.r-project.org/web/packages/pwr/pwr.pdf>) (Champely et al. 2018). A total of 77 patients with major depressive disorder (MDD) and 57 patients with bipolar disorder (BD) admitted to the Department of Psychiatry at Çukurova University Faculty of Medicine, and 93 age- and sex-matched healthy controls from surrounding community were evaluated for recruitment. A broad psychiatric interview based on DSM-5 criteria was applied to the participants by the same psychiatrist (American Psychiatric Association 2013). Healthy controls were defined by the absence of any psychiatric disorder. Two of 77 patients with MDD had a comorbid anxiety disorder, one had obsessive-compulsive disorder (OCD) and one patient did not accept the application of the scales; these patients were not included in the study. Seven of the BD patients were also excluded from the study since they did not fill the scales. As a result of the psychiatric evaluation, of 93 control cases who declared no previous psychiatric disorder, one was not included in the study because of anxiety disorder, one had OCD, and 14 were excluded because they did not fill the scales. The study was conducted with 73 MDD patients, 50 BD patients, and 77 healthy controls. 72.6% of the depression group, 56.0% of the bipolar group and 61.0% of the control group were women.

Written informed consent was obtained from all participants at the recruitment. Non-Interventional Clinical Researches Ethics Committee of our center has approved the study.

Assessment of Subjects

The Beck Depression Inventory, Beck Hopelessness Scale, Beck Scale for Suicidal Ideation, Physical Pain Scale and the PAS were administered to the participants together with MBPPAS. The items that the participants did not understand were explained by the interviewer and there was no time constraint to fill the scales.

The Mee-Bunney Psychological Pain Assessment Scale (MBPPAS): It is a 5-item Likert-type self-report scale that consists of ten items. These 10 items were prepared based on the completed suicide notes and the psychological pain descriptions of depressive patients. It questions the frequency and severity of psychological pain during the last 3 months and in the present, how much psychological pain is bearable, the severity of the worst physical pain, and what the individual can do to avoid psychological pain (including death). Higher scores reflect higher psychological pain. The Cronbach

coefficient is 0.83 for depressive patients and 0.94 for healthy controls (Mee et al. 2011).

Translation Process

The correspondence with the author Christopher Reist was made via e-mail and the scale was translated into Turkish by 3 psychiatrists and a text agreed on was created. It was then translated back into English and compared to its original form by linguists. It was used for the study after the approval for suitability.

The Beck Depression Inventory (BDI): This is a 4-point Likert-type self-report consisting of 21 items related to depressive symptoms. The severity of depression increases as the score increases (Beck and Steer 1984). The validity and reliability study of the Turkish version was conducted, and the Cronbach alpha coefficient of Turkish form is 0.80 (Hisli 1988).

The Beck Hopelessness Scale (BHS): It was developed by Beck et al. (1974). It is a self-report scale which requests answers in 20 questions as ‘yes’ or ‘no’. The total arithmetic score is evaluated as hopelessness score. The validity and reliability study of the Turkish version was conducted, and the Cronbach alpha coefficient of the Turkish form is 0.86 (Seber et al. 1993).

The Beck Scale for Suicide Ideation (BSSI): In this scale, which consists of 5 sub-sections, the total score is obtained by the arithmetic sum of the points obtained from all items. The lowest score is 0 and the highest score is 38 and the high score means that the suicidal ideation is significant and serious. The Cronbach alpha coefficient of scale is 0.89 (Beck et al. 1979). The validity and reliability study of the Turkish version was conducted, and the Cronbach alpha coefficient for the Turkish version is 0.84 (Ozcelik et al. 2015).

Physical Pain Scale (PPS): In this study, we applied the physical pain scale used by Olié et al. (2010) in their article. They administered three scales to measure 1) current suicidal ideation, 2) psychological pain and 3) physical pain. Each of the scales had a range of 0 (no pain) to 10 (maximal pain) to assess both current and past (during last 15 days) status.

The Psychache Scale (PAS): It was developed by Holden et al. (2001) on Shneidman's definition of psychological pain. It is a 5-point Likert-type scale consisting of 13 questions. Answers to questions ranged from ‘never’ to ‘always’ or from ‘strongly disagree’ to ‘strongly agree’. Nine of 13 items are related to frequency and four are related to the intensity of psychological pain. PAS has been shown to successfully distinguish patients from healthy subjects as well as, patients with suicide attempt from those without. High scores indicate high levels of psychological pain. The validity and reliability study of the Turkish version was conducted, and the Cronbach alpha coefficient of the Turkish form is 0.98 (Demirkol et al. 2018).

Statistical Analysis

In order to test the difference between the study groups in terms of sociodemographic and clinical characteristics, analysis of variance (ANOVA) was used for numerical variables and the chi-square test for categorical variables. In the reliability analysis, item-total score correlation coefficients were analyzed and Cronbach's alpha internal consistency analysis was performed. Exploratory factor analysis was applied for construct validity. Exploratory factor analysis was performed according to the principal components method and the factors with eigenvalue 1 and factor items with a factor loading of 0.4 and above were chosen according to Kaiser (1960) criteria. Correlations between all the research scales were examined in terms of convergent validity. Multi-group confirmatory factor analysis was performed in order to demonstrate that MBPPAS can make a meaningful comparison between the patient and the control groups. The validity of cross-group score comparisons is vital to many practices in applied psychological research. In practice, cross-group factorial invariance is widely tested by multi-group confirmatory factor analysis (Wu et al. 2007). Discriminant function analysis was performed to show the effectiveness of the scale score in discriminating the study groups.

According to the findings from previous studies, the validity of a scale should be tested with classification-sequencing validity, correlation analysis between criteria as well as the factor analysis (Acar 2014); thus the classification-sequencing validity of the scale was tested with Erkus' double consistency (DC) index (Erkus 2003). According to double consistency index, the scale items are divided into odd numbers and even numbers, and the total scores of each individual are calculated for each half. After the total scores are sorted from the highest to the lowest one, the consistency between the sections of upper and lower 27% is examined in two separate halves. In order for the scale to be considered as consistent, an individual in the upper group of one half should be located in the upper group of the other half, and similarly, people in the lower group of one half should be sorted in the lower group of the other half. In two halves of the scale, the frequency difference in the upper and lower 27% groups gives the index value, which ranges from 0.00 to 1.00. If the index value is close to 1.00, the scale is considered to be consistent.

Results and Discussion

Sociodemographic Characteristics

The mean age of the depression group was 36.02 ± 11.32 years, the bipolar group was 36.86 ± 9.80 and the

control group was 35.74 ± 6.58 years. No difference was found between the groups in ANOVA. 72.6% of the depression group, 56.0% of the bipolar group and 61.0% of the control group were women. Chi-square analysis didn't find a difference for the sex ratios in the groups. 39.7% of the MDB group, 36% of the BD group had previously attempted suicide which was defined as any attempt tended to end someone's own life. None of the subjects in the control group had previous suicide attempts. The distributions of participants regarding gender, marital status, place of residence, medical disease, educational status, and age are shown in Table 1. And descriptive statistics of MBPPAS and PAS scores for the MDD, control, and BD groups are shown in Table 2.

Reliability Findings

Cronbach alpha coefficient and item-total score correlations were analyzed for reliability analysis. In the internal consistency analysis, the Cronbach alpha coefficient of the MBPPAS was 0.95, and the item-total score correlation coefficients were between 0.51–0.89 (Table 3). In the original study, the Cronbach alpha coefficient was found to be 0.83 in depressive individuals and 0.94 in the control group and item-total score correlation coefficients were found to be greater than 0.75 for each of the 10 items of the scale (Mee et al. 2011). These results showed that the data we obtained were similar to study in which the scale was developed, and the internal consistency of the Turkish version of MBPPAS was good.

Findings Regarding the Classification and Sequencing Validity

After the 10-item scale was divided into two halves as items with odd and even numbers, the total scores of the individuals were obtained for each half. For both halves, individuals were sorted according to their total score. Tests were performed with the individuals in the lower and upper groups of both halves. The scores of the individuals were not taken into consideration in the subsequent procedures. According to the double consistency calculation formula, the number of individuals in both the 27% lower and upper groups was 200. The number of common individuals in the lower groups of both the odd and even number halves was 98; while the number of common individuals in the upper groups of both halves was 102. When the frequencies are used according to the formula, DC is calculated as following: $DC = 1 - [((200 - 98) + (200 - 102)) / 400] = 0.50$. When it was evaluated according to the index ranging from 0.00 to 1.00, we state that the value of 0.50 found in this study indicated moderate classification and ranking validity.

Table 1 Several sociodemographic characteristics of the groups

		Control		MDD		BD		p
		N	%	N	%	N	%	
Gender	Female	47	61.0	53	72.6	28	56.0	.134 ^a
	Male	30	39.0	20	27.4	22	44.0	
Education	Illiterate	0	0.0	1	1.4	0	0.0	.318 ^a
	Literate	1	1.3	0	0.0	0	0.0	
	Primary school	19	24.6	24	32.9	8	16.0	
	High school	27	35.0	25	34.2	17	34.0	
Marital Status	University	30	38.9	23	31.5	25	50.0	.148 ^a
	Single	45	58.4	34	46.6	21	42.0	
	Married	32	41.6	39	53.4	29	59.0	
Place of residence	Urban	56	72.7	49	67.1	37	74.0	.650 ^a
	Rural	21	27.3	24	32.9	13	26.0	
Medical disease	Yes	12	15.6	18	24.7	13	26.0	.269 ^a
	No	65	84.4	55	75.3	37	74.0	
Age	Mean ± SD	35.74 ± 6.58		36.02 ± 11.32		36.86 ± 9.80		.545 ^b

BD Bipolar disorder, MDD Major depressive disorder, SD Standard deviation

^a Chi-square test was used. Data were summarized using frequency (%)

^b One-Way ANOVA was used. Data were summarized using mean ± standard deviation

Validity Findings

Exploratory factor analysis (EFA) was performed for the construct validity of the scale. According to the principal components method, exploratory factor analysis was found to be loaded under a single factor of MBPPAS with an Eigenvalue of 7.02, explaining a total of 70.23% of the variance. The factor loadings of MBPPAS were found to be between 0.57–0.92 (Table 3). The exploratory factor results indicate that the Turkish version of the scale is well valid.

The results of convergent validity are shown in Table 4. In the original study of MBPPAS, one of the limitations stated by authors was the absence of patients with the diagnosis of bipolar disorder and other psychiatric disorders (Mee et al.

2011). Thus, we conducted this study with both major depressive disorder, bipolar disorder patients and also healthy controls. Similar to PAS, psychological pain in MBPPAS has been shown to be a predictor of suicide together with high scores of depression and hopelessness (Mee et al. 2011; Li et al. 2014). As expected, we found that the consistency correlation of MBPPAS with BHS and BDI in our study was parallel with previous studies. When the relationship between physical and psychological pain has been examined in previous studies, both conditions have been shown to have similar activation patterns in the brain (Mee et al. 2006; Kross et al. 2011). In a small sample study examining the relationship between psychological pain, physical pain and suicidal behavior in depressive patients, it was shown that the intensity of physical pain was not significantly different between patients who did and did not attempt suicide (Olié et al. 2010). On the contrary, there was also evidence that suicidal tendencies would increase when physical pain intensity increased in depressive patients (Fishbain et al. 1997; Mee et al. 2011). The correlation between MBPPAS and PPS was moderate to strong (correlation in the MDD + BD group was 0.617, in the MDD group was 0.484, and in the BD group was 0.663) in our study (Table 4).

In order to examine measurement invariance, multi-group confirmatory factor analysis was performed (Table 5). First, the factor structure of MBPPAS was examined for the patient (MDD + BD) group and the control group separately. To demonstrate that measurements with MBPPAS have the same meaning for both the patient and the control groups, multi-group confirmatory factor analysis was performed. According

Table 2 Descriptive statistics of MBPPAS and PAS total scores according to diagnostic groups

		N	Minimum	Maximum	Mean	SD
MDD	MBPPAS	73	24.00	50.00	35.30	6.25
	PAS	73	26.00	65.00	45.90	10.49
Control	MBPPAS	77	10.00	30.00	15.31	4.04
	PAS	77	13.00	33.00	18.39	4.49
BD	MBPPAS	50	22.00	49.00	34.98	7.01
	PAS	50	25.00	64.00	45.88	10.44

BD Bipolar Disorder, MBPPAS Mee-Bunney Psychological Pain Assessment Scale, PAS Psychache Scale, MDD Major Depressive Disorder, SD Standard deviation

Table 3 Item-total score correlations, Cronbach alpha coefficients, and factor loads

Item	r_1	C_α	r_2
1. Circle the number that best describes how often you suffer from severe psychological pain.	0.847	0.942	0.883
2. Circle the number that best describes the most severe psychological pain you have suffered in the last 3 months.	0.865	0.941	0.901
3. Circle the number that best describes the mild psychological pain you have suffered in the last 3 months.	0.788	0.945	0.832
4. Circle the number that best describes the severity of your psychological pain in most of the days in the last 3 months.	0.867	0.941	0.903
5. Circle the number that best describes the psychological pain you currently suffer from.	0.882	0.940	0.914
6. How much more psychological pain do you think you can endure before it becomes unbearable?	0.754	0.946	0.803
7. Have you ever thought of doing something to relieve your psychological pain, whatever the consequences?	0.514	0.956	0.572
8. How often do you suffer from psychological pain that is worse than the worst physical / body pain you've ever felt?	0.893	0.940	0.919
9. How would you rate your current psychological pain when you compare it to the worst physical / physical pain you can imagine?	0.787	0.945	0.833
10. Have you ever thought that the only way to relieve your psychological pain is to die?	0.710	0.948	0.759

r_1 Corrected item-total correlations, C_α Cronbach's alpha (When the item is ignored), r_2 Factor load, $n = 200$

to the global goodness of fit statistics and measurement invariance, MBPPAS had measurement invariance. As a result, there were no invariance problems between the patient and the control groups. MBPPAS was a suitable measurement tool for application both for patient and healthy control groups.

According to the results of the discriminant analysis (Table 6), the patients were successfully distinguished from healthy controls, and 95% of original grouped cases correctly classified. 114 of the 123 patients in the patient group were classified correctly. In the control group, 76 of the 77 (98.7%) were classified correctly. As a result, patients with suicide attempt history were distinguished from those without suicide attempt. The recent suicide attempts of the patients included in the study might have affected the symptom severity, and this would explain the accuracy rate of the scale. The results of this study should be supported by further studies involving healthy first-degree relatives of individuals who are in remission (especially including BD-2) in order to clarify the issue of endophenotypes. This study can be considered as a

preliminary study in terms of diagnostic validity that psychological pain is a marker in distinguishing between mood disorders as a trait structure.

Half of the patients with MDD or BD who completed suicide had previous suicide attempts (Holma et al. 2014). Patients with BD-2 were more likely to be exposed to depressive episodes than patients with BD-1 and MDD; therefore, suicide rates were higher (Holma et al. 2014). In addition, Baldessarini et al. (2012) found in their study on patients with BD-1 that depressive and mixed episodes increased suicide risk more than manic attack. Psychological pain can take place as a key feature (trait structure) in conditions associated with suicide. Psychological pain dimension can be shown to be present in different levels in each entity. In this study, the validity and reliability of MBPPAS, which is a more rapid and reliable application tool developed for the measurement and evaluation of the psychological pain dimension, was examined. Both state and trait structure theory (a priori) were studied in order to provide a comprehensive area of use.

Table 4 The consistency correlations of the Mee Bunney Psychological Pain Scale with other scales (r) in MDD + BD and in MDD and in BD groups separately

		Age	BSSI	PPS	BDI	BHS	PAS
MDD + BD	Mee-Bunney Psychological Pain Scale ($n = 123$)	-.120	.572**	.617**	.770**	.675**	.849**
MDD	Mee-Bunney Psychological Pain Scale ($n = 73$)	-.059	.382**	.484**	.652**	.548**	.791**
BD	Mee-Bunney Psychological Pain Scale ($n = 50$)	-.244	.729**	.663**	.865**	.857**	.882**

* $p < 0.05$, ** $p < 0.01$, MDD Major Depressive Disorder, BD Bipolar Disorder, BDI Beck Depression Inventory, BHS Beck Hopelessness Scale, BSSI Beck Scale for Suicidal Ideation, PPS Physical Pain Scale, PAS Psychache Scale

Table 5 Results of multi-group confirmatory factor analysis

Model	χ^2	χ^2/df	p	CFI	GFI	NFI	RMSEA
Patient (<i>n</i> = 123)	101.97	3.00	0.000	0.96	0.90	0.94	0.100
Control (<i>n</i> = 77)	38.94	1.15	0.257	0.99	0.90	0.94	0.044
Multi-group (<i>n</i> = 200)	99.90	1.25	0.065	0.99	–	0.94	0.50
Recommended value		$\chi^2/df \leq 3$		≥ 0.90	≥ 0.90	≥ 0.90	≤ 0.080

CFI Confirmatory Fit Index, GFI The goodness of fit index, NFI Normed-fit index, RMSEA The root mean square error of approximation

Suicide is a common public health problem all over the world. Cross cultural studies may facilitate understanding suicide in a global context. To the best of our knowledge, this is the first validation study for MBPPAS in a different language. While our study included people with bipolar disorder as an additional level, it has certain limitations. The selection of all patients participating in the study from a university hospital may limit the generalizability of the data obtained. The evaluation of the concept of psychological pain only by self-report scales, the lack of biomarkers or neuroimaging studies are other limitations of the study. Also, the lack of divergent validity in statistical analysis can be considered as another limitation.

Considering that approximately 50% of individuals with MDD are still being treated in primary health care facilities, the use of a reliable and valid self-report scale that can be filled in a short time such as MBPPAS will help to identify individuals having high suicidal risk (Narrow et al. 1993; Mee et al. 2011). The Turkish version of the MBPPAS scale can be used to classify disorders as well as to distinguish acute suicidal behavior with some limitations, and also reveal the difference between suicidal disorders in intensity and frequency. Further studies on a wider range of psychiatric disorder groups such as mood disorders, personality disorders, and substance abuse, and/or longitudinal studies will contribute to clarifying this issue.

Table 6 Classification results according to discriminant analysis

Classification Results ^a		Predicted Group Membership			Total
		Patient	Control		
Original	Count	Patient	114	9	123
		Control	1	76	77
	%	Patient	92.7	7.3	100.0
		Control	1.3	98.7	100.0

^a 95,0% of original grouped cases correctly classified

Canonical Correlation = 0.862

Wilks' Lambda = 0.257 ($\chi^2_{(1)} = 268.248; p < 0.01$)

n = 200

Acknowledgments We wish to thank Christopher Reist and Steve Mee for the permission and sharing their experiments.

Author Contributions [Finding the subject: LT, HG, MED; Literature review: LT, HG, MED, MYG, SAÖ, MZE; Conducting research: MED, LT, MOK, KU; Applying Scales: MED; Statistical Analysis: HG, LT, MED; Writing the manuscript: MED, HG, LT, MYG, SAÖ, KU, MOK, MZE; Review the manuscript: LT, HG, MED] All authors read and approved the final version of the manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

Acar, T. (2014). Ölçek geliştirmede geçerlik kanıtları: çapraz geçerlik, sınıflama ve sıralama geçerliği uygulaması. *Kuram ve Uygulamada Eğitim Bilimleri*, 14, 1–11.

Aleman, A., & Denys, D. (2014). A road map for suicide research and prevention. *Nature*, 509, 421–423.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington: American Psychiatric Publishing.

Baldessarini, R., Undurraga, J., Vázquez, G., Tondo, L., Salvatore, P., Ha, K., et al. (2012). Predominant recurrence polarity among 928 adult international bipolar I disorder patients. *Acta Psychiatrica Scandinavica*, 125, 293–302.

Beck, A. T., & Steer, R. A. (1984). Internal consistencies of the original and revised Beck depression inventory. *Journal of Clinical Psychology*, 40(6), 1365–1367.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The hopelessness scale. *Journal of Consulting and Clinical Psychology*, 42(6), 861–865.

Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: The scale for suicide ideation. *Journal of Consulting and Clinical Psychology*, 47(2), 343–352.

Bunney, W., Kleinman, A., Pellmar, T., & Goldsmith, S. (2002). *Reducing suicide: A national imperative*. Washington, DC: National Academies Press.

Champely, S., Ekstrom, C., Dalgaard, P., Gill, J., Weibelzahl, S., Anandkumar, A., ... & De Rosario, M. H. (2018). Package ‘pwr’. *R package version*, 1–2.

Demirkol, M. E., Güleç, H., Çakmak, S., Namli, Z., Güleç, M., Güçlü, N., et al. (2018). Reliability and validity study of the Turkish version of the Psychache scale. *Anatolian Journal of Psychiatry*, 19(1), 14–20.

Dennehy, E. B., Marangell, L. B., Allen, M. H., Chessick, C., Wisniewski, S. R., & Thase, M. E. (2011). Suicide and suicide attempts in the systematic treatment enhancement program for

- bipolar disorder (STEP-BD). *Journal of Affective Disorders*, 133, 423–427.
- Erkus, A. (2003). *Psikometri üzerine yazılar: Ölçme ve psikolojinin tarihsel kökenleri, güvenilirlik, geçerlik, madde analizi, tutumlar: Bileşenleri ve ölçülmesi*. Ankara: Türk Psikologlar Derneği Yayınları.
- Fishbain, D. A., Cutler, R., Rosomoff, H. L., & Rosomoff, R. S. (1997). Chronic pain-associated depression: Antecedent or consequence of chronic pain? A review. *The Clinical Journal of Pain*, 13, 116–137.
- Gvion, Y., Horresh, N., Levi-Belz, Y., Fischel, T., Treves, I., Weiser, M., David, H. S., Stein-Reizer, O., & Apter, A. (2014). Aggression–impulsivity, mental pain, and communication difficulties in medically serious and medically non-serious suicide attempters. *Comprehensive Psychiatry*, 55, 40–50.
- Hisli, N. (1988). Beck Depresyon Envanterinin gecerliliği uzerine bir calisma (a study on the validity of Beck depression inventory). *Psikoloji Dergisi*, 6, 118–122.
- Holden, R. R., Mehta, K., Cunningham, E. J., & McLeod, L. D. (2001). Development and preliminary validation of a scale of psychache. *Canadian Journal of Behavioural Science*, 33, 224–232.
- Holma, K. M., Haukka, J., Suominen, K., Valtonen, H. M., Mantere, O., Melartin, T. K., Sokero, T. P., Oquendo, M. A., & Isometsä, E. T. (2014). Differences in incidence of suicide attempts between bipolar I and II disorders and major depressive disorder. *Bipolar Disorders*, 16, 652–661.
- Jobes, D. A., & Drodz, J. F. (2004). The CAMS approach to working with suicidal patients. *Journal of Contemporary Psychotherapy*, 34, 73–85.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20, 141–151.
- Klonsky, E. D., & May, A. M. (2015). The three-step theory (3ST): A new theory of suicide rooted in the “ideation-to-action” framework. *International Journal of Cognitive Therapy*, 8, 114–129.
- Kross, E., Berman, M. G., Mischel, W., Smith, E. E., & Wager, T. D. (2011). Social rejection shares somatosensory representations with physical pain. *Proceedings of the National Academy of Sciences*, 108, 6270–6275.
- Li, H., Xie, W., Luo, X., Fu, R., Shi, C., Ying, X., Wang, N., Yin, Q., & Wang, X. (2014). Clarifying the role of psychological pain in the risks of suicidal ideation and suicidal acts among patients with major depressive episodes. *Suicide and Life-threatening Behavior*, 44, 78–88.
- Mann, J. J. (2003). Neurobiology of suicidal behaviour. *Nature Reviews. Neuroscience*, 4, 819–828.
- Mee, S., Bunney, B. G., Reist, C., Potkin, S. G., & Bunney, W. E. (2006). Psychological pain: A review of evidence. *Journal of Psychiatric Research*, 40, 680–690.
- Mee, S., Bunney, B. G., Bunney, W. E., Hetrick, W., Potkin, S. G., & Reist, C. (2011). Assessment of psychological pain in major depressive episodes. *Journal of Psychiatric Research*, 45, 1504–1510.
- Montemaranò, V., Troister, T., Lambert, C. E., & Holden, R. R. (2018). A four-year longitudinal study examining psychache and suicide ideation in elevated-risk undergraduates: A test of Shneidman’s model of suicidal behavior. *Journal of Clinical Psychology*, 74(10), 1820–1832.
- Narrow, W. E., Regier, D. A., Rae, D. S., Manderscheid, R. W., & Locke, B. Z. (1993). Use of services by persons with mental and addictive disorders: Findings from the National Institute of Mental Health epidemiologic catchment area program. *Archives of General Psychiatry*, 50, 95–107.
- Olié, E., Guillaume, S., Jaussent, I., Courtet, P., & Jollant, F. (2010). Higher psychological pain during a major depressive episode may be a factor of vulnerability to suicidal ideation and act. *Journal of Affective Disorders*, 120, 226–230.
- Oquendo, M. A., & Baca-Garcia, E. (2014). Suicidal behavior disorder as a diagnostic entity in the DSM-5 classification system: Advantages outweigh limitations. *World Psychiatry*, 13, 128–130.
- Orbach, I., Stein, D., Shani-Sela, M., & Har-Even, D. (2001). Body attitudes and body experiences in suicidal adolescents. *Suicide and Life-threatening Behavior*, 31, 237–249.
- Orbach, I., Mikulincer, M., Gilboa-Schechtman, E., & Sirota, P. (2003). Mental pain and its relationship to suicidality and life meaning. *Suicide and Life-threatening Behavior*, 33, 231–241.
- Ozcelik, H. S., Ozdel, K., Bulut, S. D., & Orsel, S. (2015). The reliability and validity of the Turkish version of the Beck scale for suicide ideation (Turkish BSSI). *Bulletin of Clinical Psychopharmacology*, 25(2), 141–150.
- Pompili, M. (2018). The increase of suicide rates: The need for a paradigm shift. *The Lancet*, 392, 474–475.
- Pompili, M., Lester, D., Leenaars, A. A., Tatarelli, R., & Girardi, P. (2008). Psychache and suicide: A preliminary investigation. *Suicide and Life-threatening Behavior*, 38, 116–121.
- Ribeiro, J., Franklin, J., Fox, K. R., Bentley, K., Kleiman, E. M., Chang, B., et al. (2016). Self-injurious thoughts and behaviors as risk factors for future suicide ideation, attempts, and death: A meta-analysis of longitudinal studies. *Psychological Medicine*, 46, 225–236.
- Roy, A., Sarchiopone, M., & Carli, V. (2009). Gene-environment interaction and suicidal behavior. *The Journal of Psychiatric Practice*, 15, 282–288.
- Seber, G., Dilbaz, N., Kaptanoğlu, C., & Tekin, D. (1993). Umutsuzluk ölççeği: Geçerlilik ve güvenilirliği. *Kriz Dergisi*, 1, 139–142.
- Shneidman, E. S. (1987). A psychological approach to suicide. In G. R. VandenBos & B. K. Bryant (Eds.), *Master lectures series. Cataclysms, crises, and catastrophes: Psychology in action* (pp. 147–183). Washington, DC: American Psychological Association. <https://doi.org/10.1037/11106-004>.
- Shneidman, E. S. (1993). Commentary: Suicide as psychache. *Journal of Nervous and Mental Disease*, 181(3), 145–147.
- Shneidman, E. S. (1996). *The suicidal mind*. New York: Oxford University Press.
- Shneidman, E. S. (1998). Further reflections on suicide and psychache. *Suicide and Life-threatening Behavior*, 28, 245–250.
- Troister, T., & Holden, R. R. (2010). Comparing psychache, depression, and hopelessness in their associations with suicidality: A test of Shneidman’s theory of suicide. *Personality and Individual Differences*, 49(7), 689–693.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review*, 117, 575–600.
- Verrocchio, M. C., Carrozzino, D., Marchetti, D., Andreasson, K., Fulcheri, M., & Bech, P. (2016). Mental pain and suicide: A systematic review of the literature. *Frontiers in Psychiatry*, 7, 108.
- World Health Organization. (2018). *National suicide prevention strategies: Progress, examples and indicators*. Geneva: WHO.
- Wu, A. D., Li, Z., & Zumbo, B. D. (2007). Decoding the meaning of factorial invariance and updating the practice of multi-group confirmatory factor analysis. *Practical Assessment, Research and Evaluation*, 12(3), 1–26.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.