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Assoc. Prof. Cuneyt Evren, Assoc. Prof. Ercan Dalbudak, Prof. Omer Aydemir, Prof. Ertugrul Koroglu, Bilge Evren, Assist. Prof. Secil Ozen & Assit. Prof. Kerem Senol Coskun

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Psychometric Properties of the Turkish PTSD-Short Scale in a Sample of Undergraduate Students

Cuneyt Evren¹, Ercan Dalbudak², Omer Aydemir³, Ertugrul Koroglu⁴, Bilge Evren⁵, Secil Ozen⁶, Kerem Senol Coskun⁷

ABSTRACT:

Psychometric properties of the Turkish PTSD-Short Scale in a sample of undergraduate students

Objective: The National Stressful Events Survey for Posttraumatic Stress Disorder (PTSD)-Short Scale (NSESS-PTSD) allows dimensional self-rating assessment of PTSD according to the DSM-5. The aim of the present study was to evaluate psychometric properties of this scale as Turkish PTSD-Short Scale (PTSD-SS) in a sample of undergraduate students in Turkey.

Method: Participants included 415 university students, among which 351 (84.8%) reported trauma and thus were included in the analysis. Participants were evaluated with the PTSD-SS and the PTSD Checklist Civilian (PCL-C) version.

Results: Turkish version of the PTSD-SS was found to be psychometrically sound PTSD screening measure with high convergent validity when compared with PCL-C ($r=0.79$) and having a Cronbach's α of 0.87. In addition, a single component accounted for 49.94% of total variance for PTSD-SS. The PTSD-SS had sensitivity and specificity scores of 0.91 and 0.77, respectively, when using the optimal cut-off score of 24. Additionally, the PTSD-SS showed good discriminant validity as it significantly differentiated students with high risk of PTSD from those with low risk of PTSD.

Conclusion: These findings supported the Turkish PTSD-SS as reliable and valid PTSD screening instrument with a unidimensional scale construct.

Keywords: NSESS-PTSD, PTSD, PTSD-Short Scale, reliability, validity, factor analysis

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¹Assoc. Prof., Bakirkoy Training and Research Hospital for Psychiatry Neurology and Neurosurgery, Research, Treatment and Training Center for Alcohol and Substance Dependence (AMATEM), Istanbul - Turkey

²Assoc. Prof., ³Assist. Prof., Private Practice, Ankara - Turkey

³Prof., Celal Bayar University, Medical Faculty, Department of Psychiatry, Manisa - Turkey

⁴Prof., Boylam Institute for Psychiatry, Ankara - Turkey

⁵M.D., Baltalimani State Hospital for Musculoskeletal Disorders, Department of Psychiatry, Istanbul - Turkey

⁷Assit. Prof., Afyon Kocatepe University, Faculty of Medicine, Department of Psychiatry, Afyonkarahisar - Turkey

Corresponding author:

Dr. Cüneyt Evren,
İcadiye Cad. Mentese Sok. Selcuk Apt.
No: 1/17, 34674 Kuzguncuk, Uskudar,
Istanbul - Türkiye

Phone: +90-212-409-1515/2111

Fax: +90-212-409-1590

E-mail address:
cuneytevren@yahoo.com

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INTRODUCTION

Posttraumatic stress disorder (PTSD) is a serious and often chronic response to overwhelmingly stressful events¹. Awareness of PTSD is growing due

to recent events such as wars and natural disasters². The consequences of untreated PTSD include increased rates of functional impairment³, poor quality of life, chronicity and, at times, mortality⁴. Although a number of efficacious behavioral and

pharmacological treatments were developed⁵, PTSD is frequently underrecognized and untreated⁶. Improving detection of PTSD is a necessary first step to addressing the mental health burden of this disorder experienced by these patients¹.

To date, several PTSD-related assessment instruments both clinician administered and self-report have been developed for use in trauma exposed individuals^{7,8}. The Clinician Administered PTSD Scale (CAPS) is a reliable structured interview designed to assess symptoms of PTSD, which correspond directly to fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)⁹ criteria for PTSD, for frequency and intensity^{10,11}. Being considered as the “gold standard” for assessment of PTSD, CAPS has excellent psychometric properties and utility as a diagnostic instrument¹¹. Among the self-report measures of PTSD, the PTSD Checklist (PCL)¹² is one of the most widely used by traumatic stress professionals^{12,13}. The PTSD Checklist (PCL)¹⁴ has a 17-item that parallels diagnostic criteria B, C, and D for PTSD, as delineated in the DSM-IV. Both CAPS¹⁵ and PCL-civilian (PCL-C)¹⁶ are validated in Turkish samples.

There is a need for shortened versions of self-rating structured psychiatric interviews that balance validity with expedited assessment when used in large general health surveys, as well as, in primary care settings¹⁷. PTSD, which affects an estimated 7% of US residents over their lifetime¹⁸ is one of the disorders for which shortened structured interviews have been developed¹⁷. Breslau et al.¹⁹ have developed an empirically derived short screening scale for the DSM-IV PTSD based on data from a general population survey. At the end of the analysis a scale comprising seven symptoms, each coded one if present and zero if absent, was selected from the 17 PTSD criterion symptoms. Kimerling et al.^{1,20} suggested that screening for PTSD in primary care¹ and in substance use disorder treatment settings²⁰ are time efficient and has the potential to increase the detection of previously unrecognized PTSD.

The diagnostic criteria of PTSD were substantially revised in the DSM-5 (fifth edition)²¹.

In the DSM-5, alterations in the definition of a traumatic event, shifting of the symptom cluster structure from three to four clusters; the addition of new symptoms including persistent negative beliefs and expectations about oneself or the world, persistent distorted blame of self or others, persistent negative trauma-related emotions, and risky or reckless behaviors²². Also, the traditional categorical diagnosis of PTSD supplemented with dimensional severity ratings in the DSM-5⁸. Miller et al.²³ conducted a large-scale study via the internet to examine the prevalence and latent structure of the proposed PTSD criteria for DSM-5 in a large national sample (n=2,953)⁸. In this study the National Stressful Events Survey^{8,24} was used. This measure is developed for the study to assess exposure to different types of traumatic events and the presence and severity of each of the 20 proposed DSM-5 PTSD symptoms⁸. Among this sample (71.0% were female) those with probable DSM-5 PTSD diagnoses (n=318, 10.8%) were used to create the National Stressful Events Survey PTSD Short Scale (NSESSS-PTSD)^{8,25}, a brief self-report measure that reduced the original item pool of 20 to nine items. Further validation of the scale was then conducted online in a trauma-exposed non-clinical sample of undergraduate students (n=296, 76.0% female)⁸. Strong psychometric properties were reported for the NSESSS-PTSD⁸.

Although Turkish version of the CAPS¹⁵ and the PCL-C¹⁶ are widely used for PTSD diagnosis in Turkey in last decades, both of these scales parallels with diagnostic criteria of DSM-IV for PTSD. There are no self-report scales currently validated in Turkish population that correspond with DSM-5 and include less than 10 items. Therefore, the aim of the present study was to assess the psychometric properties of the NSESSS-PTSD in the Turkish university students as PTSD- Short Scale (PTSD-SS).

METHODS

Participants

The data were gathered from the 3 different universities in Ankara, Istanbul, and Afyon. The

study was approved by the ethical committee of the University.

Procedure

Participants were asked a single question screener “People sometimes have problems after extremely stressful events or experiences, including witnessing or experiencing threatened death, serious injury, or assault. At any time in your life have any of these kinds of things happened to you?” and 142 (34.2%) individuals answered “Yes” to this question. Participants were also asked 14 types of trauma experience to determine whether they were eligible to complete the PTSD-SS. For this purpose we used a trauma list, which was created and was successfully used in our previous study²⁶. This list included 14 types of trauma according to the DSM-IV definition of trauma. Total of 351 students (84.6%) that reported trauma experience were automatically directed to complete the scale. Rates of trauma types are presented in Table 1. Among these students 177 (51.4%) were female and 174 (49.6%) were male. Mean age was 23.06 ± 3.97 .

Translation

The original NSESS-PTSD was independently translated from English into Turkish by two experts in psychiatry. Consensus was reached for a common version by these experts. This Turkish version was back-translated into English by an independent translator. Final versions were approved by the developers of the original scales.

Measures

The National Stressful Events Survey for PTSD-Short Scale (NSESS-PTSD): Instructions were developed for the NSESS-PTSD by LeBeau et al.⁸ and read as follows: “How much have you been bothered during the Past Seven (7) Days by each of the following problems that occurred or became worse after an extremely stressful event/experience?” Consistent with subscale length, the makeup of the measure was determined to be two items from Criterion B, one item from Criterion C, and three items each from Criteria D and E, for a total of nine items⁸. Responses for each item were on a Likert-type scale ranging from 0 (“not at all”)

Table 1: Trauma types

Single question screener	n=415	%
People sometimes have problems after extremely stressful events or experiences, including witnessing or experiencing threatened death, serious injury, or assault. At any time in your life have any of these kinds of things happened to you? (Yes)	142	34.2
Presence of trauma		
No	64	15.4
Yes	351*	84.6
Trauma Types		
1. Natural disaster (flood, earthquake, hurricane, etc)	157	37.8
2. Physical assault (attack, bitten, etc)	109	26.3
3. Attacked with weapon (shot, stab, threat with weapon, etc)	18	4.3
4. Serious accident at home, work or somewhere else	80	19.3
5. Accident with transport (car, train, ship, airplane)	149	35.9
6. To be in a battle or war area (soldier or civilian)	5	1.2
7. Severe pain caused by another person	112	27.0
8. Prisoner (kidnapped, war prisoner, etc)	2	0.5
9. Fire	27	6.5
10. Sudden and violence death incident (homicide, suicide)	22	5.3
11. Serious wound or fracture the patient caused to another person	56	13.5
12. Hijack	2	0.5
13. Unexpected and sudden death of a close person	196	47.2
14. Any other very stressful event or experience	255	61.4

*Some subjects reported multiple traumatic experiences

to 4 (“all the time”). Thus, the range of possible total scores is 0-36. Internal consistency for the NSESSS-PTSD (Cronbach’s $\alpha=0.91$) was very high⁸. Convergent validity was demonstrated through its highly significant relationship with the PCL ($r=0.84$, $p<0.001$)⁸. We named the Turkish version as PTSD-Short Scale (PTSD-SS).

The PTSD Checklist Civilian (PCL-C) version: The PTSD Checklist (PCL)¹² is one of the most widely used self-report measures of PTSD^{12,13}. The 17 Likert items correspond to diagnostic criteria B, C, and D for PTSD, as delineated in the DSM-IV⁹. Respondents are asked to rate the degree to which they were bothered by symptoms in the past month [1 (not at all) to 5 (extremely)]. The PCL-civilian (PCL-C) version anchors items to “stressful experiences”¹⁴. Turkish version of this scale has been validated¹⁶.

Statistical Analysis

The following strategies were used to examine the psychometric properties of the PTSD-SS: (a) factorial structure was examined using a principal component analysis (PCA); (b) convergent validity was evaluated by calculating a Pearson’s product-moment correlation between the PTSD-SS and PCL-C; (c) internal consistency reliability was assessed using Cronbach’s α ; (d) predictive validity, sensitivity, specificity, and optimal cut-off scores were estimated by constructing a Receiver Operating Characteristic (ROC) curve; and (e) discriminant validity was evaluated using a Students’ t test of the PTSD-SS score.

RESULTS

Factorial Structure

To explore the factorial structure of the PTSD-SS, a principal component analysis (PCA) was performed using all participants ($n=351$). Criteria for retaining extracted components on the PCA were: (1) visual inspection of the scree plot to note breaks in size of Eigenvalues between the

components; (2) Eigenvalues greater than one; and (3) percentage of variance accounted for by components retained.

To explore construct validity of the scale, initially exploratory factor analysis (EFA) then confirmatory factor analysis (CFA) were performed. Prior to any further analysis, the adequacy of sample size was verified using the Bartlett’s test of sphericity and the Keiser-Meyer-Olkin (KMO) measurement of sampling adequacy. Bartlett’s test of sphericity was significant (Chi-Square=1379.744, $df=36$, $p<0.001$) for the PTSD-SS and the KMO measure of sampling adequacy was acceptable at 0.904.

Although a visual inspection of the scree plot revealed two components accounting for the majority of variance before components started to level off, only one component on the PTSD-SS reached the criterion of an Eigenvalue greater than one (4.494) and the variance accounted for by this component was 49.94%.

The unidimensionality of the scale then was assessed subsequently with confirmatory factor analysis (CFA). Estimation of the model fit the data well ($\chi^2/df=65.800/23=2.86$; root mean square error of approximation [RMSEA]=0.064, goodness of fit index [GFI]=0.969, adjusted GFI=0.939, parsimony GFI=0.495, normed fit index [NFI]=0.965, comparative fit index [CFI]=0.977, incremental fit index [IFI]=0.977). As generally accepted, we took criteria as Chi-Square/ $df \leq 5$, >0.90 for GFI, CFI, NFI and IFI, and for RMSEA < 0.05 as goodness-of-

Table 2: Item-Component Loadings for the PTSD-Short Scale (PTSD-SS) and Item-Total Correlations for Total Sample ($n=351$)

Items	Component	PTSD-SS
5	0.814	0.80
2	0.803	0.78
3	0.749	0.74
1	0.745	0.73
4	0.738	0.72
6	0.712	0.71
7	0.709	0.71
9	0.524	0.57
8	0.492	0.54
Mean \pm S.D.	19.85 \pm 7.64	
Eigenvalue	4.494	
% of Variance	49.94	
Cronbach’s α	0.87	

Extraction Method: Principal Component Analysis.
PTSD-SS: PTSD-Short Scale, S.D.: Standart Deviation

Table 3: PTSD Status According to the Cut-Off Point 24 for the PTSD-Short Scale (PTSD-SS) and comparing mean scores of PTSD-SS

	High risk of PTSD according to PCL-C				p
	Absent		Present		
	n	%	n	%	
High risk of PTSD according to PTSD-SS					
Absent	243	76.7	3	8.8	$\chi^2=67.39$
Present	74	23.3	31	91.2	
PTSD-SS score (mean±S.D.)	32.71±9.05		51.45±10.83		t=-16.71
PTSD: Posttraumatic stress disorder, PCL-C: PTSD Checklist Civilian version, S.D.: Standart Deviation					

fit indices to assess model fit^{27,28}. As seen in Table 2, all item-component loadings were in the “good” to “excellent” range. Hence, results from the PCA and the CFA suggested that the Turkish version of PTSD-SS appeared to have a unidimensional construct.

Convergent Validity and Internal Consistency Reliability

The Pearson product-moment correlation between the PTSD-SS and PCL-C scores (n=351) was high (r=0.79, p<0.001). Correlations between PTSD-SS and B Cluster of PCL-C (r=0.77, p<0.001), C Cluster of PCL-C (r=0.69, p<0.001), and D Cluster of PCL-C (r=0.61, p<0.001) were moderate to high.

Internal consistency for the PTSD-SS (coefficient $\alpha=0.87$) examined by Cronbach's alpha, was also high (Table 2). Inter-item correlations ranged between 0.22 and 0.65. Item-total correlations for the PTSD-SS is presented in Table 2.

Predictive Validity, Sensitivity, Specificity, and Optimal Cut-Off Scores

The PTSD's predictive validity, sensitivity, and specificity were examined using a ROC curve that included all participants (n=351). Participants were dichotomously classified according to PCL-C as group with PTSD or group without PTSD, according to the cut-off score of 50. In the graph of sensitivity and 1-specificity (false positivity) values, as much as the curve approaches the left corner or the area under the curve approaches a value of 1.0 indicates that the test can discriminate between the two groups.

Results for the PTSD-SS revealed that the area under curve (AUC) (0.908-Std. Error=0.020) was in the “excellent” range and that a score of 24 was the most critical value for identifying a participant as having a PTSD. This cut-off score corresponds to a sensitivity=0.91, a specificity=0.77, Kappa=0.35, a positive predictive power (PPP)=0.30, and a negative predictive power (NPP)=0.99.

Table 3 shows the comparison of the group with PTSD and the group without PTSD according to cut-off point 24 on the PTSD-SS. These results showed support that the cut-off scores of the PTSD-SS could have discriminated university students with PTSD from students without PTSD.

Discriminant Validity

To evaluate discriminant validity, a Student's t test was performed. Mean score of the PCL-C was compared according to the participants' group membership. The mean score of the PCL-C (t=-18.03, p<0.001) was statistically higher in the group with PTSD than the group without PTSD (Table 3).

DISCUSSION

The NSESSS-PTSD is a new self-report measure developed for DSM-5 and is being suggested for use in clinical and research settings by the APA⁸. The NSESSS-PTSD was developed to identify individuals in the general public who may have a PTSD as well as individuals in clinical settings who are likely to meet criteria for a PTSD diagnosis⁸. The present study evaluated the psychometric properties of the PTSD-SS, which is a Turkish version of the NSESSS-PTSD, in university students

with trauma history. Consistent with the original study⁸, the results suggested strong psychometric properties of the PTSD-SS in a trauma-exposed non-clinical sample, including high internal consistency and convergent validity.

Although rate of self reported history of trauma found in the present study seems to be high, we know that rates for traumas such as natural disaster (flood, earthquake) and accident with transport are high in Turkey, which were found as 37.8% and 35.9% respectively. Consistent with this, a previous study found PTSD symptoms among 90% of Turkish high school students 11 months after the earthquake²⁹. Finally, including “unexpected and sudden death of a close person” and “any other very stressful event or experience” as a trauma in the list, which were 47.2% and 61.4% respectively, may have increased the rates of those with trauma history. Nevertheless the rate of those who answered as “Yes” to the screener “to have problems after extremely stressful events or experiences” was higher in the present study (34.2%) than the rate found in the original study (22.0%)⁸. Although cultural differences may have role on this inconsistency, our data is insufficient to explain it.

The Turkish PTSD-SS was found to have satisfactory psychometric characteristics as a PTSD screening test. Cronbach’s alpha for PTSD-SS was very high in the sample ($\alpha=0.87$) as was in the reference study conducted in the USA ($\alpha=0.91$)⁸ suggesting high internal consistency reliability. Also, consistent with the previous study⁸ conducted in the USA ($r=0.84$), high correlation between the PTSD-SS and the PCL-C indicated good convergent validity ($r=0.79$)⁸.

Consistent with the study conducted for the NSESS-PTSD by LeBeau et al.⁸, PCA for the PTSD-SS produced a unidimensional construct, with a single component accounting for 49.94% of the total variance (Eigenvalue=4.5). In the study of LeBeau et al.⁸ a single component accounted for 58% of the total variance (Eigenvalue=5.3), although a much smaller second factor (Eigenvalue=1.1, 11.5% of variance), characterized by arousal symptoms (hypervigilance, startle response, and

anger/ irritability), also emerged. In the present study, using the CFA provided further support for the unidimensional structure of the PTSD-SS.

The ROC curve showed that the PTSD-SS had good predictive validity as suggested by high sensitivity, specificity, and the AUC. Our results revealed that a cut-off score of 24 for the PTSD-SS was the most critical value for identifying participants as having an high risk of PTSD according to the PCL-C. The PTSD-SS also showed good discriminant validity as evidenced by its ability to significantly differentiate the students with high risk of PTSD from those with low risk of PTSD. Nevertheless, this cut-off score should be used cautiously, particularly when evaluating different populations and clinical populations, since the cut-off score may differ for different populations. Also since both the PTSD-SS and the PCL-C are self-rating screening scales and diagnosis of PTSD was not made by a “golden standard” scale, thus this cut-off score can only be considered as relative to PCL-C cut-off score. This can be considered as one of the limitations of the present study.

Several other limitations are inherent in the present study. One of them is that both PTSD-SS and PCL-C used in the present study were self-report screening scales and they may only indicate the individuals with high risk of PTSD rather than the diagnosis of PTSD. Secondly, although we used same two scales as LeBeau et al.⁸ used in the original study, while the items of NSESS-PTSD were related with the items of DSM-5 PTSD diagnosis, PCL-C correspond directly to DSM-IV, which may also be considered as a limitation. Unfortunately since there no other DSM-5 related PTSD scale other than NSESS-PTSD it was inevitable to use PCL-C. Thirdly, although among 34 of high risk students captured by PCL-C, 31 of them were defined as high risk PTSD by PTSD-SS, which seems to be a good result. Nevertheless, PTSD-SS also defined additional 75 students as high risk PTSD, suggesting a false positive. One of the reasons for this may be that since PTSD-SS is DSM-5 related range of this scale may be broader than PCL-C. Last but not least, our reliance on university students limits the generalizability of

findings regarding community trauma samples which are more heterogeneous sample of trauma survivors.

Miller et al.²³ conducted a large-scale study via the internet to examine the prevalence and latent structure of the proposed PTSD criteria for DSM-5 in a large national sample (n=2953)⁸. In this study the National Stressful Events Survey^{8,24} was used. This measure is developed for the study to assess exposure to different types of traumatic events and the presence and severity of each of the 20 proposed DSM-5 PTSD symptoms⁸. Among this sample (71.0% were female) those with probable DSM-5 PTSD diagnoses (n=318, 10.8%) were used to create the National Stressful Events Survey PTSD Short Scale (NSESSS-PTSD)^{8,25}, a brief self-report measure that reduced the original item pool of 20 to nine items. Further validation of the scale was then conducted online in a trauma-exposed non-clinical sample of undergraduate students (n=296, 76.0% female)⁸. Strong psychometric properties were observed for the NSESSS-PTSD⁸.

However, since the reduction of 20 items to 9 was conducted in a large national U.S.A. sample, we decided to delete “National Stressful Events Survey” from the name of the original scale. Thus, although this version worked well in Turkish population, we changed the name of the scale as PTSD-SS. Nevertheless reduction of 20 items in large national Turkish sample in further studies may be needed.

The PTSD-SS have good psychometric characteristics. Since it is a brief scale that is consistent with the DSM-5 interval criterion for diagnosis, it is valuable among general populations in Turkey and further studies should evaluate the psychometric characteristics among clinical populations in Turkey. In conclusion, the present study extended the evaluation of the psychometric properties of the NSESSS-PTSD to Turkish university students with trauma history, supported the unidimensional construct of the PTSD-SS with confirmatory analysis in Turkey and replicated the findings of the previous study.

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TRAVMA SONRASI STRES BOZUKLUĞU KISA ÖLÇEĞİ

Aşırı şiddetli olay ya da yaşantı sonrasında ortaya çıkan ya da daha da kötüleşen aşağıdaki her bir sorun GEÇTİĞİMİZ YEDİ (7) GÜN içinde sizi ne kadar rahatsız etti?

Lütfen aşağıdaki maddeleri okuyunuz ve size uygun olacak şekilde işaretleyiniz.

	Hiç	Biraz	Orta	Oldukça	Aşırı
1. Aniden geçmişte yaşanan stresli yaşantıyı tekrar şu an yeniden yaşıyor gibi davrandığın ya da hissettiğin, geçmişi gösteren sahnelerin (flashback) olması (örneğin, stresli yaşantının bir parçasını görerek, duyarak, koku alarak veya fiziksel olarak hissederek stresli olayı yeniden yaşama)					
2. Bir şey size stres veren deneyiminizi hatırlattığında kendinizi duygusal olarak oldukça kötü hissetme					
3. Size stres veren deneyimi hatırlatan düşünce, his veya fiziksel duyumlardan kaçınmaya çalışma					
4. Bu stresli olayın yaşanmasının sizin ya da bir başkasının (size doğrudan olarak zarar vermemiş birisi) yanlış bir şey yapmasından ya da engellemek için mümkün olan her şeyi yapmadığınızdan ya da sizinle ilgili bir şey yüzünden olduğunu düşünme					
5. Stresli bir yaşantıdan sonra çok olumsuz bir duygusal durumda olma (örneğin, çok fazla endişe, öfke, suçluluk, utanç veya korku yaşıyordunuz)					
6. Geçmişte yapmaktan keyif aldığınız aktivitelerden, yaşadığınız bu stresli olaydan sonra ilginizi kaybetme					
7. Diken üzerinde olma, alarmda olma ya da sürekli tehlike için tetikte olma					
8. Beklenmedik bir gürültü duyduğunuzda ürkek hissetme ya da kolayca irkilme					
9. Başka insanlara bağırıp çağırarak, kavga edecek ya da bir şeylere zarar verecek kadar sinirli ya da öfkeli olma					