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# The Validity and Reliability Work of the Scale That Determines the Level of the Trauma after the Earthquake

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**Abstract**

In this study, it was aimed to develop a short, comprehensible, easy, applicable, and appropriate for cultural characteristics scale that can be evaluated in mental traumas concerning earthquake. The universe of the research consisted of all individuals living under the effects of the earthquakes which occurred in Tabanlı Village on 23.10.2011 and in Van, Edremit on 09.11.2011. The intensity of these earthquakes were 7,2 and 5,6 respectively according to the Richter scale. The sample of the research was determined according to the simple random and purposeful methods in this universe. 1505 individuals (401 females, 1104 males) were determined according to this generated the sample of the research. The age range of these individuals was between 15 and 86. According to Exploratory Factor Analysis, the scale was constituted of five sub-factors. Thus, the first factor is "Behavior Problems"; the second factor is "Emotive Limitedness"; the third factor is "Affective"; the fourth factor is "Cognitive Structures" and the fifth factor is "Sleep Problems". Also Confirmatory Factor Analysis confirmed the construction of the scale which was constituted by Exploratory Factor Analysis. The reliability finding showed sufficient and appropriate level that Cronbach Alfa Reliability Coefficient was used to determine it. After all, it can be said that the Scale That Determines the Level of the Trauma after the earthquake is a measurement tool which has the validity and reliability values used for the aim of screening after earthquake, of measuring the level of trauma after earthquake.

**Key Words**

Earthquake, Trauma, Stress after Trauma.

It is informed that an individual's rate of facing with a traumatic event in his/her life adventure is between 21.4 – 89.6% (Breslau et al., 1998; Perkonigg, Kessler, Storz, & Wittchen, 2000). Traumatic event is defined as a person's living, witnessing or hearing a real death or a death threat, a severe physical injury, an event which is a threat against his/her or somebody else's physical integrity and his/her showing reactions such as fear, terror, hopelessness against this event (DSM-IV, 1994). The effects of traumatic events can change based on the individual differences. Every traumatic event does not cause the same reactions and also, those who live the same traumatic event might give different reactions (Özçetin, Maraş, Ataoğlu, & İçmeli, 2008). Most of the studies show that the growing possibility of Stress Disorder PTSD (Posttraumatic Stress Disorder) can increase depending on the effects of the marks that stress sources (traffic accidents, sudden deaths, physical injuries, divorce, being left, being fired, irrational beliefs etc.) the individual had in his/her life give (Özgen & Aydın, 1999). In spite of this, if the traumatic event is made by a human, the growing risk, intensity and duration of PTSD can be longer (DSM-IV, 1994).

Stress problems after trauma can be seen in every age, but its frequency of being seen on young adults is more (Özçetin et al., 2008). In the epidemiological study done by Helzer, Robins, and

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McEvoy (1987), the rate of being seen of PTSD in a lifespan was for males 0.5 % and for females 1-3 %. Also, after the events or disasters that affect large masses, the growing risk of psychopathology is increased by the rate of 17 % (Rubonis & Bickman, 1991). In the general public studies, the rate of PTSD is 1.3 – 9.2 % (Davitson, John, & Fairbank, 1989; Hammond, Scurfield, & Risse, 1993; Kaplan & Sadock, 1998), and its rate after various natural disasters is stated between 3.6 – 81.0 % (Acierno et al., 2007; Hagh-Shenas, Goodarzi, Farajpoor, & Zamyad, 2006).

The 3% of those who face with natural disasters can also have PTSD (Hammond et al., 1993). In the pathogenesis of this disease (the source of the problem, and the differences occur in the organism in its development), various ethnic, cultural, psychological, physical, familial, social factors and personal characteristics take an active role in the pathogenesis of this disease (Kaplan & Sadock, 1998). The growing risk of PTSD is determined by the factors that increase the severity of the stressor and the individual's tendency. In a severe trauma, while personal factors are less effective on PTSD, this case can gain importance in a less-severe trauma (Breslau et al., 1998). Coming from a poor family (McFarlane, 1988), having insufficient social support after trauma (Cohn et al., 1985), introversion, high level of neuroticism (Davitson et al., 1989; Resnick, Foy, Donahoe, & Miller, 1989), previous psychiatric disorders, (Hammond et al.), the stressor's having a subjective meaning; the guilt feelings of the individual, the guilt feelings of being alive, the feelings of being in a tight corner, the stressor's being sudden, being unprepared, using alcohol or drug beforetime (Kaplan & Sadock), living traumatic events in early childhood; seeing divorce before the age 10, having border line, paranoid, antisocial and addictive personal characteristics, having a familial tendency to have a psychiatric disease (Breslau et al., 1998; Kaplan & Sadock); having behavioural problems before trauma (Resnick et al.) are the factors that show the tendency of the individual to PTSD and that increase the severity of the disease.

The determining of stress and related symptoms in an early period is quite important in the mental health services aiming subsidiary protection (Southwick, Yehuda, & Giller, 1993; Weyermann, Norris, & Hyer, 1996). To know and evaluate PTSD, various interview devices have been developed. However, the studies about both the rate of traumatic events and of PTSD can change depending on various factors such as the places in which the studies are done, situation, time, the characteristics of the trauma and diagnosis tools used (Galea, Nandi, & Vlahov, 2005). The primary reason of it is that the effects of traumatic events occur depending on a lot of cultural and personal factors (Breslau et al., 1998; Cohn et al., 1985; Kaplan & Sadock, 1998; McFarlane, 1988; Özçetin et al., 2008).

Earthquakes have a special place in natural disasters. Because, they occur suddenly, are the source of destruction, death and woundings, and can have chronic effects because of its aftershocks (Sabuncuoğlu, Çevikaslan, & Berkem, 2003). In such big and disaster areas as Turkey, the presence and variation of proper evaluation instruments are important for protective mental health services (Aker, Hamzaoğlu, & Boşgelmez, 2007). There should be not only the tools such as "the PTSD scale applied by the clinician" which enables diagnosis and which shows the severity of psychopathology (TSSB-Ö/CAPS) but also "the effects of the events scale" which is used in public scans (Hyer, Davis, Woods, Albrecht, & Baudewyns, 1992 (IES-R); "Davidson Trauma Scale"; "the determining scale of traumatic stress symptoms" (Bramsen & Van der Ploeg, 1999; Hyer et al.). The evaluation scales used in the studies done after earthquake by Sabuncuoğlu et al., Bulut (2009) and Erkan (2010) can be an example of this case.

Also, in this study, it is aimed to develop a short, comprehensible, easy, applicable and appropriate for cultural characteristics scale that can be evaluated in mental traumas and PTSD.

## Method

The study was carried out by descriptive approach, which is one of the screening models and it is appropriate for quantitative research methods. Screening models are the models that aim to define a previous or current event (event, person, or object) in its own conditions (Karasar, 2005).

### Constructing the Scale Form

To construct the sketch scale form, the information in the literature was firstly scanned and the traumatic behaviors seen after a natural disaster were classified. The behaviors were stated with 22 items in the 5-rated form. The outline was presented to the expert academicians on the areas Assessment and Evaluation, Psychological Counselling and Guidance and Turkish language. After the adjustments, the scale was ready to be applied. The Scale That De-

termines the Level of the Trauma after Earthquake consisted of 20 items. PTSD symptoms were scaled according to the 5-rated likert scale. It included expressions such as "I do not agree at all", "I agree little", "I agree at the medium level", "I agree very much" and "I completely agree". The smallest point that can be taken from the scale is 20 and the highest is 100. The more point increases, the more level of being affected from earthquake the individual has.

**Universe and Sample**

The universe of the research consisted of all individuals living under the effects of the earthquakes which took place in Tabanlı Village on 23.10.2011 and in Van, Edremit on 09.11.2011. The intensity of these earthquakes were 7,2 and 5,6 respectively according to the Richter scale. The sample of the research was determined according to the simple random and purposeful methods in this universe. As is known, sample is chosen from a universe according to some rules and it is a small mass that can represent its universe (Karasar, 2005, p. 110-111) and, its characteristics of representing the universe is quite important (Kaptan, 1983, p. 135). The universe of the research is determined according to sample aim; hence, the universe of the research consisted of the individuals who lived the Van earthquake. However, to reach the sample group, the simple random sample method was used. As is known, each individual's chance of being in the sample is equal in this method. Thus, the significance that is given each individual in calculations is the same (Arıkan, 2004, p. 141). 1505 individuals (401 females; 1104 males) who were determined according to this generated the sample of the research. The age range of these individuals was between 15 and 86.

**Process and Data Analysis**

For the Scale that Determines the Level of the Trauma after the Earthquake's structure validity, Exploratory Factor Analysis; to test the accuracy of gained factor structure, Confirmatory Factor Analysis was taken as method (Schermelleh-Engel, Keith, Moosbrugger, & Hodapp 2004). Factor analysis was used as a method for the validity works of the scales. Factor analysis was taken under two areas called Exploratory and Confirmatory (Büyüköztürk, 2007; Tavşancıl, 2002). Exploratory Factor Analysis tried to explore the structure validity of the scale by researching the relationships between the items (Schermelleh-Engel, Moosbrugger, & Müller, 2003). Confirmatory Factor Analysis aimed to examine the model claimed by the exploratory method and test the propriety of the model (Tabachnink & Fidell, 2001). The results gained after the Exploratory Factor Analysis was usually tested by Confirmatory Factor Analysis (Maruyama, 1998); and it could be considered as an evidence for that the study had a strong basis (Şimşek, 2007). The propriety of the sample was examined by Kaiser-Meyer-Olkin (KMO) and Barlett tests (Büyüköztürk). The data used for the development of the scale were examined according to stated methods.

## Results

The applicability of the Exploratory Factor Analysis was analyzed by Kaiser-Meyer-Olkin (KMO) Barlett tests. The determiner of the sample propriety KMO value was found proper with the level 0.917. Similarly, the value of the Barlett Sphericity test was proper as well ($c^2$=7816,483; sd=190; $p$<0,01).

**Exploratory Factor Analysis**

EFA tries to explore the structure validity of the scale by studying the relationships between the items (Tabachnick & Fidell, 2001). EFA makes optimal sizing according to the factor load points in the scale (Erkuş, 2003). Factors that form the scale were vocalized according to the trauma behaviors that the items included. Thus, the first factor was "Behavior Problems"; the second factor was "Emotive Limitedness"; the third factor was "Affective"; the fourth factor was "Cognitive Structures" and the fifth factor was "Sleep Problems".

According to the results of the reliability analysis' done for the scale, the Cronbach alfa internal consistency parameter was calculated for the first sub-dimension 0.64; for the second sub-dimension 0.75; for the third sub-dimension 0,61; for the fourth sub-dimension 0.68 and for the fifth sub-dimension 0.70. The internal consistency parameter calculated for all of the scale's items (Cronbach alfa) was 0.87.

**Confirmatory Factor Analysis**

CFA aims to examine the model claimed by the EFA and test propriety of the model (Şimşek, 2007). In CFA, a lot of fit indexes are used to evaluate the validity of the model (Schermelleh-Engel et al., 2003). It is unclear that which of the fit indexes are considered for the fit of the model (Şimşek). However, it is seen that RMSEA, AGFI, CFI, NFI, RMR and GFI indexes are used frequently (Kayri, 2009). The most used ones are Chi-Square Fit Index, Goodnes Fit Index (GFI),

Adjusted Goodness Fit Index (AGFI), Root Mean Square Root (RMR) and Root Mean Square Error of Approximation (RMSEA). For the model data fit, it is expected that the values of GDI and AGFI are higher than 0.90 and the value of RMSEA is little than 0.05. Also, if the value of GFI is higher than 0.85, the values of NFI and AGFI are higher than 0.80 and the value of RMS little than 0.10, they can be considered as criterions for the fit of the model with the real data (Anderson & Gerbing, 1984; Marsh, Balla, & McDonald, 1988; Schermelleh-Engel et al., 2003).

The model gained by EFA was tested with CFA. Sümer, (2000) states that if the value of $c^2$/sd is little than 5, the model is in a good fit with the real values. The model gained in this context ($c^2$/sd=12,07/160=0,075) was considered proper. However, it was stated in the literature that $c^2$ statistics was not sufficient for the fit of the model (Şimşek, 2007). Thus, the propriety of the model was tested by RMSEA, NFI, GFI, AGFI and RMR cohesion criterions.

## Discussion

The rate of PTSD after earthquakes is stated between 3-87 % in the groups that have various cultural and socio-demographic characteristics (Aker, 2006). It is difficult to explain this variability only with various procedural differences. A lot of factors such as the destruction caused by the earthquake, deaths and time the research done can change the rate of disease (Başoğlu, Şalcıoğlu, & Livanou, 2002). The difference is big especially in developed and developing countries. Bulut (2009) says in his study titled "The comparison of the stress reactions of the children after earthquake according to age and gender" that after earthquake, PTSD diagnosis criterions are seen with the rate of 72 %. After the 1994 California earthquake, the rate of PTSD was between 6-13 %. However, for developing countries, this is more than that (Goenjian et al., 1994; Kokai, Fujui, Shinfuku, & Edwards, 2004; McMillan, North, & Smith, 2000). In this study, it was seen that the 65 % of people after Van earthquake showed PTSD symptoms. Screening forms help to define people who are at risk and with problems and develop mental health applications (Aydemir, 2006).

The Cronbach alfa internal consistency parameter for the first sub-dimension was 0.64; for the second sub-dimension 0.75; for the third sub-dimension 0.61, for the fourth sub-dimension 0.68 and for the fifth sub-dimension 0.70 after the reliability analysis' done about the scale. The internal consistency parameter for all of the items in the scale was calculated 0.87. These values are proper for a scale (Çokluk, Şekercioğlu, & Büyüköztürk, 2012).

It is considered in the literature that if the rate ($\chi^2$/sd) calculated with CFA is little than 5, the model has a good fit index with real values (Sümer, 2000). In this context, the model ($c^2$/sd=650,95/1474=0,441) has a good fit index. It is unclear that which of the fit indexes are considered for the fit of the model (Şimşek, 2007). However, it is seen that RMSEA, AGFI, CFI, NFI, RMR and GFI indexes are used frequently (Kayri, 2009). For the model data fit, it is expected that the values of GFI and AGFI is higher than 0.90, the values of RMS and RMSEA are little than 0.05. Also, if the value of GFI is higher than 0.85, the value of AGFI is higher than 0.80 and the value of RMS is little than 0.10, they can be considered as criterions for the fit of the model with real values (Anderson & Gerbing 1984; Marsh et al., 1988; Schermelleh-Engel et al., 2003). The values were calculated; for RMSEA 0,000; for NFI 0,88; for GFI 0,94, for RMR 0,080 and for AGFI 0,92.

All in all, it can be said that the Scale That Determines the Level of the Trauma after the Earthquake is a measurement tool which has the validity and reliability values used for the aim of screening after earthquake, of measuring the level of trauma after earthquake.

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