Psychometric Properties of the Turkish Version of the Ego-Resiliency Scale (ER-TR): Reliability and Validity Evidence from Turkish Earthquake Survivors

Özlem Karaırmak*

Faculty of Educational Sciences, Educational Sciences, Counseling Division, Turkey

Abstract: In the present study, the psychometric properties of the Ego-Resiliency Scale were examined. Two different samples were utilized. First, a total of 363 earthquake survivors and 496 undergraduate students participated the study. In order to provide evidence of construct validity both confirmatory factor and exploratory factor analyses were conducted on the ego-resiliency scores. Forty seven percent of the total variance was explained by three factors. Confirmatory factory analyses provides supplementary evidence for the multidimensionality of the scale. The Turkish version of the Ego-Resiliency scale is a valid and reliable measure to use in quantifying resilience.

Keywords: Resilience, ego-resiliency, earthquake survivors, natural disasters.

1. INTRODUCTION

Why are some individuals better at dealing with life challenges? There has seemed to be a recent growing interest among researchers and practitioners in assessing strengths rather than weaknesses. Resilience clearly is located within the positive psychology trend of shifting away from pathology. Resilience was first conceptualized in adult psychology in terms of ego-resiliency by [1]. They defined resilience as "resourceful adaptation to changing circumstances and environmental contingencies, analysis of the 'goodness of fit' between situational demand and behavioral possibility, and flexible invocation of the available repertoire of problem solving-strategies…" (p. 48). According to [2], resilience is "the capacity of the individual to effectively modulate and monitor an ever-changing complex of desires and reality constraints" (p. 359). More recently, [3] came up with an impact full definition of resilience as, *an innate human psychological immune capacity.* He summarized it as such: "The human capacity for resilience is natural and normal, part and parcel of the innate health built into all human beings" (p. 265).

Resilience depending on the age, personal factors, environmental resources may be a strong safeguard for the individual at any point of time throughout the life [49]. According to the authors, the significant determinants are crucial to define resilience: Positive adaptation and adversity. Particularly, the definitions of resilience vary according to different groups and different contextual factors [4]. There is a tendency of "serious conceptual misunderstandings" when it comes to specify resilience [5]. Although there is no agreed definition of resilience, it is an internal resource to adapt to stressors and its significance depends on the ability to thrive in the face of adversity [6]. According to the American Psychological Association [7], resilience is an adaptation process in the face of threat or trauma. There are many studies investigating resilience among Turkish adolescents [8] and children however; the emerging of resilience in adults might have a different path. The concept is not only specific to young individuals, resilience-promoting factors are life-enriching elements throughout the life span [9]. In the scope of the present study, resilience is operationalized for the adult earthquake survivors. The adolescents and children as a study group are not the focus of the present study.

Studies on resilience primarily have focused on the adaptability of the individual in the face of adversity, such as suffering from AIDS [10], suffering from cancer [11], being exposed to terrorist attacks [12], and coping with loss and chronic grief [13].

In a meta-analysis study, it is found that some personal factors such as positive affect, optimism, life satisfaction and self-efficacy are strong correlators of resilience in adults [14]. It is also found that those factors had a strongrer association with resilience than risk factors. Resilient qualities, such as creativity, hope (Snyder, 2000) [15], optimism (Peterson, 2000) [16] and self control [17], have been explored within positive psychology. Tugade and Frederickson [18] found evidence that psychological resilience positively

*Address correspondence to this author at the Faculty of Educational Sciences, Educational Sciences, Counseling Division, Turkey; Tel: +90 212 381 51 71; E-mail: ozlemkarairmak@gmail.com

E-ISSN: 2313-1047/16

influenced physical health, which was consistent with the results of a study carried out among survivors of violent trauma [19], that concluded that higher levels of resilience produced more favorable outcomes regarding physical health, mental health and PTSD symptoms. Several personality factors, such as self worth and self efficacy [20], optimism and hope [21] and internal locus of control [22], seem also to be associated with resilience.

As previously mentioned, resilience appears to be a vital construct in dealing with adversity and trauma. Since it is hard to measure and define resilience [3], the refined use of various instruments and their cross-cultural adaptation will facilitate the achievement of more consistent empirical findings and the improvement of knowledge. Although there are a number of existing resilience measures (e.g., [3, 23, 24], none has been able to achieve a general acceptance as the most reliable measure. Cross-cultural studies comparing resilience across different samples is also needed to better understand the concept. More reliable and valid resilience measures may lead to more consistent findings in the literature. Different resilience measures may result in better understanding of resilience across cultures. Ego-Resilience Scale is one of the earliest instruments to measure and define resilience. The simplicity of the language and the practicality of the items provide a significant advantage in the use of the scale.

In this study, the Ego-Resiliency Scale developed by J. Block and Kremen [2] was utilized to quantify psychological resilience. The study aims to translate and adapt ego-resiliency scale into Turkish, with the permission of the original authors. In the scope of the present study was to explore the psychometric properties of the Turkish version of Ego-Resiliency scale. Firstly, the factor structure of Ego-Resiliency scale across the Turkish sample was investigated and verified. Research was then undertaken into internal consistency, concurrent-construct validity and nomological network. Gender differences in resilience were also investigated.

2. METHOD

2.1. Participants

The primary aim of this study was to explore the psychometric properties of the Turkish version of Ego-resilience scale. The definition of resilience emphasizes the importance of 'bouncing back' in the face of adversity and risk. Experiencing a devastating earthquake can be considered as a risk factor and resilience mechanism is expected to be active. It was assumed that resilience in individuals who have experienced a severe earthquake may be different from individuals who have not had such an experience. For this reason, the validity and reliability efforts were carried out in two different groups of participants (exposed group and non-exposed group). The evidence for validity was first obtained from a group of participants who had been exposed to a major earthquake and the acquired validity evidence was tested subsequently in a group of participants who had not been so exposed.

2.2. Earthquake-Exposed Group

According to an international report by the Turkish Red Crescent (2006) [50], earthquakes are the most frequent natural disasters in Turkey and more than one-third of the country's total population lives in the first degree earthquake zone [25]. Two devastating earthquakes hit the northwestern part of Turkey in 1999 causing a huge death toll (over 18,000) and extensive property damage [26]. Participants who had been exposed to those earthquakes took part in this study.

A purposive sampling method was used and participation in the research was limited to residents of the cities Kocaeli, Adapazarı, Yalova, Düzce and Bolu, where the greatest damage and loss of life occurred in the 1999 Marmara Earthquakes. Three hundred and forty seven participants were provided with the online form of the questionnaire booklet and 61 were sent paper-pencil questionnaire booklets making an initial total of 408 participants. Useful email addresses in both governmental and private web sites and online discussion groups were searched for and the study was introduced by sending the standard e-mails. Self-responsibility and mitigation for future earthquakes were mentioned in the standard e-mails as the motivation sources. Web-based survey link was provided in those e-mails. Volunteer participants completed all the measures online and submitted it.

Availability of participants was limited to Internet users, which might be interpreted as biased sampling. Online data showed diversity just like the data collected using traditional methods and the conclusion was that participants in online studies take the study seriously and provide accurate information like the participants in traditional studies [27]. Additionally, several authors have mentioned that self-disclosure is increased when people use Web-based surveys as compared to

traditional data collection methods (e.g., [28, 29]. Since the data were collected online, the participants themselves are the only decision makers when completing the questionnaire.

After deleting inappropriate data and outliers, the final number of participants was 363 (224 male, 138 female, one no gender information). The mean age of the sample was 33.30 (SD = 0.517) with a range between 17 and 58 years (10 participants did not report their ages). Statistical analyses were mainly carried out in the exposed group sample.

Forty-three participants' houses (11%) had collapsed during the earthquake. Twelve participants (3%) had been under debris. Forty nine participants (13.5%) reported that at least one person in their family had been under debris. Thirty five participants (10%) lost a family member. Two hundred and twenty-two participants (61%) lived in tents after the earthquake. Two hundred and sixteen participants (60%) lost a friend.

Non-Exposed Group. A total of 496 participants (339 females, 157 males) was recruited from undergraduate majors in the School of Education at a large-scale university in Turkey. Their ages ranged from 18 to 26 years (*M*= 21.35, *SD*=1.50). A paper-pencil form of the questionnaire booklet was administered by the researcher in classroom settings. The non-exposed sample was used to confirm the factor structure for concurrent validity.

2.3. Procedure

Univariate and multivariate outlier checks were carried out before data analysis. Descriptive statistics for the Ego-Resiliency scale were gathered first. Subsequently gender differences and group differences regarding earthquake exposure were examined through multivariate analyses of variances. Construct validity was assessed using factor analysis and correlational analyses. In addition, confirmatory factor analysis was computed to verify the gathered factor solution. According to the original authors (1996) [51], self-esteem, emotional stability, self-regulation and about a feeling of zest for life are the indicators of human adaptation and well-functioning. Therefore, other measures were used for the nomological validity. Internal consistency of the scale was assessed by means of Cronbach's alpha coefficient and test-retest. Statistical analyses were performed with SPSS 19.0 and LISREL 8.3.

3. MEASURES

3.1. The Ego-Resiliency Scale

Block & Kremen [2] consists of 14 items and is a Likert-type scale with a 4-point range from 1 (*does not apply at all*) to 4 (*applies very strongly*). The coefficient alpha reliability of the scale reported by Block and Kremen was 0.76. The cross-time correlations (five years) were 0.51 for the female sample and 0.39 for the male sample, but when adjusted for the attenuation effect, they changed to 0.67 and 0.51 for the female and male samples respectively. No factor analysis was carried out in the original study.

3.2. The Rosenberg Self-Esteem Scale

RSES; Rosenberg [30]. This measures the general evaluation of one's worthiness as a human being. It is the most widely used measure of self-esteem in social science research [31]. The test-retest reliability coefficient was 0.71 within a 4-week time period.

3.3. The Positive and Negative Affect Schedule

(PANAS, Watson, Clark and Tellegen) [32] is a 20-item scale with two independent subscales: Positive Affect (PA) and Negative Affect (NA). Positive Affect reflects the level of emotional wellbeing whereas Negative Affect relates to emotional distress.

The *Life Orientation* [33], which has been the most widely used instrument to measure optimism in psychological research, was used in the current study. It is an eight-item self-report measure assessing generalized expectancies for positive versus negative outcomes.

3.4. Translation Procedure

The simplicity of items in the Ego-Resiliency Scale has provided a crucial advantage in translation [34]. This simplicity of language meant that a back-translation procedure was not utilized in this study, with back-translation procedures not always ensuring validity in cross-cultural research [35, 36]. However, the accuracy and clarity of the translated items were carefully examined in a detailed translation process, with the skills of a team of 'experts' who had lived in both American and Turkish cultures being utilized. Several had counseling expertise and some had expertise in teaching English as a second language.

In adapting the original scale to Turkish, it was first translated into Turkish by four 'experts': An English

Language Teaching instructor who holds a master degree and works at a private university in Turkey, a graduate student who has been pursuing her PhD in multilingual and multicultural education, focusing on teaching English as a second language in a Southern state university in the US, a graduate who has a master's degree in English literature, a counselor who has a PhD degree in counseling from an English-medium university in Turkey and who had spent almost one year in the US as a visiting scholar in an American university. Subsequently, the best combination of the five different translations was selected by the researcher. Two more judges evaluated and agreed on the appropriateness of the translation: A faculty member in an English-medium university in Turkey and a PhD student in multilingual and multicultural education in the US, also experienced in teaching English as a foreign language. The final form of the Turkish version of the scale was administered to the participants.

4. RESULTS

4.1. Descriptive Analyses

Means, standard deviations for each item in the Ego-Resiliency scale, total score and factor scores on Ego-Resiliency scale can be seen in Table **1**. There were no gender differences across two sample groups (exposed and non-exposed groups) for the total score and the factors scores on the Ego-Resiliency Scale. In order to compare the mean score of the study group in the present study with the means of Arabic and American University students, one sample *t*-test was used to examine the differences. The means score was taken from two major studies [12, 34]. It was found that Kuwaiti males had significantly higher resilience scores than Kuwaiti females [34]. One sample *t*-test was used to examine the mean difference between Kuwaiti and Turkish university students. The results indicated significant group differences for males [t (1, 338) = -10.676 p = 0.000] and female students [t (1, 155) = -2.415 p = 0.017]. The mean score for the Kuwaiti male university students was 41.15 (sd = 5.47). This score was significantly higher than the mean score of the Turkish male students (M = 38.33; sd = 4.85) in the present study. A similar result was gathered for the female students. The Kuwaiti female students (M = 39.84; sd = 5.19) scored significantly higher than the Turkish female university students (M = 38.88; sd = 4.91). In another study [12] the mean score for university students and recent graduates was 41.13 (5.93). The mean score for Turkish university students was 38.50 (sd = 4.86). The result of one sample *t*-test showed that American individuals scored higher than Turkish individuals [t (1, 495) = -11.993 p = 0.000]. By the means of these two one-sample *t*-tests comparing the means of ER Scale in three different university student groups from diverse cultures it is not intented to inflate any findings. These initial attempt indicates that there may well be cultural differences in resilience.

Table 1: Descriptive Statistics

	Earthquake Survivors		Non-Survivors	
	n = 363		n = 496	
	M	SD	M	SD
Item 1	3.3140	0.63550	3.3185	0.61574
Item 2	2.8788	0.73707	2.6149	0.68379
Item 3	2.5895	0.86975	2.5051	0.77816
Item 4	3.1543	0.67177	3.0020	0.66210
Item 5	2.6364	0.96628	2.6492	0.87728
Item 6	2.8292	0.83668	2.6815	0.83807
Item 7	2.2810	0.84314	2.1371	0.83928
Item 8	2.7631	0.82707	2.7419	0.76932
Item 9	2.7851	0.67970	2.7677	0.60350
Item 10	3.0634	0.74616	2.8468	0.78670
Item 11	2.9642	0.77341	3.0202	0.73827
Item 12	2.6336	0.71733	2.5544	0.67649
Item 13	3.0386	0.74970	2.8569	0.80759
Item 14	2.8623	0.76727	2.8125	0.78052
Total	39.79	5.73	38.5086	4.86805
Factor 1	11.8430	2.10895	11.1310	2.04815
Factor 2	14.7163	2.25561	14.3241	1.94654
Factor 3	13.2342	2.86486	13.0534	2.54886

Mean differences in the Ego-Resiliency scale scores with regard to age were also examined. The whole sample was categorized into three groups: (1) young adults (17 through 22); (2) adults (23 through 40) and (3) middle-aged adults (41 through 58). ANOVA was conducted to explore the impact of age on the total scores of ego-resiliency. The homogeneity of variance test was violated for the total score of the scale. However, the significance value (0.043) for Levene's test was close to 0.05. There was a statistically significant difference at the $p < 0.05$ level in ego-resiliency scores for the three age groups, F (2, 856) = 13.06, p = 0.00. Despite reaching significant difference, the actual mean difference in mean scores between groups was quite small. The effect size using era squared was 0.03. Hence, the strength of the association was small. According to

Post-hoc analysis using Dunett C, young adults (17 through 22) scored significantly lower than adults (23 through 40) and middle-aged adults (41 through 58). Likewise, middle-aged adults scored higher than adults.

5. CONSTRUCT VALIDITY

5.1. Factorial Structure

In order to provide evidence of the construct validity and gathering independent factors to use in the further structural model, 14 items of the Ego-Resiliency (ER) scale were subjected to principal component analysis (PCA) with varimax rotation using Kaiser Normalization through SPSS 13.0. Data gathered from the group exposed to the earthquake was utilized performing exploratory factor analysis. Kaiser-Meyer-Olkin value (0.849) and Bartlett test of sphericity (Chi-square $p < 0.001$) justified the adequacy of sampling for the factor analysis. The results revealed three factors with eigen values exceeding 1 (4.099, 1.516, 1.054), accounting for 47.63 percent of the total variance. The first, second and the third factors accounted for 29 percent, 11 percent and 7 percent of the variance respectively. The results of the factor analysis are displayed in Table **2**.

Three-factor solution explored by factor analysis was tested in the non-exposed group. Data Principal Component Analysis (PCA) with varimax rotation using Kaiser Normalization was computed. Data was extracted into three factors in accordance with the obtained factor structure. Three factors exceeding eigen value 1 explained 41.68% of the variance in the non-exposed group. The percentage of explained variance for the first factor was 23% (eigen value 3.18), for the second 11% (eigen value 1.53) and for the third 8% (eigen value 1.11). The first factor was *Openness to new experience*: The second factor was *Personal Strengths Relating to Recovery*: The third factor was *Positive Self-Appraisals* within the exposed group.

Factor loadings were identical both in the exposed and non-exposed groups, with the exception of item 12. Item 12 was loaded on the *Positive Self-Appraisals* factor within the exposed group. However, item 12 was loaded on the *Personal Strengths Relating to Recovery* factor within the non-exposed group. Item 12 was '*My daily life is full of things that keep me interested'*. It is more sensible to include item 12 in the *Positive Self-Appraisals* factor, as was done for the exposed group. Hence, we could conclude that almost the same three factor-solution was obtained from two samples.

Table 2: Factor Loadings, Standardized Estimates, t-Values and Squared Multiple Correlations for ER Scores

	EFA			CFA		
	1	2	3	λ	t	R^2
1. Personal Strenghts Relating Recovery (ER1)						
Item 2	**0.734**	0.318	0.058	0.79	25.70	0.63
Item 14	**0.695**	-0.059	0.207	0.53	12.30	0.28
Item 13	**0.648**	0.414	0.050	0.76	23.70	0.57
Item 10	**0.447**	0.082	0.042	0.37	7.62	0.14
2. Positive Self-Appraisals (ER2)						
Item 9	-0.147	**0.605**	0.185	0.42	8.69	0.17
Item 6	0.239	**0.593**	0.220	0.64	16.13	0.41
Item 12	0.304	**0.564**	0.097	0.67	16.90	0.45
Item 1	0.240	**0.535**	-0.035	0.46	9.80	0.21
Item 4	0.402	**0.488**	0.093	Not	*Included*	*In CFA*
3. Openness to New Experience (ER3)						
Item 7	0.121	-0.064	**0.751**	0.49	11.13	0.24
Item 8	0.181	0.050	**0.671**	0.61	11.52	0.37
Item 11	0.106	0.463	**0.638**	0.93	23.04	0.86
Item 5	-0.228	0.329	**0.526**	0.39	6.88	0.46
Item 3	0.393	0.298	**0.510**	0.42	9.23	0.18

5.2. Confirmatory Factor Analysis

The original scale is generally used as a uni-dimensional scale. For that reason the uni-dimensional factor structure was first tested using confirmatory factor analyses in the Turkish sample. The results show the one-factor model, in which all items loading on a single factor do not show a reasonable or good fit to the data (χ^2 / df = 7.27; RMSEA = 0.132; SRMR = 0.082; GFI = 0.83; AGFI = 0.77; CFI = 0.76), which supported the multidimensionality of the scale. Multidimensionality of the ER scale or the factor structure clustered using PCA in the Turkish adult sample was then tested.

First order confirmatory factor analyses based upon individual items in the Ego-Resiliency scale using asymptotic covariance matrix and estimation method of weighted least square was performed. One item (item 4) with high cross loading was [37] in order to obtain interpretable and refined factor structures.

The results indicated a good fit to examine how well three factor models approaches to_the data. All items loaded sufficiently and significantly on their respective factors, thus supporting a three factor model for the ER scale in Turkish culture. The R^2's ranged from .14 to .86 and item 9 and 10 had the lowest three R^2's. Among the items in the ER scale item 11 has a satisfactory value of R^2 (0.86). In order to capture the optimal measurement model for the ER scale, modifications based on the suggestions (one error covariance and one path from *item 3* to latent variable were added) made by LISREL 8.3, and theoretical meaningfulness was performed. According to the modifications suggested by LISREL, item 3 was loaded on the first factor (*Personal Strengths Relating to Recovery*) as well. For future studies, this item should be scored both in first and third factor. Table **2** also shows the standardized lambda-x Estimates, *t*-values and squared multiple correlations of the items in the ER scale in the confirmatory factor analyses. Chi square, which evaluates the absolute fit of the tested model to the data, (Bollen, 1989) was significant, $\chi^2(60, N= 363) = 109.04$ $p < 0.05$. The collective goodness of fit indices used in this study (χ^2/df = 1.81; RMSEA = 0.048; SRMR = 0.064; GFI = 0.98; AGFI = 0.97; CFI = 0.94) indicated that the first order confirmatory model was a good solution for the data. The final measurement model with two modifications included three factors and 14 indicators. Three-factor solution for the ER scale proved a good fit to the data. The goodness of fit measures is summarized in Table **3**.

When adapting an instrument from another language, validity is the main concern of the researcher keen to get accurate results. Therefore, the validity structure of the scale obtained in one sample and the confirmation of the obtained validity structure in another sample consolidate the validation [38]. As a result, the three factor structure was verified by both the results of exploratory and confirmatory factor analyses. The Turkish version of the Ego Resiliency scale can be used as a measure of trait-based resilience. The path diagram of the first-order measurement model of trait based resilience with standardized path coefficients can be seen in Figure **1**. The construct validity of the translated scale was supported by the inter-correlation between the factor scores and the total score.

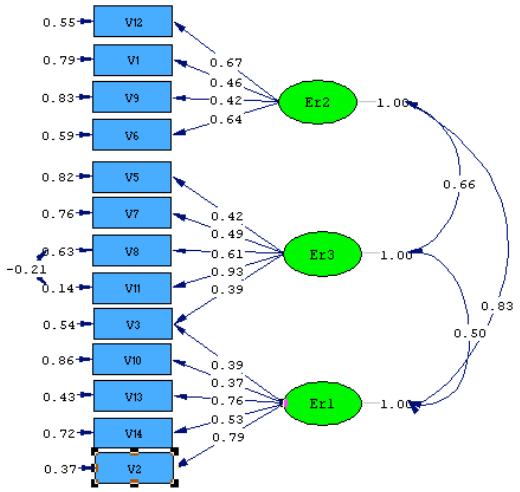

Figure 1: The standardized estimates for three-factor, 13-item ER Scale.

The correlations among the factors which are intended to measure separate dimensions of the construct and the total score were also calculated in

Table 3: Summary of Fit Indices from the Measurement Model of ER

Indexes	χ^2, df	χ^2 / df	RMSEA	SRMR	CFI	AGFI	GFI
CFA Model	109.04; 0. 60	1.81	0.048 Confidence Interval (0.033; 0.062)	0.064	0.94	0.94	0.98

Table 4: The Inter-Correlations among the Factor Scores and Total Scores on Ego-Resiliency Scale

	Total Score	Factor1	Factor2	Factor3
Total Score	1	0.81[a]; 0.70[b]	0.80[a], 0.75[b]	0.81[a], 0.78[b]
Factor 1		1	0.59[a], 0.37[b]	0.53[a], 0.25[b]
Factor 2			1	0.45[a], 0.36[b]
Factor 3				1

Significant at the 0.01 level (2-tailed). [a] = Survivors [b] = NonSurvivors.

the whole sample. Moreover, the correlation coefficients between the total Ego-Resiliency score and the three factors, (*Personal Strengths Relating to Recovery, Positive Self-Appraisals and Openness to New Experience*) were: 0.76, 0.60, and 0.79, respectively. On the other hand, the inter-correlations among the factors were relatively weaker, which indicates the independence of the factors. The correlation coefficient between the first and second factors was 0.37. Moreover, the first factor was correlated with third factor (r = 0.39). Finally, the correlation between the second and third factors was 0.32. All the correlations were significant at the 0.01 level (2-tailed). Table **4** displays the inter-correlations among the factor scores and total score on Ego-Resiliency scale in the exposed group and non-exposed group.

5.3. Concurrent Validity

We examined the concurrent validity by examining differences between the exposed and non-exposed groups. A one-way multivariate analysis of variance was conducted to investigate differences across the two different groups. The dependent variables were the total score and factor scores on the Ego-Resiliency scale. Significant group differences were found in the total scores and the second factor scores on the Ego-Resiliency scale, Wilk's Lamba (λ or Λ) = 0.157; F (4, 852) = 1149.417 $p < 0.001$. The value of partial eta squared (η^2**)** 0.843. Using Bonferroni adjusted significance level, the exposed group scored significantly higher on the total scores [F (1, 857) = 12.54, p = 0.000, η^2 = 0.014] and on the second factor scores [F (1, 857) = 314.87, p = 0.000, η^2 = 0.27]. Hence, total score on the Ego-Resiliency scale seems to differentiate different groups.

5.4. Nomological Validity

Cronbach and Meehl [39] argued that nomological network, a theoretical framework, provides validity evidence for measures. In order to obtain additional validity evidence for the Ego-Resiliency scale for Turkish participants, a nomological network was also investigated.

As mentioned before, resilience appeared to be highly correlated with self-esteem [40, 41] and positive and negative emotions [12, 18]. Furthermore, [42] underlined the optimistic way of life in resilient personality in her theoretical study. There are two studies [52, 43] suggesting that optimism and self-esteem constructs are the core resources in forming a resilient personality with control beliefs. Thus, the Positive and Negative Affect Schedule [32], Life Orientation Test [33] and Self-esteem Scale [30] were used to investigate the correlations among the study variables. In short, self-esteem, optimism and affective moods (positive and negative) appear to be the strongest correlates of a resilient personality. The most widely used measures were chosen to quantify those variables and the variables were thus shown to be valid and reliable in Turkish culture. The correlations were theoretically meaningful.

According to the results of the correlational analysis, resilience was positively correlated with self-esteem (r (361) = 0.47 among the individuals exposed to the earthquake $p < 0.001$), positive affect (r (361) = *0*.64 among the individuals exposed to the earthquake $p < 0.001$) and optimism (r (361) = *0*.51 among individuals exposed to the earthquake $p < 0.001$). On the other hand, the correlation between resilience and negative affect was negative (r (361) = 0.43 among the individuals exposed to the earthquake $p < 0.001$). All of the correlation coefficients among the determined variables were significant and in the direction hypothesized. Table **5** displays the correlations among resilience measured by the Turkish version of the Ego-Resiliency scale and the other criterion variables in both groups.

Table 5: The Evidence for Divergent and Convergent Validity Evidence for ER Scale

	Resilience	Self Esteem	Positive Affect	Negative Affect	Optimism
Resilience	1	0.47[a]; 0.44 [b]	0.64[a], 0.54[b]	-0.43[a], -0.38[b]	51[a], 0.38[b]
Self Esteem		1	0.53[a], 0.54[b]	-47[a], -0.45[b]	0.45[a], 0.43[b]
Positive Affect			1	-0.33[a], -0.28[b]	42[a], 0.35[b]
Negative Affect				1	-0.55[a], -0.44[b]
Optimism					1

Significant at the 0.01 level (2-tailed). [a] = Survivors [b] = NonSurvivors.

6. RELIABILITY

Cronbach Alpha was also calculated separately for both the total scale and the subscales using the exposed group. The coefficient alpha reliability of the scale reported by Block and Kremen [2] was reported as 0.75. A value of .80, an extremely high value for a relatively short scale, was found for the total scale. Cronbach Alpha coefficients were 0.66, 0.63, and 0.69 for the three factors named *Personal Strengths Relating to Recovery*; *Positive Self-Appraisals* and *Openness to New Experience* respectively. Internal consistency was also assessed by test-retest. The reliability coefficient was 0.75 within a three-week interval (*n = 63*). All item-total correlations were positive and above 0.30 except for two items (0.25 for item 10 and 0.27 for item 5). The mean of item-total correlation was 0.42.

7. DISCUSSION

Validity was assessed on the basis of construct, concurrent and nomogical validity. Construct Validity was calculated by means of exploratory and confirmatory factor analyses. The Ego Resiliency Scale was used as uni-dimensional in the original study and in some other studies [12, 18] although the original authors emphasized the multidimensionality of the construct. A single factor solution for the Ego Resiliency Scale was tested first; However, the results of confirmatory factor analyses did not support the single factor solution. As the multi-dimensional nature of the resilience concept was stated by the original authors, (Block and Kremen) [2] in the following step the dimensions that could be differentiated in the scale were explored using factor analysis. Exploratory factor analysis yielded a three-factor solution for Turkish disaster survivors. The factors were labeled as *Personal Strengths Relating to Recovery*; *Positive Self-Appraisals* and *Openness to New Experience*. The same factors with the same items were obtained for the non-exposed group, with the exception of item 12, which belonged to the *Positive Self-Appraisals* within the exposed group. However, item 12 loaded on the *Personal Strengths Relating to Recovery* within the non-exposed group. Item 12 was 'My daily life is full of things that keep me interested'. It makes more sense to include item 12 in the *Positive Self-Appraisals* factor. Hence, almost the same three factor-solution was obtained from two samples.

According to confirmatory factor analyses, multiple fit indices confirmed the three-factor model for the Ego Resilience Scale obtained through exploratory factor analyses. However, it suggested slight modifications. Although all the items loaded sufficiently and significantly on their respective factors, the present researcher has concerns about difficulties associated with the translation of two items (items 9 and 10). Although no negative feedback about the clarity of the two items was received from the participants, more accurate expressions of those items are likely to be required in future re-evaluations, in order to deal with such issues. Since the first item relates to the positive perception of others ('Most of the people I meet are likable') and the second represents an individual's planning ability ('I usually think carefully about something before acting'), they may well be the reasonable representations of resilience. In future, the revisions in translations may be obtained and the factor structure may be retested.

8. RESULTS

The results also suggested that the exposed group scored significantly higher on the total score of the Ego-Resiliency scale and on the score of *Positive Self-Appraisals*. There were no gender differences regarding Ego-Resiliency scores. There was a small but significant difference across different age groups.

Older participants seem to have higher scores on the Ego-Resiliency scale.

Support of nomoligical validity is provided by the strong associations based on priori research. A wide range of literature indicates that high self-esteem contributes to well-being [44] and assists coping with difficulties, setbacks, and failures [45]. Likewise, optimism [46] and positive affect (e.g., [48] contribute to better mental health and effective coping [47]. Experiencing positive emotions may be the crucial element in the activation process of resilience following adverse events [12, 18]. Consistent with the previous research, our results validated the associations between resilience and self-esteem, optimism and positive affect. We can therefore conclude that resilience is positively associated with better mental outcomes. In addition to validity efforts, the results of reliability efforts also showed satisfactory internal consistency and stability for the scale. Internal consistency value of the scale was higher than the value in the original study.

CONCLUSION

The present study examined the psychometric properties of the Ego-Resiliency scale in the Turkish sample. Significantly, this study is the first attempt to provide validity evidence for the ego resilience construct in Turkish culture. Overall, the results revealed that the Ego Resiliency scale is a valid and reliable measure of psychological resilience. Cross-cultural findings help to understand human nature in psychology, and such studies and international research collaboration efforts inevitably require culturally validated instruments. The study provides insights into the concept of resilience from a cultural perspective. It makes it possible to conduct studies comparing resilience across Turkish samples and English-spoken samples, which can contribute to a better understanding of the concept.

Natural disasters such as earthquakes bring great uncertainty to people's lives. In addition, traumatic events such as man-made disasters, serious traffic accidents and terrorist attacks are the facts of life in Turkey, as in many parts of the world. Therefore, resilience is an extremely important phenomenon that should be examined in greater depth by researchers and counselors.

REFERENCES

[1] Block JH and Block J. The role of ego-control and ego-resiliency in the organization of behavior. In W.A. Collins (Ed.), The Minnesota Symposia on Child Psychology. Hillsdale, NJ: Erlbaum 1980; 13: 39-101.

[2] Block J and Kremen A. IQ and ego resiliency: Conceptual and empirical connections and separateness. Journal of Personality and Social Psychology 1996; 70: 349-361. https://doi.org/10.1037/0022-3514.70.2.349

[3] Kelley TM. Natural resilience and innate mental health. American Psychologist 2005; 60(3): 265-271. https://doi.org/10.1037/0003-066X.60.3.265a

[4] Madsen MD and Abell N. Trauma resilience scale: Validation of protective factors associated with adaptation following violence. Research on Social Work Practice 2010; 20(2): 223-233. https://doi.org/10.1177/1049731509347853

[5] Bonanno GA. Uses and abuses of the resilience construct: Loss, trauma, and health-related adversities. Social Science and Medicine 2012; 74(5): 753-756. https://doi.org/10.1016/j.socscimed.2011.11.022

[6] Connor KM and Davidson JRT. Development of a new resilience scale the Connor-Davidson Resilience Scale (CD-RISC). Depression and Anxiety 2003; 18: 76-82. https://doi.org/10.1002/da.10113

[7] American Psychological Association. The road to resilience 2010.

[8] Altundağ Y and Bulut S. Prediction of Resilience of Adolescents Whose Parents Are Divorced. Psychology 2014. https://doi.org/10.4236/psych.2014.510134

[9] Southwick SM and Charney DS. The science of resilience: Implications for the prevention and treatment of depression. Science 2012; 338(6103): 79-82. https://doi.org/10.1126/science.1222942

[10] Rabkin JG, Reminen R, Katoff L and Williams JBW. Resilience in adversity among long term survivors of AIDS. Hospital and Community Psychiatry 1993; 44(2): 162-167. https://doi.org/10.1176/ps.44.2.162

[11] Antoni MH and Goodkin K. Host moderator variables in the promotion of cervical neoplasia-I. Personal facets. Journal of Psychosomatics Research 1988; 32(3): 327-338. https://doi.org/10.1016/0022-3999(88)90075-X

[12] Fredrickson BL, Tugade MM, Waugh CE and Larkin GR. What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. Journal of Personality and Social Psychology 2003; 84(2): 365-376. https://doi.org/10.1037/0022-3514.84.2.365

[13] Bonanno GA, Papa A and O'Neill K. Loss and human resilience Applied and Preventative Psychology 2002; 10: 193-206.

[14] Lee JH, Nam SK, Kim AR, Kim B, Lee MY and Lee SM. Resilience: A meta-analytic approach. Journal of Counseling and Development 2013; 91: 269-279. https://doi.org/10.1002/j.1556-6676.2013.00095.x

[15] Snyder CR. The past and possible futures of hope. Journal of Social and Clinical Psychology 2000; 19(1): 11-28. https://doi.org/10.1521/jscp.2000.19.1.11

[16] Peterson C. The future of optimism. American psychologist 2000; 55: 44-53. https://doi.org/10.1037/0003-066X.55.1.44

[17] Baumeister RF and Exline JJ. Self-control, morality and human strength. Journal of Social and Clinical Psychology 2000; 19: 29-42. https://doi.org/10.1521/jscp.2000.19.1.29

[18] Tugade MM, Fredrickson BL and Barrett LF. Psychological resilience and positive emotional granularity: Examining the

benefits of positive emotions on coping and health. Journal of Personality 2004; 72(6): 1162-1190. https://doi.org/10.1111/j.1467-6494.2004.00294.x

[19] Connor KM, Davidson JRT and Ching-Lee L. Spirituality, resilience, and anger in survivors of violent trauma: A community survey. Journal of Traumatic Stress 2003; 16(5): 487-494. https://doi.org/10.1023/A:1025762512279

[20] Fonagy P, Steele M, Steele H, Higgit A and Target M. The Emmanuel Miller memorial lecture 1992: The theory and practice of resilience. Journal of Child Psychology and Psychiatry 1994; 35: 231-257. https://doi.org/10.1111/j.1469-7610.1994.tb01160.x

[21] Floyd C. Achieving despite the odds: A study of resilience among a group of African American high school seniors. Journal of Negro Education 1996; 65(2): 181-189. https://doi.org/10.2307/2967312

[22] Parker GR, Cowen EL, Work WC and Wyman PA. Test correlates of stress-resilience among urban school children. Journal of Primary Prevention 1990; 11: 19-35. https://doi.org/10.1007/BF01324859

[23] Gilgun JF. Mapping resilience as process among adults with childhood adversities. In McCubbin HI, Thompson EA, Thompson AI and Futrell JA (Eds.). The dynamics of resilient families. Thousand Oaks, CA: Sage 1999; pp. 41-70.

[24] Wagnild GM and Young HM. Development and psychometric evaluation of the Resilience Scale. Journal of Nursing Measurement 1993; 1(2): 165-78.

[25] Özmen B, Nurlu M and Güler H. Analysis of earthquake zones with geographical information system. Ankara, Turkey: Republic of Turkey Ministry of Public Works and Settlement, Disaster and Emergency Management Presidency, Earthquake Department 1997.

[26] Turkish Prime Ministery Crisis Management Center. Earthquakes 1999, Ankara: Prime Ministery Printing House 2000.

[27] Gosling SD, Vazire S, Srivastava S and John OP. Should we trust Web-based studies? A comprative analysis of six preconceptions about Internet questionnaires. American Psychologist 2004; 59: 93-104. https://doi.org/10.1037/0003-066X.59.2.93

[28] Joinson AN. Social desirability, anonymity, and Internet-based questionnaires. Behavior Research Methods, Instruments and Computers 1999; 31: 433-438. https://doi.org/10.3758/BF03200723

[29] Moon Y. Intimate exchanges: Using computers to elicit self-disclosure from consumers. Journal of Consumer Research 2000; 27: 323-339. https://doi.org/10.1086/209566

[30] Rosenberg M. Society and the Adolescent Self-Image. Revised edition. Middletown, CT: Wesleyan University Press 1989.

[31] Blascovich J and Tomaka J. Measures of self-esteem. In Robinson JP, Shaver PR and Wrights LS. man (Eds.). Measures of personality and social psychological attitudes. San Diego, CA: Academic Press 1991; 1. https://doi.org/10.1016/b978-0-12-590241-0.50008-3

[32] Watson D, Clark LA and Tellegen A. Development and validation of a brief measure of positive and negative affect: The PANAS Scales. Journal of Personality and Social Psychology 1988; 54: 1063-1070. https://doi.org/10.1037/0022-3514.54.6.1063

[33] Scheier MF and Carver CS. Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. Health Psychology 1985; 4: 219-247. https://doi.org/10.1037/0278-6133.4.3.219

[34] Al-Naser F and Sandman M. Evaluating resilience factors in the face of traumatic events in Kuwait. Medical Sciences 2000; 2: 111-116.

[35] Geisinger KF. Cross-cultural normative assessment: Translation and adaptation issues influencing the normative interpretation of assessment instruments. Psychological Assessment 1994; 6: 304-312. https://doi.org/10.1037/1040-3590.6.4.304

[36] Hilton A and Skrutkowski M. Translating instruments into other languages: Development and testing process. Cancer Nursing 2002; 25(1): 1-7. https://doi.org/10.1097/00002820-200202000-00001

[37] MacCallum RC and Austin JT. Applications of structural equation modeling in psychological research. Annual Review of Psychology 2000; 51(1): 201-226. https://doi.org/10.1146/annurev.psych.51.1.201

[38] Marsh HW and Byrne BM. Confirmatory factor analysis of multigroup-multimethod self-concept data: Between-group and within-group invariance constraints. Multivariate Behavioral Research 1993; 28: 313-349. https://doi.org/10.1207/s15327906mbr2803_2

[39] Cronbach LJ and Meehl PE. Construct validity in psychological tests. Psychological Bulletin 1955; 52: 281-302. https://doi.org/10.1037/h0040957

[40] Benetti C and Kambouropoulos N. Affect-regulated indirect effects of trait anxiety and trait resilience on self-esteem. Personality and Individual Differences 2006; 41: 341-352. https://doi.org/10.1016/j.paid.2006.01.015

[41] Judge TA and Bono JE. A rose by any other name. Are neuroticism, self-esteem, locus of control, and generalized self-efficacy indicators of a common construct? In B. W. Roberts & R. T. Hogan (Eds.), Personality psychology in the workplace. Washington, DC: American Psychological Association 2001; pp. 93-118. https://doi.org/10.1037/10434-004

[42] Klohnen EC. Conceptual analysis and measurement of the construct of ego resiliency. Journal of Personality and Social Psychology 1996; 70(5): 1067-1079. https://doi.org/10.1037/0022-3514.70.5.1067

[43] Wanberg CR and Banas JT. Predictors and outcomes of openness to changes in a reorganizing workplace. Journal of Applied Psychology 2000; 85: 132-142. https://doi.org/10.1037/0021-9010.85.1.132

[44] Dubois DL and Flay BR. The healthy pursuit of self-esteem: Comment on and alternative to the Crocker and Park (2004) formulation. Psychological Bulletin 2004; 130: 415-420. https://doi.org/10.1037/0033-2909.130.3.415

[45] Carver CS and Scheier MF. On the Self-Regulation of Behavior. New York: Cambridge University Press 1998. https://doi.org/10.1017/CBO9781139174794

[46] Achat HI, Kawachi A, Spiro DA, DeMolles and Sparrow D. Optimism and depression as predictors of physical and mental health functioning: The normative aging study. Annals of Behavioral Medicine 2000; 22: 127-130. https://doi.org/10.1007/BF02895776

[47] McCrae RR and Costa PT. Personality, coping, and coping effectiveness in an adult sample. Journal of Personality 1986; 54: 385-405. https://doi.org/10.1111/j.1467-6494.1986.tb00401.x

[48] Taylor SE and Brown JD. Illusion and well-being: A social psychological perspective on mental health. Psychological Bulletin 1988; 103: 193-210. https://doi.org/10.1037/0033-2909.103.2.193

[49] Fletcher D and Sarkar M. Psychological resilience: A review and critique of definitions, concepts and theory European Psychologist 2013; 18(1): 12-23. https://doi.org/10.1027/1016-9040/a000124

[50] American Red Cross. (n.d.). Worldwide Earthquake Relief: 2nd Anniversary of Earthquake in Turkey. Retrieved May 10, 2006, from http://www.redcross.org/news/in/earthquakes/turkeypage.html

[51] Block J and Kremen A. IQ and ego resiliency: Conceptual and empirical connections and separateness. Journal of Personality and Social Psychology 1996; 70: 349-361. https://doi.org/10.1037/0022-3514.70.2.349

[52] Major B, Richards C, Cooper ML, Cozzarelli C and Zubek J. Personal resilience, cognitive appraisals, and coping: an integrative model of adjustment to abortion. Journal of Personality and Social Psychology 1998; 74(3): 735. https://doi.org/10.1037/0022-3514.74.3.735

Received on 13-10-2016 Accepted on 19-10-2016 Published on 31-12-2016

DOI: http://dx.doi.org/10.12974/2313-1047.2016.03.02.4