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PSYCHOLOGICAL DISTRESS AMONG THE NON-RELOCATED AND RELOCATED SURVIVORS AFTER THE AUGUST 17TH 1999 EARTHQUAKE IN TURKEY

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Abstract

The effects of demographic factors, pre and post disaster factors and relocation on psychological distress were examined in a sample of the earthquake survivors after the August 17th earthquake in Turkey. 71 relocated survivors were compared with 78 survivors remained in the disaster area, in terms of symptom domains. All relocated survivors and nearly the half of those who stayed in the disaster area were interviewed and checked for the symptoms in December 1999 and the rest in April and May 2000. Multiple regression analyses showed that the external locus of control, age and gender predicted the three subscales of Symptom Check-list 90-R (SCL-90-R), namely depression, anxiety, and Global Severity Index (GSI); loss of life and satisfaction with the decisions, rescue and damage evaluation work of the government predicted anxiety and GSI, and relocation predicted anxiety. External locus of control was the most related factor to depression, anxiety and GSI scores, and the relocated group had significantly higher symptoms than the survivors remained in the disaster area. Our findings suggest that relocation after a disaster may be considered as an additional risk factor and the disruption of social network after the relocation may increase psychological distress. Therapeutic techniques that alter the external locus of control may be helpful in decreasing depression, anxiety, and GSI.

Keywords: Earthquake, Turkey, External Locus of Control, Relocation, Posttraumatic Stress Disorder.

INTRODUCTION

In the night of August 17, 1999 at 3.02 a.m., a multiple-shock quake with a magnitude of M=7.4 and with a pause of 1-2 seconds between two major shocks hit the Eastern Marmara Sea region and caused considerable loss of life and damage in the region. It had two epicentres near Gölcük and somewhere between Lake Sapanca and Akyazı and lasted over 45 seconds. It destroyed the cities Kocaeli, Adapazarı, Yalova, Istanbul and Bolu causing nearly 16000 casualties, over 40000 injuries and extensive damage. Nearly 77342 houses including offices collapsed and 77169 houses including offices were moderately damaged. The national economic loss was estimated to be between 9-13 billion dollars. The quake disrupted transportation, utilities and communication systems in the region and had a considerable effect on public services, industrial production and on the financing system of the government (Yılmaz & Demirtaş, 1999; State Planning Organization, 2003). Some of the survivors, whose houses were totally destroyed, were relocated into distant cities and placed in public houses there. This study was conducted in the disaster area and in Samsun on the north coast of Turkey by the Black Sea where a part of the survivors were located in temporary summer camps.

DISASTER STUDIES

The empirical disaster studies done on natural, technological and other disasters and on mass violence between 1981-2001, as particular events that occurred at a particular time to a particular population in a particular place, show that the dedicated psychological problems and distress after disasters are highly depended on demographic and other factors such as gender, age, ethnicity, socioeconomic and marital status, presence of children, personality, on the sample type, disaster location and disaster type, and on the social support received and resource loss because of the disaster and relocation (Norris et al., 2002). It is hard to compare the results of the previous studies since there is a great deal of difference in the severity of earthquakes, the extent of devastation and casualties, time passed after the earthquake, sampling methods, and the measures used (Başoğlu, Şalcıoğlu, & Livanou, 2002).

Most of the studies with age-related results were conducted on the disasters like events or on other disasters than earthquake. Middle-aged people affected by Hurricane Hugo exhibited the most distress

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(Thompson, Norris, & Hanacek, 1993); young people exposed to traumatic events such as tragic death, sexual assaults or motor vehicle crash showed the highest rates of PTSD (Norris, 1992), older age was a significant risk factor of PTDS after flood (Liu et al., 2006); younger and single disaster workers were more likely to develop acute stress disorder after the events of Sept. 11, 2001 (Fullerton, Ursano, & Wang, 2004). Other studies have been conducted on train collision and an aircraft crash or hurricane. Mitch has showed that either there were no main effects of age on general health (Chung, Dennis, Easthope, Farmer, & Werrett, 2005) or there were no significant differences in PTSD and depression between elderly and younger adults (Kohn, Levav, Garcia, Machuca, & Tamashiro, 2005). The studies done on the survivors of 1999 Marmara and 1992 Erzincan earthquakes in Turkey showed that the PTSD and depression symptoms were related to older age (Şalcıoğlu, Başoğlu, & Livanou, 2003), and the majority of parents, but only a minority of children, expressed continued distress due to the disaster events while phobic, somatic, depressive reactions and perceived lack of control were higher among parents than children. The data suggested that parental somatization was related to child distress (Rüstemli, & Karancı, 1996).

Gender is another most examined factor in disaster research. The results have shown that female survivors are more adversely affected after traumas, and are more at risk for having psychological distress (Anderson & Manuel 2005; Başoğlu, Kılıç, Şalcıoğlu, & Livanou, 2004; Breslau, Davis, Andreski, Peterson, & Schultz, 1997; Liu et al., 2006; Montazeri et al., 2005; Norris et al., 2002; Şalcıoğlu et al., 2003; Ticehurst, Webster, Carr, & Lewin, 1996; Tural et al., 2004).

Some studies found that resource loss in general caused more distress (Norris et. al., 2002), but "loss of property" was not seen as a significant predictor of traumatic stress in a study conducted with the survivors of the August 19th earthquake in Turkey (Başoğlu et al., 2004). Personal loss had intense but short term effect on older adults' depressive symptoms and the long-term psychological distress was more related with community destruction and loss of social support systems due to disaster (Watanabe, Okumura, Chiu, & Wakai, 2004). Loss of family members, close friends or neighbors is a well-known predictor of PTSD and/or depression after disasters (Armenian et al., 2000; Başoğlu et al., 2004; Goenjian et al., 1994; Montazeri et al., 2005; Kılıç et al., 2006; Kılıç & Ulusoy, 2003; Tural et al., 2004).

A number of other variables have been correlated to the psychological distress in disaster research. Unemployment was associated with severe psychological distress (Montazeri et al., 2005). Being not alone at the moment of the earthquake was protective for PTSD (Armenian et al., 2000) or fear during earthquake was significantly related to post-earthquake traumatic stress responses. (Başoğlu et al., 2004; Şalcıoğlu et al., 2003). Other protective factors for PTSD were the highest level of education compared to lowest and making new friends after the earthquake (Armenian et al., 2000). The dose of exposure influenced the rates of PTSD and the closer were the survivors to the epicenter, the higher were the rates of PTSD (Goenjian et al., 1994). Other factors significantly related to PTSD symptoms were either earthquake related anxiety, inability to express one's thoughts and feelings and emotional coping, previous life events, low self-worth and luck attributions (Bödvarsdóttir & Elklit, 2004) or the history of past psychiatric illness, past trauma experiences, participation in rescue work, damage to home, participation in rescue work, having being trapped under rubble, and personal history of psychiatric illness (Başoğlu et al., 2004). The PTSD was higher in persons who had higher levels of perceived life threat, who had been injured or who had been trapped in the rubble (Tural et al., 2004). Depression symptoms were related to single marital status, past psychiatric illness, previous trauma experience and to the family history of psychiatric illness (Şalcıoğlu, Başoğlu, & Livanou, 2003). The studies have shown that the prevalence of PTSD according to the factors of the trauma has a wide range between 4% and 88 % (Bödvarsdóttir & Elklit, 2004; Goenjian et al., 1994; Başoğlu et al., 2004).

There are few studies on the effects of relocation among earthquake survivors. Some of these show that the relocated survivors after an earthquake had either high prevalence of psychiatric problems (Maj et al., 1989 as cited in Najarian et al., 2001) or had higher depression scores (Najarian et al., 2001; Watanabe et al., 2004). Relocation status of Turkish survivors after the August 19th earthquake predicted depression but not traumatic stress (Kılıç et al., 2006). The survivors in a refugee camp had higher levels of PTSD and depression than the non-relocated traumatized survivors (Savin, Sack, Clarke, Meas, & Richard, 1996, as cited in Najarian et. al., 2001). Permanently evacuated male workers because of earthquake tremors and shocks reported significantly higher symptoms than the not evacuated or evacuated but returned to the same house groups, across all dimensions of distress (Bland et al., 1997). The studies dealing with the effects of relocation after a man-made disaster showed similar results: Stress symptoms of children who were not displaced after the SCUD missiles in 1991 Gulf war decreased over time, but those symptoms persisted over time in displaced children. Similarly displaced mothers reported significantly higher symptoms then the non-displaced mothers (Laor, Wolmer, & Cohen, 2001). In contradiction to all those results, Najarian et al., (1996) have found that there were no significant differences between the relocated children and the children who stayed in the devastated area.

Catastrophic earthquakes have long-term psychological consequences (Şalcıoğlu et al., 2003) and it is obvious that understanding the responses of the survivors and exploring the risk factors are important in developing intervention programs (Rüstemli & Karancı, 1996). With the intention of contributing to the development of intervention programs in Turkey and of contributing relocation related earthquake studies, our study examined the distress level of survivors and its relation with some demographic factors and some other risk factors by comparing a relocated group of survivors with another group of survivors that remained in the earthquake location after the earthquake.

METHOD

Sample

Data were collected from a randomly selected greater data (n=248) due to the objectives of this study. The aim of the study was to obtain demographically equal groups, but this was only partly feasible under the circumstances after the earthquake. In total 71 relocated survivors in Samsun and 78 non-relocated survivors in the epicenter of the disaster area were interviewed and checked for the symptoms. The relocated people were accommodated in temporary vacation camps in Samsun and the non-relocated were living with their families in the disaster area after the quake and staying either in their houses, or in tents or in prefabricated houses. There were no significant differences in the distribution of gender and age groups in the sample, but there were significant differences in the marital status, level of education, employment status and number of children: Most of the respondents in the relocated and non-relocated groups were 21-40 years old (60% and 55%) and female (66% and 64%). On the other hand, the non-relocated survivors were more likely to be married (74 %) than the relocated (51%), had more a high school (40%) or university degree (47%) than the relocated (14% and 8%), were more employed (75%) than the relocated (43%) and finally had fewer children than the relocated survivors. Most of the non-relocated respondents were teachers (34%), students (19%) or employees (14%), but most of the relocated were housewives (52%), employees (11%), casual laborers/freelances (10%), owners of small enterprisers or manual workers (10%).

Further data showed that all participants (99%) had lived at least for one year and most of them for five years or more in the earthquake area (87%). Of the relocated survivors 30% stayed for 2-7 days, 60% of them for 8-30 days and 9% of them for 40-66 days in the region after the disaster until they were relocated to Samsun. One third of the participants were born in the disaster area and nearly one third of them had experienced another disaster before August 19th, mainly another earthquake (37%) or a flood (22%). The majority faced the disaster in a building (98%) and while sleeping (82%) and nearly all participants were in a multi-storey building during the disaster, together with more than one person such as family members, relatives or friends. Moreover, more than the half of the participants considered their life before the disaster either as “hard” (11%) or as “moderate” (40%) in contrast to those who found their life circumstances in general as “comfortable” (49%).

Measurements

Two instruments were used in this study: a questionnaire and the Symptom Check-List 90R (SCL-90-R; Derogatis & Cleary, 1977). SCL-90-R is a multidimensional self-report inventory assessing psychopathology in terms of nine symptom clusters which are Depression, Anxiety, Somatization, Obsessive-compulsive, Interpersonal sensitivity, Hostility, Phobic anxiety, Paranoid ideation, Psychoticism, and a Global Severity Index (GSI) designed to measure overall psychological distress. SCL-90-R includes 90 items concerning a patient’s symptom distress in the previous 7 days, each item rated on a five point Likert scale (0–4) from “0= not at all” to “4= extremely”. This instrument has been adapted to Turkish by Dağ (1991).

The questionnaire consisted of a total number of 68 items with sub-items and was partly developed from a sociological questionnaire used in an empirical research in the mid-eighties in the region of northern Anatolia earthquake zone between the cities Adapazarı and Bolu (Geenen, 1995). It has been pre-tested on the students of Ondokuz Mayıs University in Samsun. The following categories of variables relevant to our task were integral to our questionnaire:

Personal-familial variables: Variables included age, gender, family size, education, professional, marital and employment status before and after the earthquake, pre-disaster life satisfaction.

Residential variables: Variables included home ownership and perceived strength and height of the building.

Experiential variables: Since all participants experienced the earthquake, questions measuring its severity were used. The severity of experience was assessed by the questions asking for the deaths and injuries among family members, close relatives and neighbors. The participants’ material loss and damage were assessed by the following questions: loss of own home, damage to workplace, damage to furniture, loss of animals, loss of a person who gave financial support and loss of harvest. Probable peritraumatic factors such as; “in which floor were you during the earthquake?”, “How many people were you with during the earthquake?” or

"How long did you stay in the disaster area after the earthquake?" were asked the participants. The participants' previous natural disaster experiences were assessed as well.

Perceived control: Perceived control variable, 9 sub-items of which were based on a 5-point Likert scale (0=I don't agree at all, 4=I completely agree) was formed or adapted from the relevant literature of "control" or "locus of control" (Edinsel, 1998; Krampen 1982; Rotter 1966). The items were as follows:

1-The destructive results of natural disasters like earthquakes, floods or drought can not be prevented by some measures taken before.
2-People can determine the course of their own lives.
3-The best way to solve problems is to wait in patience.
4-Getting what one wants in life has mostly to do with luck, not with efforts to achieve it.
5-The average citizen can have an influence in government decisions.
6-What happens to me is my own doing.
7-What is going to happen to someone is due to his or her fate.
8-What is going to happen will happen, no matter how hard you try to prevent it.
9-God punished the people with the earthquake.

These items were subjected to factor analysis and a two factor solution, namely external locus of control and internal locus of control are given in results section in detail. Since the internal locus of control variable had a poor Cronbach alpha value (α=.44), it was not used in the statistical analysis. The Cronbach alpha value of external locus of control was satisfactory (α=.72).

Another item was supposed to measure the life expectations of the participants after the quake ("Do you think that your future life will get better?) The response categories were "no" (0) and "yes" (1). Satisfaction with the decisions, rescue and damage evaluation work of the government after the earthquake was assessed by the following 5-point Likert type question (0=not satisfied at all, 4=very much satisfied): "How satisfied are you with the evaluation work of the government regarding the private property damage and with the decisions and practice of the government concerning the people affected by the earthquake?"

Interview

The interviews were carried out face to face in two steps and in a nine months period between November 1999 and July 2000 by experienced psychologists. The questionnaire was used in the first step and the SCL-90-R in the following step.

Statistical Analyses

Analyses were performed with statistical software SPSS for Windows, version 11.0. As a first step, the items of locus of control were subjected to factor analysis. The means, standard deviations, and factor loadings of items have been given in Table 1. The Pearson product moment correlations among the predictor variables and criterion variables have been presented in Table 2. Then a t-test comparison of the two groups was conducted between the subscales of SCL-90-R. Then hierarchical multiple regressions were used to examine predictors for three subscales of SCL-90-R namely depression, anxiety and Global Symptom Index as those three scales are more related with the trauma literature.

RESULTS

Locus of Control

Table 1: Means, Standard Deviations and Factor Loadings of Items

Factors and Items	Factor 1	Factor 2	Mean	SD
Factor 1: External Locus of Control				
Cronbach Alpha = .77 Var. Explained = 33,69 %				
8. What is going to happen will happen, no matter how hard you try to prevent it.	**,794**		3,56	1,19
7. What is going to happen to someone is due to his or her fate.	**,790**		3,44	1,14
3. The best way to solve problems is to wait in patience	**,702**	,312	3,14	1,29
9. God punished the people with the earthquake.	**,671**		2,20	1,33
1. The destructive results of natural disasters like earthquakes, floods or drought can not be prevented by some measures taken before.	**,549**	-,302	2,44	1,08
4. Getting what one wants in life has mostly to do with luck, not with efforts to achieve it.	**,530**		2,65	1,09
Factor 2: Internal Locus of Control				
Cronbach Alpha = .44 Var. Explained = 17,03 %				
6. What happens to me is my own doing.		**,706**	2,54	1,09
2. People can determine the course of their own lives.	-,325	**,702**	3,19	1,07
5. The average citizen can have an influence in government decisions.		**,567**	2,80	1,27
Cronbach Alpha = .56 Total Var. Explained= 50,72 %				

The responses to the 9 locus of control items were subjected to a factor analysis. Our criteria to determine the number of factors to rotate were: employing an eigenvalue of 1.00 and the scree test. The initial analysis resulted in 2 factors. Further, those two factors were rotated with a Varimax rotation procedure with a criterion of factor loading of .30. The rotated solution as shown in Table 1 yielded external locus of control and internal locus of control factors. External locus of control factor accounted for 33.7 % of the item variance, and internal locus of control accounted for 17.0 % of the item variance. Factor scores were simply the mean of the responses to items of the factors. External locus of control had Cronbach alpha reliability coefficient of .77 and internal locus of control had a coefficient of .44. Since internal locus of control factor was not found very reliable by the authors, it was not used in the further analysis.

As can be seen in Table 2, depression and anxiety symptoms and GSI are highly correlated with each other and with the following variables: Age, gender, years of education, previous life satisfaction, and days in disaster area, loss of life, and loss of property, external locus of control, positive life expectation and relocation.

Table 2: Pearson Correlation Coefficients of Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age																	
2. Gender	,125																
3. Marital status	,527**	,074															
4. Years of education	,007	,141	-,225**														
5. Previous life	,117	-,103	-,136	,536**													
6. Hazard experience	,117	-,002	,189*	-,238**	-,337**												
7. Which storey?	,032	-,102	-,191*	,252**	,315**	-,161*											
8. How many people?	-,079	-,075	,064	-,033	-,073	,168*	-,100										
9. Days in disaster area	-,041	,153	-,095	,474**	,241**	-,121	,049	-,028									
10. Loss of life?	-,059	-,162*	-,096	-,254**	-,101	,117	,014	,046	-,187*								
11. Loss of property?	,086	-,069	,122	-,321**	-,168*	,113	,074	,106	-,249**	,284**							
12. External locus of control	-,055	-,116	,210*	-,572**	-,363**	,192*	-,130	,054	-,496**	,206*	,267**						
13. Satisfaction with decisions and work of the government?	-,019	-,068	-,007	,013	-,053	-,104	-,053	-,109	-,099	-,045	-,136	,144					
14. A better life expectation?	-,218**	-,028	-,330**	,465**	,286**	-,223**	,221**	-,017	,414**	-,091	-,264**	-,383**	,056				
15. Relocation	,052	-,022	,241**	-,658**	-,483**	,235**	-,254**	,025	-,625**	,124	,240**	,534**	,151	-,536**			
16. DEPRESSION	-,214**	-,274**	-,066	-,349**	-,245**	,169*	-,039	,017	-,294**	,300**	,282**	,410**	-,092	-,264**	,268**		
17. ANXIETY	-,245**	-,217**	-,048	-,401**	-,308**	,119	-,078	,026	-,349**	,321**	,310**	,450**	-,112	-,247**	,413**	,852**	
18. GSI	-,280**	-,236**	-,090	-,389**	-,325**	,147	-,077	,013	-,320**	,317**	,294**	,464**	-,102	-,238**	,362**	,938**	,927**

* Correlation is significant at the 0.05 level, (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Comparison of the two groups' SCL-90-R scores

A t-test comparison of the two groups was used in order to examine the relocation effect on the symptom clusters. Table 3 displays the mean, standard deviations, and t values of the survivors of the earthquake. The results showed that the relocated group exhibited significantly higher symptoms than the non-relocated group in all subscales. The t values for each subscale were as: for somatization t(147)=5.79, p< .001; for obsessive/compulsive t(147)=2.27, p< .05; for interpersonal sensitivity t(147)=4.16, p< .001; for depression t(147)=3.37, p< .01; for anxiety t(147)=5.49, p< .001; for Hostility t(147)=3.32, p< .01; for phobic anxiety t(147)=4.89, p< .001; for paranoid t(147)=2.84, p< . 01; for psychoticism t(147)=3.87, p< .001; and for the global severity index t(147)=4.70, p< .001.

Table 3: Comparison of SCL-90-R Scores by Location

		Relocated (n=71)		Non-relocated (n=78)	
	t	M	SD	M	SD
Somatization	5.79***	1.38	.84	.67	.65
Obsess	2.27*	1.46	.86	1.15	.80
Interpersonal sensitivity	4.16***	1.41	.99	.81	.75
Depress	3.37**	1.47	.90	1.03	.71
Anxiety	5.49***	1.65	.95	.87	.77
Hostility	3.32**	1.30	.92	.85	.74
Phobic Anxiety	4.89***	1.19	.81	.60	.66
Paranoid	2.84**	1.17	.85	.79	.80
Psychoticism	3.87***	.93	.79	.50	.57
GSI	4.70***	1.37	.75	.84	.62

* p< .05; ** p< .01; *** p< .001.

Predictors of Depression, Anxiety, and GSI

Hierarchical multiple regression analyses were conducted to examine how well the predictor variables predicted depression, anxiety and GSI among earthquake survivors. Table 4 displays the standardized regression coefficients (β), R^2, and R^2 Change after each block of regression analysis.

The predictors entered into regression analyses were classified into blocks. The first block consisted of pre-trauma factors and demographics namely previous life conditions (0=hard, 1=moderate, 2=comfortable), previous hazard experience (0=no, 1=yes), age, gender (1=female, 2=male), marital status (1=single/widowed/divorced, 2=married) and years of education.

The second block consisted of variables related to the conditions of the earthquake moment and post-earthquake variables, namely loss of life of a significant one (0=no, 1=yes), loss of property, relocation (1=non-relocated, 2=relocated), on which storey they experienced the earthquake, duration of stay in the disaster area, and the number of the people they were together at the time of the earthquake.

Finally the third block consisted of cognitive and personal variables, namely external locus of control, satisfaction with the decisions, rescue and damage evaluation work of the government (1=not satisfied at all, 5=very much satisfied) and a better life expectation (0=no, 1=yes) were entered.

Table 4: Predictors of Depression, Anxiety and GSI

		Depression		Anxiety		GSI	
Block	Variable	R^2 Change	β	R^2 Change	β	R^2 Change	β
1		.23***		.25***		.28***	
	Previous Life		-.08		-.13		-.16
	Hazard Experience		.11		.03		.06
	Age		-.16		-.20*		-.21*
	Gender		-.22**		-.16*		-.18*
	Marital Status		-.06		-.02		-.06
	Years of Education		-.26**		-.30**		-.28**
2		.07*		.12**		.09**	
	Previous Life		-.08		-.09		-.13
	Hazard Experience		.11		.02		.06
	Age		-.21*		-.25**		-.26**
	Gender		-.20*		-.14		-.17*
	Marital Status		-.01		.00		-.03
	Years of Education		-.11		-.04		-.06
	Loss of Life		.14		.18*		.17*
	Loss of Property		.17		.18*		.17*
	Relocation		-.02		-.24*		-.16
	Which storey?		.00		.00		.00
	Days in Disaster		-.12		-.07		-.08
	How many people		-.09		-.07		-.10
3		.06**		.06**		.07**	
	Previous Life		-.08		-.10		-.14
	Hazard Experience		.08		-.02		.03
	Age		-.18*		-.21*		-.22*
	Gender		-.22*		-.16*		-.18*
	Marital Status		-.08		-.04		-.08
	Years of Education		.01		.08		.07
	Loss of Life		.13		.16*		.15*
	Loss of Property		.12		.13		.13
	Relocation		.02		-.26*		-.15
	Which storey?		.00		-.02		-.02
	Days in Disaster		-.04		-.02		-.01
	How many people		-.10		-.08		-.11
	Ext. Locus Control		.26**		.25**		.30**
	Satisfaction		-.13		-.20*		-.18*
	A better life expect.		-.15		-.02		-.05

* p< .05; ** p< .01; *** p< .001.

Table 4 shows the predictors of the depression, anxiety and GSI. All three blocks significantly predicted depression among the earthquake survivors; for the first block R^2= .23 and $F(6,142)$=6.96, p< .001, for the second block R^2= .30 and $F(6,136)$=2.35, p< .05, and for the third block R^2= .36 and $F(3,133)$=4.42, p< .01. Using all factors in the model, 36% of the variance in depression was explained.

The results showed that all three blocks also significantly predicted anxiety among earthquake survivors; for the first block R^2= .25 and $F(6,142)$=7.92, p< .001, for the second block R^2= .37 and $F(6,136)$=4.25, p< .01, and for the third block R^2= .43 and $F(3,133)$=4.66, p< .01. Using all factors in the model 43% of the variance in anxiety was explained.

Finally, the results also showed that all of the three blocks significantly predicted GSI among earthquake survivors; for the first block R^2= .28 and $F(6,142)$=9.01, p< .001, for the second block R^2= .37 and $F(6,136)$=3.40, p< .01, and for the third block R^2= .44 and $F(3,133)$=5.73, p< .01. Using all factors in the model 44% of the variance in GSI was explained.

DISCUSSION

Our results as shown in Table 4 revealed that younger aged, female and external locus of control predicted depression, anxiety and GSI; "loss of life" and the grade of "satisfaction with governmental politics" predicted anxiety and GSI, and finally relocation predicted anxiety.

Our finding that younger age predicted depression, anxiety and GSI corresponded with some results of disaster research (Fullerton et al., 2004; Norris, 1992), but they were contradictory to the results of Turkish earthquake studies (Rüstemli & Karancı, 1996; Şalcıoğlu et al., 2003). Our study was conducted in an earlier period after the earthquake than those Turkish studies. This implies that the effects of age on psychological distress may change over time following disasters (Kato, Asukai, Miyake, Minakawa, & Nishiyama, 1996). In other words, older people may have some social competences of coping with the burdens of disasters. However, if these competences cannot be put into practice due to lack of appropriate circumstances in a long-term post-disaster period, the elder may be adversely affected.

Our gender-specific result that being female predicted depression, anxiety and GSI is in the line with the results of previous studies (Anderson & Manuel 2005; Başoğlu et al., 2004; Breslau et al., 1997; Liu et al., 2006; Montazeri et al., 2005; Norris et al., 2002; Şalcıoğlu et al., 2003; Ticehurst et al., 1996; Tural et al., 2004). However, this does not necessarily mean that women in general have a social disposition for a harmful event like earthquake. Gender-specific psychological vulnerability or the severity of psychological distress reactions in males and females should be compared in a wider model that includes at least the life history, especially the experienced psychologically harmful or traumatic events, socialization practices of behavior development in the childhood, social factors of personal resource development and psychological factors of coping strategies (Gavranidou & Rosner, 2003).

Special attention should be paid to the "external locus of control" which was significantly related (at a level of $p<.01$) to depression, anxiety and GSI scores in our study. The impact of "locus of control" on psychological distress after an earthquake has hardly been the subject of previous studies. The studies containing different samples and scales used were conducted either on clinical drug trials or veterans or on other traumatic events than earthquake: Kennedy, Lynch, and Schwab (1998) have found no significant differences between the Levenson's internal locus of control scale scores of adult patients (18-65) with six DSM-III-R diagnoses and the control group. The powerful others and chance scales scores of patients with major depression, social phobia or mixed anxiety depressive disorder were significantly higher than the control group. McKever, McWhirter, and Huff's study (2006) on US Vietnam veterans showed that that the internal locus of control significantly contributed in a reverse direction to the explanation of variance in PTSD. Due to the results of other studies, internal locus of control was significantly a predictor of the development of posttraumatic stress disorder symptoms after the birth by women from childbirth education classes (Soet, Brack, & DiIorio, 2003), firefighters with lack of personal control were more likely to experience higher levels of depression and posttraumatic stress symptoms subsequent to exposure to traumatic events on the job (Regehr, Hill, & Glancy, 2000). Spinal cord injury patients used significantly more external locus of control than the control group. Internal locus of control predicted in a reverse direction re-experiences and avoidance symptoms, powerful others predicted only re-experience symptoms (Chung, Preveza, Papandreou, & Prevezas, 2006).

Satisfaction with the decisions, rescue and damage evaluation work of the government concerning the people affected by the earthquake was another predictor for anxiety and GSI. This is a new finding in the disaster research. More than the half of respondents (58%) were either "not satisfied at all" (28%) or "not satisfied" (30%) with the governmental work and decisions and another 30% found them "normal". The so called "silent society" was not silent in giving responds against the governmental practice and 80% of the unsatisfied respondents gave the reasons for their dissatisfaction as follows: 1. the assessment work related to damaged houses and buildings. The respondents frequently complained either about the incompetence of

appointed staff or about the fact that the damage reports were changed in one's favour when they found "the right person".2. The "incompetence" of the government/state to come to the rescue rapidly and effectively 3. Bureaucratic hindrances to get help 4. The late clearing-up operations and 5. the unfair distribution of aid.

"Loss of life" significantly predicted ($p<.05$) anxiety and GSI in our study. This result is in line with the results of previous studies.

Our results as shown in Table 2 revealed that the scores of the three subscales of SCL-90-R; depression, anxiety and GSI correlated positively with relocation. This finding was supported by the t-test results that included the comparison of the relocated and non-relocated groups (Table 2). The relocated group scored significantly higher than the non-relocated group on all of the subscales of SCL-90-R. Despite the paucity of studies about the effects of relocation after disasters, our findings are in line with those few relocation studies that do exist (Watanabe et al., 2004; Bland et al., 1997; Laor, Wolmer, & Cohen, 2001; Kılıç et al., 2006; Najarian et al., 2001).

The reasons behind the higher distress of the relocated survivors may be multifarious. First of all, relocation itself may serve as a distressing factor. Since relocated survivors have to adapt themselves to a new city, new surrounding, new workplaces, loss of daily family routines, etc., they have to not only deal with the loss and trauma after the disaster, but also they have to adapt themselves to new life settings. A second factor may be about the disruption of the social network (Bland et al, 1997). Social connections between friends, relatives, colleagues, and neighbors may serve as a resource for social support, which plays an important role on buffering of stress, but relocated survivors may lack such important support resources (Kaniasty & Norris, 1995). Finally, the third factor of higher distress may stem from the effects of social comparison in the new social environment after the relocation. Social comparison usually affects the personal self-regulation and self-esteem and those contribute to the construction and expression of one's self-regard. To be forced to reconstruct or to modify existing subjectivities in light of decreasing and undermined self-esteem may cause an additional distress for a victimized person.

Limitations and Conclusions

The limitations of this study should be taken into consideration. First, the non-relocated and relocated groups were not completely equal in terms of education, job, and marital status. This may raise questions about the comparability. We should have compared two similar groups, but this was not feasible under the circumstances of the earthquake. Secondly, the timing of data collection was not equal for all the participants. Despite these limitations, it is assumed that our study provides valid results about the predictors of psychological distress.

Our results suggest that the relief organizations should pay special attention to younger and female survivors as the primarily risk groups by allocation of social and psychological aid. Social and psychological intervention programs should be developed in accordance with survivors' needs. Since the relocated survivors are at higher risk for psychological distress, survivors should not be relocated if possible and the supporting aid should be provided in the site of the disaster. If relocation is unavoidable, the probable adverse effect of relocation must be taken into consideration by the authorities, and the duration of relocation must be kept as short as possible. The mental health professionals should help survivors in creating and maintaining social networks in the relocation locality in order to expedite the reconstruction process of daily life in which they might feel secure.

"External locus of control" is significantly related with depression, anxiety and GSI scores in our study, but there are also contradictory results in the previous disaster literature. Therapeutic techniques that alter the external locus of control may be helpful in decreasing depression, anxiety and GSI, but there is certainly a need for locus of control outcome studies in disaster, especially in earthquake research to evaluate the effects of external locus of control on

psychological distress. Satisfaction with the decisions, rescue and damage evaluation work of the government is another predictor for anxiety and GSI. Although this is a new finding in the disaster research, it should be proved through further studies, and should be discussed in a more specific context. The "incompetence" of the government in its mentioned context by the survivors can not be the subject of this study, but encouragement of the survivors to participate in the decision making processes may make them feel more fairly treated; in turn, this may decrease the psychological distress.

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