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Single-Session Behavioral Treatment of Earthquake-Related Posttraumatic Stress Disorder: A Randomized Waiting List Controlled Trial

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In an attempt to develop a brief treatment for disaster survivors, the present study examined the effectiveness of a single session of modified behavioral treatment in earthquake-related posttraumatic stress disorder. Fifty-nine earthquake survivors in Turkey were randomized into either single-session modified behavioral treatment (SSBT) designed to enhance sense of control over earthquake-related fears or waiting list control condition (WL). The WL group received SSBT after a second baseline assessment. Follow-ups were at weeks 6, 12, 24, and at 1–2 years posttreatment. Significant treatment effects were found on all measures at posttreatment. The improvement rate was 49% at week 6; it rose to 80% by week 12, 85% by week 24, and 83% by the 1–2-year follow-up. Brief behavioral treatment has promise as a cost-effective intervention for disaster survivors.

Growing recognition of the extent of mental health consequences of mass trauma events such as natural disasters, wars, mass terrorism, and political violence has led to an increasing awareness among care providers of the need for brief psychological treatments. Such need is highlighted by the 2004 tsunami disaster in Asia, which exposed tens of millions of people to severe trauma. To qualify as suitable for postdisaster circumstances, a treatment needs to be brief and proven effective, culturally relevant, and suitable for cost-effective dissemination through other media such as self-help manuals; in addition, training professionals in its delivery must be easy. Among available treatments, cognitive-behavioral treatment (CBT) is most successful in meeting these requirements. CBT is regarded as the treatment of choice in posttraumatic stress disorder (PTSD) (Ballenger et al., 2000). However, because it is usually delivered in about 10 sessions, it is still not sufficiently brief for use after large-scale disasters. Some researchers (Goenjian et al., 1997) have examined the usefulness of a six-session intervention that included a variety of cognitive and behavioral techniques with child survivors of earthquakes and reported improvement in PTSD but not in depression. Briefer versions of CBT have not yet been tested for chronic PTSD.

The present report is based on a project that we established in Turkey to provide psychological care for the survivors of the 1999 earthquakes. Faced with a high rate of chronic PTSD (43%) in the community (Başoğlu, Şalcıoğlu, & Livanou, 2002), we conducted a series of studies to develop a briefer version of CBT. In an open clinical trial that involved 231 survivors who had chronic PTSD (Başoğlu, Livanou, Şalcıoğlu, & Kalender, 2003b), a modified version of CBT with a focus on enhancing sense of control over earthquake-related fears significantly

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reduced PTSD in 76% of the survivors after one session and in 88% after two sessions. These results were supported by a further pilot study (Başoğlu, Livanou, & Şalcıoğlu, 2003a) that showed that a single session of exposure to artificial tremors in an earthquake simulator was highly effective in reducing PTSD.

The present study, conducted approximately 3 years after the earthquake in Turkey, tested the effectiveness of a single session of modified behavioral treatment that used a waiting list control group. The need to reduce the treatment to a single session arose from the fact that many survivors could not attend treatment more than once because of difficult postdisaster circumstances, survival problems, and increased demographic mobility. The study tested the hypothesis that modified behavioral treatment can be effectively delivered in a single session.

Method

Sample

The study was conducted as part of an outreach mental health care delivery program that we implemented in 15 project sites after the earthquake that occurred in Turkey on August 17, 1999. The participants were recruited from two housing sites (Site I and Site II) built for about 8,000 homeless adult survivors and from among self-referrals to our community care center in the epicenter region (Site III).

A two-tiered approach was used in sampling from Site I and Site II. First, a total of 500 households from Site I and Site II were consecutively screened for PTSD, using the Traumatic Stress Symptom Checklist (TSSC; Başoğlu et al., 2001), and those who had a TSSC score higher than 20, were literate, and were 16–65 years old were identified for further assessment. Next, these survivors were contacted again to determine their suitability for the trial. Those who met the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV), diagnosis of PTSD according to a structured clinical interview for PTSD were offered participation in the study. Exclusion criteria were alcohol or drug dependence, severe depression with suicidal intent, psychotic illness, predominating grief, use of benzodiazepines, use of a stable dose of antidepressants for less than 2 months at the time of assessment, and previous CBT for earthquake-related traumatic stress problems. This process yielded 63 people suitable for the study. A further 6 survivors were recruited from among 31 consecutive self-referrals to Site III. Written informed consent was obtained from all participants. The study was conducted between February 2002 and January 2004.

Study Design

Of the 69 people who were found eligible for the study throughout the trial, 59 were randomly assigned to either the single-session modified behavioral treatment (SSBT; $n = 31$) or waiting list control (WL; $n = 28$) condition. Whenever a participant was not available for the second assessment ($n = 10$), she or he was replaced by the next eligible individual. The survivors in the SSBT condition received a single 1-hour session of modified BT and were followed up at weeks 6, 12, and 24. The WL controls were given the same treatment 6 weeks after trial entry, after a second baseline assessment, and followed up at 6, 12, and 24 weeks posttreatment. Although it was not part of the original study design, attempts were made to follow up the trial completers 1 to 2 years post treatment ($M = 1.2$ years; $SD = 0.15$, range = 1.0–1.7).

Random allocation was conducted according to a computer-generated randomization list. Blocking was used to ensure approximately equal cell sizes. The participants were recruited into the study by four independent assessors, who did not have access to the random assignment schedule. The latter was implemented by the project coordinator (E.Ş.), who did not take part in the assessments at any stage during the trial.

Sample Size

A power analysis was conducted to determine the sample size. On the basis of findings from our previous treatment study (Başoğlu et al., 2003b), we expected an improvement rate of 55% in the SSBT group. In the latter study, the TSSC data on 85 survivors who had PTSD and who were assessed twice in 1 month before they received treatment had shown 15% reduction in their PTSD symptoms. Accordingly, the expected rate of recovery in the WL group was set to 15%. On the basis of these figures, the cell size required to detect a between-groups difference significant at the .05 level with a degree of certainty of .90 was 24.

Blinding

The assessments were conducted by four independent assessors (three psychologists and one psychiatrist), who were blind as to the participants' experimental condition. A Blindness Integrity Assessment Form was used to elicit information about whether assessor blindness was

maintained at the second assessment and the assessor's guess as to the study participant's experimental condition.

Study Measures

The assessor-rated measures included the Semi-Structured Interview for Survivors of Earthquake (Şalcıoğlu, 2004), which yields information on demographic and trauma characteristics; the Major Depressive Episode (MDE) module of the Structured Clinical Interview for DSM-IV (SCID-I/NP, Version 2; First, Spitzer, Gibbon, & Williams 1996); the standardized Turkish version (Aker et al., 1999) of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1996); and the Clinician's Global Impression–Improvement (CGI; Marks et al., 1993; Marks, Lovell, Noshirvani, Livanou, & Trasher, 1998). The self-rated measures included the TSSC (Başoğlu et al., 2001), Fear and Avoidance Questionnaire (FAQ; Başoğlu et al., 2003a), Beck Depression Inventory (BDI; Beck, Rial, & Rickels, 1974), Work and Social Adjustment Scale (WSA; Marks et al., 1998), and Patient's Global Impression—Improvement (Marks et al., 1993; Marks et al., 1998).

The TSSC assessed 17 PTSD and 6 depression symptoms in the last week, all rated on an intensity scale (0 = *not at all bothered*, 3 = *very much bothered*). This scale was specifically designed for earthquake survivors and validated in Turkey. When the diagnosis of PTSD was based on a cutoff point of 25 in the total scores of the 17 PTSD items, the scale showed sensitivity of .81 and specificity of .81. The overall correct classification rate was 81%. Similarly, a diagnosis of MDE based on a cutoff point of 38 in the total scores of the 23 TSSC items yielded sensitivity of .83 and specificity of .73. The overall correct classification rate was 77%.

The FAQ included 35 self-rated items measuring the current level of difficulty (or avoidance) in conducting various activities (e.g., entering buildings) that evoke earthquake-related fears (0 = *no difficulty/avoidance*, 3 = *extreme difficulty/avoidance*). Both the FAQ and the TSSC showed adequate sensitivity to clinical change in previous treatment studies (Başoğlu et al., 2003a; Başoğlu et al., 2003b).

The CGI and Patient's Global Impression—Improvement were rated on a 1–7 scale (1 = *very much improved*, 2 = *much improved*, 3 = *slightly improved*, 4 = *no change*, 5 = *slightly worse*, 6 = *much worse*, 7 = *very much worse*). Both scales referred to global improvement since the treatment session and thus required a comparison between the present psychological state and that before treatment.

Each baseline assessment lasted about 2 hours and the follow-up assessment about 45 minutes. The assessors were standardized in their ratings through an interrater reliability exercise based on five videotaped and five live interviews (concordance rate of 90%).

Treatment

Treatment employed a shorter version of CBT, which was modified by (1) limiting cognitive interventions to the explanation of the treatment rationale only, (2) focusing on reduction of fear and avoidance, and (3) shifting focus from habituation to anxiogenic stimuli to enhancement of sense of control over traumatic stressors. A treatment focus on fear and avoidance was based on evidence (Başoğlu et al., 2002; Başoğlu, Kılıç, Şalcıoğlu, & Livanou, 2004; Şalcıoğlu, Başoğlu, & Livanou, 2003) that fear is the most important mediating factor in earthquake-related PTSD.

The first step in treatment (10 minutes) involved identification of the presenting problems, which often included fear of earthquakes, behavioral avoidance of earthquake reminders, reexperiencing, and hyperarousal. The second step (30 minutes) consisted of an explanation of the treatment rationale. The treatment focus was on increasing sense of control over earthquake-related fears, distressing trauma reminders, and associated emotional and/or behavioral responses (e.g., confront your fear/distress until you feel you can control and overcome it) rather than habituation to trauma reminders (e.g., remain in the situation until your anxiety subsides). For example, fear was personified by presenting it as an adversary that required fighting back. A choice had to be made between surrendering to fear and defeating it. Avoidance meant surrender, and the consequence would be living the rest of one's life in fear and helplessness. The most effective way of defeating fear would be to confront it until one felt in control.

The third and final step (20 minutes) involved treatment target setting and self-exposure instructions. The treatment targets involved four of the most functionally disabling problems, such as avoidance of being in safe buildings, staying home alone, sleeping in the dark, taking a shower, and going near sites of devastation or rubble or other such trauma reminders. Once agreement was achieved on the targets, self-exposure instructions were given. The survivors were instructed about the ways they should conduct exposure and deal with commonly encountered problems during treatment. No systematic cognitive restructuring was undertaken during treatment. In an effort to limit the survivors' expectations from treatment to a single session, they were informed that they would receive only one treatment session from their therapist and subsequent contacts would be with a different staff

member and only for assessment. The whole session took about 60 minutes. The assessors refrained from giving further exposure instructions during follow-up and answered questions about treatment by saying, "Follow your therapist's instructions."

Treatment was delivered by two psychologists (E.Ş. and D.K.) who were trained by the main author. Nineteen of the treatment sessions could be audiotaped; all of them were assessed for compliance with the treatment protocol and rated as satisfactory.

Data Analyses

To be eligible for analysis, the participants needed to have at least one follow-up assessment after treatment. Between-groups treatment effects were examined at the first follow-up assessment for the SSBT group (week 6) and at the second baseline assessment for the WL group by using repeated measures analysis of variance (ANOVA). As the same study design was used for the WL group after they received treatment, the two groups were pooled for analysis of longer-term treatment outcome. The second assessment for the WL group was taken as their pretreatment baseline. Within-group treatment effects were tested at each follow-up point by using repeated measures ANOVA. Treatment effect sizes were computed by dividing the mean change in a clinical rating by the standard deviation of the change. All other between-group comparisons were made by using chi-square tests for categorical and two-tailed t-tests for continuous variables. A multiple regression analysis examined the factors related to treatment outcome.

As a result of case attrition after week 6, two types of end-point imputation analyses were carried out. First, the treatment effects were examined at each follow-up, carrying forward the scores of the nonimproved noncompleters at their last available assessment to subsequent follow-up points. As this procedure did not involve the improved noncompleters and assumed that the nonimproved noncompleters would have remained nonimproved had they stayed in the study, it led to a conservative analysis of the treatment effects. However, the second type of end-point imputation, use of the *last assessment available* for each case as the final follow-up point for that case, included both improved and nonimproved noncompleters.

Results

Flow of Participants

Figure 1 shows the flow of participants into the study in accordance with the Consolidated Standards of Reporting Trials (CONSORT) statement (Altman et al., 2001). Of the 879 people who were screened for PTSD, 310 were suitable for assessment. Of these, 130 (42%) either were unavailable for further contact or refused further assessment. These survivors were not different from the 180 who were assessed in their total TSSC scores and demographic, personal history, and trauma characteristics. Similarly, among the people who had a full assessment, the 35 survivors who were excluded on grounds of severe depression, unavailability for follow-up assessments, and refusal to participate did not significantly differ from those recruited in the study on any characteristic. In addition, the 10 people who were lost to the first follow-up assessment after trial entry (and thus were ineligible for analysis) were similar to the study participants in their pretreatment characteristics. Finally, the 6 self-referred individuals did not significantly differ from those who were recruited from the community on any pretreatment variable.

Sample Characteristics

The SSBT and WL groups were similar in every baseline variable, except gender; there were fewer men in the latter group (8 vs. 1), $\chi^2\,(1, N = 59) = 4.04$, $p < .05$. The mean age in the entire sample was 36.3 ($SD = 11.5$). Fifty (84.7%) of the study participants were women, and 48 (81.4%) were married. The preponderance of women in the sample reflected the fact that the rates of PTSD in the community were three times higher in women than in men (Başoğlu et al., 2004). In addition, the assessments for suitability at the study sites were conducted in daytime, when most men were at work. Twenty-four participants (40.7%) had primary school education, 14 (23.7%) had secondary school, 18 (30.5%) had high school, and 3 (5.1%) had university education. Thirty-seven (62.7%) survivors had previous trauma experience, which included road traffic accidents, fire, and floods.

The extent of damage to the home was reported as moderate to severe (uninhabitable) in 33 (55.9%) and reduced to rubble in 12 (20.3%). Twelve (20.3%) survivors were trapped under rubble, 23 (39%) suffered varying degrees of physical injury, three (5.1%) lost at least one first-degree relative, and 41 (69.5%) lost at least a second-degree relative or a friend. Eleven (18.6%) survivors participated in rescue work. The mean time since the earthquake was 3 years ($SD = 0.3$) at first assessment.

Treatment Effects

Table 1 shows the mean clinical ratings at each assessment time (pretreatment vs. week 6 assessment) by

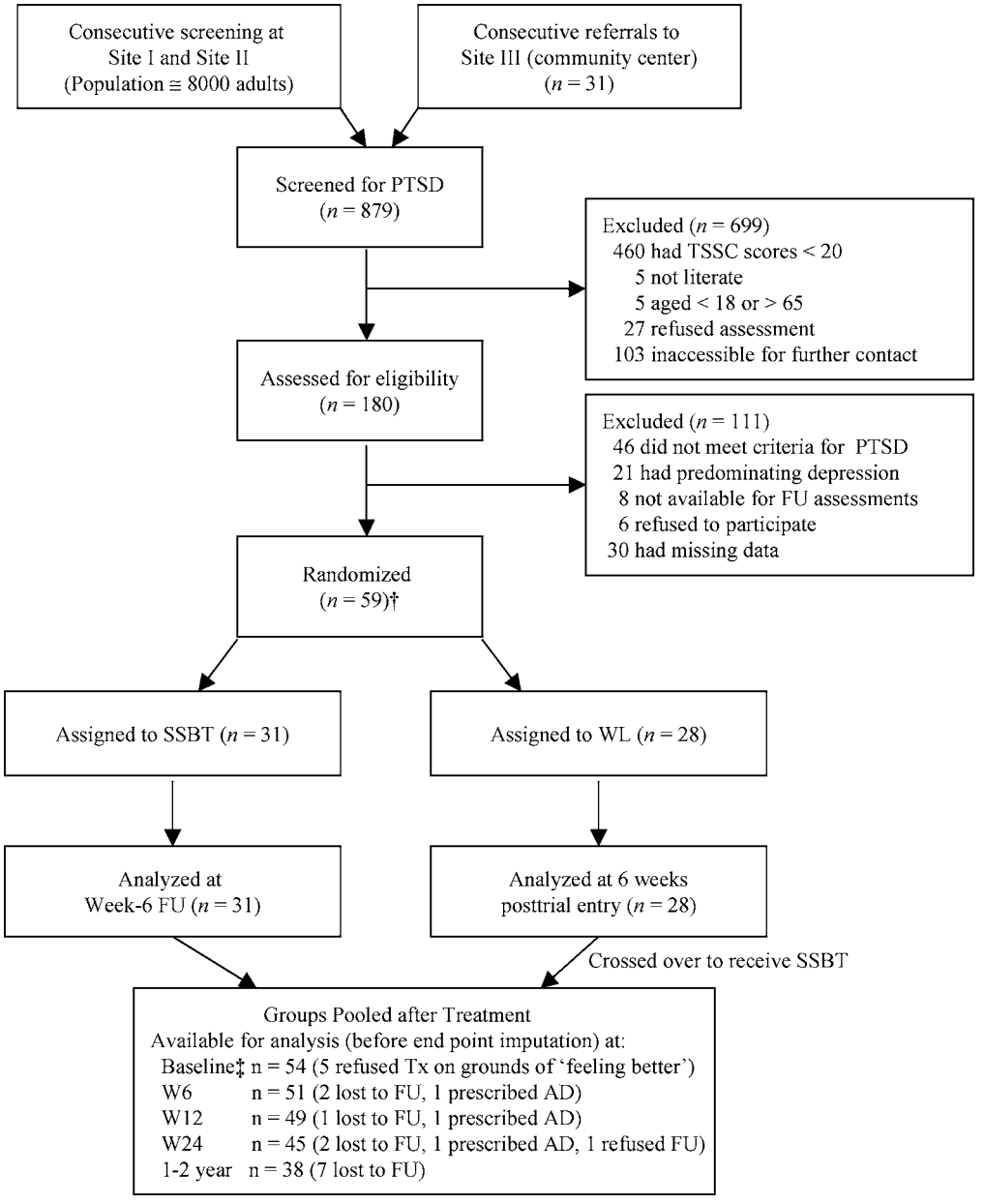

Fig. 1. CONSORT diagram showing the flow of participants through each stage of the study. TSSC = Traumatic Stress Symptom Checklist; FU = follow-up; SSBT = single-session behavioral treatment; WL = waiting-list control; Tx = treatment; AD = antidepressant drug. †Ten (8 WL, 2 SSBT) individuals recruited as replacement for those who were not available for follow-up after the first assessment; ‡Second assessment 6 weeks post trial entry taken as pretreatment baseline for the WL group.

treatment type (SSBT vs. WL), interaction effects (repeated measures ANOVA), within-group treatment effects (paired *t*-tests), and the effect sizes. The between-group comparisons were significant on all measures. The largest effect sizes were noted on the CAPS, TSSC, and FAQ, suggesting that the treatment was particularly effective in reducing PTSD and fear/avoidance symptoms during the first 6 weeks. The effect sizes in the SSBT group were substantially larger than those in the WL group. According to the CGI, 17 people (54.8%) in the SSBT group, as opposed 4 (14.3%) in the WL group, showed much/very much improvement, $\chi^2(1, N = 59) = 8.86$, $p < .01$; odds ratio (OR) = 7.3, 95% CI = 2, 26. The respective figures for Patient's Global Impression—Improvement were 14

Table 1. Comparison of Single-Session Behavioral Treatment ($n = 31$) and Waiting List Control ($n = 28$) Groups in Clinical Outcome at Second Assessment Six Weeks After Trial Entry

	First Assessment		Second Assessment[a]		Between-Groups Effect		Within-Group Change		
Measures	*M*	*(SD)*	*M*	*(SD)*	*df*	*F*	*df*	*t*	Effect Size[b]
CAPS (0–136)									
SSBT	67.8	(16.5)	44.4	(25.0)	1, 57	14.0***	30	7.0***	1.3
WL	60.5	(14.1)	54.7	(21.4)			27	1.8	0.3
TSSC									
SSBT	42.0	(12.0)	25.3	(15.0)	1, 57	9.1**	30	8.0***	1.4
WL	39.9	(11.0)	32.6	(13.5)			27	3.2**	0.6
FAQ (0–105)									
SSBT	58.3	(19.7)	32.7	(24.5)	1, 57	8.7**	30	7.6***	1.4
WL	59.4	(18.1)	48.7	(18.0)			27	2.8**	0.5
BDI (0-63)									
SSBT	22.0	(9.8)	15.1	(11.4)	1, 57	4.8*	30	4.8***	0.9
WL	18.6	(8.8)	16.1	(9.5)			27	1.8	0.3
WSA (0-8)									
SSBT	3.9	(1.9)	2.4	(2.4)	1, 57	4.0*	30	4.0***	0.7
WL	3.2	(1.9)	2.7	(1.6)			27	1.7	0.3

SSBT = Single-session behavioral treatment; WL = waiting list controls; CAPS = Clinician-Administered PTSD Scale; TSSC = Traumatic Stress Symptom Checklist; FAQ = Fear and Avoidance Questionnaire; BDI = Beck Depression Inventory; WSA = Work and Social Adjustment.

[a] Second assessment corresponds to the posttreatment follow-up at week 6 for the SSBT group and to the second baseline assessment for the WL group.

[b] Mean change/SD of the change.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

(45.2%) and 4 (14.3%), $\chi^2(1, N = 59) = 5.24$, $p < .05$; $OR = 4.9$, 95% $CI = 1.4, 17.7$.

The significant improvement on the TSSC and FAQ in the WL group reflected in part the presence of four markedly improved survivors who had carried out self-instigated exposure during the waiting period. When marked improvement during the waiting period was noted in these people, they were interviewed at second assessment to examine possible causes. Two survivors stated that the first assessment helped them to recognize their fear-related problems as symptoms and encouraged them to do something about them. Discovering that confronting their fear helped them to overcome it, they started regular exposure exercises. For the other two people, a change in their life circumstances, such as having to travel in or out of town or being relocated from a prefabricated house in a survivor camp to a flat in a concrete block of apartments, necessitated exposure to the situations they feared and avoided.

Analysis of Treatment Outcome in Pooled Groups

A comparison of the SSBT and WL groups revealed no significant differences in their pretreatment or change scores from baseline to subsequent follow-up assessments. The flow of participants in the pooled groups is shown in Figure 1. Of the 13 noncompleters, only 4 had not improved in terms of the Patient's Global Impression–Improvement at their last available assessment.

Table 2 shows the mean clinical ratings, mean change scores, within-subjects contrasts testing change from baseline to each subsequent time point, linear and quadratic trends, percentage of improvement, and effect sizes at each follow-up. The pre- to posttreatment change in all measures was highly significant at all time points. Although the clinical ratings showed continuing improvement until the 1- to 2-year follow-up, the greatest percentage of improvement (ranging from 51% to 67% on the five measures) occurred by week 12. The effect sizes for CAPS, TSSC, and FAQ were almost twice those for BDI and WSA at week 6. The latter reached the clinically meaningful level of 1 at subsequent follow-up points, suggesting that improvement in depression and social disability followed the reduction in fear/avoidance and PTSD symptoms. The finding that improvement occurred in all measures suggested a 'patholytic' effect of treatment.

The linear and quadratic trends were significant on all the measures. The linear and quadratic F values were, respectively, 89.62 and 64.06 for the CAPS, 127.71 and 49.45 for TSSC, 135.80 and 90.27 for FAQ, 43.31 and 19.51 for BDI, and 89.62 and 64.06 for WSA (all *df*'s = 1, 38). All F values were significant at the $p < .001$ level. The significant quadratic trends reflected the fact that much of the reduction in the scores occurred by week 6

Table 2. Repeated Measures Analysis of Variance of Treatment Outcome in Pooled Groups ($N = 51$): Mean Scores (*SD*) at All Assessments, Within-Subjects Contrasts, Percentage of Improvement, and Effect Sizes

Measures and Assessment Points	*n*	*M*	*SD*	Mean Change Score	*SD*	Within-Subjects Contrasts[a] *F*[b]	PI[c]	Effect Size[d]
CAPS (0-136)								
Baseline	51	64.8	17.0					
Week 6	51	41.5	22.2	23.3	18.4	54.9***	36	1.3
Week 12	50	30.4	24.8	34.5	23.0	74.8***	53	1.5
Week 24	47	25.8	25.9	38.8	23.4	94.1***	60	1.7
1- 2-year FU	42	27.1	26.8	37.5	23.3	92.4***	58	1.6
Last available FU	51	26.5	24.8	38.4	22.5	147.1***	59	1.7
TSSC (0-69)								
Baseline	51	39.4	12.1					
Week 6	51	23.8	13.3	15.6	12.1	67.9***	40	1.3
Week 12	50	17.7	14.3	21.6	13.1	93.9***	55	1.7
Week 24	47	14.5	14.9	25.4	14.3	111.5***	63	1.8
1- 2-year FU	42	13.1	16.1	25.6	13.6	132.0***	67	1.9
Last available FU	51	13.0	14.9	26.4	13.4	198.8***	67	2.0
FAQ (0-105)								
Baseline	51	56.2	17.7					
Week 6	51	31.5	20.9	24.8	17.9	81.4***	44	1.4
Week 12	50	22.4	21.6	33.8	19.2	126.1***	60	1.8
Week 24	47	18.8	23.2	38.1	21.0	129.4***	67	1.8
1- 2-year FU	42	17.7	24.5	39.3	20.0	141.5***	69	2.0
Last available FU	51	17.4	22.9	38.8	20.5	183.1***	69	1.9
BDI (0-63)								
Baseline	51	20.4	9.6					
Week 6	51	13.7	9.8	6.7	7.6	35.8***	33	0.9
Week 12	50	10.6	11.2	9.8	10.4	27.7***	48	0.9
Week 24	47	10.1	11.6	11.0	9.2	48.2***	51	1.2
1- 2-year FU	42	8.4	12.1	12.0	10.6	48.1***	59	1.1
Last available FU	51	8.4	11.5	12.0	10.1	73.0***	59	1.2
WSA (0-8)								
Baseline	51	3.4	1.8					
Week 6	51	2.1	2.1	1.4	1.7	22.7***	38	0.8
Week 12	50	1.6	2.0	2.0	2.0	30.9***	53	1.0
Week 24	47	1.2	2.0	2.3	1.9	50.3***	65	1.2
1- 2-year FU	42	1.2	2.0	2.3	2.0	45.8***	65	1.1
Last available FU	51	1.2	1.9	2.3	1.9	71.5***	65	1.2

Note. For noncompleters after week 6, scores at last assessment carried forward for only those who were nonimproved. The analyses involving "Last available FU" include both improved and nonimproved individuals at their last available assessment.

CAPS = Clinician-Administered PTSD Scale; TSSC = Traumatic Stress Symptom Checklist; FAQ = Fear and Avoidance Questionnaire; BDI = Beck Depression Inventory; WSA = Work and Social Adjustment; FU = Follow-up.

[a] All contrasts test change from baseline. Repeated measures analysis of variance conducted separately for change from baseline to last available FU.

[b] All *df*'s for within-subjects contrasts = 1, 38, except the contrast involving last available FU, in which all *df*'s = 1, 50.

[c] Percentage of improvement.

[d] Based on mean change score divided by *SD* of the change.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

and week 12, with relatively less additional improvement thereafter.

The results on the global ratings of outcome were consistent with the findings indicated. Figure 2 shows the improvement trend over time on Patient's Global Impression—Improvement. The improvement rate was 49% at week 6, 80% by week 12, 85% by week 24, and 83% by the 1- to 2-year follow-up. Although the proportion of much/very improved individuals remained fairly stable after week 12, those in the very much improved category showed a twofold increase from week 12 to 1- to 2-year follow-up. Thus, the survivors not only maintained their early treatment gains over time but also continued to improve further. CGI (not shown in Figure 2) showed slightly higher rates of improvement: 55% at week 6, 80% by week 12, 87% by week 24, 88%

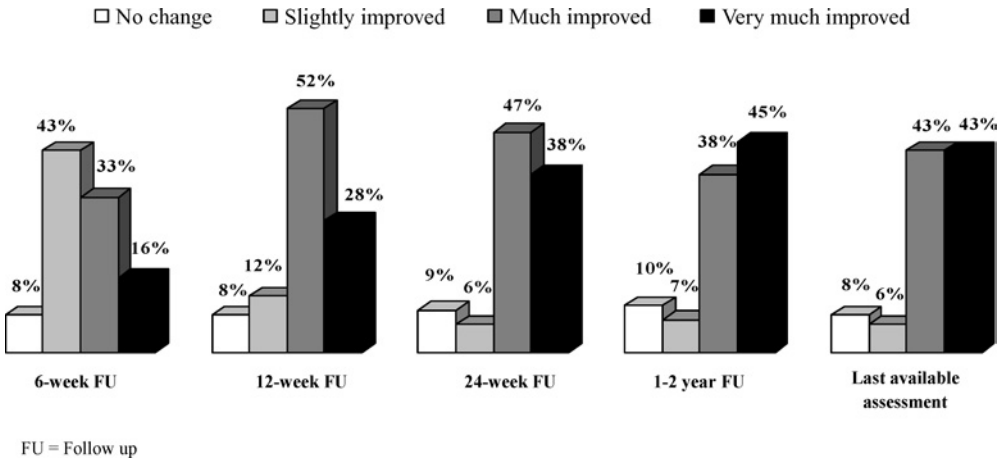

Fig. 2. Patient's Global Impression—Improvement Ratings at follow-up.

by the 1- to 2-year follow-up, and 90% at last available assessment. Thus, the patients' ratings provided a more conservative measure of global improvement.

CGI and Patient's Global Impression—Improvement are widely used global clinical improvement measures with well-established validity (Marks et al., 1993; Marks et al., 1998). Although these ratings intercorrelated highly significantly in our study (ranging from .78 to .88 at all assessment points, all p's $< .001$), the patients' ratings of global improvement may be a more reliable measure of treatment outcome, as assessor blindness was not maintained after the sixth trial week. Patient's Global Impression—Improvement ratings also corresponded closely to the percentage of improvement in other clinical measures at all assessments. At the last available assessment, for example, the ratings of no change/worsening, slightly improved, much improved, and very much improved corresponded to a change of, respectively, −1%, 16%, 58%, and 78% in the total CAPS; 4%, 29%, 68%, and 87% in TSSC; −16%, 30%, 59%, and 84% in BDI; 12%, 30%, 69%, and 91% in FAQ; and –16%, 54%, 66%, and 86% in WSA scores (negative percentages indicate worsening). This measure also correlated highly with change in the CAPS, $r = -0.66$, $p < .001$; TSSC, $r = -0.64$, $p < .001$; FAQ, $r = -0.59$, $p < .001$; BDI, $r = -0.44$, $p < .001$; and WSA, $r = -0.53$, $p < .001$.

Using the criterion (Jacobson & Truax, 1991) of two standard deviations or more improvement since baseline, the percentage of improvement in the CAPS total scores was 29% at week 6, 64% at week 12, 75% at week 24, and 71% at 1- to 2-year follow-up. At the last available assessment 71% of the survivors had improved.

Analysis of Relapse Rates

Relapse was defined as a change in the Patient's Global Impression—Improvement rating from much/very much improved at either 6- or 12-week follow-up or both to slight improvement/no change at 24-week or 1- to 2-year follow-up (depending on which was the last available assessment for a particular person). Among the 45 improved individuals, 3 were excluded because improvement was noted at week 24 (and not at an earlier assessment point, as required by the definition of relapse) and 2 because they did not have follow-up beyond week 12. Of the 40 improved individuals, only 1 satisfied the criterion for relapse.

Assessment of Blindness

Blindness could not be maintained in 11 (19%) cases (8 SSBT and 3 WL), often because the participants unintentionally revealed their experimental condition. These cases did not significantly differ in assessor-rated treatment outcome from the others, suggesting that unblinding did not affect the assessors' ratings. On the other hand, the assessors correctly guessed the treatment condition in 20 (83.3%) of the cases in the WL group and in 23 (88.5%) cases in the SSBT group, mainly by observing the extent of reduction in avoidance behaviors. The rate of correct guessing was higher than expected by chance in both groups, $\chi^2(1, N = 28) = 15.4$, $p < .001$. and $\chi^2(1, N = 31) = 10.7$, $p < .001$, respectively. The relationship between correct guessing and the assessors' ratings of clinical outcome could not be examined because there were too few people in each group whose treatment condition was incorrectly guessed. Although correct guessing

may have biased the assessors' ratings, such bias did not seem to lead to a substantial difference between assessor and patient ratings of the same constructs, as evidenced by the magnitude of correlations between the two ratings of global improvement, as well as between the TSSC and CAPS scores (ranging from .69 to .97, all *p*s <.001) at all follow-up points.

Factors Related to Treatment Outcome

Age, gender, education (1-4), past psychiatric illness, family history of psychiatric disorder, past trauma, extent of damage to the survivor's house (0 = *no damage*, 5 = *reduced to rubble*), having been trapped under rubble, time since the earthquake, therapist (1 = *DK*, 2 = *EŞ*), and pretreatment clinical ratings were selected as the independent variables and Patient's Global Impression—Improvement as the dependent variable. To reduce the number of variables for regression analysis, a principal components analysis was conducted on the five clinical measures. An unrotated component of general illness severity was extracted (73% of the total variance), with item loadings ranging from .78 to .94. The participants' scores on this component were computed as a composite measure of General Illness Severity (GIS).

Patient's Global Impression—Improvement significantly correlated only with the GIS, $r = 0.42$, $p < .001$, and the therapist variable, $r = -0.31$, $p < .05$. As 11 independent variables were still too many for regression analysis involving 51 cases, only four variables (education, history of past trauma, GIS, and therapist) that had correlations with the dependent variable showing a p value <.50 were selected for analysis. These variables were entered into the regression equation, using the simultaneous entry method. The regression model was significant, adjusted $R^2 = .31$, $F(4, 51) = 6.69$, $p < .001$. Greater illness severity, $\beta = .54$, $p < .001$, higher education, $\beta = .33$, $p < .05$, and past trauma, $\beta = .25$, $p < .05$, predicted less improvement.

We conducted two further regression analyses, one using change in the CAPS scores and the other a composite measure of clinical improvement derived by a principal components analysis of change in all five clinical measures as the dependent variable. Neither analysis yielded any significant predictors.

Discussion

As improvement continued beyond week 6, a comparison with control individuals at subsequent time points would have probably yielded stronger between-group effects. We chose not to extend the control condition beyond 6 weeks mainly as a result of ethical considerations. The improvement in the WL group was rather limited, as significant change was noted on only two of five clinical measures. No significant change was noted on the CAPS. The change in TSSC and FAQ may be attributable to the therapeutic effects of assessment. As illustrated by the stories of the improved survivors in the WL group, a detailed assessment may help survivors gain awareness of their problems as 'symptoms' and enhance their sense of control over them. This process sometimes leads to self-instigated exposure, which might further enhance sense of control and, ultimately, reduce PTSD and depression. For some survivors, changing life circumstances may lead to opportunities for exposure and discovery of its beneficial effects. We have also observed that some survivors, particularly those whose fear and avoidance problems caused serious disruption in life functioning, instigated self-exposure, considering it the only way to overcome their fear and return to normal functioning. Such processes may indeed explain 'spontaneous' recovery from posttraumatic stress for many disaster survivors.

Several lines of evidence suggest that the effects of a single-session intervention designed to enhance sense of control are fairly robust and replicable across studies. The treatment effects were significant on all measures, despite some improvement in the WL group. Second, the effect sizes on the total CAPS scores at week 24 (1.7) were larger than those achieved on the same measure by 10 sessions of exposure treatment (1.3) in a previous controlled trial (Marks et al., 1998) and by 10 sessions of imaginal exposure (0.9) in another study (Tarrier et al., 1999). Furthermore, the present study is the third in a series of four clinical trials (altogether involving a total of 331 earthquake survivors who had chronic PTSD), which showed that high levels of improvement could be achieved by using a single session of modified BT. The first study (Başoğlu et al, 2003b) showed marked improvement in 76% of the survivors after one session. In the second study (Başoğlu et al, 2003a) a single session of exposure to artificial earthquake tremors that used an earthquake simulator (without any subsequent self-exposure instructions concerning fear cues) dramatically reduced fear of earthquakes at post session and achieved marked improvement in 80% of the survivors at 3-month follow-up. A more recent randomized controlled study (Başoğlu, Şalcıoğlu, & Livanou, 2005a) that used a single session of combined treatment (self-exposure instructions plus 45-minute exposure to simulated tremors) achieved even stronger treatment effects.

Such high recovery rates after a single session may be regarded as surprising and thus warrant some explanation.

Because of their uncontrollable and unpredictable nature, earthquakes and the hundreds of aftershocks that usually follow lead to pervasive conditioned fear, extensive avoidance behaviors, and, ultimately, feelings of helplessness among survivors. This effect is consistent with the evidence on the role of uncontrollable and unpredictable stressors in the development of anxiety and fear (reviewed by Başoğlu & Mineka, 1992). Extensive fear and avoidance often cause serious disruption in life functioning, which further aggravates feelings of helplessness. With its emphasis on sense of control and a discourse designed to instill courage, modified BT offers an effective strategy to overcome fear and thereby reverse the process leading to helplessness. Presenting fear as an enemy that must be fought and defeated to prevent living the rest of life in fear and helplessness often conveys hope and courage and enhances motivation to confront fear. We have observed in our fieldwork with several thousand survivors that they relate to this discourse very well. Indeed, the effectiveness of such discourse could be better appreciated when one considers that it can make people confront even life-threatening situations or certain death, as it does army soldiers, political activists, kamikaze pilots in World War II, and suicide bombers.

Furthermore, a single session of this intervention, with its emphasis on control over fear, may have been sufficient in mobilizing and/or reinforcing a naturally existing tendency to fight fear in people. Fighting a perceived or real threat to safety may well be an evolutionarily determined response that is essential for survival. Indeed, this possibility may explain why so many survivors intuitively understand and relate to the rationale of the intervention so well. It may also explain why so many survivors, particularly those who suffer serious disruption in their life functioning (e.g., loss of employment, living in survivor camps because of fear for long periods and under difficult and at times life-threatening conditions), eventually utilize this strategy to combat their fear.

Our findings may not be surprising, considering that the greatest proportion of improvement achieved by behavioral treatment in other anxiety disorders usually occurs within the first few sessions (Marks et al., 1993). It is therefore conceivable that an enhanced single session may achieve a similar effect. In addition, the relatively little therapist contact and the self-help focus of treatment may also have helped the survivors attribute their gains in treatment to their own personal efforts, and that perception in turn may have enhanced their sense of control. Such internal attributions indeed relate to posttreatment maintenance of improvement (Başoğlu, Marks, Kılıç, Brewin, & Swinson, 1994) and PTSD (Livanou et al., 2002). They may also explain the extremely low rates of relapse in both the present and the previous study (Başoğlu et al., 2003b).

Although we have not systematically examined whether our study participants actually carried out exposure after the session, we know from self-report data in two other treatment studies (Başoğlu et al., 2003b; Başoğlu, Şalcıoğlu, & Livanou, 2005a) that more than 90% of the survivors comply with the instructions. It should also be borne in mind that the focus of the treatment is on enhancement of sense of control rather than on reduction in fear through habituation. Although the two phenomena may be related, habituation is not a necessary condition for sense of control, as suggested by a study (de Silva & Rachman, 1981) that showed the termination of an exposure session without complete habituation did not impede improvement. Thus, unlike habituation-based exposure treatment, modified BT does not prescribe repeated and prolonged exposure until complete habituation occurs; exposure until one regains sense of control is sufficient. Future research is needed to clarify the relative effectiveness of habituation- and control-based exposure strategies.

Because SSBT mainly involves self-exposure instructions, the intervention is readily applicable in cases in which symptoms of behavioral or cognitive avoidance are prominent. These symptoms are particularly common among survivors who are exposed to an ongoing threat to safety. Indeed, the prevalence of behavioral avoidance in a study of 1,000 earthquake survivors 8 months post disaster was as high as 71% (Başoğlu et al., 2002). In other cases without prominent avoidance, exposure instructions could relate to trauma cues that trigger reexperiencing symptoms (e.g., distress when reminded of the trauma, flashbacks, nightmares, intrusive thoughts). However, whether a focus on these symptoms would yield similar results remains to be determined.

In conclusion, SSBT appears to be a useful and cost-effective intervention for most earthquake survivors. Further studies are needed, however, to replicate these findings in other survivor populations, using a control condition for longer periods. The intervention may also be particularly useful in mass trauma conditions that are characterized by prolonged or repetitive traumatic events involving intense fear and perceived threat to safety (e.g., natural disasters, wars, political violence, and mass terrorism). Its relative simplicity makes training therapists in its delivery easier. There is some preliminary evidence (Başoğlu, Şalcıoğlu, & Livanou, 2005b) that the treatment can be effectively disseminated to survivors by a self-help manual. Cost-effective dissemination of a treatment is particularly important after large-scale disasters, such as the tsunami disaster in Asia, which often overwhelm the national mental health care resources of the

affected countries Furthermore, the treatment appears to be particularly effective for survivors who have lower socioeconomic status (SES) and educational status, possibly because of their greater faith in authority figures and readiness to comply with treatment instructions. This effect is particularly important, given that disasters often have a greater impact on people who have lower SES (Norris, Friedman, & Watson, 2002). Finally, the low rates of relapse in both of our studies in the face of ongoing threat to safety suggest that the intervention has a resilience-enhancing effect. This effect is also supported by other evidence (Bryant, Sackville, Dang, Moulds, & Guthrie, 1999) that CBT delivered in the early aftermath of traumatic events reduces the likelihood of PTSD in the long term. If this possibility can be confirmed by further research, behavioral interventions could be a useful substitute for the controversial technique of debriefing.

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References

Aker, A.T., Özeren, M., Başoğlu, M., Kaptanoğlu, C., Erol, A., & Buran, B. (1999). The Turkish version of Clinician-Administered PTSD Scale for DSM-IV: A study of its reliability and validity. Turkish Journal of Psychiatry, 10, 286–293.

Altman, D.G., Schulz, K.F., Moher, D., Egger, M., Davidoff, F., Elbourne, D., et al. (2001). The revised CONSORT statement for reporting randomized trials: Explanation and elaboration. Annals of Internal Medicine, 134, 663–694.

Ballenger, J.C., Davidson, J.R., Lecrubier, Y., Nutt, D.J., Foa, E.B., Kessler, R.C., et al. (2000). Consensus statement on posttraumatic stress disorder from the International Consensus Group on Depression and Anxiety. Journal of Clinical Psychiatry, 61, 60–66.

Başoğlu, M., Kılıç, C., Şalcıoğlu, E., & Livanou, M. (2004). Prevalence of posttraumatic stress disorder and comorbid depression in earthquake survivors in Turkey: An epidemiological study. Journal of Traumatic Stress, 17, 133–141.

Başoğlu, M., Livanou, M., & Şalcıoğlu, E. (2003a). A single session with an earthquake simulator for traumatic stress in earthquake survivors. American Journal of Psychiatry, 160, 788–790.

Başoğlu, M., Livanou, M., Şalcıoğlu, E., & Kalender, D. (2003b). A brief behavioural treatment of chronic posttraumatic stress disorder in earthquake survivors: Results from an open clinical trial. Psychological Medicine, 33, 647–654.

Başoğlu, M., Marks, I.M., Kılıç, C., Brewin, C.R., & Swinson, R.P. (1994). Alprazolam and exposure for panic disorder with agoraphobia: Attribution of improvement to medication predicts subsequent relapse. British Journal of Psychiatry, 164, 652–659.

Başoğlu, M., & Mineka, S. (1992). The role of uncontrollability and unpredictability of stress in the development of post-torture stress symptoms. In M. Başoğlu (Ed.), Torture and its consequences: Current treatment approaches. Cambridge: Cambridge University Press.

Başoğlu, M., Şalcıoğlu, E., & Livanou, M. (2002). Traumatic stress responses in survivors of earthquake in Turkey. Journal of Traumatic Stress, 15, 269–276.

Başoğlu, M., Şalcıoğlu, E., Livanou, M., Özeren, M., Aker, T., Kılıç, C., et al. (2001). A study of the validity of a screening instrument for traumatic stress in earthquake survivors in Turkey. Journal of Traumatic Stress, 14, 491–509.

Başoğlu, M., Şalcioğlu, E., & Livanou, M. (2005a). The effectiveness of a single-session of behavioral treatment involving exposure to artifical tremors in an earthquake simulator in earthquake-related posttraumatic stress disorder: A randomized waiting list controlled study. Manuscript in preparation.

Başoğlu, M., Şalcioğlu, E., & Livanou, M. (2005b). Behavioral treatment of earthquake-related posttraumatic stress disorder using a self-help manual. Manuscript in preparation.

Beck, A.T., Rial, W.Y., & Rickels, R. (1974). Short form of depression inventory: Cross validation. Psychological Reports, 34, 1184–1186.

Blake, D.D., Weathers, F.W., Nagy, L.M., Kaloupek, D.G., Klauminzer, G., Charney, D.S., et al. (1996). Clinician-Administered PTSD Scale for DSM-IV: Current and Lifetime Diagnostic Version. Boston: National Center for Posttraumatic Stress Disorder, Behavioral Science Division, VA Medical Center.

Bryant, R.A., Sackville, T., Dang, S.T., Moulds, M., & Guthrie, R. (1999). Treating acute stress disorder: An evaluation of cognitive behavior therapy and supportive counseling techniques. American Journal of Psychiatry, 156, 1780–1786.

de Silva, P., & Rachman, S. (1981). Is exposure a necessary condition for fear-reduction? Behaviour Research and Therapy, 19, 227–232.

First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (1996). Structured Clinical Interview for DSM-IV Axis I Disorders—Nonpatient Edition (SCID-I/NP, Version 2). New York: Biometrics Research Department, New York State Psychiatric Institute.

Goenjian, A.K., Karayan, I., Pynoos, R.S., Minassian, D., Najarian, L.M., Steinberg, A.M., et al. (1997). Outcome of psychotherapy among early adolescents after trauma. American Journal of Psychiatry, 154, 536–542.

Jacobson, N.S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. Journal of Consulting and Clinical Psychology, 59, 12–19.

Livanou, M., Başoğlu, M., Marks, I.M., de Silva, P., Noshirvani, H., Lovell, K., et al. (2002). Beliefs, sense of control and treatment outcome in post-traumatic stress disorder. Psychological Medicine, 32, 157–165.

Marks, I.M., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of post-traumatic stress disorder by exposure and/or cognitive restructuring: A controlled study. Archives of General Psychiatry, 55, 317–325.

Marks, I.M., Swinson, R.P., Başoğlu, M., Kuch, K., Noshirvani, H., O'Sullivan, G., et al. (1993). Alprazolam and exposure alone and combined in panic disorder with agoraphobia—a controlled study in London and Toronto. British Journal of Psychiatry, 162, 776–787.

Norris, F.H., Friedman, M.J., & Watson, P.J. (2002). 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. Psychiatry, 65, 240–260.

Şalcıoğlu, E. (2004). The effect of beliefs, attribution of responsibility, redress and compensation on posttraumatic stress disorder in earthquake survivors in Turkey. Unpublished Ph.D. dissertation, University of London, England.

Şalcıoğlu, E., Başoğlu, M., & Livanou, M. (2003). Long-term psychological outcome in non-treatment-seeking earthquake survivors in Turkey. Journal of Nervous and Mental Disease, 191, 154–160.

Tarrier, N., Pilgrim, H., Sommerfield, C., Faragher, B., Reynolds, M., Graham, E., et al. (1999). A randomized trial of cognitive therapy and imaginal exposure in the treatment of chronic posttraumatic stress disorder. Journal of Consulting and Clinical Psychology, 67, 13–18.