DOCUMENT RESUME

ED 334 482 CG 023 497

AUTHOR Cardena, Etzel; Spiegel, David
TITLE Dissociative Reactions to the Bay Area Earthquake.
PUB DATE 91
NOTE 20p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Anxiety; College Faculty; *Earthquakes; *Emotional Problems; Graduate Students; Higher Education
IDENTIFIERS California

ABSTRACT

This study systematically evaluated the psychological reactions of a non-clinical population to the October 1989 Bay Area earthquake. Within a week of the earthquake, a checklist of anxiety and dissociative symptoms was administered to a representative sample of approximately 100 graduate students and faculty members from two different institutions in the Bay Area. A follow-up study was conducted 4 months afterwards. Analyses of variance for time of testing showed that during or shortly after the earthquake respondents experienced significantly greater number and frequency of time distortions, alterations in cognition, memory and somatic sensation, derealization, depersonalization, and, to a lesser degree, anxiety symptoms and Schneiderian first-rank symptoms. These results suggest that among non-clinical populations extreme distress significantly increases the prevalence not only of anxiety but of transient dissociative phenomena as well, a fact of considerable clinical and theoretical import particularly considering the lifetime prevalence of traumatic experiences among the general population. (Author/LLL)

Corresponding author: Etzel Cardeña (415) 322-3129

Dissociative reactions to the Bay Area Earthquake

Etzel Cardeña, Ph.D.*
and
David Spiegel, M. D.

Department of Psychiatry and Behavioral Sciences
Stanford University. Stanford, CA
and
*Department of Psychology
Trinity College, Hartford, CT 06106

An earlier version of this paper was presented at the 144th Annual Meeting of the American Psychiatric Association, New Orleans, May 11-16, 1991.

Address reprint requests to: Etzel Cardeña, Ph.D., Department of Psychology, Trinity College, Hartford, CT 06106, or to David Spiegel, M.D., Department of Psychiatry and Behavioral Sciences, Stanford Medical School, Stanford, CA, 94305

Abstract

Objective This study systematically evaluates the psychological reactions of a non-clinical population to the October 1989 Bay Area earthquake. Method Within a week of the earthquake we administered a checklist of anxiety and dissociative symptoms and conducted a follow-up study four months afterwards. In both instances, a representative sample of close to 100 graduate students from two different institutions in the Bay Area volunteered to participate in the study. Results Analyses of variance for time of testing show that during or shortly after the earthquake respondents experienced significantly greater number and frequency of time distortions, alterations in cognition, memory and somatic sensation, derealization, depersonalization and, to a lesser degree, anxiety symptoms and Schneiderian first-rank symptoms. Conclusions These results suggest that among non-clinical populations extreme distress significantly increases the prevalence not only of anxiety but of transient dissociative phenomena as well, a fact of considerable clinical and theoretical import particularly considering the lifetime prevalence of traumatic experiences among the general population.

Observations of a connection between traumatic events and dissociative symptomatology (i.e. alterations in the normally integrative functions of memory, identity and consciousness) date back at least to the writings of such seminal figures as Pierre Janet. Morton Prince, Breuer and Freud. and William James (1-4). More recent reports support earlier observations that traumatic events , including human-made and natural disasters. in addition to bringing about emotional, biological, behavioral and interpersonal alterations, also elicit with dissociative symptomatology (5-6).

William James had already alluded in his 1896 Lowell lectures to traumatic amnesia in village inhabitants exposed to two catastrophic landslides (4), and a more recent review of the literature on immediate and more long-term reactions to trauma suggests that there are three frequent types of dissociative alterations in conscious experience following nature- and human-made disasters (7). These alterations include: 1) experiences of unreality or detachment from the self, physical or social environments (8-10), 2) alterations in perceptual experience (11-12), and 3) memory disturbances (11, 13-14) .

With respect to the immediate psychological aftermath of natural disasters, the relevant literature has been limited by a number of methodological problems, including delay in collecting data (the vast majority of studies assessed victims months or even years after the event), the lack of comparison groups and of a systematic chronology of

the development of symptoms. The unfortunate events surrounding the Bay Area Earthquake of October 17, 1989, provided us with an opportunity to overcome some of these methodological limitations.

The devastating Loma Prieta earthquake occurred in the middle of the day (5:04 p.m.) without any forewarning. Although the main earthquake, with a magnitude of 7.1 on the Richter scale, lasted only 15 seconds, during that and the following few days there were about 4,000 aftershocks (15). The main earthquake itself was a palpable physical experience to eveyon in the Bay Area. The direct effects on people's lives ranged from little or no physical damage to the person or belongings, through the destruction of many houses in the Loma Prieta region and Marina District, to the loss of life of dozens of individuals driving through the Cypress Street viaduct of the Nimitz freeway in Oakland. But even those who were only affected by the temporary loss of telephone and electric sevice vicariously shared the plight of the less fortunate by constantly being exposed through the media to images of destruction and loss of life. Whether mildly or severely affected, all the inhabitants in the area shared an experience of uncertainty about future events and of loss of control of the surroundings. We were able to initiate systematic data collection within one week of the earthquake, shortly after most of the aftershocks had ceased.

Method

Participants: After clearance from the appropriate Human Subjects Committee, we obtained the collaboration of two groups. The first one consisted of psychology students and faculty from a postgraduate psychology institution in the Bay Area. Out of the approximately 250 community members approached, we obtained 52 respondent (35 females, 12 males, 5 unknown; mean age= 35 years). From the second group, formed by first year medical students, we obtained 49 respondents (36 males, 13 females; mean age=23) out of a class of 86. Participation in both groups was strictly anonymous and voluntary and, for the purpose of this paper, both groups were collapsed into one.

For retest purposes, we again approached both communities approximately four months after the earthquake. We enlisted the participation of 98 (50 from the psychology program: 15 males, 34 females, 1 unknown; 48 from the medicine program; 32 males, 16 females) individuals. Although specific checklists (see below) could not be matched because of anonymity, we could determine that about 80% of the follow-up respondents had also participated in the first testing. To evaluate the presence of testing or contrast effects, we ran unpaired t-Tests between the group of participants who had not taken part in the first testing, and a comparable group of participants who answered the checklist for the second time. The results for all the categories of the

checklist did not show any significant differences between the groups (for all analyses, $t<1.3$, $df=49$, $p\geq.2$) nor, consequently, testing or contrast effects. Hence, in subsequent analyses all participants filling the second questionnaire were collapsed into one group.

Instrumentation and Procedure: We provided all participants with a short form for demographic information and a checklist of dissociative and anxiety phenomenology modified for self-assessment[1]. This checklist is a comprehensive list of 98 items generated from a review of previous instruments assessing reactions to traumatic events, and from other phenomena described in the relevant literature. In its revised version used in this project, it provides a self-report of various phenomena according to a Likert-type scale ranging from 0=not experienced, to 5= very often experienced.

The questionnaire encompasses eight different clusters of phenomena, each one with different numbers of items. The eight categories are: 1) alterations of perception (12 items containing alterations in pain perception, hallucinatory phenomena and time perception), 2) cognitive alterations (9 items dealing with attention, mental clarity), 3) memory items (13 items dealing with intrusive recollections, problems with recollection, hypermnesia, etc.), 4) somatic sensations and symptoms (20 items including headaches, dizziness, unusual body sensations such as spinning, palpitations), 5) derealization and avoidance items (7 items involving experiencing the surrounding

environment as unreal or dreamlike and. withdrawal from the environment), 6) depersonalization and changes in personal identity (12 items dealing with a sense of being at a distance from one's sensations. thoughts or emotions, changes in personal identity), 7) non-somatic anxiety symptoms (14 items including excessive worrying, phobias, etc.), and 8) Schneiderian first-rank symptoms (11 items such as thought insertion, delusions). For both first testing and follow-up participants were asked to fill the checklist for phenomena they had experienced during the previous week.

Results

In this paper we will concentrate on the differences between the initial testing shortly after the earthquake and the follow-up four months later. A very general index of the difference between the two testing times is provided by the percentage of the respondents endorsing any of the 98 individual items in the checklist. Taking an item endorsed by 1/5 (20%) of the respondents as meaningful, almost three times as many items were endorsed at first testing (50) than at retest (18).

To obtain a more precise index of the the effect of the earthquake. we carried out ANOVAs with the checklist data. This analysis probed the incidence of symptoms reported. The dependent variable was the total number of items endorsed by each individual for each of the eight different categories. without regard for how frequently the respondent had experienced each of the items (i.e. in this analysis the two scores

used for each item were: 0 (not experienced) or 1(any score between 1=very rarely experienced and 5=very often experienced, and the sum total of items for each category was then computed). Table 1 shows the results.

Insert Table 1 about here

Table 1 shows that during the week following the earthquake, respondents experienced significantly more time distortions, cognitive and memory alterations, unusual somatic sensations and symptoms, derealization and avoidance, depersonalization, non-somatic anxiety symptoms and first-rank Schneiderian symptoms, in comparison with their weekly experiences four-months afterwards. The only areas where there were no significant differences were pain perception changes and hallucinatory phenomena. A less conservative second ANOVA using weighted scores (i.e. maintaining the difference between a score of 1 and a score of 2, 3, 4, or 5 and then computing the sum of scores for each category) shows exactly the same pattern of significant results as those of Table 1. Hence, not only did respondents reported significantly more symptoms, but they also reported them as occurring more frequently.

To look at the pattern of intercorrelations among the different categories, we conducted a principal components orthogonal factor analysis on the data from the first testing. There were four significant

factors. The first one, explaining about 60% of the variance, is a general alteration of consciousness factor with highest loadings for cognitive alterations and derealization and no loading on hallucinations; the second and third factors are single category factors for hallucinations and pain alterations respectively; the fourth factor is primarily a first rank symptoms factors with a high negative loading on cognition and smaller negative and positive loadings on derealization and depersonalization respectively. The second through fourth factor account for about 10% of the variance each. Thus, the factor analysis suggests that participants had a number of general alterations involving almost all categories except for pain alterations and hallucinations (which did not vary significantly from first testing to follow-up) and, of particular interest, that people who endorsed the more pathognomic first-rank symptoms, did not tend to endorse the more common cognitive or derealization alterations, although they endorsed some depersonalization items. A factor analysis with responses from the second testing shows showed a similar pattern.

We also looked at the specific items that were frequently endorsed. Table 2 shows the changes in the percentage of respondents ordered by category and greatest amount of change from first testing to follow-up.

Insert Table 2 about here

While most of the symptoms noticeably decreased at follow-up, this was not the case with all items. For instance, anger and irritability remained relatively high (about 30%) at both testings. Despite the absence of significant changes in the perception of pain, the somatic symptoms of "chest pain" and "headaches" were the only items that increased in the follow-up by 10% or more, suggesting that the experience of trauma may decrease the experience of these common pains, conceivably either through inattention or though SIA (stress induced analgesia) (17).

The pattern of these results strongly suggests that the response of this non-clinical sample to the earthquake involved a cluster of clearly dissociative and anxiety symptoms, which abated after some time. Other types of phenomena (e.g. emotions such as anger, changes in pain or illusion phenomena) were not particularly affected one way or the other, while the occurrence of the rare and more pathognomic first-rank symptoms seemed to vary independent from the more common cognitive and derealization alterations. Given the relatively mild direct physical effect of the earthquake on most participants, a more striking pattern of symptoms could be expected from more directly affected individuals.

Discussion

The previous results suggest that the disruptions created by a traumatic event such as an earthquake profoundly alter the psychological experience of non-clinical populations and are frequently associated with

both dissociative and anxiety phenomena. While this project supports the long-established connection between trauma and anxiety symptomatology, it also indicates that dissociative symptomatology is a frequent and important outcome of exposure to traumatic events.

A perusal of table 2 shows a number of interesting patterns: 1) some of the cognitive alterations frequently endorsed include symptoms such as confusion, exaggerated startle and hypervigilance described in the PTSD literature as indicating enhanced reactivity. Interestingly, though, attentional items such as narrowing of attention, attention automatically drawn to stimuli and the mind "going blank", suggestive of absorption and hypnotic-like processes (16) were also frequently endorsed.

2) Memory alterations included intrusive and detailed recollections of the traumatic event, although difficulties with everyday memory were also reported. Neither partial nor full amnesia for the traumatic event were reported, although a few written accounts from a different sample of more severely affected individuals given to the first author suggest that some form of amnesia may have occurred within the more affected population.
3) Somatic and non-somatic anxiety phenomena frequently reported included typical PTSD phenomena such as restlessness, physiological reactivity, difficulty with sleep and general anxiety, and despair, although interestingly most of these symptoms were not endorsed as frequently as cognitive alterations.

4) Phenomena directly suggestive of alterations in consciousness were also very frequently reported, including time expansion and timelessness, as were more directly dissociative phenomena such as the perception of unreal surroundings, disinterest in or avoidance of activities, the experiencing of events, emotions and thoughts at a distance, and unusual body sensations including the sense of the self detaching from the body. Thus, dissociative phenomena were common within this sample.

The specific mediating mechanisms underlying these changes still need to be elucidated, though there is some laboratory work suggesting that even mild distressing events may produce sudden and very narrow focus of attention (18-19). This externally generated modification of attentional processes is similar to traditional hypnotic induction procedures, which frequently induce a continuous and narrow focus of attention, with consequent alterations in conscious experience not unlike some of those found in this sample [2]. Further research on the relation between trauma and dissociative phenomena is clearly warranted both from a clinical and research perspective. The already vast clinical literature describing the relationship of current dissociative symptomatology and reported early chronic and/or extreme abuse has found support in some recent systematic studies (20-22). This and other projects suggest that other forms of extreme distress can bring about at least transient dissociative phenomena among non-clinical populations.

a particularly relevant finding considering that exposure to traumatic events in the general population may run as high as 39% (23).

Some important lines of future inquiry include: 1) probing more precisely the relation between attention deployment, cognitive style and dissociative experience, 2) investigating possible personality/cognitive traits (e.g. hypnotizability) that may predispose individuals to experience dissociative events when exposed to stressful events, and 3) evaluating systematically what pattern of responses predict future PTSD or good outcome, 4) determining in which ways and under what circumstances dissociative responses may be adaptive, and 5) systematically looking at the effect of techniques involving the intentional deployment of attention, such as hypnosis (24) and body awareness training, in the treatment of individuals with transient and chronic dissociative symptomatology. The line of research should sensitize the clinician to the possiblity of transient or chronic dissociative phenomena among non-clinical populations exposed to traumatic events.

While we may not be able to make the world more predictable or controllable, an understanding of the common occurrence of dissociation as an immediate response to trauma may allow us to better deal with people undergoing terrible circumstances. In a different way than he intended, H. G. Wells may have had keen psychological insight when he said that "Human history becomes more and more a race between education and catastrophe".

Notes

1. Cardeña E, Spitzer R, Spiegel D: Checklist for brief reactive dissociative disorder/acute stress reaction research project-Revised. Typescript, Stanford University; 1989

2. Cardeña E: The phenomenology of quiescent and physically active deep hypnosis. Paper presented at the 39th Annual Meeting of the Society for Clinical and Experimental Hypnosis, Asheville, North Carolina, 1988

References

1. van der Kolk BA, van der Hart, O. Pierre Janet and the breakdown of adaptation in psychological trauma. Am J Psychiatry 1989; 146:1530-1540

2. Prince M: Hysteria from the point of view of dissociated personality. Journal of Abnormal Psychology 1906-1907; 1:170-187

3. Breuer J, Freud, S: (1895) Studies on hysteria, in Complete Psychological Works of Sigmund Freud, standard ed, vol. 2. London, Hogarth Press, 1955

4. Taylor E: William James on exceptional mental states. Amherst: University of Massachusetts Press, 1984

5. McCann IL, Sakheim DK, Abrahamson DJ: Trauma and victimization: A model of psychological adaptation. Counseling Psychologist 1988; 16:531-594

6. Terr L: Childhood traumas: An outline and overview. Am J Psychiatry

1991: 148: 10-20

7. Spiegel D, Cardeña: Disintegrated experience: The dissociative disorders redefined. Journal of Abnormal Psychology (in press)

8. Hillman RG: The psychopathology of be ng held hostage. Am J Psychiatry 1981; 138: 1193-1197

9. Solomon Z, Mikulincer M, Benbenistry R: Combat stress reaction. Clinical manifestations and correlates. Military Psychology 1989; 1:35-47

10. Feinstein A: Posttraumatic stress disorder: A descriptive study supporting DSM-III-R criteria. Am J Psychiatry 1989: 146: 665-666

11. Terr L: What happens to early memories of trauma? J Am Acad Child Adolesc Psychiatry 1988; 27:96-104

12. Siegel RK: Hostage hallucinations. Journal of Nervous and Mental Disease 1984; 172:264-272

13. Wilkinson CB: Aftermath of a disaster: The collapse of the Hyatt Regency Hotel skywalks. Am J Psychiatry 1983; 140, 1134-1139

14. Madakasira S, O'Brien K: Acute posttraumatic stress disorder in victims of a natural disaster. Journal of Nervous and Mental Disease 1987; 175:286-290

15. Los Angeles Times: The 1989 San Francisco Bay Earthquake. Los Angeles, CA: Los Angeles Times, 1989

16. Cardeña E, Spiegel, D: Suggestibility, absorption and dissociation: An integrative model of hypnosis. In Human suggestibility: Advances in theory, research and application. Edited by Schumaker JF. New York,

Routledge. 1991

17. Pitman RK, Orr SP., van der Kolk BA, *et al.*: Analgesia: A new dependent variable for the biological study of posttraumatic stress disorder. In Posttraumatic stress disorder: Etiology, phenomenology, and treatment. Edited by ME Wolf, AD Mosnaim. Washington, D.C., American Psychiatric Press, 1990

18. Christianson SA, Loftus EF: Memory for traumatic events. Applied Cognitive Psychology 1987; 1: 225-239

19. Loftus EF, Burns TE: Mental shock can produce retrograde amnesia. Memory and Cognition 1982; 10:318-323

20. Chu JA, Dill DL: Dissociative symptoms in relation to childhood physical and sexual abuse. Am J Psychiatry 1990; 147:887-892

21. Sanders B, Giolas MH: Dissociation and childhood trauma in psychologically disturbed adolescents. Am J Psychiatry 1991; 148:50-54

22. Herman JL, Perry JC, van der Kolk BA: Childhood trauma in borderline personality disorder. Am J Psychiatry 1989, 146: 490-495

23. Breslau N, Davis GC, Andreski, P, *et al :* Traumatic events and posttraumatic stress disorder in an urban poulation of young adults. Arch Gen Psychiatry 1991; 48:216-222

24. Spiegel D, Cardeña E: New uses of hypnosis in the treatment of PTSD. Journal of Clinical Psychiatry 1990: 51(suppl. to 10):39-43

Table 1 Mean number of dissociative and anxiety reactions

	One week X s.d.	Four months X s.d.	F ratio	Adj R^2
Cognitive alterations	5.08 (3.07)	2.76 (2.79)	30.81**	.13
Memory alterations	2.88 (2.78)	1.42 (3.39)	15.69**	.07
Perceptual alterations				
- Time	1.14 (1.06)	.58 (.98)	14.76**	.06
-Pain	.39 (.84)	.52 (.81)	1.31	.00
-Hallucinations	.14 (.47)	.10 (.34)	.4	.00
Derealization	2.23 (2.34)	.95 (1.69)	19.39**	.08
Depersonalization	2.03 (2.81)	.8 (1.84)	13.33**	.06
Somatic anxiety	4.48 (5.09)	2.18 (3.03)	14.9 **	.07
Non-somatic anxiety	3.13 (3.31)	1.97 (3.05)	6.57*	.03
First rank symptoms	.38 (1.29)	.04 (.32)	6.65*	.03

df= 1, 197; * = p≤.01; ** = p<.001

Table 2. Change in frequently endorsed dissociative and anxiety items

	One week	Four months	Decrease
Cognitive alterations	%	%	%
- Confusion	55	16	39
- Exaggerated startle	67	29	38
- Hypervigilance	76	39	37
- Difficulty with new information	55	26	29
- Narrowing of attention	47	22	25
- Attention automatically drawn to stimuli	56	33	23
- Difficulty concentrating	71	54	17
- Mind "going blank"	52	38	14
Memory alterations			
- Very detailed memory of trauma	55	23	32
- Intrusive recollection	39	17	22
- Distressful associations	39	18	21
- Reliving the trauma	29	14	15
- Difficulties with daily memory	29	14	15
- Re-enactment of trauma	25	10	15
- Recurrent dreams	22	11	11
- Impersonal recollection	21	11	10
Somatic sensations			
- Restlessness	57	29	28
- Palpitations	39	13	26
- Physiological reactivity	36	14	22
- Trembling	25	6	19
- Easy fatigue	44	28	16
- Dizziness	30	17	13

Non-somatic anxiety			
- Difficulty with sleep	44	22	22
- Despair	42	22	20
- General anxiety	36	17	19
- Fear of dying soon	21	10	11
Perceptual alterations			
-Time expansion	51	19	32
-Timelessness	38	9	29
Derealization			
- Unreal surroundings	40	12	28
- Disinterest in activities	40	12	28
- Avoidance of activities	26	10	16
- Avoidance of thoughts	30	15	15
- Withdrawal	28	13	15
Depersonalization			
- Events at a distance	40	13	27
- Emotions at a distance	27	8	19
- Self detaching from body	25	6	19
- Unusual body sensations	27	10	17
- Foreshortened future	28	12	16
- Numbing, slowness	23	7	16
- Thoughts at a distance	22	7	15
- Restricted emotional range	23	9	14
- Loss of usual sense of identity	20	10	10