Dissociation and Posttraumatic Stress 1 Year After the World Trade Center Disaster: Follow-Up of a Longitudinal Survey

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Background: We conducted a 1-year follow-up of an original mail survey of early reactions to the World Trade Center disaster.

Method: Of the 75 subjects originally surveyed, 58 (77%) responded. The survey included measures of dissociation (Dissociative Experiences Scale, Cambridge Depersonalization Scale, Clinician-Administered Dissociative States Scale), posttraumatic stress (Impact of Event Scale–Revised), social support (Interpersonal Support Evaluation List–short form), and a life quality measure (Quality of Life Enjoyment and Satisfaction Questionnaire–short form). We hypothesized that dissociative versus posttraumatic symptoms at follow-up could be dissected on the basis of early reactions.

Results: Responders and nonresponders did not differ in baseline characteristics. Exposure was not associated with dissociation or posttraumatic stress at follow-up. Of distress, dissociation, and posttraumatic stress at baseline, baseline dissociation was the strongest predictor of outcome dissociation while baseline posttraumatic stress was the strongest predictor of outcome posttraumatic stress. Of 4 peritraumatic distress factors generated in the original survey, "loss of control" and "guilt/shame" were significantly related to dissociation and posttraumatic stress at outcome, while "helplessness/anger" was only associated with posttraumatic stress at outcome. Lesser improvement in posttraumatic stress over the first year was significantly related to less social support and greater comorbid dissociation. Interim social support was associated with better life quality and fewer symptoms at outcome.

Conclusion: There was evidence for partly independent pathways toward dissociation versus posttraumatic stress 1 year after the disaster. Feelings of guilt and shame, and persistent dissociation, were poor prognostic factors, while social support had a powerful ameliorating influence.

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The World Trade Center disaster of September 11, 2001, was an event of unprecedented impact in recent U.S. history, and early studies revealed high rates of distress and initial psychopathology not only for those highly exposed to the disaster or living in the New York area, but also nationally and even internationally. A random sample of 1008 Manhattan, N.Y., residents interviewed by telephone 2 months after the disaster revealed a substantial psychological burden on the population, with a 10% rate of depression and an 8% rate of posttraumatic stress disorder (PTSD), and a 20% rate of PTSD for those living close to the World Trade Center; exposure to the attacks predicted PTSD, while losses consequent to the disaster predicted depression.[1] There was also evidence that for those directly exposed to the disaster, even the repetitive television viewing of the event exacerbated psychological symptoms.[2] At a national level, a Web-based survey of 1069 U.S. residents outside New York City revealed a 17% rate of posttraumatic stress symptoms 2 months after the attack and a 6% rate 6 months after.[3] In particular, this study found that disengagement from active coping strategies was predictive of psychological difficulties 6 months after the disaster. Finally, there is preliminary evidence that recovery from emotional distress secondary to the disaster was marked over the first 6 months after the attack.[4] Past disaster studies have shown that social support is a key element to such recovery.[5,6]

Furthermore, it appears that the presence of dissociative-type symptoms, not only in the acute aftermath of a trauma (typically referred to as "peritraumatic dissociation"), but also in the longer term, may be an indicator of more disabling and persistent pathology. In a recent U.S. disaster bearing many similarities to the World Trade Center attack, the Oklahoma City bombing, it was found that 6 months after the event intrusive- and hyperarousal-type PTSD symptoms were nearly universal and unassociated with other psychopathology or with functional impairment, whereas dissociative-type symptoms (avoidance, detachment, amnesia, numbing) were highly associated with comorbidity, impairment, and need for treatment.[7] Similarly, in a sample of 130 survivors 3 months after an earthquake, reexperiencing and

arousal symptoms were very common and seemingly "normal," whereas avoidance and numbing symptoms were rarer and associated with psychiatric morbidity.[8] Therefore, even though these studies did not directly measure dissociation at follow-up, they suggested that such measurement could be very pertinent to later psychiatric morbidity. Still, few follow-up studies of dissociative symptoms from the time of a disaster to months or years later have been conducted. In one study that we are aware of, dissociative symptoms were compared at 1 week and 4 months after a San Francisco, California, earthquake.[9] Although dissociative symptoms on the whole diminished markedly over the 4-month period, approximately 10% of the sample was still experiencing depersonalization/derealization symptoms after 4 months. Foa and Hearst-Ikeda[10] have proposed that dissociation may interfere with the processing of, and therefore the recovery from, traumatic experience.

In the acute aftermath of the World Trade Center disaster, we conducted a pilot mail survey examining early reactions to the event, and the detailed procedures and findings of that study have been previously published.[11] A convenience community sample of adults recruited via local newspaper advertisement who had felt "significantly affected" by the disaster were surveyed. The 75 survey responders, 43 women and 32 men, were demographically diverse and had experienced a wide range of exposures to the disaster, such as being inside a tower (6.7%), losing a loved one (25.3%), participating in rescue efforts (17.3%), and only watching the event on television (4.0%). The survey revealed markedly elevated scores of peritraumatic distress, dissociative symptoms, and posttraumatic stress symptoms occurring "during and shortly after the disaster." There was also evidence of similar but independent pathways toward dissociation and posttraumatic stress in the early phase after the trauma. The "loss of control" component of peritraumatic distress had been most predictive of both early dissociation and posttraumatic stress, while dissociation had not contributed beyond distress to the prediction of early posttraumatic stress.

The predictive value of peritraumatic dissociation in the development of later PTSD has been extensively investigated and debated since Marmar et al.[12] developed a peritraumatic dissociation scale and reported that peritraumatic dissociation was highly predictive of later PTSD in Vietnam veterans. Subsequently, numerous studies, including a prospective study by Shalev et al.,[13] supported that peritraumatic dissociation predicts subsequent PTSD diagnosis beyond the contribution of initial intrusion and avoidance PTSD symptoms, depression, and anxiety. Other studies of PTSD predictors have not supported peritraumatic dissociation as a significant predictor of later PTSD, leading to a critical review of the literature by Marshall et al.[14] which argued that peritraumatic dissociation does not constitute a core feature of the unitary syndrome of acute stress disorder and PTSD. More recently, a statistically sophisticated study[15] reappraised the link between peritraumatic dissociation and PTSD severity, based on longitudinal follow-up of community violence survivors over a 1-year period, and concluded that peritraumatic dissociation was not predictive of follow-up PTSD severity after controlling for baseline PTSD severity. Therefore, the power of peritraumatic dissociation in predicting later PTSD may be due, at least in part, to the failure to measure either early posttraumatic stress symptoms or emotional and cognitive distress reactions to the trauma. Along these lines, a recent study of a student sample found that trauma-related fears of death and loss of control largely accounted for the association between peritraumatic dissociation and later PTSD severity and that the effect of peritraumatic dissociation on PTSD severity was eliminated after controlling for these fears.[16] In summary, then, it is conceivable that part of the strong relationship between peritraumatic dissociation and later PTSD is an "artifact" of other early reactions and experiences that precipitate or covary with peritraumatic dissociation and that have not been as concisely articulated.

In the present study, we were interested in prospectively following up, 1 year after the disaster, the same sample that we initially surveyed for early September 11 reactions. We were specifically interested in examining the following questions and hypotheses. First, we expected that there would be a notable decline in posttraumatic symptomatology 1 year later and wished to examine factors related to such change. Second, we postulated that various factors would impact, positively or negatively, the severity of subsequent symptomatology. We specifically hypothesized that, after accounting for exposure, early dissociation versus posttraumatic stress would be most predictive of the respective symptoms at outcome. We also hypothesized that social support during the first year after the disaster would be an important factor mitigating subsequent pathology and enhancing life quality at follow-up, beyond exposure and symptoms. Additionally, we hypothesized that, as in the original survey, of the 4 components of peritraumatic distress, loss of control would be most strongly related to follow-up dissociation and posttraumatic stress. Third, we predicted that better quality of life at follow-up would be related to both fewer psychological symptoms and greater social support.

METHOD

A self-report survey containing questionnaires about demographic changes, psychiatric symptoms, and life quality 1 year after the disaster was approved by our institutional review board with waiver of written informed consent. All subjects who had completed surveys 1 year prior (N = 75) were mailed follow-up surveys and offered

a $50 compensation. Surveys were sent out in November/December to avoid, as much as possible, 1-year anniversary reactions and holiday reactions. The survey had a 1-page cover detailing the purpose of the study, who was being contacted, the voluntary nature of participation, confidentiality, instructions for completing and returning the anonymously coded form, and reimbursement procedures.

A brief summary of the measures used in the initial survey is provided here in order to facilitate understanding of the current study's procedures; further details can be found in the original publication.[11] The Peritraumatic Distress Inventory[17] was administered and generated 4 distress factors, "life threat," "loss of control," "helplessness/anger," and "guilt/shame." The Peritraumatic Dissociative Experiences Questionnaire (PDEQ) was used to assess early dissociation.[12] The Impact of Event Scale–Revised (IES-R)[18] was used to measure early posttraumatic stress symptoms. Exposure to the disaster was quantified by numerous yes-no questions regarding specific types of exposures. An arbitrary scaled score from 0 to 10 was assigned to each type of exposure based on the consensus of 3 investigators (intercorrelation coefficient = 0.88). The total scaled exposure score summed for each subject was strongly correlated with initial distress, dissociation, and posttraumatic stress (r range, 0.24–0.49), providing evidence for the face validity of the scale.

The following scales were administered at follow-up. We administered 3 dissociation scales, since we were particularly interested in the greatly understudied dissociative sequelae of adult trauma and since different dissociation scales capture somewhat differing aspects of dissociative experiences. Of note, the only dissociation scale administered in the early survey, the PDEQ, was a different scale from the 3 follow-up dissociation scales. First, the Dissociative Experiences Scale (DES)[19,20] is a self-report measure of dissociation that has been used in hundreds of research studies to date and is more reflective of pathologic dissociative symptoms including identity fragmentation. It consists of 28 items, each scored from 0 to 100 at 10-point intervals, and the total score is the mean of all 28 items. It captures more "normal" dissociative experiences such as absorption, as well as "pathologic" dissociative experiences such as depersonalization, derealization, amnesia, and identity changes. It has been found to be internally consistent and reliable over time and has good discriminant and convergent validity.

Second, the Cambridge Depersonalization Scale (CDS)[21] is a 29-item self-report scale of depersonalization/derealization "detachment"-like experiences that rates each experience for frequency on a scale of 0 to 4 and duration on a scale of 1 to 6; total score is the sum of frequencies and severities of all items. The scale has good internal consistency (alpha = .89), good convergent validity (r = 0.49 with total DES score and r = 0.80 with DES depersonalization factor score), and good discriminant validity against measures of depression, anxiety, and obsessionality. The CDS also has good criterion validity in discriminating subjects with anxiety disorders versus epilepsy versus depersonalization disorder and good discriminant validity for discriminating subjects with primary depersonalization compared with nonspecific anxiety disorders and normal control subjects. We expected that the CDS might better capture detachment-type experiences, which are not as highly represented in the childhood-trauma–oriented DES.

Third, the Clinician-Administered Dissociative States Scale (CADSS)[22] is a clinician-administered "state" scale that consists of both objectively and subjectively rated items, rated on a 0-to-4 scale. The scale has been modified for use as a self-report in its subjective section and captures a variety of dissociative experiences encompassing depersonalization, attention, and memory disturbances.

To measure PTSD symptoms at follow-up, we employed the IES-R,[18] which we had also administered in our initial survey. The IES-R is a widely used self-report measure of PTSD applied to a single trauma. It consists of 22 items, rated from 0 ("not at all") to 4 ("extremely") and yields a total score, as well as reexperiencing, avoidance, and arousal scores; the total score is the sum of all item scores.

Life satisfaction was measured by the Quality of Life Enjoyment and Satisfaction Questionnaire–short form,[23] a 16-item self-report measure of the degree of enjoyment and satisfaction experienced by subjects in various areas of daily functioning such as physical well-being, work, home, social relationships, and leisure activities, rated on a 1- to 5-point scale; it has been shown to have good reliability, validity, and sensitivity to change. Social support was measured with the Interpersonal Support Evaluation List–short version (ISEL), a self-report 12-item questionnaire rated on a 4-point scale that measures the subjectively perceived availability of 4 social support resources, material aid, availability of others to talk to, positive self-evaluation compared with others, and a sense of belonging.[24] All scales were applied to the past month except for the ISEL, which was applied to the past year.

Chi-square and Student t tests were used to compare independent samples as applicable. Hierarchical linear regression analyses were performed to examine the prediction of follow-up dissociation and posttraumatic stress by predictor variables, examined in the presumed "chronological" order of their occurrence. In step 1, exposure severity was entered. In step 2, peritraumatic distress, peritraumatic dissociation, and early posttraumatic stress were entered; a conservative assumption was made that these sets of symptoms occurred more or less concurrently "during and shortly after the disaster." In step 3, social support over the ensuing year was entered.

Table 1. Comparison of Survey Responders Who Were Exposed to the Disaster via Personal Life Threat (group A, N = 23) Versus All Other Types of Exposure (group B, N = 35)

Outcome Variable	Group A, Mean ± SD	Group B, Mean ± SD	t[a]	p
Exposure	56.0 ± 30.2	36.1 ± 18.7	3.10	.003
PDI (peritraumatic distress)	35.8 ± 7.2	35.3 ± 5.1	0.29	.77
PDEQ (peritraumatic dissociation)	15.4 ± 2.5	15.2 ± 3.3	0.26	.80
IES-R (early posttraumatic stress)	49.7 ± 18.7	47.8 ± 16.9	0.39	.70
DES	18.3 ± 16.9	16.3 ± 15.0	0.45	.65
CDS[b]	54.0 ± 58.6	41.1 ± 38.1	1.00	.32
CADSS	19.4 ± 16.3	14.8 ± 14.8	1.12	.27

[a]df = 56.
[b]df is shown minus 1 (1 subject did not complete the CDS).
Abbreviations: CADSS = Clinician-Administered Dissociative States Scale, CDS = Cambridge Depersonalization Scale, DES = Dissociative Experiences Scale, IES-R = Impact of Event Scale–Revised, PDEQ = Peritraumatic Dissociative Experiences Questionnaire, PDI = Peritraumatic Distress Inventory.

Simple and multiple correlation analyses were used to examine the relationships of dissociation and posttraumatic stress at outcome with baseline peritraumatic distress factors as well as baseline posttraumatic stress subscales. Finally, life satisfaction at follow-up was examined via its correlation with follow-up symptoms as well as with social support.

RESULTS

Of the 75 individuals originally surveyed,[1] 58 (77%) returned completed questionnaires 1 year later, 35 women and 23 men. Responders represented a wide range of demographics. Ethnicity was as follows: white, N = 32; African American, N = 14; Hispanic, N = 6; American Indian, N = 1; Asian, N = 2; mixed, N = 3. Educational status was as follows: completed/partial high school, N = 6; completed/partial 2-year college, N = 12; completed/partial 4-year college, N = 27; completed/partial graduate degree, N = 13. Employment status was as follows: employed, N = 48; unemployed, N = 2; student, N = 4; homemaker, N = 2; retired, N = 2. Of the 58 responders, the following reported a change in demographic status rated as "probably or definitely" due to the disaster: employment status, N = 17; educational status, N = 7; residential status, N = 7; and marital status, N = 1.

Follow-up survey responders and nonresponders did not differ in demographics, exposure to the disaster, or initial symptomatology (gender: $\chi^2 = 0.95$, df = 1, p = .33; ethnicity: $\chi^2 = 3.17$, df = 5, p = .67; education: $\chi^2 = 4.60$, df = 3, p = .20; occupation: $\chi^2 = 3.66$, df = 4, p = .45; mean ± SD exposure: responders 44.0 ± 25.6, nonresponders 47.0 ± 29.6, t = 0.41, df = 73, p = .69; mean peritraumatic dissociation: responders 15.3 ± 3.0, nonresponders 14.1 ± 2.7, t = 1.56, df = 73, p = .12; mean peritraumatic distress: responders 35.5 ± 6.0, nonresponders 34.3 ± 9.5, t = 0.63, df = 73, p = .53). The only significant difference between the 2 groups was a marginally older mean age in follow-up survey responders (responders 41.8 ± 12.5 years, nonresponders 35.1 ± 9.9 years, t = 2.01, df = 73, p = .05).

Given the heterogeneity in the types of exposure present in this sample, we subdivided survey responders into those who had initially experienced immediate life threat (defined as those who had been either inside or in close physical proximity to the towers at the time of the disaster) versus the remainder, who were exposed via threat to loved ones, participation in rescue efforts, media coverage, etc. Table 1 presents comparison of the 2 subgroups in initial and follow-up symptoms. It can be seen that the 2 subgroups did not significantly differ in initial or follow-up symptom scores, supporting the subsequent analysis of the sample as a whole.

Mean scores for follow-up dissociative symptoms were 17.1 ± 15.7 for the DES, 46.3 ± 47.4 for the CDS, and 16.6 ± 15.5 for the CADSS. There was no available equivalent dissociation score from the first survey in order to examine change in dissociative symptoms over the first year. The mean score for posttraumatic stress symptoms on the IES-R at follow-up (IES-R-FU) was 37.4 ± 20.5, while the mean initial IES-R score for the 58 subjects had been 48.5 ± 17.5. The mean percent decline in IES symptoms over the first year was 21% ± 38%, ranging greatly from a 61% worsening to a 94% improvement, revealing a mean 23% decrease in posttraumatic symptoms over the first year. Percent improvement in posttraumatic stress symptoms was not significantly associated with exposure (r = 0.08, df = 56, p = .54), peritraumatic distress (r = –0.01, df = 56, p = .97), peritraumatic dissociation (r = –0.11, df = 56, p = .41), or initial posttraumatic stress symptoms (r = 0.15, df = 56, p = .25), but was significantly associated with interim social support (r = 0.38, df = 56, p = .004) and lesser dissociative symptoms at follow-up (DES: r = –0.42, df = 56, p = .001; CDS: r = –0.37, df = 56, p = .005; CADSS: r = –0.50, df = 56, p < .001).

Table 2 presents the zero-order and partial correlations among predictor and follow-up variables based on the hierarchical regression analyses. It can be seen that, with the exception of exposure, all initial variables significantly correlated with follow-up dissociation and posttraumatic stress. However, when the 3-step model was applied, it was found that peritraumatic dissociation was the strongest predictor of later dissociation, whereas early posttraumatic stress was the strongest predictor of later posttraumatic stress. Social support was a powerful predictor of all symptoms at outcome, even after all other predictor variables were accounted for.

Table 3 presents the simple and multiple correlations between the 4 factors of peritraumatic distress from the

Table 2. Hierarchical Regression Simple and Partial Correlations[a] Between Predictor and Follow-Up Variables

Predictor (baseline variable)	Follow-Up Variables: IES-R-FU r	IES-R-FU p	DES r	DES p	CDS[b] r	CDS[b] p	CADSS r	CADSS p
Simple correlations[c]								
Exposure	0.19	.15	0.04	.78	0.08	.55	0.04	.67
PDI	0.51	< .001	0.31	.02	0.26	.06	0.26	< .05
PDEQ	0.42	.001	0.30	.02	0.48	< .001	0.41	.001
IES-R	0.54	< .001	0.36	.006	0.31	.01	0.35	.007
ISEL	–0.50	< .001	–0.48	< .001	–0.48	< .001	–0.49	< .001
Partial correlations								
Step 1[d]								
Exposure	0.19	.15	0.04	.78	0.08	.55	0.06	.67
Step 2[e]								
PDI	0.15	.28	0.02	.88	–0.12	.40	–0.08	.55
PDEQ	0.15	.28	0.14	.32	0.40	.003	0.30	.03
IES-R	0.25	.07	0.21	.13	0.17	.21	0.21	.13
Step 3[f]								
ISEL	–0.48	< .001	–0.42	.001	–0.40	.003	–0.42	.002

[a]Partial correlations in each step control for the preceding steps.
[b]df is shown minus 1 (1 subject did not complete the CDS).
[c]df = 56.
[d]df = 1,56.
[e]df = 4,53.
[f]df = 5,52.
Abbreviations: CADSS = Clinician-Administered Dissociative States Scale, CDS = Cambridge Depersonalization Scale, DES = Dissociative Experiences Scale, IES-R = Impact of Event Scale–Revised, IES-R-FU = Impact of Event Scale–Revised (follow-up), ISEL = Interpersonal Support Evaluation List–short version, PDEQ = Peritraumatic Dissociative Experiences Questionnaire, PDI = Peritraumatic Distress Inventory.

original survey and follow-up symptoms. It can be seen that loss of control and guilt/shame were the 2 factors most strongly associated with both dissociation and posttraumatic stress at follow-up. Additionally, helplessness/anger was strongly associated with follow-up posttraumatic stress. The 4 distress factors combined accounted for a significant proportion of the variance in all symptoms at follow-up, ranging from 28% to 37%.

Table 4 presents the simple and multiple correlations between the 3 subscales of initial posttraumatic stress from the original survey and follow-up symptoms. It can be seen that all reexperiencing and avoidance at baseline were more strongly related to dissociation at outcome than hyperarousal, whereas all 3 posttraumatic subscales at baseline were similarly related to posttraumatic stress at outcome.

Life satisfaction at follow-up was significantly inversely related to all follow-up symptoms (IES-R-FU: $r = –0.66$, $df = 56$, $p < .001$; DES: $r = –0.58$, $df = 56$, $p < .001$; CDS: $r = –0.69$, $df = 55$, $p < .001$; CADSS: $r = –0.62$, $df = 56$, $p < .001$) and significantly positively related to interim social support ($r = 0.69$, $df = 56$, $p < .001$).

DISCUSSION

This survey longitudinally followed dissociation and posttraumatic stress 1 year after the World Trade Center disaster in a cohort of subjects initially recruited 1 year prior as a convenience sample and surveyed for early reactions to the trauma.[11] While dissociation and posttraumatic stress at follow-up were strongly interrelated, each was uniquely and significantly predicted by corresponding similar symptoms shortly after the disaster. Our finding is very reminiscent of Marshall and Schell's[15] recent reappraisal of the link between peritraumatic dissociation and PTSD severity using a longitudinal 1-year follow-up design, which concluded that peritraumatic dissociation was not predictive of follow-up PTSD severity after controlling for baseline PTSD severity. Also of note, we found that even though exposure severity was significantly associated with early dissociation and posttraumatic stress in the first survey, this association was no longer significant 1 year later. Other factors appear to become more important in the long-term maintenance of symptoms, as highlighted by the powerful contribution of social support toward alleviating long-term symptoms of both dissociation and posttraumatic stress.

The components of peritraumatic distress that had predicted early dissociation and posttraumatic stress in the first survey are interestingly similar yet different from the distress components that figured most prominently in the follow-up. As we predicted, loss of control remained a strong predictor of dissociation and posttraumatic stress at follow-up, as it had been in the original study.[11] Also similar to the original study,[11] helplessness/anger was significantly associated with posttraumatic stress but not dissociation at follow-up. However, in contrast to the original survey in which guilt/shame did not bear on early symptoms, 1 year after the disaster these affects were strongly related to the persistence of both dissociation and

Table 3. Simple and Multiple Correlations Between the 4 Baseline Peritraumatic Distress Factors and Outcome

Outcome	Peritraumatic Distress Inventory Factors										
	Safety Fears		Loss of Control		Helplessness/Anger		Guilt/Shame		All Factors Combined		
Variable	r[a]	p	r[a]	p	r[a]	p	r[a]	p	R^2	F[b]	p
IES-R-FU	0.08	.54	0.51	< .001	0.37	.005	0.46	< .001	0.37	7.75	< .001
DES	–0.07	.59	0.40	.002	0.15	.26	0.47	< .001	0.31	5.83	.001
CDS[c]	–0.17	.19	0.46	< .001	0.11	.40	0.37	.004	0.35	6.92	< .001
CADSS	–0.17	.21	0.38	.003	0.24	.07	0.36	.005	0.28	5.25	.001

[a]df = 56.
[b]df = 4,53.
[c]df is shown minus 1 (1 subject did not complete the CDS).
Abbreviations: CADSS = Clinician-Administered Dissociative States Scale, CDS = Cambridge Depersonalization Scale, DES = Dissociative Experiences Scale, IES-R-FU = Impact of Event Scale–Revised (follow-up).

Table 4. Simple and Multiple Correlations Between Baseline Posttraumatic Stress Subscales and Outcome

Outcome	Impact of Event Scale–Revised Subscales								
	Reexperiencing		Avoidance		Hyperarousal		All Scales Combined		
Variable	r[a]	p	r[a]	p	r[a]	p	R^2	F[b]	p
IES-R-FU	0.47	< .001	0.48	< .001	0.41	.002	0.30	7.77	< .001
DES	0.35	.007	0.30	.02	0.24	.07	0.15	3.17	.03
CDS[c]	0.32	.02	0.35	.008	0.16	.24	0.18	3.81	.02
CADSS	0.24	.07	0.42	.001	0.21	.11	0.18	3.90	.02

[a]df = 56.
[b]df = 3,54.
[c]df is shown minus 1 (1 subject did not complete the CDS).
Abbreviations: CADSS = Clinician-Administered Dissociative States Scale, CDS = Cambridge Depersonalization Scale, DES = Dissociative Experiences Scale, IES-R-FU = Impact of Event Scale–Revised (follow-up).

posttraumatic stress. It may be that guilt and shame exerted a more pathogenic influence over time, making it difficult to process and work through the impact of the attack. Studies have documented the role that shame and guilt can play in intensifying or prolonging posttraumatic stress and in impeding therapeutic recovery if they are not processed.[25–27]

The wide range of change in posttraumatic stress symptoms over time is of considerable interest. One year after the disaster, initial exposure and symptoms were no longer related to improvement in posttraumatic stress or lack thereof. Rather, both interim social support and comorbid persistent dissociation were strongly related to change in posttraumatic stress. This finding is in good accordance with prior disaster literature, which has underlined the importance of social support in recovery[5,6] and has also clearly shown that individuals who remain functionally impaired in the long term are those with detachment- and avoidance-type PTSD symptoms, reminiscent of dissociation.[7] Foa and Hearst-Ikeda[10] have hypothesized, in this regard, that the presence of dissociation interferes with improvement in posttraumatic stress by impeding the processing of the traumatic events and their associated memories and affects.

This study is limited by its small sample, especially for a disaster of this magnitude, as well as by its survey nature and convenience sampling. It also did not address preexisting psychopathology or predisposing risk factors prior to the September 11 attack, and therefore despite its longitudinal nature temporal attribution is limited by our inability to know what symptoms and predispositions might have been present prior to September 11. This limitation is especially applicable to dissociative symptoms at outcome: dissociation had been measured by a different scale peritraumatically, thus not permitting estimates of change in dissociation over the 1-year period. Still, all 3 dissociation scales had modestly to moderately elevated scores compared with those typically reported in nonclinical samples, rendering it quite plausible that these elevated scores were consequent to the disaster. Strengths of the study include its longitudinal design, good follow-up response rate, use of well-accepted scales, and thorough measurement of the frequently neglected dissociative symptoms.

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