Journal of Consulting and Clinical Psychology
1997, Vol. 65, No. 5, 811–820

0022-006X/97/$3.00

Traumatic Events: Prevalence and Delayed Recall in the General Population

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A random sample of 724 individuals across the United States were mailed a questionnaire containing demographic information, an abridged version of the Traumatic Events Survey (D. M. Elliott, 1992), and questions regarding memory for traumatic events. Of these, 505 (70%) completed the survey. Among respondents who reported some form of trauma (72%), delayed recall of the event was reported by 32%. This phenomenon was most common among individuals who observed the murder or suicide of a family member, sexual abuse survivors, and combat veterans. The severity of the trauma was predictive of memory status, but demographic variables were not. The most commonly reported trigger to recall of the trauma was some form of media presentation (i.e., television show, movie), whereas psychotherapy was the least commonly reported trigger.

Research conducted over the past 2 decades documents a relatively robust association between self-reported exposure to traumatic events and subsequent psychological distress. This association has been demonstrated across a variety of traumas, including natural disasters (e.g., Escobar, Canino, Rubio-Stipec, & Bravo, 1992; Green, 1993), imprisonment during war (e.g., Hunter, 1993; Sutker, Bugg, & Allain, 1991), combat experiences (e.g., Blake, Cook, & Keane, 1992; Kulka et al., 1990), adult physical assault (e.g., Loughrey, Curran, & Bell, 1993; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993), adult sexual assault (e.g., Burnam et al., 1988; Koss, 1993b), child physical abuse (e.g., Kolko, 1996; Pelcovitz et al., 1994), and child sexual molestation (e.g., Briere & Elliott, 1994; Polusny & Follette, 1995).

Among the long-term correlates of trauma are classic symptoms of posttraumatic stress disorder, including intrusive experiences (e.g., nightmares, flashbacks), avoidance and numbing (e.g., inability to recall parts of the trauma, emotional detachment), and anxious arousal (e.g., hyperactivity, restlessness). Other symptoms shown to be correlated with trauma are affective distress (e.g., anger, depression), cognitive distortions (e.g., guilt, self-blame, low self-esteem), somatization, and dissociation (for reviews, see Blank, 1993; Briere, 1997; Davidson & Foa, 1993; Herman, 1992a).

Psychogenic or dissociative amnesia is one potential dissociative response to trauma (see Loewenstein, 1993, for a review). The *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV;* American Psychiatric Association, 1994) highlights the potential impact of trauma in this disorder and indicates that trauma can produce various types of dissociative memory disturbance. Although dissociative amnesia is a recognized psychiatric diagnosis in this and previous editions of the *DSM,* it has come into particular focus in recent years because of the controversy surrounding the delayed recall of sexual abuse.

Beginning with a study by Herman and Schatzow (1987), followed by several others (e.g., Briere & Conte, 1993; Elliott & Briere, 1995; Feldman-Summers & Pope, 1994; Loftus, Polonsky, & Fullilove, 1994), researchers have studied self-reported loss of memory and subsequent recall as it specifically relates to child sexual abuse. The cumulation of these data suggests that a significant portion of self-reported victims of sexual abuse describe a period of time when they had no memory for part or all of their victimization, which was later recalled. The combined percentages of self-reported partial and complete memory loss and subsequent recall in these studies range from 31% to 64%.

Additionally, Williams (1994) conducted a prospective study on 129 women who had been identified as child victims of sexual assault during a study conducted in the mid-1970s. These women were reinterviewed in the early 1990s regarding the index case of sexual assault. Williams' data suggested that as many as 38% of these known victims of sexual abuse had no current memory of the abuse. An additional 16%, who remembered the assault at the time of data collection, reported a period of time in the past when they did not remember that the abuse had occurred (Williams, 1995). Women were more likely to report loss of memory for the abuse if they were younger at the time of the abuse and if the perpetrator was known to the victim. Women who reported prior loss of memory and subsequent recall for the abuse were no more likely to distort (either elaborate or minimize) their abuse than were women who reported continuous recall of the abuse.

Portions of this article were presented in August 1995 at the 103rd Annual Convention of the American Psychological Association, New York, NY, and in June 1996 at the NATO Institute on Recollections of Trauma in Talmont Saint Hilaire, France.

I express my appreciation to John Briere, who provided valuable input in the designing of this project and the revisions of the article. I am also grateful to the members of the Family Research Laboratory at the University of New Hampshire for their constructive feedback.

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Although less systematically studied, clinical and research data suggest that the occurrence of partial or complete loss of memory is not limited to sexual abuse but exists across a wide variety of traumas. Such memory difficulties have been observed in children who experienced natural disasters (e.g., Miller, Kraus, Tatevosyan, & Kamenchenko, 1993), individuals who were children in the Holocaust (e.g., Mazor, Gampel, Enright, & Orenstein, 1990), children who have been terrorized (e.g., Terr, 1994), victims of rape (e.g., Coons, Bowman, Pellow, & Schneider, 1989), adult torture victims (e.g., Goldfeld, Mollica, Pesavento, & Faraone, 1988), refugees (e.g., Kinzie, 1993), war veterans (e.g., Bremner et al., 1992) and concentration camp survivors (Auerhahn, Laub, & Peskin, 1993).

It is possible that some of the reports of memory loss and subsequent recall of events may be the results of normal forgetting. Read (in press), for example, pointed out that, when asked about unspecified (and not necessarily traumatic) events, 60% of the respondents reported at some point in the past having recalled at least one such event that they thought they had forgotten. However, despite the possibility of normal forgetting in this sample, a significant number of Read's respondents (44%) who reported recovering a memory believed that they would not have recalled the event if they had been asked about it before the point at which it was recalled. From these data, there appear to be at least two types of memory recovery: that which is relatively easily accessed simply from the individual's being asked (normal forgetting) and that which remains inaccessible even when the individual is asked about an unspecified event.

In contrast to normal forgetting, theoretical writers in the area of trauma have suggested that some memory loss in trauma survivors may reflect dissociative avoidance strategies developed by the victim to reduce trauma-related distress (e.g., Briere, 1996; Harvey & Herman, 1994; Polusny & Follette, 1995). From this perspective, traumatic memory loss may be understood as a form of avoidance conditioning, whereby access to memory is punished by the negative affect that accompanies the recall, thereby motivating the development of memory-inhibiting mechanisms. Such avoidance strategies might interfere with verbal memory at any point during rehearsal, storage, or retrieval of material (Bower, 1990; McFarlane, 1992). There are other reasons for memory loss, such as organic impairment, lack of significance of the event, and infantile amnesia. However, if access to events is lost because of avoidance conditioning, the more severe and chronic the trauma, the more painful the resultant affect should be, and thus, the more likely the victim's avoidance behavior would be reinforced (Briere, 1996, Herman, 1992b).

From an information-processing perspective, traumatic events that are not encoded or stored successfully would not be available for future recall (Bower, 1990; Terr, 1994). However, because some previously unavailable traumatic memories appear to be triggered by external stimuli (Harvey & Herman, 1994; van der Kolk, McFarlane, & Weisaeth, 1996), some memory disruption seems to occur at the retrieval level, rather than solely at rehearsal and storage levels. According to Tulving (1983), cues that assist in the recall of events are typically those that match the original encoded material. This suggests that dissociative avoidance strategies may be effective if they reduce an individual's responsiveness to relevant cues in the environment that otherwise may activate the original memory traces. However, when recognition cues are sufficient in number, intensity, or meaningfulness, they may overwhelm existing avoidance defenses, resulting in the emergence of previously unavailable memories. Extreme dissociative avoidance (i.e., in response to a highly aversive experience), however, might be relatively resistant to external cuing and, thus, less likely to remit in response to environmental triggers.

Understood from this perspective, dissociative amnesia for previous events would be best predicted by the severity of the trauma and most apt to be triggered by intrapersonal, interpersonal, or environmental cues that closely match the original trauma. Although certain forms of memory loss (e.g., infantile amnesia, normal forgetting, organic impairment) may best be predicted by demographic variables (e.g., age at time of trauma, length of time since the event, current age), avoidance-related traumatic memory loss should be less a function of demographic variables and more related to characteristics of the trauma.

To date, no study has explored delayed recall of multiple traumatic events in the general population. The present study expanded on the available literature as an examination of self-reported memory loss and subsequent recall (heretofore referred to as *delayed recall*) of traumatic events in a nonclinical sample and broadened the focus to multiple forms of trauma. My purpose in this study was to (a) examine the prevalence of various traumas reported in the general population; (b) investigate self-reported delayed recall across a variety of traumas; and (c) explore the relative role of demographic, trauma, and cuing variables in the recall of traumatic events. The available theory, research studies, and clinical experience led to four hypotheses.

First, it was hypothesized that some portion of participants who reported a history of each of 13 traumas would also report delayed recall of the trauma. Second, it was hypothesized that severity of the trauma (as measured by the age of onset, frequency of trauma, variety of traumas, and perceived level of distress created by the trauma) would predict memory status, with increased rates of delayed recall among participants with more severe trauma. Third, demographic variables were expected to predict memory status only to the extent that these variables were related to increased severity of the traumatic events. Finally, among participants who reported a history of delayed recall, cues to recall of the trauma were predicted to be most powerful if they were similar to aspects of the original trauma.

Method

Participants

As a part of a larger study on the prevalence and impact of trauma, a national, stratified, random sample of 800 individuals living in a household with a telephone or owning a registered automobile was computer generated by a national sampling service. According to the 1990 U.S. census, 95% of all households have telephones, allowing the database to tap the majority of Americans. The sample was stratified on the basis of geographic location and the density of households in counties across the United States. The 50 states were represented in the original sample on the basis of the percentage of the U.S. population living in each state.

A questionnaire was mailed to the 800 individuals with a cover letter requesting their involvement in a project on traumatic experiences and

adult psychological adjustment. (For information regarding other aspects of this study, see Elliott & Briere, 1995). The anonymity of their responses was also explained. Each participant was given $5 regardless of whether they chose to participate in the study. One week after the initial mailing, a postcard was sent to each participant, encouraging nonresponders to complete the questionnaire. Three additional follow-up mailings were sent to nonrespondents at approximately 3-week intervals (the last of which was sent by special 1-day U.S. Postal Service mail). After surveys that were inadvertently sent to deceased individuals and those that were undeliverable by the postal service were subtracted, the available respondent pool consisted of 724 individuals. Of these, 526 participants returned questionnaires, of whom 21 did not complete the majority of the trauma questions. Thus, the final sample was composed of 505 participants. This 70% response rate is consistent with the mean response rate of 72% in a number of other studies using mailed questionnaires with follow-up letters (see Dillman, 1978; Frankfort-Nachmias & Nachmias, 1992).

The mean age of participants in this sample was 46 years (SD = 16.6; range = 18–90 years). Fifty-five percent were female. Most participants were married (52%), Caucasian (73%), had a high school or trade school education (55%), were employed (61%), and had an annual family income between $20,000–$39,999 (32%). Just under 8% of the sample reported being in psychotherapy at the time of data collection. This sample is generally comparable with the 1990 U.S. Census data on most variables, although respondents were somewhat more educated than the general population. Table 1 provides detailed demographic and U.S. Census information.

Materials

The questionnaire included demographic questions, an abridged version of the Traumatic Events Survey (TES; Elliott, 1992) and memory questions about the traumatic events. The TES consists of a series of items inquiring about the participant's history of child and adult traumatic experiences. This study examined 13 types of trauma. These traumatic events are listed and defined in Table 2. The study relied on behavioral definitions of traumatic events because previous research suggests that as many as 67% of highly educated sexual abuse survivors did not endorse the question "Were you sexually abused prior to the age of 16?" but, nevertheless, positively endorsed behaviorally based questions indicating that they did have a sexual abuse history (Elliott & Guy, 1993). Similar definitional problems have been addressed in the study of rape (see Koss, 1993a). Thus, the methodology used is apt to have reduced the false-negative rate in the calculation of prevalence rates.

Participants were asked to indicate whether they had ever experienced each of 13 traumas. Following each trauma question, those who indicated that they had experienced the trauma were asked about characteristics of that experience. These included the ages at which the trauma occurred, how upsetting the experience was at the time of the trauma and at the time of data collection (rated on Likert-type scales ranging from 0 [*not at all*] to 3 [*very*]), and the number of times that particular traumatic event had occurred (1, 2–5, 6–10, 11–20, or 21+ incidents). Thus, participants who reported a history of more than one type of trauma provided characteristics of each type of trauma they reported.

Participants who indicated that they had experienced one or more types of trauma were then asked about their memory of each type of trauma. Two questions were asked to determine memory status: "Was there ever a period of time when you had less memory of this event than you do now?" (referred to hereafter as *partial memory loss*) and "Was there ever a period of time when you had no memory of this event?" (referred to hereafter as *complete memory loss*).[1] Participants were placed into one of three memory groups as follows: The continuous memory group contained individuals who reported continuous memory for all traumas they experienced, the partial memory group contained participants who reported partial memory for at least one trauma but no complete memory loss for any trauma, and the complete memory loss group contained participants who reported complete loss of memory for at least one trauma.

Participants with a self-reported history of either partial or complete memory loss were asked what their age was at the time of recall and what type of experiences cued their recall of the traumatic event. These questions were asked for each trauma for which the participant reported delayed recall of the event. Participants were asked to check all of the following that described their experience: (a) something happening similar to the experience; (b) a dream or nightmare; (c) some form of media presentation (e.g., news show, TV program, movie, book, or magazine); (d) seeing, hearing, or smelling something that reminded you of the experience; (e) something violent; (f) something sexual; (g) a conversation with a family member; (h) a conversation with someone other than a family member; (i) psychotherapy; and (j) other.

On the basis of the participants' responses to these questions, several variables were calculated. These included the number of trauma types reported (calculated by summing the number of positive responses to the 13 traumas), age at first trauma, age of most recent trauma, chronicity of trauma (calculated by summing the lowest point in each range [1, 2, 6, 11, and 21] on each of the frequency variables endorsed across the 13 traumas), and highest level of distress reported for any traumatic event.

Results

Some form of childhood or adult trauma was reported by 72% (n = 364) of the sample. Forty percent reported noninterpersonal trauma (e.g., natural disaster or major motor vehicle accident), 43% witnessed violence (e.g., parental spousal battery, combat injury, or the murder of a loved one), and half of all participants reported being a victim of some form of interpersonal violence (e.g., child abuse, physical assault, rape). Table 3 provides a breakdown of the prevalence of the reported traumas.

Prevalence of Delayed Recall

As hypothesized, some proportion of participants who reported a history of trauma also reported a history of partial or complete memory loss for the trauma. Table 4 provides a breakdown of specific traumatic events according to memory status. Overall, among participants with a history of trauma who responded to the memory questions (n = 357; 98% of all trauma victims), 17% (n = 62) reported a period of time in which

[1] The survey actually contained three (rather than two) questions intended to assess memory loss and subsequent recall. To assess potential misinterpretations of these items, I asked 30 individuals who were not involved in the present study (clerical workers and laborers at a large hospital) a series of questions about these items. The two questions examined in the present study were understood by 96% of these individuals to refer to a lack of access to memory (rather than normal forgetting or an active attempt to avoid the memory). The third question was intended to examine what Ofshe and Watters (1994) referred to as robust amnesia: "Did you suddenly remember the event, but up until that time had no memory of it?" This question was not understood by one third of these individuals and, therefore, was not included in the present analyses. A self-reported history of trauma was unrelated to understanding the items correctly.

Table 1
Sample (N = 505) and 1990 U.S. Census Demographic Data

Variable	*n* in sample	% in sample	% in 1990 U.S. Census
Sex			
Female	280	55.4	52.1
Male	225	44.6	47.9
Age			
18–34	155	30.7	37.7
35–54	183	36.2	33.9
55–74	137	27.1	20.2
75+	30	5.9	7.1
Race			
Asian	11	2.2	2.9
Black	66	13.1	12.1
Caucasian	369	73.1	70.3
Hispanic	40	7.9	9.0
Native American	9	1.8	0.8
Other	10	2.0	3.9
Marital status			
Never married	99	19.7	26.9
Married	263	52.4	54.8
Separated–divorced	82	16.3	10.9
Widowed	58	11.6	7.4
Region of residence			
New England/Mid-Atlantic	94	18.7	20.6
South Atlantic	91	18.0	17.9
East Central	120	23.7	23.0
West Central	87	17.2	13.3
Mountain	29	5.7	5.5
Pacific	84	16.6	15.1
Education			
Less than high school	79	15.7	24.8
High school–trade school	284	56.3	54.9
Bachelor's degree	86	17.1	13.1
Graduate degree	55	10.9	7.2
Employment status			
Employed	298	59.2	61.2
Unemployed	31	6.2	4.1
Not in work force	174	34.6	34.7
Total household income			
Less than $20,000	158	31.5	
<$25,000			41.8
$20,000–$39,999	162	32.3	
$25,000–$49,000			33.7
$40,000–$69,999	113	22.6	
$50,000–$75,000			15.0
$70,000–$99,999	45	9.0	
$75,000–$99,000			5.1
More than $100,000	23	4.6	4.4
Current treatment status			
Not in psychotherapy	464	92.1	—
In psychotherapy	40	7.9	—

they had less memory of at least one traumatic event than they did at the time of data collection (but no complete loss of memory for any event). An additional 15% (n = 53) reported a period of time in which they had no memory of at least one traumatic event.

Participants were most likely to report continuous memories of adult sexual assault that did not include penetration (94%), major motor vehicle accidents (92%), and natural disasters (89%). A history of partial memory loss was most common when an individual had witnessed the murder or suicide of a loved one (38%), had been a victim of child sexual abuse (22%), and had been a victim of child physical abuse (22%). A history of complete memory loss was most common among victims of child sexual abuse (20%), witnesses of combat injury (16%), victims of adult rape (13%), and witnesses of domestic violence as a child (13%).

Trauma Severity and Memory Status

To determine whether various aspects of the trauma were related to memory status, I examined variables that tapped trauma severity using a one-way analysis of variance (ANOVA), followed up with post hoc Tukey *B* tests. To address the experimentwise error rate inflation associated with multiple statistical tests, I required a minimal alpha level of .01 for results to be considered significant in this study. As shown in Table 5, those who reported delayed recall (partial or complete memory loss) of any trauma also reported significantly (a) more types of trauma, (b) more distress about a trauma (both at the time of the event and at the time of data collection), and (c) a younger age at the time of the earliest trauma.

The relationship between age and a history of memory loss could be due to the normal lack of recall for events occurring in the first 3 to 4 years of life (i.e., infantile amnesia) for those victimized in early childhood (Loftus, 1993). To examine this hypothesis, I completed a second analysis, deleting the 24 participants who reported trauma before age 5. This produced no change in the results, with memory loss more frequently reported when the trauma occurred at a younger age: comparing all participants with a reported trauma history, $F(2, 339) = 7.91$, $p < .001$; comparing all participants who reported trauma occurring after age 4, $F(2, 315) = 8.52$, $p < .001$.

Demographics and Memory Status

It was hypothesized that demographic variables would predict memory status only to the extent that these variables were related to increased severity of the traumatic events. To test this hypothesis, I conducted t tests and cross-tabulation analyses on the demographic variables. The results indicate that none of the following variables were significantly related to memory status: age, $t(357) = 0.39$, *ns;* sex, $\chi^2(2, N = 357) = 0.59$, *ns;* region of residence, $\chi^2(10, N = 357) = 6.87$, *ns;* marital status, $\chi^2(4, N = 324) = 3.74$, *ns;* education, $\chi^2(6, N = 357) = 1.62$, *ns;* employment status, $\chi^2(4, N = 357) = 8.60$, $p = .072$; income, $\chi^2(6, N = 355) = 7.64$, *ns;* or treatment status, $\chi^2(2, N = 356) = 1.01$, *ns*. Race was the only demographic variable that approached significance in predicting memory status, although not at the more stringent alpha of .01, $\chi^2(6, N = 357) = 13.35$, $p = .038$. Specifically, Caucasians reported continuous memory of traumatic events at a greater rate than did Blacks, Hispanics, or respondents of other racial groups (70% vs. 64% vs. 57% vs. 62%, respectively).

Because this difference was of interest, despite its only marginal statistical significance, I used a series of one-way ANOVAs to examine the relationship between severity of the trauma and race. Results indicated that Blacks, Hispanics, and respondents of other racial groups were more likely than Caucasians to have reported significantly more types of trauma, $F(3, 364) = 13.81$, $p < .001$; were more chronically traumatized, $F(3, 363) =$

Table 2
Definitions of Traumatic Events as Used in the Survey

Traumatic event	Definition
	Noninterpersonal trauma
Natural disaster	Had been in a major earthquake, fire, flood, hurricane, or tornado that resulted in significant loss of personal property, serious injury to self or significant other, death of significant other, or fear of death for self
Motor vehicle accident	Had been in a major automobile, boat, motorcycle, plane, or train accident that resulted in significant loss of personal property, serious injury to self or significant other, death of significant other, or fear of death for self
	Witnessed trauma
Death of child <18	As a parent, had a child die who was under age 18 at the time of death
Witnessed nondomestic violence	Witnessed a nonfamily member being killed or injured by another person so as to result in marks, bruises, blood, or broken bones
Murder or suicide of a loved one	Witnessed the murder or suicide of a parent, sibling, lover, spouse, child, or loved one
Witnessed combat injury	Witnessed the injury or death of another person while engaged in military action
Witnessed domestic violence	Witnessed a parent or caretaker hit another family member so as to result in marks, bruises, blood, broken bones, or broken teeth prior to you reaching the age of 18
	Experienced interpersonal violence
Adult physical assault	Was hit by another person so as to result in bruises, marks, blood, broken bones, or broken teeth subsequent to reaching the age of 18
Adult rape	Was threatened with violence or physically forced to have sexual contact that resulted in anal, oral, or vaginal penetration subsequent to reaching the age of 18
Adult sexual assault	Was threatened with violence or physically forced to have sexual contact (such as fondling of the genital area) that did not include sexual penetration subsequent to reaching the age of 18
Child physical assault	Was hit by a noncaretaker prior to reaching the age of 18, so as to result in bruises, marks, blood, broken bones, or broken teeth
Child physical abuse	Intentionally hit, beaten, or thrown by a parent or caretaker such as to result in bruises, marks, blood, broken bones, or broken teeth prior to reaching the age of 18
Child sexual abuse	Sexual contact ranging from fondling to intercourse that occurred prior to reaching the age of 18 either (a) with someone 5 or more years older than the participant or (b) with someone who threatened physical violence or used physical force

6.82, $p < .001$; and were more distressed by the trauma at the time of data collection, $F(3, 358) = 3.70$, $p < .012$. Race was unrelated to the age at first trauma and the level of distress at the time of the trauma.

To clarify the relationships among race, trauma characteristics, and recall, I performed a logistic regression, predicting reports of continuous versus delayed recall (either partial or complete memory loss) of the traumatic event. At Step 1, the three trauma variables significantly related to race were entered simultaneously into the equation. At Step 2, the race variable (three dummy codes to capture each of four groups) was entered. As expected, the set of trauma variables predicted memory status, $\chi^2(3, N = 348) = 30.30$, $p < .001$. However, adding race to the equation failed to predict any additional variance, $\chi^2(3, N = 348) = 0.45$, *ns*.

Cues That Triggered Recall

The last set of analyses was completed only on participants who reported a history of delayed recall of a traumatic event. Table 6 indicates various memory cues reported to trigger recall of the traumatic events. Across traumas, participants reported that recall was most commonly triggered by some form of media presentation (54%), an experience similar to the original trauma (37%), and a conversation with a family member (37%). Recall of the trauma was least likely to have been triggered by a sexual experience (17%) or psychotherapy (14%). As can be seen from Table 6, however, cues to recall vary across trauma type.

To examine whether cues to recall of the trauma would be more powerful if they were similar to the original trauma, I calculated two dummy-coded variables. Participants were categorized according to whether they reported delayed recall of (a) a violent trauma (i.e., witnessed violent crime, physical assault, adult sexual assault, or child sexual abuse in which physical force was used) and (b) a sexual trauma (i.e., adult sexual assault or child sexual abuse). Of the 115 participants who reported delayed recall, 79% involved a violent trauma and 47% involved a sexual trauma. I performed cross-tabulations to determine whether (a) a violent experience cue to recall of

Table 3
Prevalence of Reported Traumas (N = 505)

Type of trauma	*n*	%
Noninterpersonal trauma		
Major motor vehicle accident	135	27
Natural disaster	115	23
Total	201	40
Witnessed trauma		
Death of a child under 18	28	6
Witnessed nondomestic violent crime	105	21
Witnessed murder or suicide of a loved one	24	5
Witnessed or experienced combat injuries	33	7
Witnessed domestic violence as a child	126	25
Total	217	43
Experienced interpersonal violence		
Adult physical assault	115	23
Adult rape	32	6
Adult sexual assault	32	6
Child physical assault	33	7
Child physical abuse	102	20
Child sexual abuse	116	23
Total	250	50
All traumas combined	364	72

memory would be more likely if the participant reported delayed recall of a violent trauma and (b) a sexual experience cue to recall of memory would be more likely if the participant reported delayed recall of a sexual trauma.

Chi-square analyses revealed that participants who reported delayed recall of a sexual trauma were more likely to have their memory cued by another sexual experience than were participants who had delayed recall of a nonsexual trauma (35% vs. 0%), $\chi^2(1, N = 115) = 25.71, p < .001$. Similarly, participants who reported delayed recall of a violent trauma were more likely to have their memory cued by another violent experience than were participants who reported delayed recall of nonviolent traumas (35% vs. 3%), $\chi^2(1, N = 115) = 11.69, p < .001$.

Discussion

To my knowledge, this is the first published study to examine the issue of delayed recall of different types of traumatic events in a random sample of individuals from the general population. The sample size allowed for relatively uncommon events to be examined and provided reasonable statistical power in tests of associations between memory status and trauma variables.

The findings of the present study suggest that a history of trauma is common in the United States. For example, 40% of respondents experienced a major motor vehicle accident or natural disaster, 43% had witnessed violence, and 50% had been the victims of interpersonal violence. The victimization rates found in this sample generally parallel those found in similarly designed studies of the general population (for a review, see Briere, 1997).

These data also suggest that delayed recall of traumatic experiences may not be uncommon, with some proportion of individuals reporting impaired recollection for virtually every type of trauma. This phenomenon appears to be more common among events considered particularly upsetting or distressing (e.g., among childhood sexual abuse survivors, those who witnessed the murder or suicide of a loved one, and veterans who witnessed combat injury) and less common for events that contained no interpersonal violence (e.g., major motor vehicle accidents, disasters, and having had a child die under the age of 18).

Table 4
Recall Status According to Trauma Type on the Subsample of Participants Reporting a Trauma History (N = 357)

	Continuous recall		Partial memory loss		Complete memory loss	
Type of trauma	*n*	%	*n*	%	*n*	%
Noninterpersonal trauma						
Major motor vehicle accident	109	92	6	5	4	3
Natural disaster	90	86	11	11	4	4
Witnessed trauma						
Death of a child under 18	25	89	3	11	0	0
Witnessed nondomestic violent crime	89	87	6	6	7	7
Witnessed murder or suicide of a loved one	14	58	9	38	1	4
Witnessed or experienced combat injuries	20	62	7	22	5	16
Witnessed domestic violence as a child	87	71	20	16	16	13
Experienced interpersonal violence						
Adult physical assault	98	86	11	10	5	4
Adult rape	25	78	3	9	4	13
Adult sexual assault	30	94	1	3	1	3
Child physical assault	27	84	2	7	3	19
Child physical abuse	74	76	14	14	9	9
Child sexual abuse	67	58	26	22	23	20
All traumas combined	242	68	62	17	53	15

Table 5
Characteristics of Trauma as They Relate to Memory Status Among Participants Reporting a Trauma History (N = 357)

Trauma characteristics	Continuous memory (n = 242)		Partial memory loss (n = 62)		Complete memory loss (n = 53)		$F(2, 354)$ ratio
	M	SD	M	SD	M	SD	
No. of traumas experienced (1–13)	2.6_a	1.7	3.1_b	1.8	3.2_b	1.8	4.94*
Frequency of traumatization	13.1	20.7	17.9	19.2	18.9	23.9	4.54
Level of distress from the trauma at the time of the trauma (0–3)	2.6_a	0.7	$2.8_{a,b}$	0.5	2.9_b	0.4	4.06*
Level of distress from the trauma at the time of data collection	1.5_a	1.2	2.2_b	0.9	2.1_b	0.9	15.04**
Age at first trauma	17.3_a	14.5	11.5_b	6.5	11.4_b	9.8	7.91**
Age at first trauma (excluding trauma that occurred before age 5)	18.3_b	14.5	11.7_b	6.5	12.7_b	9.9	8.52**

Note. Means not sharing a common subscript are significantly different at $p < .05$.
* $p < .01$. ** $p < .001$.

Race was the only demographic variable that was even marginally associated with delayed recall of a trauma, and the race–memory relationship was mediated by the severity of the trauma experienced. However, several characteristics of trauma severity predicted memory status. Such data support an avoidance defense mechanism hypothesis as a partial explanation for the findings, because more traumatic events would appear more likely to be remembered, not forgotten, if no defensive response were involved.

For those who reported a history of memory loss for a trauma, subsequent recall was most commonly cued by some form of media presentation. As predicted, cues to recall were more powerful if they shared some similarity to aspects of the original trauma. For example, no respondents who reported delayed recall of nonsexual trauma had their memory triggered during a sexual experience, compared with 35% of those who reported delayed recall of a sexual trauma. This is consistent with the notion that traumatic memory may be encoded at the sensorimotor level and subsequently recalled when there are sufficient affective and environmental cues to the traumatic event (see, e.g., van der Kolk et al. 1996).

The nonclinical nature of the sample addresses one of the appropriate criticisms by Loftus (1993) of earlier clinical research studies in the area of child sexual abuse. Loftus suggested that psychotherapy clients may report or affirm delayed recall (or repressed memory) of a traumatic event to fulfill the expectation of their therapist or in response to the therapist's use of so-called memory recovery techniques. Using a random sample of the general population reduces this potential bias and, thus, is apt to reduce the potential number of false-positives. The finding of a relatively high prevalence of delayed recall reported in the present sample suggests that trauma may impact memory not only for individuals in clinical groups or among those experiencing social distress but for individuals in all strata of society.

The present study shares certain limitations with other studies in this area. First, this study relied on retrospective self-reports

Table 6
Cues to Delayed Recall According to Traumatic Event (N = 115)

Traumatic event	n	Media presentation	Something similar to trauma	Talk with family member	Talk with nonfamily member	Dream or nightmare	Violent experience	Sensory experience	Sexual experience	Psychotherapy	Other
Major motor vehicle accident	10	60	70	20	20	10	10	10	0	0	10
Natural disaster	15	60	47	40	33	10	0	33	0	0	13
Witnessed nondomestic violence	13	46	31	39	31	23	31	23	0	0	8
Witnessed murder–suicide	10	10	40	80	50	20	0	20	0	20	10
Death of a child under 18	3	0	0	67	0	0	0	33	0	67	0
Witnessed combat injuries	12	75	17	17	58	50	25	50	0	25	8
Witnessed domestic violence	36	42	31	42	19	11	33	14	3	5	11
Adult physical assault	16	56	56	12	25	19	50	19	13	19	13
Adult sexual assault	8	75	50	0	13	38	25	38	88	13	13
Child physical assault	5	60	40	60	40	40	80	60	0	0	0
Child physical abuse	23	52	35	57	22	17	35	13	0	4	17
Child sexual abuse	49	55	29	20	16	16	8	16	29	14	20
All traumas combined	115	54	37	37	27	24	28	23	17	14	17

Note. Percentages total to more than 100% because participants could endorse more than one cue to recall.

of trauma and memory. As with any study using such data, there is the possibility of bias, the nature and direction of which is not always clear (Briere, 1992). For example, most studies examining historical aspects of participants' lives (e.g., divorce, treatment status, alcohol usage) may contain both false-positives and false-negatives. To date, there are no data available regarding the accuracy of self-reported trauma histories or the conditions under which biases are more (or less) likely to occur. In the present study, I sought to reduce any unintentional misreporting by providing behaviorally based descriptions of each of the traumas and by providing participants with complete anonymity.

Certain authors have been critical of questions used to assess a prior history of delayed recall for traumatic events. Loftus and her colleagues (Loftus et al., 1994) pointed out that prevalence rates of delayed recall (or repressed memories) in self-report retrospective studies rely on the participants' correct interpretation of the question as intended by the researcher. They suggested, for example, that participants might have endorsed items indicative of delayed recall if they "spent one nice summer in Europe where [they] didn't think about the abuse at all" (p. 81). Read (in press) has reported that 66% of individuals who indicated they "recalled an [unspecified] experience or series of experiences that [they] had 'forgotten' about for some extended period of time" had simply failed to think about the unspecified event.

The extent to which the questions used in the present study may have been misunderstood by participants is unclear. However, a pretest of the questions used in this study indicated that 96% of the individuals understood the questions to refer to a period of time in which an individual was unable to access part or all of the memory of the traumatic event, as opposed to simply not thinking about the trauma. Additionally, participants in the present study went on to record their age at recall of each specific trauma and indicated what it was that cued their recall. Given these data, misinterpreting the question to be about normal forgetting is not likely to be a sufficient explanation for the memory findings reported here.

The "false memory–delayed recall debate" in the child sexual abuse field (see Enns, McNeilly, Corkery, & Gilbert, 1995, for a review) has brought into question certain clinical assumptions and observations regarding posttraumatic symptomatology, particularly as it relates to delayed recall for traumatic events. Proponents of the false memory position, for example, question the validity of the construct of psychogenic or dissociative amnesia per se (see Gardner, 1993; Loftus, 1993; Ofshe & Watters, 1994). They suggest that it is impossible for traumatic events (particularly chronic sexual abuse) to be "forgotten." Rather, they assert, it is the traumatic quality of such events that fix them in memory. These authors hypothesize that when delayed recall is reported, it is the result of questionable therapy interacting with high levels of client suggestibility or it is motivated by financial gain. The present data, however, call into question these assumptions.

This study does not support the notion that delayed recall is limited to sexual abuse. It suggests that the phenomenon occurs across a variety of traumas and is especially high for particularly traumatic events involving interpersonal victimization. The data suggest that demographic variables do not distinguish participants who report continuous recall from those who reported delayed recall, with no age, sex, regional, educational, income, or treatment status differences (see Elliott & Briere, 1995, for parallel findings among the subsample of individuals with a reported history of sexual abuse).

With regard to the claim of therapy-based iatrogenesis, only 14% of participants in the present study who reported delayed recall of a trauma reported having their memory triggered during the course of psychotherapy. Even if all individuals who had ever been in treatment reported delayed recall of trauma (a conservative assumption), 86% of the sample, nevertheless, reported recovering memory through other means. This finding suggests that the process of psychotherapy, per se, does not intrinsically explain the recovered memory phenomenon. Rather, these data suggest that, like other posttraumatic stress responses, intrusion of previously avoided memory can be cued by environmental stimuli, perhaps in the same way as has been documented with posttraumatic flashbacks (American Psychiatric Association, 1994).

Some authors have suggested that individuals who claim to have delayed recall of childhood trauma may be motivated to do so for the purposes of financial gain (e.g., Gardner, 1993). Several states have extended statutes of limitations allowing adult survivors of child abuse to make civil complaints against their alleged perpetrator when the survivor previously has been amnestic for the abuse. Although it may be argued that the high rate of delayed recall of sexual abuse memories in the present study reflects such social dynamics, the nonforensic, anonymous, random-sampling methodology used here does not appear to motivate false reports on the basis of financial gain. Additionally, not all delayed-recall reports are associated with potential financial reward. Participants who were unlikely to be compensated regardless of delayed-recall status (e.g., those who witnessed the suicide of a loved one), nevertheless, reported delayed recall in this study. Additionally, war veterans often are compensated for their injury regardless of their memory status, yet 38% reported delayed recall for aspects of their war experience. Thus, intentionally misrepresenting reports of delayed recall for the purposes of financial gain is an unlikely explanation for the findings in this study.

As previously noted, the best predictor of memory status was the severity of the trauma, rather than demographic variables. These findings suggest that the traumatic impact of the event—rather than childhood amnesia, normal forgetting, secondary gain, or iatrogenic treatment effects—provides a good conceptual fit to the data. Many authors (e.g., Herman, 1992b; Terr, 1994; van der Kolk et al., 1996) have noted that traumatic memory is a complex phenomenon that involves biological, cognitive, and psychological aspects that may vary from traditional notions of "normal" memory. In this regard, future research might focus on such processes as they relate to normal versus traumatic encoding, forgetting, and recalling.

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Received April 6, 1996
Revision received October 6, 1996
Accepted April 10, 1997 ■