

*J. Michael Rivard,<sup>1</sup> M.D.; Park Dietz,<sup>2</sup> M.D., Ph.D.; Daniel Martell,<sup>3</sup> Ph.D.;  
and Mel Widawski,<sup>4</sup> M.A.*

## Acute Dissociative Responses in Law Enforcement Officers Involved in Critical Shooting Incidents: The Clinical and Forensic Implications\*†

**ABSTRACT:** The authors examine the prevalence of acute traumatic dissociative responses in a group of 115 law enforcement officers involved in critical incidents. Law enforcement officers were retrospectively surveyed for the presence of dissociative symptoms at the time of the critical incident, as well as for the presence of acute stress symptoms and posttraumatic stress symptoms. Results show that 90% of the officers reported experiencing a dissociative response during the critical incident. Thirty percent meet the Dissociative Criterion B of acute stress disorder under the DSM-IV. The mean number of dissociative symptoms in this group was two and one-half. In addition, 19% of the law enforcement officers reported varying forms of memory impairment for details of the incident. There were no reports of amnesia for the entire event. The clinical, forensic, and legal implications of these preliminary findings are discussed in this paper.

**KEYWORDS:** forensic science, law enforcement, critical incidents, acute traumatic dissociation, peritraumatic dissociation, memory impairment, dissociative amnesia, acute stress responses, acute stress disorder, posttraumatic stress disorder

Law enforcement officers bear one of the most public and visible positions in society. In discharging their responsibility to protect and serve their communities, officers face the ever-present danger of traumatic death during critical shooting incidents. Critical shooting incidents are defined as those incidents in which law enforcement officers witness the loss of and/or serious injury to human lives. Critical incident stress responses in police officers merited sufficient attention that the FBI Academy held a special conference on this topic (34). Violanti (41) reported that approximately one million police officers had been assaulted since 1960, resulting in the murder of 2129 police officers and physical injury to another 328,000 officers. In the ten-year period from 1988 to 1997, 621,881 law enforcement officers were assaulted (19). Nationwide, an average of 11 out of every 100 law enforcement officers were assaulted in 1997. In that year, a total of 49,151 line-of-duty assaults were reported. Firearms were used against the law enforcement officers in

1,844 (approximately 4%) of these assaults. Another 13% of the officers were attacked with knives or other dangerous weapons.

Law enforcement officers place their lives, physical health, and psychological health at risk in their effort to protect society, and even those who survive critical incidents without physical injury may suffer psychological sequelae. Several studies have examined the prevalence of posttraumatic stress symptoms in law enforcement officers following critical incidents (12,13,15,21,27,30,31,39,43). These studies indicate that posttraumatic stress disorder (PTSD) occurs in 5–50% of law enforcement officers involved in critical incidents.

Despite the frequency with which law enforcement officers are confronted with critical incidents and the relatively high rates of posttraumatic responses, there have been few studies on the prevalence of acute traumatic dissociation in law enforcement officers (24,38). No study has examined the relationship between acute traumatic dissociation and PTSD in law enforcement officers involved in critical incidents, despite evidence that dissociation at the time of the traumatic event is strongly associated with the later development of PTSD (35). Knowledge of acute traumatic dissociation in officers may be relevant because it could effect an officer's appraisal of the traumatic event, level of functioning during the traumatic event, memory for the event, and psychological outcome following the critical incident.

Studies on civilian populations indicate that acute traumatic dissociation occurs among 30–79% of trauma victims (2,3,9,17,18,32, 35–37,40,42). In addition, several studies from the trauma literature have supported a strong relationship between acute traumatic dissociation and the development of PTSD (6,14,23,26,28). Based on this body of research, the diagnosis of acute stress disorder (ASD) was introduced into the Diagnostic and Statistical Manual of Mental Disorders (1) in 1994.

<sup>1</sup> Private practice in forensic psychiatry, 1241 Johnson Avenue #319, San Luis Obispo, CA.

<sup>2</sup> Clinical Professor of Psychiatry and Biobehavioral Sciences, UCLA School of Medicine; President, Park Dietz & Associates, Inc., Newport Beach, CA.

<sup>3</sup> Clinical Assistant Professor of Psychiatry and Biobehavioral Sciences, UCLA School of Medicine; Affiliated with Park Dietz & Associates, Inc., Newport Beach, CA.

<sup>4</sup> Affiliated with UCLA School of Medicine, Department of Biostatistics.

\* Presented at the 53rd Annual Meeting of the American Academy of Forensic Sciences, February 2001, Seattle, WA and at the 32nd Annual Meeting of the American Academy of Psychiatry & the Law, October 2001, Boston, MA.

† 2001 Award Winner/Richard Rosner Award for the Best Paper by a Fellow in Forensic Psychiatry or Forensic Psychology.

Received 27 Aug. 2001; and in revised form 29 Nov. 2001, 10 Jan. 2002; accepted 10 Jan. 2002; published 17 July 2002.

ASD was conceptualized as an acute form of PTSD that occurs within four weeks of a traumatic experience. In contrast to PTSD, a diagnosis of ASD requires that an individual experience three of the following five acute traumatic or peritraumatic dissociative symptoms during or after the traumatic event: numbing, detachment, or absence of emotional responsiveness; a reduction in awareness of surroundings; derealization; depersonalization; or dissociative amnesia. In addition to this core feature (Criterion B) in ASD, an individual must also experience intrusion, avoidance, and arousal symptoms. For symptoms lasting longer than four weeks, a diagnosis of PTSD should be considered. Appendix I presents the diagnostic criteria for ASD.

Whether ASD represents a distinct mental disorder as opposed to a more pathological variant of acute stress response remains unclear. Nonetheless, the inclusion of ASD in the DSM-IV has generated research into acute traumatic dissociative responses. Several of these studies further support acute traumatic dissociation as a risk factor for the later development of PTSD (7,17,22,29,35,37,40).

Whether acute traumatic dissociation represents an adverse or adaptive consequence of trauma remains debated. The term dissociation is broadly defined in the DSM-IV (1) as the “disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment.” This “dissociative” disruption may be sudden or gradual, transient or chronic. In this study, acute traumatic dissociation is operationally defined as a sudden, transient change in perception, identity, or memory resulting from a life-threatening traumatic event. Within the police literature, Reiser and Greiger (33) were among the first to comment on dissociative phenomena. They noted, “dissociation makes it appear as if the officer is watching a movie rather than being a participant” in the critical incident and concluded that “perceptual shifts” seem to occur more often than not and are considered typical.

The prevalence of acute traumatic dissociation in law enforcement officers comes from only two studies. The first was by Solomon and Horn (38), who reported a variety of perceptual distortions. In a sample of 86 police officers, they found that 83% reported time distortion, with 67% of the subjects reporting “slow motion” and 15% reporting “fast motion.” A total of 63% of the subjects reported auditory distortion, with 51% reporting “diminished sound” and 18% reporting “intensified sound.” Finally, 56% reported visual distortions, with 37% reporting “tunnel vision” and 18% “heightened detail.” They also concluded that there is wide variation in post-shooting reactions, with approximately two out of three officers involved in a shooting experiencing a moderate to severe reaction.

The second study on acute traumatic dissociation (24) reported that 90% of the officers surveyed experienced some form of perceptual disturbance. Specifically, they found that 74% of the subjects reported auditory distortion, with 51% of the officers reporting “sounds were quieter,” and 23% reporting “sounds were louder.” A total of 86% of the subjects reported visual distortion, with 45% experiencing “tunnel vision,” and 41% experiencing “increased attention to detail.” A total of 61% of the subjects reported time distortion, with 41% reporting that “time slowed down,” and 20% reporting that “time sped up.” Finally, 22% of the officers reported “memory loss” for part of the incident, which the authors suggest might be relevant, particularly since an officer may be asked to testify about his or her actions at some point in the future.

The primary objective of the present study was to estimate the prevalence of acute traumatic dissociation in a sample of 115 law enforcement officers involved in critical shooting incidents. This study also sought to determine the prevalence of acute and post-

traumatic stress symptoms in officers and to identify risk factors that may predispose a law enforcement officer to acute traumatic dissociation and/or subsequent posttraumatic stress symptoms. Finally, the study sought to estimate the prevalence of reported forms of memory impairment for details of the traumatic event, since the inability to recall an important aspect of the trauma is a symptom of ASD as well as PTSD. This kind of information has important clinical implications in the evaluation and treatment of law enforcement officers, as well as forensic and legal implications.

## Methods

### Subjects

The study’s nonrandom sample was a convenience. Through the FBI Behavioral Science Unit, questionnaires were distributed to active law enforcement officers, seeking the participation of any who had experienced a critical shooting incident during their career and were willing to complete the anonymous survey. A total of 122 federal and local law enforcement officers completed this retrospective, self-report trauma survey. The response rate is unknown, for there is no measure of the number of shooting-involved officers who declined to participate. All officers participated voluntarily and were informed about the purpose of the study. Seven subjects failed to complete one or more of the sections and were excluded from the sample. The 115 subjects (94%) who completed the questionnaire represented an all male sample. The subjects ranged in age from 18 to 44, with a mean age of 28.6 years (SD 5.71). They had been in law enforcement from less than one year to 21 years, with a mean of 5.7 years of experience (SD 4.93). Questionnaires were completed a mean of 9.26 years after the critical shooting incident (SD 6.69) with a range from 1–29 years.

### Instruments

The measurement instrument was a retrospective self-report trauma survey developed by one of the authors, Dr. Park Dietz, in the early 1980s. While having face validity, the measurement instrument had no established validation or reliability psychometrics. Survey items were primarily scored in a “yes/no” dichotomous format. Participants were asked their age at the time of the shooting, the type of service at the time of the shooting, the circumstances of the shooting incident, the number of years of law enforcement they had to the time of the shooting, and gender. Subjects were also asked whether they had sustained physical injury and whether they had suffered a head injury or loss of consciousness or had consumed drugs or alcohol prior to the critical incident. Experiences preceding the critical shooting incident included respondent’s mental expectation of becoming involved in a critical shooting incident. Acute dissociative experiences during the incident, somatic experiences during the incident, and the respondent’s memory of the incident were also evaluated. Dichotomously scored items relating to psychological experiences after the incident included acute stress symptoms, posttraumatic stress symptoms, and whether the respondent experienced depression. Additionally, the length of time the symptoms were experienced, the type of support or help sought, extent of disability, and the respondent’s overall view of their experience were elicited.

*Dissociative and Memory Items*—A total of 31 dichotomously scored items were used to measure potential dissociative experiences during a critical incident, and 9 dichotomously scored items were used to score respondent’s memory of the incident. Appendix II presents the dissociative and memory items used in the survey.

**Diagnostic Criteria**—Current DSM-IV criteria were used to define acute stress disorder and posttraumatic stress disorder with one exception. Because the survey elicited a two-week and six-month cut off, rather than the DSM-IV criteria of a thirty-day cut off, we considered posttraumatic stress symptoms and disorder to be present when subjects reported symptoms lasting greater than six months. Acute stress symptoms and disorder were considered to be present when symptoms lasted more than two days but less than six months.

Because only three subjects fulfilled DSM-IV criteria for PTSD we also investigated those individuals who suffered clinically significant PTSD symptoms, but did not fulfill DSM-IV criteria for PTSD. The concept of “partial PTSD” was introduced to describe subsyndromal forms of PTSD symptoms, which contribute to impairment in an individual who does not meet full DSM-IV criteria (5,11). Respondents were considered to have experienced clinically significant PTSD symptoms if the minimum number of symptoms for the re-experiencing criterion and either the avoidance criterion or the hyperarousal criterion were met, in addition to fulfilling the other PTSD criteria. Similarly, for ASD we considered respondents as having experienced acute stress disorder symptoms if they had experienced at least two of four dissociative symptoms from Criterion B of ASD, reported symptoms from the re-experiencing criterion, and reported symptoms from either the avoidance or hyperarousal criteria of ASD.

Finally, the report of memory impairment for details of the event was not included as an acute dissociative symptom, since these reports could not be presumed to be dissociative amnesia, based on the retrospective nature of the survey. This avoided implying a false relationship between acute traumatic dissociation and PTSD symptoms.

#### Statistical Analysis

Frequency tables and percentages of dissociative symptoms experienced during the critical incident were calculated, as well as acute and posttraumatic symptoms experienced after the incident. Logistic regression was used to demonstrate the relationship between predictor (independent) variables and dichotomous criterion (dependent) variables, such as meeting the ASD Criterion B for dissociative symptoms. When the criterion variable was continuous, such as the total number of dissociative symptoms endorsed, multiple linear regression was used. All statistical tests were carried out using SPSS for Windows, release 9.0.0 (1998).

## Results

#### Frequency of Acute Traumatic Dissociative Symptoms

**Total Number of Dissociative Symptoms Experienced**—The results illustrate the high frequency and broad range of acute traumatic dissociative symptoms experienced by law enforcement officers involved in critical shooting incidents. Table 1 presents the cumulative frequencies of acute traumatic dissociative symptoms. Overall, 90.4% of the sample reported at least one dissociative symptom, 61.7% reported at least two dissociative symptoms, and 37.4% reported three or more dissociative symptoms. The officers experienced a range from 0 to 9 acute traumatic dissociative symptoms. The mean number of dissociative symptoms experienced during the critical incident was 2.5 (standard deviation = 2.1). The median was 2.

**Temporal/Auditory Distortions**—Overall, 80.8% of the sample reported time distortion, 53% of the officers experienced the trauma in “slow motion,” and 27.8% experienced the trauma as “happening

TABLE 1—Cumulative frequency of acute traumatic dissociative symptoms.

| Number of Dissociative Symptoms Experienced | Number of Subjects | Percent | Cumulative Percent |
|---|--------------------|---------|--------------------|
| 9.00  | 3                  | 2.6     | 2.6                |
| 8.00  | 2                  | 1.7     | 4.3                |
| 7.00  | 2                  | 1.7     | 6.1                |
| 6.00  | 5                  | 4.3     | 10.4               |
| 5.00  | 5                  | 4.3     | 14.8               |
| 4.00  | 9                  | 7.8     | 22.6               |
| 3.00  | 17                 | 14.8    | 37.4               |
| 2.00  | 28                 | 24.3    | 61.7               |
| 1.00  | 33                 | 28.7    | 90.4               |
| .00   | 11                 | 9.6     | 100.0              |
| Total                                       | 115                | 100.0   |                    |

in fast forward.” Another 47.8% of the sample experienced auditory distortions; 34.8% experienced the sounds as “far away or muffled,” and 13% reported “not hearing the gunfire.” These findings are consistent with those of previous studies (24,38).

**DSM-IV Based Dissociative Symptoms**—Using the narrower dissociative construct of Criterion B of ASD, 30.4% of the officers experienced three or more dissociative symptoms. A reduction in awareness of surroundings (B2 criterion of ASD) was the most prevalent acute traumatic dissociative symptom, reported by 86.1% of the sample. In addition, 47.0% reported an immediate sense of detachment or numbness (B1 criterion of ASD), 13.0% reported derealization (B3 criterion of ASD), and 22.6% reported depersonalization (B4 criterion of ASD) during the critical incident. Furthermore, 19.1% of the sample reported some degree of memory impairment for the traumatic event consistent with dissociative amnesia (B5 criterion of ASD). These reports of memory impairment were not accounted for by head injury (chi sq. = .047,  $df = 1$ ,  $p = .83$ ); loss of consciousness (chi sq. = .069,  $df = 1$ ,  $p = .79$ ); recent drug or alcohol ingestion (chi sq. = .025,  $df = 1$ ,  $p = .87$ ); age (chi sq. = .43,  $df = 1$ ,  $p = .51$ ); or time elapsed since the critical incident (chi sq. = .22,  $df = 1$ ,  $p = .64$ ).

A relationship trend existed between reporting one or more acute traumatic dissociative symptoms and reported memory impairment for some part of the event, but this did not reach statistical significance in this study (chi sq. = 3.52,  $df = 1$ ,  $p = .06$ ).

Table 2 presents the frequency of experiencing additional dissociative symptoms if a subject reported one DSM-IV dissociative symptoms. These results indicate that there is a significant degree of symptom overlap among the DSM-IV dissociative symptoms.

Nearly half (47%) of the sample reported having a clear memory of the traumatic incident. Moreover, as would be expected, reporting clear memory for the event was inversely correlated with elapsed time since the critical incident (chi sq. = 5.38,  $df = 1$ ,  $p = .02$ ). In other words, the more time elapsed since the critical incident, the more likely the officer did not report a clear memory of the event. Finally, no subject reported complete loss of memory (i.e., complete amnesia for the traumatic event).

#### Symptoms and Predictors of ASD

**Symptoms of Acute Stress Disorder**—Symptoms of ASD were present in 81.3% of the law enforcement officers; however, only 6.1% met full DSM-IV criteria for ASD. Relative to other symp-

TABLE 2—Frequency and percentage of subjects reporting a DSM-IV dissociative symptom who reported additional dissociative symptoms (across).

|                   | Numbing                | Reduced Awareness      | Derealization | Depersonalization | Memory Impairment | No Symptoms | Total                               |
|-------------------|------------------------|------------------------|---------------|-------------------|-------------------|-------------|-------------------------------------|
| Numbing           | <i>N</i> = 54<br>100%  | 48<br>89% <sup>a</sup> | 9<br>17%      | 15<br>28%         | 14<br>26%         | 0           | <i>N</i> = 54<br>47.0% <sup>b</sup> |
| Reduced awareness | <i>N</i> = 48<br>48.5% | 99<br>100%             | 14<br>14.1%   | 26<br>26.3%       | 19<br>14.2%       | 0           | 99<br>86.1%                         |
| Derealization     | <i>N</i> = 9<br>60%    | 14<br>93.0%            | 15<br>100%    | 8<br>53.3%        | 6<br>40%          | 0           | 15<br>13.0%                         |
| Depersonalization | <i>N</i> = 15<br>57.7% | 26<br>100%             | 8<br>30.8%    | 26<br>100%        | 7<br>26.9%        | 0           | 26<br>22.6%                         |
| Memory impairment | <i>N</i> = 14<br>63.6% | 19<br>86.4%            | 6<br>27.3%    | 7<br>31.8%        | 22<br>100%        | 0           | 22<br>19.1%                         |
| No Symptoms       | <i>N</i> = 0           | 0                      | 0             | 0                 | 0                 | 9<br>100%   | 9<br>7.8%                           |
| Total             | 54<br>47.0%            | 99<br>86.1%            | 15<br>13.0%   | 26<br>22.6%       | 22<br>19.1%       | 9<br>7.8%   | 115<br>100.0%                       |

<sup>a</sup> Cell Percentages are of the row.

<sup>b</sup> Total Percentages are of the column.

tom clusters of ASD, 76.5% of the sample reported immediate re-experiencing symptoms as defined under the C Criterion, 28.7% experienced avoidance symptoms defined under the D Criterion, and 16.5% experienced anxiety or increased arousal symptoms as defined under the E Criterion of ASD.

*Predictors of Acute Traumatic Dissociative Symptoms*—Using both the narrower dissociative construct defined by Criterion B of ASD and a more global construct of total number of acute traumatic dissociative symptoms experienced, the study investigated possible predictors of acute traumatic dissociative symptoms associated with ASD.

Logistic regression was used to predict whether subjects met or did not meet dissociative Criterion B of ASD. Independent variables used in the model included the respondent's age at the time of the critical incident, years of experience, sustaining a physical injury, and mental expectations prior to the critical shooting incident. Results show that sustaining a physical injury (odds ratio = 8.0,  $p = 0.0008$ ), a lack of mental preparation as measured by a subject reporting "I never expected this to happen to me" (odds ratio = 5.1,  $p = 0.009$ ), and critical incident anxiety for the event as measured by a subject endorsing, "I knew it might happen, sooner or later" (odds ratio = 4.7,  $p = 0.006$ ), all significantly predicted meeting dissociative Criterion B of ASD (i.e., experiencing three or more dissociative symptoms during the critical incident). In other words, a physically injured subject was eight times more likely to meet dissociative Criterion B of ASD than a subject who had not been physically injured. Likewise, subjects reporting lack of mental preparation prior to the shooting were 5.1 times more likely to meet dissociative Criterion B of ASD than if they did not report this. Finally, subjects were 4.7 times more likely to meet dissociative Criterion B of ASD if they reported having critical incident anxiety prior to the critical incident than if they did not.

Similar results were obtained with the total number of dissociative symptoms as the dependant variable, using multiple linear regression. Both a lack of mental preparation (B coefficient = 1.6,  $p = 0.001$ ) and critical incident anxiety (B coefficient = 0.8,  $p = 0.46$ ) remained significant in predicting the total number of dissociative symptoms, although the relationship was smaller. However, sustaining a physical injury ( $p = 0.39$ ) did not predict the total number of dissociative symptoms, although it had previously predicted fulfilling dissociative Criteria B of ASD. This finding sug-

gests that dissociative Criterion B of ASD may be a more significant construct of psychological trauma than simple dissociative symptom counting.

#### *Symptoms and Predictors of PTSD*

*Symptoms of Posttraumatic Stress Disorder*—In the present study, only 2.7% ( $N = 3$ ) of the subjects retrospectively fulfilled DSM-IV criteria for PTSD. An additional 11.3% reported having experienced "clinically significant" PTSD symptoms that did not fulfill DSM-IV criteria, but did result in mental health treatment and/or filing for workers compensation benefits.

*Predictors of Posttraumatic Stress Symptoms*—Using logistic regression, the total number of acute traumatic dissociative symptoms predicted developing clinically significant PTSD symptoms. While no single acute traumatic dissociative symptom was predictive, for each additional acute traumatic dissociative symptom experienced, the probability of subsequent clinically significant PTSD symptoms increased by 40% (odds ratio = 1.4,  $p = 0.0154$ ). Sustaining a physical injury dramatically increased the probability of subsequent clinically significant PTSD symptoms (odds ratio = 9.6,  $p = 0.0016$ ). Lack of mental preparation as previously defined ( $p = 0.35$ ) was not a significant predictor of PTSD symptoms. The effect of each of these variables in the model was independent and "over and above" the effect of the other variables. This can be demonstrated by the fact that while physical injury did not predict the total number of dissociative symptoms, it did predict clinically significant PTSD symptoms. Overall, the model accounted for 34% of the variance (Nagelkerke  $R^2 = 0.343$ ) and successfully predicted clinically significant PTSD symptoms, with a specificity of 83.3% and a sensitivity of 84.6% (cut value = 0.12).

Deleting the dissociative amnesia criterion (B5 of ASD), we found that meeting just two of the four dissociative criteria of ASD predicted clinically significant PTSD symptoms, with a specificity of 80.4% and a sensitivity of 76.9% (cut value = 0.12). Furthermore, experiencing two of four dissociative symptoms resulted in five times the risk of experiencing clinically significant PTSD symptoms (odds ratio = 5.0,  $p = 0.034$ ).

Finally, the total number of dissociative symptoms experienced predicted self-reports of depressed mood in this sample (odds ratio = 1.4,  $p = 0.26$ ).

## Discussion

Results from this study suggest that the majority (90%) of law enforcement officers experienced one or more acute traumatic dissociative experiences in response to a critical incident shooting. These findings are consistent with those of Solomon and Horn (38) and Honig et al. (24), who reported similar frequencies of perceptual disturbances in police officers. Furthermore, results of this and other studies indicate that dissociative responses to critical shooting incidents in law enforcement officers may be more common than such responses among other trauma populations (2,3,9,17,18,32,35,36,37,40,42). Further studies controlling for the unique characteristics of the individual, the critical incident, and mental health support are needed.

This study also found that nearly 82% of the sample experienced ASD symptoms, while only 6% retrospectively met full criteria for ASD. Furthermore, 11.3% of subjects reported experiencing clinically significant PTSD symptoms, with an additional 2.7% meeting full DSM-IV criteria for PTSD. These findings are consistent with recent police trauma research. Wilson et al. (43) found that 5% of officers retrospectively met criteria for PTSD. Honig et al. (24) found that 14% of all officers involved in shootings experienced significant distress or impairment and suggested that an even smaller percentage were predicted to ultimately develop either ASD or PTSD.

The results of this study indicate that approximately one-fifth of officers reported clinically significant acute stress and posttraumatic stress symptoms. This finding lends support to previous research indicating that current DSM-IV criteria may exclude a number of individuals who do not meet full diagnostic criteria for PTSD but nonetheless suffer clinically significant symptoms of PTSD (5,11).

The present study also found that acute traumatic dissociation predicts the reporting of clinically significant PTSD symptoms. While these retrospective findings should be interpreted with caution, they do extend previous research that supports acute traumatic dissociation as a significant predictor of subsequent PTSD symptoms (7,17,22,29,35,37,40). While no single dissociative symptom accounted for the development of PTSD symptoms, reporting of two of four (B1–B4) criteria in ASD predicted the development of PTSD symptoms equally as well as the current DSM-IV dissociative criteria within ASD. This finding suggests that future research should be directed toward refining the DSM-IV dissociative criteria in ASD.

This study also found acute traumatic dissociation to predict self-reported depressed mood. Although the survey did not account for genetic or premorbid psychiatric history, it is consistent with previous research that indicates acute traumatic dissociation may predict nonspecific psychiatric distress (20).

The preliminary findings regarding traumatic memory indicate that normal memory decay for the traumatic event occurred in this sample. Also of significance is that no officer reported complete memory loss for the traumatic event. The finding of 19% of police officers reporting memory impairment for some part of the event is intriguing. It is also consistent with a recent study (24) reporting that 22% of law enforcement officers involved in a shooting experienced “memory loss for some part of the incident.” Whether these reports represent dissociative amnesia remains speculative.

Dissociative amnesia as defined in the DSM-IV (1) is the inability to recall important personal information, usually of a traumatic or stressful nature, that is too important to be explained by ordinary forgetfulness. Kihlstrom et al. (25) noted that in dissociative amnesia, the content of the memory is available but temporarily inac-

cessible to an individual. Interestingly, one subject in the present study endorsed the inability to remember the event followed by the return of memory, and several others reported that their memory improved over time. The retrospective nature of this survey study does not allow one to definitively call the responses dissociative amnesia. To date there is little empirical evidence that a person’s memory for a traumatic event becomes so impaired that they fail to retrieve the memory (i.e., dissociative amnesia) even when presented with specific cues of the traumatic event (8).

Dissociation has also been hypothesized to be the mechanism most likely to predict posttraumatic dissociative amnesia (44). But studies are needed to test this hypothesis. The present study found a statistically non-significant relationship trend between reporting acute traumatic dissociative symptoms and reported memory impairment for parts of the event.

Alternatively, the lack of memory for part of the incident (separate from posttraumatic dissociative amnesia) has been hypothesized to be secondary to alterations of perception, such as the narrowing of attention or reduced awareness of the immediate surroundings (16). The present study’s findings do not support this hypothesis; however, the study’s sample size may have prevented demonstrating that a relationship existed. Finally, the lack of memory for part of the event could also be accounted for by other mechanisms such as normal forgetting, active/motivated forgetting, and intentional nondisclosure. These findings suggest that further descriptive research on the phenomena of acute traumatic dissociation, perceptual alteration, and dissociative amnesia is warranted.

The present study has several limitations. First is the relatively small all male sample. Second is the study’s retrospective design, which may have resulted in the under-reporting or over-reporting of symptoms, though it has been suggested that retrospective reports of acute traumatic dissociation may be stable over periods of twenty years or more (29). Third, sampling bias may have occurred. The present sample was drawn from a group of actively employed law enforcement officers, thereby potentially omitting police officers that had retired on workers’ compensation or left the force for other reasons related to psychopathology. Fourth, this study’s primary objective was to describe the frequency of acute traumatic dissociation and not the frequency of PTSD. The study’s time duration criteria may have resulted in a higher prevalence of ASD and a lower prevalence of PTSD. Clinical examination or more detailed clinical rating scales may have yielded different point prevalence estimates. In addition, DSM-IV criteria utilized in this study are more conservative than earlier DSM-III criteria used in several prior police studies. Fifth, this study’s retrospective design and the limited number of variables investigated suggest that caution be used when interpreting the predictors of acute traumatic dissociation and clinically significant PTSD symptoms. Sixth, there was no measurement of post-incident intervention. Finally, although the instrument used to measure acute traumatic dissociative symptoms has face validity, comprehensive validation and reliability psychometrics have not been obtained.

### *Clinical and Forensic Implications*

To the extent that these findings accurately reflect the prevalence of acute traumatic dissociation and memory impairment in law enforcement officers who are involved in critical incident shootings, they have important implications for clinical and forensic evaluators.

*Clinical Evaluation, Diagnosis, and Treatment*—These data suggest that acute traumatic dissociation is a normative response in law

enforcement officers involved in critical shooting incidents. Therefore, it may prove valuable to educate law enforcement recruits about critical incident dissociative responses. Educating officers about the effects of trauma may prove useful as a primary prevention technique, protecting against the development of PTSD. While acute traumatic dissociation appears to be common, it should not be overlooked in critical incident stress debriefings (4) or in clinical evaluations of officers who have experienced a critical incident. Psychological outcomes following critical incidents result from the interaction between the pre-event coping mechanisms of the individual, the unique characteristics of the critical incident, the individual's appraisal of the event, and the post-event coping mechanisms of the individual. Acute traumatic dissociation appears to be affected by these first two variables and to impact the latter two variables.

How best to screen and evaluate law enforcement officers who may be at risk for posttraumatic stress problems remains an area of investigation. Several studies have questioned whether the prevailing critical incident stress debriefing intervention achieves its goal of reducing posttraumatic stress problems (10). To the extent that acute traumatic dissociation has been shown to be an important predictor of subsequent PTSD and general psychological distress, screening for acute traumatic dissociation may help to identify officers who will continue to be distressed about their experience. This could lead to more targeted therapeutic interventions and improved psychological outcomes.

*Forensic Implications*—First, acute traumatic dissociation appears to be a normative and expected phenomenon following critical shooting incidents. Second, incorporating this information into critical incident response training may assist law enforcement officers to appraise and function optimally during critical incidents. Third, an individual officer's ability to give a full and detailed account about the critical incident may come into question at some point during post-event civil or criminal litigation. This study's findings suggest that while a majority of officers report acute traumatic dissociative experiences, only a minority of officers will report memory impairment for parts of the traumatic event. Furthermore, there were no reports of total event amnesia in this study. Finally, this information is relevant within the legal arena. Knowledge of the relationship between acute traumatic dissociation and the effects of trauma on memory are essential for the trier of fact who must weight the reliability and credibility of various eyewitness "memory" accounts of the event, often given by persons who directly experienced the traumatic event.

Perhaps most importantly, the occurrence of dissociative symptoms among such a high proportion of shooting-involved officers casts serious doubt on the credibility of those who argue that dissociation at the time of a crime is a mental disease or defect for purposes of a defense of insanity. It would be more reasonable to believe that, in general, dissociation is a normal response of some criminals to the traumatic events they create.

## Conclusions

These data suggest that a significant majority of law enforcement officers involved in critical shooting incidents experience acute traumatic dissociation. However, only a small percentage of the sample went on to develop a traumatic stress reaction. Acute traumatic dissociative responses appear to be the normal mental state at the time of a critical shooting incident. Acute traumatic dissociation, however, should not be overlooked either clinically or forensically. Acute traumatic dissociation has been shown to pre-

dict subsequent posttraumatic stress symptoms. Just how acute traumatic dissociative responses affect later recall remains to be determined. Therefore, the field of traumatic stress studies must continue to examine the phenomenological core of psychological trauma and further define and validate the DSM-IV criteria that define psychological reactions to trauma. Future field research into the measurement of acute traumatic dissociation and the various forms of traumatic memory impairment is also indicated. Only in this manner will dimensions of trauma, traumatic dissociation, ASD, PTSD, amnesia, and memory be revealed.

## Acknowledgments

The authors express appreciation to Robert Weinstock, M.D., Nina Sachinvala, M.D., Hadley Osran, M.D., and Colleen Love, R.N., D.N.S., and acknowledge the assistance of members of the Behavioral Science Unit, FBI Academy, Quantico, VA, for coordinating the data collection.

## References

1. APA diagnostic and statistical manual of mental disorders, fourth edition. American Psychiatric Association, Washington, DC, 1994.
2. Berah FF, Jones HJ, Valent, P. The experience of a mental health team involved in the early phase of a disaster. *Austral New Zeal J Psychiatry* 1984;18:354–8.
3. Barton KA, Blanchard EB, Kicklying EJ. Antecedents and consequences of acute stress disorder among motor vehicle accident victims. *Behav Res Ther* 1996;34:805–13.
4. Bohl N. The effectiveness of brief psychological interventions in police officers after critical incidents. In: Reese JT, Horn JM, Dunning C, editors. *Critical incidents in policing*. Washington, DC: U.S. Department of Justice, 1991;31–8.
5. Blanchard EB, Hickling EJ, Vollmer AJ, Loos WR, Buckley TC, Jaccard JJ. Short-term follow-up of posttraumatic stress symptoms in motor vehicle accident victims. *Behav Res Ther* 1995;33:369–77.
6. Bremner JD, Southwick S, Brett E, Fontana A, Rosenheck R, Charney DS. Dissociation and posttraumatic stress disorder in vietnam combat veterans. *Amer J Psychiatry* 1992;149(3):328–32.
7. Bremner JD, Brett E. Trauma-related dissociative states and long-term psychopathology in posttraumatic stress disorder. *J Traumatic Stress* 1997;10:37–50.
8. Brewin CR. Questionable validity of 'dissociative amnesia' in trauma victims. *Br J Psychiatry* 1998;172:216–7.
9. Cardena E, Spiegel D. Dissociative reactions to the Bay Area Earthquake. *Amer J Psychiatry* 1993;150:474–8.
10. Carlier IVE. Critical incident stress debriefing. In: Shalev AY, Yehuda R, McFarlane AC, editors. *International handbook of human response to trauma*. New York: Kluwer Academic/Plenum Publishers, 2000;379–87.
11. Carlier IVE, Gersons PBR. Partial posttraumatic stress disorder (PTSD): the issue of psychological scars and the occurrence of PTSD symptoms. *J Nerv Ment Dis* 1995;183:107–9.
12. Carlier IVE, Lamberts RD, Fouwels AJ, Gersons BPR. PTSD in relation to dissociation in traumatized police officers. *Amer J Psychiatry* October 1996;153(10):1325–8.
13. Carlier IVE, Lamberts RD, Gersons BPR. Risk factors for posttraumatic stress symptomatology in police officers: a prospective analysis. *J Nerv Men Dis* 1997;185(8):498–506.
14. Carlson EB, Rosser-Hogan R. Trauma experiences, posttraumatic stress, dissociation, and depression in Cambodian refugees. *Amer J Psychiatry* 1991;148:1548–51.
15. Carson S. Post-shooting stress reaction. *Police Chief* October 1982; 66–8.
16. Christianson SA. Emotional stress and eyewitness memory: a critical review. *Psychol Bull* 1992;112:284–309.
17. Classen C, Koopman C, Hales R, Spiegel D. Acute stress disorder as a predictor of post-traumatic stress symptoms. *Amer J Psychiatry* 1998; 155:620–4.
18. Erickson NG, Lundin T. Early traumatic stress reactions among Swedish survivors of the m/s Estonia disaster. *Br J Psychiatry* 1996;169:713–6.
19. Federal Bureau of Investigation, Law enforcement officers killed and assaulted. *Uniform Crime Reports*, U.S. Department of Justice 1997;69–79.

20. Freedman SA, Brandes D, Tuvia P, Shalev A. Predictors of chronic post-traumatic stress disorder: A prospective study. *Br J Psychiatry* 1999;174:353–9.
21. Gersons BPR. Patterns of PTSD among police officers following shooting incidents: a two-dimensional model and treatment implications. *J Traumatic Stress* 1989;2(3):247–57.
22. Harvey AG, Bryant RA. The relationship between acute stress disorder and posttraumatic stress disorder: a prospective evaluation of motor vehicle accident survivors. *J Clin Consulting Psychol* 1998;66:507–12.
23. Holen A. The North Sea oil rig disaster. In: JP Wilson, B Raphael, editors. *International handbook of traumatic stress syndromes*. New York: Plenum Press, 1993;471–8.
24. Honig AL, Roland JE. Shots fired; officer involved. *Police Chief* October 1998;116–20.
25. Kilstrom JF, Glisky ML, Anguilo MJ. Dissociative tendencies and dissociative disorder. *J Abnormal Psychol* 1994;103(1):117–24.
26. Koopman C, Classen C, Spiegel D. Predictors of posttraumatic stress symptoms among survivors of the Oakland/Berkeley, California, firestorm. *Amer J Psychiatry* 1994;151(6):888–94.
27. Loo R. Post-shooting stress reactions among police officers. *J Hum Stress Spring* 1986;27–31.
28. Marmar CR, Weiss DS, Schlenger WE, Fairbank JA, Jordan BK, Kulka RA, et al. Peritraumatic dissociation and posttraumatic stress in male Vietnam theater veterans. *Amer J Psychiatry* 1994;151(6):902–7.
29. Marmar CR, Weiss DS, Metzler TJ, Delucchi KL, Best SR, Wentworth KA. Longitudinal course and predictors of continuing distress following critical incident exposure in emergency services personnel. *J Men Nerv Dis* 1999;187(1):15–22.
30. McCafferty RL, McCafferty E, McCafferty MA. Stress and suicide in police officers: paradigm of occupational stress. *South Med J* 1992;83:233–43.
31. Nielsen E. The law enforcement officers use of deadly force and post-shooting trauma [dissertation]. Order No. 8121983. The University of Utah, 1980;142.
32. Noyes R, Hoenk PR, Kuperman S, Sylmen DJ. Depersonalization in accident victims and psychiatric patients. *J Nerv Ment Dis* 1977;164(6):401–7.
33. Reiser M, Geiger SP. Police officer as victim. *Professional psychology: research and practice*, vol.15. 1984;315–23.
34. Reese JT, Horn JM, Dunning C, editors. *Critical incidents in policing*. Washington, DC: U.S. Department of Justice, 1991.
35. Shalev AY, Tuvia P, Canetti L, Schreiber S. Predictors of PTSD in injured trauma survivors: a prospective study. *Amer J Psychiatry* 1996;153(2):219–25.
36. Sloan P. Post-traumatic stress in survivors of an airplane crash landing: a clinical and exploratory research intervention. *J Traumatic Stress* 1988;1:211–29.
37. Spiegel D, Koopman C, Cardena E, Classen C. Dissociative symptoms in the diagnosis of acute stress disorder. Michelson LK, Ray WJ, editors. *Handbook of dissociation: theoretical, empirical, and clinical perspectives*. New York: Plenum Press, 1996:367–80.
38. Solomon RM, Horn JM. Post-shooting traumatic reactions: a pilot study. In: Reese JT, Goldstein HA, editors. *Psychological services for law enforcement*. Presented at the National Symposium on Police Psychological Services, FBI Academy: Quantico (VA). Washington, DC, U.S. Government Printing Office, 1986;383–93.
39. Stratton JG, Parker DA, Snibbe JR. Post-traumatic stress: study of police officers involved in shootings. *Psychol Reports* 1984;55(1):127–31.
40. Ursano RJ, Fullerton CS, Epstein RS, Crowley B, Vance K, Kao TC. Peritraumatic dissociation and posttraumatic stress disorder following motor vehicle accidents. *Amer J Psychiatry* 1999;156(11):1808–10.
41. Violanti JM, Paton D, editors. *Police trauma: psychological aftermath of civilian combat*. Springfield, IL: Charles C Thomas, Publisher, Ltd., 1999.
42. Wilkinson CB. Aftermath of a disaster: the collapse of the Hyatt Regency hotel skywalks. *Amer J Psychiatry* 1983;140(9):1134–9.
43. Wilson FC, Poole AD, Trew K. Psychological distress in police officers following critical incidents. *Irish J Psychol* 1997;18(3):321–40.
44. Yates JL, Nasby W. Dissociation, affect and network models of memory: an integrative proposal. *J Traumatic Stress* 1995;8:649–73.

Additional information and reprint requests:  
 J. Michael Rivard, M.D.  
 1241 Johnson Avenue, #319  
 San Luis Obispo, CA 93401

## Appendix 1

### *DSM-IV Acute Stress Disorder*

- A. The person has been exposed to a traumatic event in which both of the following were present:
  - (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
  - (2) the person's response involved intense fear, helplessness, or horror
- B. Either while experiencing or after experiencing the distressing event, the individual has three (or more) of the following dissociative symptoms:
  - (1) a subjective sense of numbing, detachment, or absence of emotional responsiveness
  - (2) a reduction in awareness of his or her surroundings (e.g., "being in a daze")
  - (3) Derealization
  - (4) depersonalization
  - (5) dissociative amnesia (i.e., inability to recall an important aspect of the trauma)
- C. The traumatic event is persistently reexperienced in at least one of the following ways: recurrent images, thoughts, dreams, illusions, flashback episodes, or a sense of reliving the experience, or distress on exposure to reminders of the traumatic event.
- D. Marked avoidance of stimuli that arouse recollections of the trauma (e.g., thoughts, feelings, conversations, activities, places, people).
- E. Marked symptoms of anxiety or increased arousal (e.g., difficulty sleeping, irritability, poor concentration, hypervigilance, exaggerated startle response, motor restlessness).
- F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning or impairs the individual's ability to pursue some necessary task, such as obtaining necessary assistance or mobilizing personal resources by telling family members about the traumatic experience.
- G. The disturbance lasts for a minimum of two days and a maximum of four weeks and occurs within four weeks of the traumatic event.
- H. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition, is not better accounted for by Brief Psychotic Disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder.

Reprinted with permission from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Copyright 2000 American Psychiatric Association.

## Appendix 2

### *Memory Items*

- I have never remembered what happened.
- I have always remembered everything that happened.
- I have always remembered parts of what happened but have never been able to remember other parts.
- At first I could not remember anything, but my memory eventually returned.

- At first I only remembered parts of what happened, but my memory got better as time went on.
- I used to remember everything that happened, but now I've forgotten some of it.
- My memory of what happened got better as time went on.
- My memory of what happened got worse as time went on.
- I remember everything so clearly it seems as though it happened only yesterday.

*Dissociative Experiences During the Incident*

- I felt as if things were happening in slow motion.
- I felt as if everything were happening on fast forward.
- I felt as if I fell asleep.
- I felt as if I were in a dream.
- I felt as if I were in a trance.
- I felt as if I were floating above myself.
- I felt as if I were watching myself from a distance.
- I felt as if I were watching myself on television or in a movie.
- I felt as if my mind left my body.
- I felt as if I were detached from my own mind.
- I felt as if I were detached from my own body.

- I felt as if I were observing my own mind.
- I felt as if I were observing my own body.
- I felt as if my body were on automatic pilot.
- I felt as if other people or things were on automatic pilot.
- I felt as if I were unreal.
- I felt as if other people or things were unreal.
- I felt as if part or all of my body changed in size or shape.
- I felt as if other people or things changed in sized or shape.
- I felt as if I were mechanical.
- I felt as if other people were mechanical.
- I felt as if other people were dead, even though they were alive and moving.
- I felt as if I were not in complete control of my actions.
- I had no feeling in parts of my body.
- I felt as if other people or things had changed.
- I felt as if I were far away from what was happening.
- I felt as if people or things around me were far away.
- There was gunfire nearby that sounded far away or muffled.
- There was gunfire nearby that I did not hear at all.
- I thought I had died and could hear others talking about me.
- I saw a tunnel with light shining at the end of it.