# Post-traumatic Stress Disorder and Memory: Prescient Medicolegal Testimony at the International War Crimes Tribunal?

Landy F. Sparr, MD, MA, and J. Douglas Bremner, MD

The nature of remembrance of traumatic events has been particularly controversial during the past decade as vigorous new research has reshaped thinking about trauma and memory. Memory alterations in traumatized individuals have been investigated within both theoretical and biological frameworks. There are different types of memory, and empirical studies have associated post-traumatic stress disorder (PTSD) with a simultaneous weakening and a strengthening of memory. Memory deficiencies in PTSD have been found to be related to problems in new learning (explicit memory), but other specific deficiencies are unvalidated. Recently, accuracy of memory has received particular scrutiny because considerable importance is attached to victims' recollections. In 1998, at the International War Crimes Tribunal in The Hague, The Netherlands, a Bosnian-Croatian soldier was tried for aiding and abetting the rape of a Muslim woman. The defendant's lawyers suggested that the woman's memory was inaccurate, having been adversely affected by her traumatic experiences, and that the defendant whom she identified was not present during her interrogation and abuse. The prosecution disagreed and argued that memories of traumatic experiences in individuals with PTSD are characteristically hyperaccessible. Expert witnesses on both sides were brought in to provide medicolegal testimony about the scientific parameters of stress and its long-term effects on brain regions associated with memory. With the expert witness discussion as background, this article reviews the most recent research about the nature of memory in the aftermath of trauma and the politics of psychological trauma and the law.

J Am Acad Psychiatry Law 33:71-8, 2005

Post-traumatic stress disorder (PTSD) is the only psychiatric disorder that currently has, as one of its diagnostic critera, the requirement that an individual be exposed to a traumatic stressor prior to the development of the disorder. From the outset therefore, clinicians and investigators have focused on the primacy of the traumatic experience when considering PTSD patients' clinical symptoms. Recently, the determinants of memories related to traumatic events have received increasing scientific scrutiny. Evidence from a variety of studies has shown a relationship between PTSD and deficits in explicit memory function. Since trauma victims often, either willingly or unwillingly, enter the legal arena, it is not surprising

Dr. Sparr is Associate Professor of Psychiatry, School of Medicine, Oregon Health and Science University, Portland, OR. Dr. Bremner is Associate Professor of Psychiatry and Radiology, Emory University School of Medicine, Atlanta, GA. Address correspondence to: Landy F. Sparr, MD, MA, Department of Psychiatry (OP02), Oregon Health and Science University, 3181 SW Sam Jackson Park Road, Portland, OR 97201. E-mail: sparrl@ohsu.edu

that considerable importance or emphasis is attached to their recollections. In the summer of 1998, the controversial nature of these issues boiled over at the International War Crimes Tribunal in The Hague, The Netherlands, where a Bosnian-Croatian soldier was being tried for aiding and abetting the rape of a Muslim woman.

Although there has been considerable expert witness testimony about the accuracy of recovered memory, the trial of *Prosecutor v. Anto Furundzija* (Ref. 1, Judgment December 10, 1998) was the first time that psychiatric experts were invited to offer opinions to the court about the nature and accuracy of explicit memory after trauma in individuals with PTSD. In this particular case the trauma victim, a woman in her mid-40s, who had never claimed to have suppressed the memories related to her trauma, provided several different accounts of her experience through deposition and trial testimony. In 1995, her testimony in deposi-

tion indicated that the defendant was "about 172 cm tall. He was thin, small featured, and had short blond hair. He was young, maybe around 25" (Ref. 1, Deposition statement of Witness A, July 22-23, 1995). At trial in 1998, Witness A described the defendant as having "chestnut to black [hair], cut short, it was combed up. He was a rather thin young man, rather strong jaw or teeth. Height, well, medium for a man, 175-180 cm" (Ref. 1, Trial transcript, p 403, June 12, 1998). Over the course of her testimony, the role played by the defendant became more central to her trauma. For example, early in her testimony, the victim did not endorse the presence of the defendant during the trauma, whereas in her testimony at trial, she indicated that the defendant was present and directing the sexual assault. Thus, the trial turned on the woman's memory of her traumatic experiences (which were not in question) and her recollections with regard to the persons (especially the defendant) who were present during the trauma.

The events of the trial were complex in that the prosecution did not reveal to the defense that the victim and principal witness had been diagnosed with PTSD and that her primary doctor was a relative. As a result, the court delayed judgment and reopened the trial to hear additional testimony about PTSD, the nature of memory in PTSD, and the implications of these issues for witness credibility (Ref. 1, Trial transcript, pp 725–46, July 14, 1998). The defendant's lawyers suggested that the troubled victim was manipulated into erroneously naming their client culpable and that her memory had been adversely affected by her traumatic experiences. Further, the defense argued that the "incourt" identification by the defendant was misleading and contrary to her previous statements about the defendant's physical appearance. The prosecution disagreed and argued that the diagnosis of PTSD, per se, in a victim witness does not influence the facts reported by that witness and that memories of traumatic experiences in individuals with PTSD are hyperaccessible. The scientific parameters of the ongoing debate about stress and its long-term effects on brain regions, which recently has been gaining momentum and which may have, despite disclaimers, far-reaching forensic implications, are presented in this article.

### The Arrest and Initial Trial

On November 10, 1995, Judge Gabrielle Kirk MacDonald confirmed the indictment of Anto Furundzija, a Croatian paramilitary soldier, charging him with grave breaches of the Geneva Conventions and violations of the laws and customs of war (Ref. 1, Initial ICTY indictment of Anto Furundzija, November 2, 1995. Amended indictment June 2, 1998). Mr. Furundzija was charged with three individual counts of: (1) torture and inhumane treatment; (2) torture; and (3) outrages upon personal dignity, including rape. These charges were linked to acts alleged to have been committed at headquarters of the "Jokers," a special unit within the armed forces of the Croatian community of Bosnia-Herzegovina, known as the Croatian Defense Counsel, or HVO. In her decision, Judge MacDonald ordered that there be no public disclosure of the indictment.

Mr. Furundzija was arrested on December 18, 1997, by members of the International Stabilization Force, also known as SFOR. He was immediately transferred to The International Tribunal and detained in its detention unit in The Hague, The Netherlands. The same day, the president of the Tribunal assigned the case to Trial Chamber II. The initial appearance of the accused was on December 19, 1997. The accused was represented by Mr. Srdjan Joka, a member of the bar of the Republic of Croatia, who rendered a plea for the defendant of not guilty to all counts of the indictment. Mr. Furundzija was subsequently found to be indigent and assigned Mr. Luka Misetic, a practicing attorney in Chicago, Illinois, as defense counsel with fees paid by The International Tribunal.

The trial of the accused commenced on June 8, 1998. By then, Mr. Sheldon Davidson had been assigned as co-counsel for the defense. The prosecution team was led by Ms. Patricia Sellers and was assisted by Mr. Michael Blaxill and Ms. Ijeoma Udogaranya. The initial trial closed on June 22, 1998, after six prosecution witnesses testified and four prosecution exhibits were admitted into evidence. The defense called two witnesses, and 22 defense exhibits were admitted into evidence.

### **Factual Allegations**

The prosecution's case stated that from about January 1993 until mid-July 1993, the HVO was engaged in an armed conflict with the army of Bosnia-Herzegovina. The Croatian community of Bosnia

had declared itself an independent political entity inside the Republic of Bosnia on July 3, 1992. During this time, the HVO attacked villages inhabited mainly by Bosnian Muslims in the Lasva River Valley region in central Bosnia, including the municipality of Vitez. The accused was a member of the Jokers, which participated in the armed conflict in Vitez and especially in an attack on the village of Ahmici. These attacks led to the expulsion, detention, wounding, and death of numerous civilians.

The first incident of violence occurred on May 20, 1992, when a young Muslim was killed by an HVO guard. This incident was followed by the HVO's takeover of the local town hall, the police station, and the territorial defense building. The HVO demanded that the Muslims place themselves under HVO command. The Muslims, however, considered the actions of the HVO to be an illegal coup and refused to become part of the new government. The HVO, nevertheless, took control of the town of Vitez, and the harassment of Muslims became frequent (Ref. 1, Trial transcript, pp 103-8, June 8, 1998). In November 1992, armed conflict erupted between the HVO and the army of Bosnia-Herzegovina, including violent incidents in Vitez, followed by the HVO's blockade of the town (Ref. 1, Trial transcript, p 119, June 8, 1998).

It was alleged that on or about May 15, 1993, Witness A, an approximately 45-year-old married female Muslim civilian residing in Vitez, was arrested by members of the Jokers. The headquarters of the Jokers was in a well-known local hotel known as the Bungalow in the village of Nadioci. The Jokers took Witness A to a house adjacent to the Bungalow, the Holiday Cottage, and she was detained in a large room in the company of a group of soldiers. It was alleged in some of the sworn testimony that the accused, a local commander of the Jokers, arrived at the Holiday Cottage and immediately began to interrogate Witness A about a list of Croatian names and the activities of her sons. During questioning by the accused, one of the soldiers forced Witness A to undress and then rubbed his knife along her inner thigh and lower stomach and threatened to put his knife inside her vagina if she did not tell the truth. Meanwhile, it was alleged, the accused continued to interrogate Witness A.

Thereafter, Witness A was moved to another room in the Holiday Cottage. A Croatian soldier, known as Witness D during the trial, was also brought into the room. He appeared to have been badly beaten. While the accused continued to interrogate Witness A and Witness D, the same soldier who had earlier assaulted Witness A beat both of them on their feet with a baton and then forced Witness A to have oral sex and vaginal intercourse with him (Ref. 1, Trial transcript, pp 401-57, June 12, 1998). The accused, it was alleged, did nothing to prevent these acts. Afterward, Witness A was kept in detention for six to eight weeks and repeatedly raped and sodomized. Of note, Witness D, who reported being physically tortured by the Jokers during Witness A's early captivity, testified that he was uncertain whether the accused was present during the initial interrogations of Witness A. He said that when he was being taken away he thought he saw the accused outside the room.

The defense did not deny that Mr. Furundzija was in the Holiday Cottage, only that he was present two weeks prior to the alleged interrogations and sexual assault. Both parties agreed that the perpetrator of the actual assaults remained at large in the former state of Yugoslavia. Furthermore, there was no denial that Witness A did, in fact, suffer the atrocities she claims were committed against her. The defense simply stated that Witness A's recollection of the events was inaccurate; that the accused was not present when she was being assaulted; and that, as a result, he could not be held responsible for the actions of the men in his unit.

The defense maintained that Witness A was mistaken due to the combination of the traumatic events she endured and the lapse of time since the events. In addition, the defense argued that intimations about the defendant's actions and culpability may have been suggested to her during psychological treatment at the Medica Clinic in Zenica, rendering her memory unreliable. This, it was argued, was demonstrated by inconsistencies in statements she gave in 1993, 1995, and 1997 and before the Trial Chamber in 1998, in oral testimony.

The defense further contended that Witness A's testimony was directly contradicted by some testimony from Witness D. The evidence of an expert witness for the defense, Dr. Elizabeth Loftus, was submitted to the court to demonstrate the unreliability of memory, particularly when trauma is involved. Although Dr. Loftus did not examine the witness, her expertise about recovered memory was professed to be relevant to the questions before the court. Dr. Loftus opined, however, that because there was no

evidence that Witness A ever indicated a period during which she had no memory of the traumatic events, she could not be considered to be exhibiting a recovered memory (Ref. 1, Trial transcript, pp 593–627, June 22, 1998).

As noted earlier, after the close of the trial hearings on June 29, 1998, the prosecution disclosed that it had withheld two documents from the defense. One was a redacted medical certificate dated July 11, 1995, and the other was a witness statement dated September 16, 1995, from a psychologist from the Medica Women's Therapy Center concerning Witness A and the treatment that she received at Medica.

## The Reopened Trial

After receiving these documents, the Trial Chamber ruled that the prosecution had exhibited misconduct and also ruled that the interests of justice required a reopening of the proceedings because the prosecution disclosed the Medica documents to the defense after the close of the trial. In the circumstances of the case, the court reasoned that the late disclosed material was relevant to the issue of credibility of Witness A's testimony because the defense was unable to cross-examine relevant prosecution witnesses fully or to call into evidence issues raised by the Medica documents (Ref. 1, Trial transcript, pp 725–46, July 14, 1998).

The Trial Chamber ordered the proceedings reopened but limited strictly to further cross-examination of prosecution or defense witnesses and new evidence only in connection with the medical or psychological treatment received by Witness A after May, 1993 (Ref. 1, Written decision of the Trial Chamber, July 16, 1998).

# **Trial Testimony**

A clinic doctor (Dr. Mujezinovic), the uncle of Witness A, saw her in the autumn of 1993. He stated that, after her release from captivity, she was frightened, expressed thoughts of wanting to kill herself, had sleep difficulties and nightmares, and experienced thoughts that people were accusing her and staring at her. Dr. Mujezinovic described his impression of Witness A when he first saw her in the fall of 1993, or perhaps the winter of 1994. He said that he was surprised by her appearance and stated:

She had completely changed. She had become deformed. She was a very good-looking woman, a very attractive woman, a

beautiful woman in her middle age, a middle-age woman, who had worked in Vitez as a sales person. She dressed very elegantly, and was always very neat. So it was a shock when I saw her, for me. I asked Witness A, What on earth happened to you? [Ref. 1, Trial transcript, pp 804–6, November 9, 1998].

Dr. Mujezinovic testified that he had also treated the parents and family of Witness A. Witness A tried to tell him that some terrible things had happened to her. She started to say what had happened to her, but after a sentence or two started weeping.

Dr. Mujezinovic said that he may have spent about a half an hour with Witness A. He told her that there was a doctor whom he would personally call and ask to see her. She started telling Dr. Mujezinovic, "Doctor you don't know what I have been through. You don't know what happened to me. I don't know what to do. I want to kill myself. I'm ashamed. I can't sleep, I have nightmares. I can't calm down. I cannot talk to people. Everything irritates me" (Ref. 1, Trial transcript, pp 804-6, November 9, 1998). She thought everyone was staring at her and that everybody was accusing her of something. He referred her to Dr. Kadrija Haracic-Sabic, an associate at Medica, who worked in the Neuropsychiatric Department in Zenica. Dr. Haracic-Sabic told the referring doctor that Witness A would need a long period of psychiatric treatment because she was severely traumatized. On July 11, 1995, it was recorded that she occasionally came to the clinic to talk and to receive a tranquilizer.

Witness A gave a different account of the events. She agreed that she had seen the doctor in 1993, but denied that she had experienced physical exhaustion or difficulty sleeping. She said she did not seek psychiatric help and that she did not receive psychiatric medicine but did take tranquilizers. She did not follow through on the referral to Dr. Haracic-Sabic, and maintained that she never asked for psychological assistance. She also denied ever having received a diagnosis of PTSD. While on the witness stand and after repeated statements denying that she had ever been a psychiatric patient and denying that she had taken psychiatric medications, Witness A was confronted by the defense attorney with her medical psychiatric records as well as prescriptions for a tranquilizer (Valium). When confronted with this evidence, Witness A admitted to obtaining the medications (for "female problems") but did not endorse other symptoms.

During the reopened hearing, the defense introduced testimony from an expert witness who pointed toward inconsistencies in Witness A's testimony and cited studies regarding memory deficits in PTSD victims. A prosecution expert countered by stating that inconsistency does not necessarily imply inaccuracy. He said that progressive memory recovery is a well-known phenomenon among trauma victims who often remember more details as time goes by (Ref. 1, Trial transcript, pp 1110–242, November 11, 1998).

### **Decision**

The hearings were reopened in November 1998, and judgment was pronounced on December 10, 1998. The Trial Chamber found Anto Furundzija guilty, on the basis of individual criminal responsibility, of co-perpetrating torture, and of aiding and abetting in outrages upon personal dignity, including rape (Article 3 of the Statute). The sentence was 10 years' imprisonment as a co-perpetrator of torture and 8 years' imprisonment for aiding and abetting in outrages upon personal dignity. Following the determination by the Trial Chamber that the sentences be served concurrently, Anto Furundzija was ordered to serve the highest penalty, 10 years.

### **Discussion**

This case highlights several issues that are relevant to psychiatry and the law in the area of psychological trauma. Two salient questions are related to the nature of memory in the aftermath of trauma and the politics of psychological trauma and the law.

### Explicit Memory

The nature of trauma and memory has been a controversial topic for the past decade. Most professionals divide memory functions into explicit and implicit memory (also called episodic and procedural or declarative and nondeclarative). Explicit memory comprises material that can easily be brought to consciousness, such as facts or lists of words. Implicit memory refers to material that cannot be easily brought to consciousness, such as how to ride a bicycle or play a piano. Included in the implicit category are conditioned responses—for example, automatic feelings of fear in response to a particular cue. Patients with lesions of the hippocampus have specific deficits in explicit (declarative) memory, sometimes

referred to as neurological amnesia.<sup>4</sup> Another type of amnesia, dissociative amnesia, differs from neurological amnesia (a consistent deficit in ability to learn new information) in that it involves gaps of memory that occur for time-limited periods. Dissociative amnesia is also seen primarily in trauma victims.

### Hippocampus

Disturbances of memory, including intrusive memories and dissociative amnesia, are a part of the clinical presentation of PTSD, as defined in DSM-IV. Other symptoms, including problems with concentration and conditioned responses, also reflect disturbances of memory. Animal studies have shown that stress is associated with damage to the hippocampus and associated problems with new learning and memory. Stress also inhibits the growth of neurons, or neurogenesis, in the hippocampus, an effect that is reversed by antidepressants. 6,7

Promotion of hippocampal neurogenesis may actually underlie the symptom improvement that follows antidepressant treatment. Patients with PTSD have deficits in verbal declarative memory (known to be mediated at least in part by the hippocampus), including learning lists of words or similar material.<sup>9,10</sup> These memory deficits are different from the disturbances of memory listed as symptoms of PTSD, including dissociative amnesia and intrusive memories, and similar to the deficits in patients with neurological amnesia who have known hippocampal damage. Consistent with the hypothesis that stressinduced hippocampal damage is responsible for the verbal declarative memory deficits of PTSD are findings of smaller hippocampal volume in PTSD. 11,12 These findings have led to a model of disturbances in memory representing a core aspect of PTSD.<sup>13</sup>

### **Traumatic Memories**

The wide range of memory disturbances associated with PTSD can lead to fragmentation and distortion of traumatic memories. This problem has led to the accusation that there is a fundamental inconsistency in the association of PTSD with both a simultaneous weakening and strengthening of memory. However, on a biological level, stress hormones such as cortisol and norepinephrine act at the level of the hippocampus and other brain regions to both inhibit (cortisol) and strengthen (norepinephrine) memory formation. The time course of release of these hormones can influence the formation of the

traumatic memory, leading to both strengthening and weakening of memory.

The variety of memory disturbances associated with PTSD adds to the controversy surrounding the veracity and accuracy of memories for traumatic events. Traumatic memories are memories for events related to a trauma, defined in DSM-IV as an actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others, associated with intense fear, horror, or helplessness. 14 Traumatic memories are different from neutral memories, involving an event in a person's life that was not associated with exposure to a trauma, although both are autobiographical in nature. A common clinically based approach to PTSD has been to posit that there are fundamental differences between traumatic and neutral memories. Indeed, recent studies have illustrated that memory in humans can be enhanced during states of noradrenergic arousal. 15 Recently, however, some researchers have questioned whether there are fundamental differences between neutral and traumatic memories. 16 Others have questioned whether a traumatic memory identified by the clinician-patient dyad represents the source of the patient's true memories and whether it can ever be validated as having a basis in fact. 17

### **Accuracy of Memory**

Another factor contributing to the political culture surrounding legal aspects of the trauma and memory debate is the controversy about the accuracy of delayed recall of traumatic events. Dr. Elizabeth Loftus, whose expert testimony was entered in the trial of Anto Furundzija, is a primary proponent of the idea that recovered memories of trauma are subject to modification and distortion. The transcripts of the trial proceedings noted that Witness A did not have a recovered memory, that she had a continuous memory of her traumatic event, and therefore, according to the prosecution, the testimony of this expert witness was not relevant to the case. Dr. Loftus and others, however, have conducted research showing that continuously recalled memories are also subject to distortions and modifications. 17,18 These studies have primarily been conducted in normal human subjects. There are at least two studies in patients with PTSD, however, showing an increase in memory distortion on so-called "false memory tasks."19,20 No study directly addresses the relationship between traumatic memories and recall accuracy. More recently, however, a prospective investigation of human eyewitness memory for highly stressful events indicates that under conditions of extreme stress, human memory is extremely poor.<sup>21</sup>

Related to the question of the accuracy of memory for traumatic events is a study showing that memories of traumatic events in Persian Gulf War veterans changed over time. This study was entered as scientific evidence that memory for traumatic events is inconsistent, and an author of the study, Dr. Charles A. Morgan, testified at the trial. The evidence for a conclusion that memory is more fallible in victims with PTSD (thus potentially negating the testimony of Witness A) that was outlined in the trial includes greater false recall on false memory tasks, deficits in hippocampal-based memory pointing to the possibility of hippocampal damage, and inconsistency of traumatic event recall. Southwick et al.<sup>22</sup> and their research team conducted a set of studies demonstrating that memory of traumatic events is subject to considerable alteration over time. In the first study, Gulf War veterans were interviewed one month, two years, and six years after returning from the war.<sup>22</sup> When requestioned the first time, combat veterans changed their answers to specific questions about their trauma exposure. The veterans were more likely to say, after being interviewed at a two-year point, that they had seen more trauma than originally described, rather than less. Although there was alteration in memory in nearly all subjects, the greatest changes were seen in veterans suffering from PTSD, and the more PTSD symptoms subjects had, the more they changed their answers. In the six-year follow-up study, alterations in memory (increase or decrease) were also significantly related to PTSD symptomatology.

All subjects were absolutely convinced that their answers were right, even though they changed their answers each time and were sure that each answer was correct. The answers provided by the subjects were considered "inconsistent" rather than "inaccurate," because the research team had no way of knowing which accounts were true. Separate studies by Roemer *et al.*<sup>23</sup> and by North *et al.*<sup>24</sup> have shown that many individuals with PTSD symptoms on one-year follow-up may deny symptoms they had previously endorsed. Roemer and associates<sup>23</sup> reported that, while Gulf War veterans with and without PTSD were inconsistent when reporting trauma exposure, veterans with PTSD provided significantly more in-

consistencies than people without PTSD. As in the study conducted by Southwick *et al.*,<sup>22</sup> Roemer found that the more PTSD-type symptoms subjects endorsed, the more inconsistent they were when reporting traumatic events. Studies by Foa *et al.*<sup>25</sup> and van der Kolk and Fisler<sup>26</sup> also show that female rape victims may change their story to a significant degree and that memory in people who have highly stressful, life-threatening experiences may be "unorganized." It is possible that victims could become more consistent over time (but not necessarily more accurate) if they found a comfortable way of telling their stories (Ref. 1, Trial transcript, p 1009, November 10, 1998).

An expert witness for the prosecution criticized this evidence on a variety of methodological grounds. He cited studies showing that individuals often have an increase in information over time, which helps explain inconsistent reporting. Therefore, even though there is inconsistency, typically in the direction of increased memory, it does not necessarily imply inaccuracy, but instead, may be the result of temporary memory loss. Individuals who are traumatized often report less detail shortly after the trauma and more detail later (Ref. 1, Trial transcript, pp 1135–6, November 11, 1998).

In the final judgment, the Trial Chamber accepted defense testimony about inconsistencies of memory in individuals with PTSD and reasoned that Witness A's having given inconsistent reports provided additional evidence that she did suffer from the disorder. The court then incorporated prosecution testimony into the decision by reasoning that, since it has been shown that one remembers the gist of a traumatic event better, the PTSD victim's primary memory provides compelling affirmation that the event has occurred, and other inconsistencies do not diminish credibility.<sup>1</sup>

### PTSD, Memory, and the Law

This case highlights on multiple levels the politics of psychological trauma and the law. PTSD researchers have identified psychological and biological markers that are characteristic of the disorder. This research has been used to champion PTSD as a real disorder, meaning that trauma victims deserve financial compensation under the law and treatment from medical providers. This trend began explicitly with the creation of the National Center for PTSD, which was established by an act of Congress to provide re-

search information about the neurobiological and psychological correlates of PTSD in traumatized Vietnam veterans. This understated mission has been mostly successful. Veterans who were previously viewed skeptically with regard to the relationship between their symptoms and their war experiences now routinely receive PTSD treatment and disability compensation.<sup>27</sup>

The case of Anto Furundzija, however, turns the heretofore peaceful alignment of forces between the trauma victims and the clinicians and researchers on its head. The disruption this entails can be seen in the controversy related to this case in general, and in the presentation and discussion of the scientific evidence in particular. The case taps into a recently evolving area of research that suggests that PTSD victims have more memory fallibility than persons without the disorder. The same framework of physiological disturbances (e.g., hippocampal abnormalities) that had been used in support of victims is now perceived as undermining the trauma victim in a fundamental way. Relevant to this, it is perhaps not surprising that in the case of Anto Furundzija, Witness A sought to deny that she had PTSD or had even engaged in psychiatric treatment.

An important philosophical question that emerges from the Furundzija case is whether all testimony from PTSD patients should be thrown out of a court of law. Assuming for the moment that PTSD patients do have more fallible memories, does that imply that all their memories are inherently suspect? There is now a wealth of evidence that memories in all individuals are subject to a range of inaccuracies, and much of this literature has been related to research on witness testimony in court. Does that mean that all witness testimony should be discounted? Perhaps this merely highlights the importance of obtaining collateral information in cases involving both PTSD and non-PTSD victims. The model of children's testimony could be used as an example. Although memory in children may not be as accurate or take the same form as memory in adults, children's testimony is, and should be, allowed in court. In the final analysis, rational foresight and common sense, as in the example described herein, should prevail.

### References

- Prosecutor v. Anto Furundzija, ICTY Case No. IT-95-17/1-T. Available at www.un.org\icty (accessed May 10, 2004)
- Brown D, Scheflin AW, Hammond DC: Memory, Trauma Treatment, and the Law. New York: WW Norton, 1998

### **PSTD** at the International War Crimes Tribunal

- 3. Zola-Morgan SM, Squire LR: The primate hippocampal formation: evidence for a time-limited role in memory storage. Science 250:288–90, 1990
- 4. Scoville WB, Milner B: Loss of recent memory after bilateral hippocampal lesions. J Neurol Psychiatry 20:11–21, 1957
- Sapolsky RM: Why stress is bad for your brain. Science 273:749– 50, 1996
- Duman RS, Malberg JE, Nakagawa S: Regulation of adult neurogenesis by psychotropic drugs and stress. J Pharmacol Exp Ther 299:401–7, 2001
- Vermetten E, Vythilingam M, Southwick SM, et al: Long-term treatment with paroxetine increases verbal declarative memory and hippocampal volume in posttraumatic stress disorder. Biol Psychiatry 54:693–702, 2003
- 8. Santarelli L, Saxe M, Gross C, *et al*: Requirement of hippocampal neurogenesis for the behavioral effects of antidepressants. Science 301:805–9, 2003
- Bremner JD, Scott TM, Delaney RC, et al: Deficits in short-term memory in post-traumatic stress disorder. Am J Psychiatry 150: 1015–19, 1993
- Gilbertson MW, Gurvits TV, Lasko NB, et al: Multivariate assessment of explicit memory function in combat veterans with posttraumatic stress disorder. J Trauma Stress 14:413–20, 2001
- Bremner JD, Randall PR, Scott TM, et al: MRI-based measurement of hippocampal volume in posttraumatic stress disorder. Am J Psychiatry 152:973–81, 1995
- 12. Bremner JD: Does Stress Damage the Brain? Understanding Trauma-Related Disorders from a Mind-Body Perspective. New York: WW Norton, 2002
- 13. Elzinga BM, Bremner JD: Are the neural substrates of memory the final common pathway in PTSD? J Affect Disord 70:1–17, 2002
- 14. Diagnostic and Statistical Manual of Mental Disorders (ed 4). Washington, DC: American Psychiatric Association, 1994
- 15. Southwick SM, Davis M, Horner B, *et al*: Relationship of enhanced norepinephrine activity during memory consolidation to enhanced long-term memory in humans. Am J Psychiatry 159: 1420–22, 2002

- Kihlstrom JF: The trauma-memory argument. Conscious Cogn 4:63–7, 1995
- 17. Schacter DL, Coyle JT, Fischbach GD, et al: Memory Distortion: The Brain, the Mind, and the Past. Cambridge, MA: Harvard University Press, 1995
- Loftus EF, Miller DB, Burns HJ: Semantic integration of verbal information into a visual memory. J Exp Psychol Hum Learn Mem 4:19–31, 1978
- Bremner JD, Shobe KK, Kihlstrom JF: False memories in women with self-reported childhood sexual abuse: an empirical study. Psychol Sci 11:333–7, 2000
- Clancy SA, Schacter DL, McNally RJ, et al: False recognition in women reporting recovered memories of sexual abuse. Psychol Sci 11:26–31, 2000
- Morgan CA, Hazlett G, Doran A, et al: Accuracy of eyewitness memory for persons encountered during exposure to highly stressful personally relevant events. Int J Law Psychiatry 27:265–79, 2004
- 22. Southwick SM, Morgan CA, Darnell A, *et al*: Trauma-related symptoms in veterans of Operation Desert Storm: a 2-year follow-up. Am J Psychiatry 152:1150–5, 1995
- Roemer L, Litz B, Orsillo SM, et al: Increases in retrospective accounts of war-zone exposure over time: the role of PTSD symptom severity. J Trauma Stress 11:597

  –605, 1998
- 24. North CS, Smith EM, Spitznagel EL: One-year follow-up of survivors of a mass shooting. Am J Psychiatry 154:1696–702, 1997
- Foa EB, Molnar C, Cashman L: Change in rape narratives during exposure therapy for posttraumatic stress disorder. J Trauma Stress 8:675–90, 1995
- van der Kolk BA, Fisler RE: Dissociation and the fragmentary nature of traumatic memories: overview and exploratory study. J Trauma Stress 8:505–25, 1995
- Atkinson RM, Henderson RG, Sparr LF, et al: Assessment of Vietnam veterans for post-traumatic stress disorder in VA disability claims: process and pitfalls. Am J Psychiatry 139:1118–21, 1982