

## Memory impairments in posttraumatic stress disorder are related to depression

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### Abstract

The present study focuses on verbal learning and memory alterations in refugees with posttraumatic stress disorder, and whether the alterations are related to attention, acquisition, storage, or retrieval. Twenty-one refugees exposed to war and political violence with chronic PTSD, were compared to an exposed control sample of 21 refugees without PTSD. No differences were found in attention span, but tests of verbal memory showed less efficient learning in the PTSD sample. Group differences in delayed recall could be explained by learning efficiency. No differences were seen in recognition memory. These results indicate that memory alterations in PTSD are related to impaired acquisition and less effective encoding of the memory material and not to impaired attention span and/or impaired retrieval. Controlling for specific PTSD symptom clusters and self-reported depression showed that the intrusion subscale and depressive reactions are the most important symptoms in understanding the memory alterations in PTSD. © 2007 Elsevier Ltd. All rights reserved.

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The present study focuses on verbal learning and memory alterations in refugees with chronic posttraumatic stress disorder (PTSD) after exposure to war and political violence. PTSD is a disorder triggered by one or more traumatic events and the three main clusters of symptoms include intrusive reexperiencing symptoms, avoidance behaviors, and hyperarousal (DSM-IV; American Psychiatric Association, 1994). In addition, problems with memory and lack of concentration characterize most of the patients treated for PTSD.

The reports of the extent and nature of the cognitive alterations in patients with PTSD have been inconsistent, and they range from global cognitive deficits to

specific memory disturbances (e.g., Bremner et al., 1993; Gilbertson, Gurvits, Lasko, Orr, & Pitman, 2001; Uddo, Vasterling, Brailey, & Sutker, 1993). The most consistent findings have been impaired performance in attention, verbal learning, and short-term memory (e.g., Bremner et al., 1995; Vasterling, Brailey, Constans, & Sutker, 1998; Yehuda, Golier, Halligan, & Harvey, 2004).

Although the relationship between the experience of traumatic stress and verbal memory dysfunction is well documented, few of the previous studies have systematically analyzed the relationship between attention, encoding, storage, and retrieval. When testing the relationship between attention and memory, it is necessary to take into account that these two processes are closely related, and that the memory function is dependent on the effectivity of the attention process. Many studies do not report how deficits in attention are

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related to the impairments in memory function (e.g., Jenkins, Langlais, Delis, & Cohen, 1998). In most of the previous studies where delayed recall was impaired, immediate recall was also impaired (e.g., Bremner et al., 1993), and few of the surveyed studies report control for differences in initial acquisition between PTSD patients and control groups.

Some studies have attempted to give an answer to the relation between stage of processing (encoding, storage and retrieval) and memory impairments. Uddo et al. (1993) found no group difference on the first two trials on a list learning test, but on the last trials the PTSD group showed impaired acquisition. Yehuda and co-workers (2004) found impaired ability to learn new verbal information in Holocaust survivors with PTSD. More recently, Yehuda, Golier, Tischler, Stavitsky, and Harvey (2005) found more rapid forgetting in aging combat veterans. When comparing the PTSD group with non-exposed controls, these authors found a difference in total learning, reflecting problems with encoding of new information.

Several of the former studies of cognitive dysfunctions were performed on treatment-seeking Vietnam War veterans. Studies on war veterans have methodological challenges, and uncontrolled factors like secondary gain from a diagnosis may cause unintended and artificial results (McNally, 2003). In addition, war veterans were specially trained for challenging situations, and this may affect their coping and later development of PTSD symptoms (Hytten, 1989; Johnsen, Eid, Løvstad, & Michelsen, 1997). One study on refugees found that PTSD was associated with altered fluid intelligence and episodic memory (Kivling-Bodén & Sundbom, 2003). However, this study did not include more specific verbal memory tests, so memory functions in these samples require further exploration.

Both the elevated arousal levels and the intrusive memories related to PTSD have been hypothesized to interfere with ongoing cognitive processing and thus produce the memory impairments (Kolb, 1987). However, few of the previous studies have analyzed specific hypotheses regarding how the different symptom clusters influence the performance on memory tasks.

Other clinical states and premorbid cognitive abilities may contribute to the cognitive problems in patients with PTSD (Barrett, Green, Morris, Giles, & Croft, 1996; Macklin et al., 1998). In addition to PTSD, exposure to a traumatic event can also result in depression or anxiety, and may lead to substance abuse (Kessler, Sonnega, Bromet, & Hughes, 1995;

McFarlane & Papay, 1992). Major depression is found to be related to memory impairments, including problems with recall and effortful information processing (Burt, Zembler, & Niederehe, 1995; Egeland et al., 2003; Weingartner, 1981). Since PTSD often occurs comorbidly with other psychiatric disorders with known cognitive impairments, it is a challenge to assess the unique contribution of PTSD on memory functions. In addition, other psychiatric problems have frequently been discussed as comorbid conditions as if they occurred independently from the PTSD symptoms. There is now a growing awareness that complex and prolonged trauma may result in many posttraumatic outcomes (Bremner, 2002; McFarlane & Papay, 1992; Van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005).

The aim of the present study is to analyze the different processing components of verbal memory and attention. The study will use a battery of different tests that distinguish more precisely among the memory components. In addition we will control for attention by covarying for a measure of attention. This will enable us to find the focal points at which the attention and memory processes become dysfunctional after trauma exposure. In addition the findings from trained samples will be replicated in a sample of war-exposed civilians. PTSD was measured with The Impact of Event Scale—Revised and the construct and its specific symptom clusters is used in reference to this scale (Weiss & Marmar, 1997). We will examine for the effect of these different clusters on verbal learning and memory. In order to examine other possible explanations for memory impairments, we would control for concurrent depressive reactions and general distress.

Collecting data on the cognitive and clinical aspects of trauma in different ethnic minorities entail several challenges. The test materials are not always available in the different minorities' native language. There is a lack of norms, and the use of interpreters increase possible sources of errors. This could be controlled for by balancing for ethnicity in the target group and the control group, and in having a design that focuses on the between-groups comparisons.

In this study we will test a set of hypotheses regarding impairments in memory functions in refugees/immigrants with PTSD. The first question addressed is whether there are differences in verbal learning and memory as seen on a standardized memory test, between a group of war exposed refugees with PTSD and a control group of exposed refugees without PTSD. If the memory impairments in patients with PTSD are related to intrusive and arousal symptoms, it

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