

# *Twenty Years of Progress in the Study of Trauma*

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*In this article, the authors argue that studies investigating the nature of traumatic memory have made the greatest contribution to trauma research in the past 20 years. Neuroimaging studies provide empirical support for the diagnosis of posttraumatic stress disorder and have important implications for the treatment of trauma survivors. In the future, the authors hope to see an empirically derived model of trauma that incorporates both mediating and moderating factors to predict outcome.*

**Keywords:** *trauma; PTSD; neuroimaging; traumatic memory*

*The past 20 years* have seen exponential growth in the study of trauma. The expanded scope of this work has helped bridge gaps between the once disparate worlds of the front-line clinician and the academic and has brought together researchers and clinicians from divergent groups working with various types of trauma. A proliferation of peer-reviewed journals focused on trauma, such as the *Journal of Interpersonal Violence*, paved the way for academics to disseminate their work. According to PsycInfo, in 1984, there was one article with the term *PTSD* (posttraumatic stress disorder) as a keyword, three with the words *posttraumatic stress disorder*, none with the words *psychological trauma*, and none with the word *dissociation*. In 2003, there were 599 articles with the term *PTSD*, 813 with the words *posttraumatic stress disorder*, 43 with the words *psychological trauma*, and 413 with the word *dissociation*. The field has come of age.

## WHAT IMPORTANT KNOWLEDGE HAS ALL OF THIS ACTIVITY GENERATED?

Without question, the debate that has come to be known as “the memory wars” has been the most contentious area of study. This still unresolved

JOURNAL OF INTERPERSONAL VIOLENCE, Vol. 20 No. 4, April 2005 488-492

DOI: 10.1177/0886260504267836

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debate about the veracity of recovered memories has had both intended and unintended consequences. An intended benefit is a more rigorous approach to clinical work. Perhaps an unintended benefit is research about the nature of traumatic memory, which has slowly revealed what we believe is the most important group of findings in the field over the past 20 years.

Clinical anecdotes and research indicate that traumatic memories are not stored or recalled in the same manner as nontraumatic memories. Specifically, these memories tend to be dissociated from consciousness and stored as sensory fragments that have little narrative attached to them. When these memories are recalled, they are as vivid as if the survivor were reliving the trauma. These sensory fragments are most likely to recur when a survivor is in an aroused psychological state or when he or she is reminded of the original event by sensory stimuli. It is only over time and through piecing together the fragments that survivors develop a story about their experiences (Blank, 1985; Janet, 1994; Kardiner, 1941; Rivers, 1918; van der Kolk, 1994; van der Kolk & Fislser, 1995; van der Kolk, Perry, & Herman, 1991).

Neuroimaging studies aimed at stimulating and studying traumatic memories show that the recall of traumatic memories is associated with the right-side limbic and paralimbic regions, strong activation of the amygdala, activation of the visual cortex, and deactivation of Broca's area. Again, these findings are consistent with emotional and visual reexperiencing of the traumatic experience and with the difficulties that PTSD survivors have in creating narratives for their traumatic experiences (Bremner et al., 1995; Gurvits et al., 1996; Rauch & Shin, 1997; Rauch, van der Kolk, Fislser, & Alpert, 1996; Shin et al., 1997).

Such research also consistently shows that survivors of trauma have decreased hippocampal volumes, with symptom severity correlating negatively with the degree of shrinkage (Bremner, 2001). It is hypothesized that the chronically high levels of cortisol that are the result of trauma are neurotoxic and result in degradation of the hippocampus. Decreases in hippocampal volume may play a role in abnormalities of memory and behavior in individuals with PTSD. For instance, hippocampal shrinkage may be related to the misattribution of ambiguous information as threatening and the difficulties that PTSD survivors have with affect regulation. Recent research suggests that decreased hippocampal size may be a predisposing factor for developing clinically distressing symptoms in response to trauma (Gilbertson et al., 2002) and that it may result in behavioral inhibition, which leads individuals to place themselves in situations where they would be likely to experience trauma. Reduced hippocampal volume also may be related to behaviors that are comorbid with PTSD, such as substance abuse (Bower, 1996). Importantly, studies with children and twins discordant from trauma history sug-

gest that hippocampal volume decreases following trauma among those who develop PTSD (Yanasue et al., 2003). We believe that these technologies not only have produced the most important findings but that they are the most promising methodological innovations in the past 20 years.

These studies have significant clinical implications, in part because they validate the experience of trauma survivors and the diagnosis of PTSD, the credibility of which have at times been questioned. These findings also make us realize that we have to work with trauma survivors at all levels because simply talking about the trauma is unlikely to be effective (Levin, Lazrove, & van der Kolk, 1999). What we need to do as clinicians is help survivors encode their sensory fragments into a narrative and create a semantic and autobiographical memory that ultimately enables them to self-soothe and self-regulate affect when they are bombarded by internal signals of danger. The neuroimaging studies also lend credibility to nonverbal approaches to treatment, such as massage therapy, and suggest that these treatments can be important adjuncts to more traditional talk therapy.

However, the neuroimaging findings need to be applied cautiously as the potential exists for them to be misused. For instance, based on this knowledge, beta blockers are beginning to be prescribed to trauma survivors in an effort to prevent the development of PTSD through blocking the activation of the sympathetic nervous system (Vaiva et al., 2003; Vaiva et al., 2004). Ironically, one side effect of beta blockers is difficulty with encoding emotionally arousing memories. We shudder to think of a world where traumatic experiences can be endured without consequence for the individual's emotional well-being. Another concern is that these incompletely understood neuro-anatomical findings could be used by the military to select soldiers who can witness and participate in horrific acts without risking PTSD or to stigmatize those who do develop symptoms.

#### WHERE DO WE GO FROM HERE?

Trauma research was greatly assisted by the inclusion of the PTSD diagnosis in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III)*; American Psychiatric Association, 1980). However, clinicians who work extensively with this population soon realized that a diagnosis of PTSD does not adequately capture the complex pattern of symptoms and difficulties in interpersonal relations and affect regulation that characterizes this population (Herman, 1992). In addition, there are significant problems with comorbidity in the *DSM* system. Many researchers and clini-

cians have called for overhauling or replacing the *DSM* criteria. Although we considered adding our voices to the clamor, ultimately, we concluded that researchers' efforts would be better aimed at articulating an empirically based model of trauma that incorporates both moderating and mediating factors to predict outcome (Whiffen & MacIntosh, 2004). In light of the pressures on mental health professionals to use empirically validated treatments, this model could be used to assist clinicians in refining extant treatment approaches.

This has been a poignant time to reply to these questions. The news of the systemically sanctioned humiliation and abuse of Iraqi prisoners reminds us that trauma touches both the victims of violence and the perpetrators. The study and treatment of trauma continues to be a field where social and political interests influence the research that is done. As clinicians and researchers, we have a responsibility not only to seek answers and provide effective, sensitive treatment but also to advocate and educate the public about the prevalence and impact of trauma at all levels, from natural disasters and terrorism to the insidious violence that lives under the cover of darkness in our own homes.

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