

Raz, A., Bowles, E. (2009). Exploring Posttraumatic Stress Disorder in the Light of Neuroscience. *PsycCRITIQUES*, Vol 54(43).

**Title:**

Exploring posttraumatic stress disorder in the light of neuroscience.

**Authors:**

Raz, Amir  
Bowles, Elizabeth

**Source:**

*PsycCRITIQUES*, Vol 54(43), 2009.

**Publisher:**

US: American Psychological Association

**Reviewed Item:**

Cerasuolo, Enrico (Dir); Fergnachino, Sergio (Dir) (2008). *The Hidden Face of Fear*

**ISSN:**

1554-0138 (Electronic)

**Language:**

English

**Keywords:**

The Hidden Face of Fear; tragedy; September 11th; posttraumatic stress disorder; fear; brain; psychotherapy; pharmacology

**Abstract:**

Reviews the film, *The Hidden Face of Fear* directed by Enrico Cerasuolo and Sergio Fergnachino (2008). Following the tragedy of September 11th, 4.7%–10.2% of the adult population in New York City suffered from functional impairments stemming from posttraumatic stress disorder (PTSD) without an increase in hospital visits (Neria, 2009). New Yorkers needed a large-scale intervention that they were not receiving. In this new film, the directors profile three New Yorkers suffering from 9/11-related PTSD. Pulling in the theories and voices of leading New York City mental research luminaries, the film explores PTSD as a function of our brain circuitry for fear—a complex network involving the amygdala. These experts argue that mental activity and brain activity are intimately related, and that the brain is malleable. It follows that traumatic events can reshape and rewire the brain, and so, too, may psychological or pharmacological therapies. (PsycINFO Database Record (c) 2009 APA, all rights reserved)

**Subjects:**

\*Emotional Trauma; \*Fear; \*Pharmacology; \*Posttraumatic Stress Disorder;  
\*Psychotherapy; Brain

**Classification:**

Health & Mental Health Treatment & Prevention (3300)  
Neuroses & Anxiety Disorders (3215)

**Population:**

Human (10)

**Format Availability:**

Electronic

**Format Covered:**

Electronic

**Publication Type:**

Electronic Collection

**Document Type:**

Raz, A., Bowles, E. (2009). Exploring Posttraumatic Stress Disorder in the Light of Neuroscience.  
*PsycCRITIQUES*, Vol 54(43).

Review-Media

**Release Date:**

20091026

**Correction Date:**

20091102

**Digital Object Identifier:**

10.1037/a0017664

**PsycINFO AN:**

2009-17223-001

**Accession Number:**

psq-2008-8891-1-2

**Database:**

PsycCRITIQUES

---

# Exploring Posttraumatic Stress Disorder in the Light of Neuroscience

**Review By:** [Amir Raz](#)  
[Elizabeth Bowles](#)

**Review of:** The Hidden Face of Fear  
**By:** Enrico Cerasuolo and Sergio Fergnachino (Directors), (2008)

Following the tragedy of September 11th, 4.7%–10.2% of the adult population in New York City suffered from functional impairments stemming from posttraumatic stress disorder (PTSD) without an increase in hospital visits (Neria, 2009). New Yorkers needed a large-scale intervention that they were not receiving.

In their new film *The Hidden Face of Fear*, Enrico Cerasuolo and Sergio Fergnachino profile three New Yorkers suffering from 9/11-related PTSD. Pulling in the theories and voices of leading New York City mental research luminaries, the film explores PTSD as a function of our brain circuitry for fear—a complex network involving the amygdala. These experts argue that mental activity and brain activity are intimately related, and that the brain is malleable. It follows that traumatic events can reshape and rewire the brain, and so, too, may psychological or pharmacological therapies.

PTSD is a complex disorder with a relatively short history. The disorder results from exposure to an event so jarring that it fundamentally disrupts the mind, causing persistent and intrusive thoughts. First diagnosed in Vietnam veterans and later in Holocaust survivors, PTSD is a modern incarnation, born in and defined by events of the 20th century. Yet if one looks deeper, its history is old. Known as *soldier's heart* in the Civil War, *shell shock* in World War I, and *battle fatigue* in World War II, PTSD and the notion of traumatic memory are at the culmination of over 150 years of attention (Young, 1995). The disorder resists categorization and often straddles the lines between dissociative, anxiety, and personality disorders.

Debates have shrouded the definition, let alone treatment, of PTSD. Some experts suggest that PTSD-like symptoms can develop without any precipitating traumatic event. Such arguments, however, represent a minority view, and most researchers and clinicians agree that some extremely traumatic events can create symptomatically unique, indelible marks on individuals.

While certain organizations find it difficult to accept PTSD (e.g., soldiers with PTSD are ineligible for the Purple Heart), the scientific community is slowly coming to a tenuous accord regarding this disorder. The American Psychiatric Association included it in its *Diagnostic and Statistical Manual of Mental Disorders* in 1980 (3rd ed.; *DSM-III*); a few years later, the National Institute for Mental Health recognized it. Moreover, the zeitgeist has picked up PTSD, now an oft-discussed subject in scientific journals and popular media.

Raz, A., Bowles, E. (2009). Exploring Posttraumatic Stress Disorder in the Light of Neuroscience. *PsycCRITIQUES*, Vol 54(43).

Today, controversy over PTSD mirrors the general divide within the scientific community over how to understand mental disorders. On one hand, greater numbers of social scientists, such as psychologists and anthropologists, seek to elucidate these disorders as cultural constructions, with cobbled-together histories and radically different manifestations depending on context (Young, 1995). On the other hand, biologically minded researchers, including psychiatrists and neuroscientists, increasingly disengage from the context and history of disorders, rendering situational factors ostensibly irrelevant (Neria, 2009).

In this latter vein, a wave of neuroscientists such as those featured in *The Hidden Face of Fear* are attempting to unpack the nature of PTSD with biological tools, using novel technologies such as functional magnetic resonance imaging (fMRI) to explore the living human brain. These efforts locate abnormal activity related to the disorder almost exclusively in the amygdala, a brain region putatively responsible for fear and learning. These scientists believe a cure to PTSD lies in a pharmacological intervention targeting the amygdala, especially its lateral nucleus, which seems particularly relevant for changing a memory into a traumatic memory.

For example, noradrenergic blockade in the amygdala may disrupt formation of fearful memories and, therefore, the imprint of a traumatic memory (Yehuda & LeDoux, 2007). In the film, leading neuroscientist Joseph LeDoux discusses a theoretical “fear pill” that would unravel only when detecting amygdala-specific proteins. Nobel laureate Eric Kandel responds to LeDoux by referring to such a pill as “a fantasy” and an “ideal scenario” that “is not absurd.”

Neuroimaging permits observation of specific brain areas such as the amygdala; however, researchers using fMRI run the risk of reverse inferences—applying a mental state to the activation of a particular brain region. Kandel and LeDoux tread this line when they equate amygdala activation exclusively with a fear state. While feelings of fear correlate with fMRI indications of changes in the amygdala, so do many other stimuli such as intense smells and sexual arousal. Although following a reductionist model is useful for developing pharmacological solutions, reductionism often implies specious pharmacological specificity. The logic of reductionism posits that biology should provide a complete description of brain function.

However, this approach ignores a realm of human exploration that is patently psychological and irreducibly symbolic. Neuroscience and psychology are complementary; while reductionism and brain imaging can lead to interesting insights into disorders, additional promising paths lie in a more interdisciplinary approach.

A highly contextual impairment, PTSD evades reduction through its coconstruction with culture. In the film, nonpharmacological therapies emerge as important treatment for PTSD from the patient perspective, whereas biological treatments seem to be most important for the clinician researchers. Toward the end of *The Hidden Face of Fear*, Kandel shakes his head and acknowledges, “The really striking advance in the last decade has not been in the development of new drugs, despite the fact that this is the year of biology, but in the scientific validation of cognitive behavioral therapy” (CBT). Clinical psychologist Marylene Cloitre exclaims that “it might have been rather amazing at one time to think that words—talking—can actually change the way the brain works, but it seems to be true.”

Raz, A., Bowles, E. (2009). Exploring Posttraumatic Stress Disorder in the Light of Neuroscience. *PsycCRITIQUES*, Vol 54(43).

In a study of patients suffering from severe arachnophobia, fMRI and positron emission tomography (PET) scans revealed that previously triggered brain regions of patients exposed to spiders showed less activation after a regime of CBT (Paquette et al., 2003). In the treatment of obsessive-compulsive disorder, CBT and fluoxetine seem to produce comparable changes in the brain, suggesting that both can be useful treatments (Baxter et al., 1992). Although behavioral interventions can result in measurable changes in brain activity, most biologically minded clinicians falter when it comes to implementing nonpharmacological treatments for brain-based disorders. While recognizing the potency of nondrug factors, they seldom use them.

One promising path for nonpharmacological treatment of PTSD may lie in harnessing its dissociative nature. Whether a defense against the memory of a trauma or against the event itself, dissociation naturally occurs in people during times of intense stress. Among Vietnam War veterans with PTSD, the more highly symptomatic are also more highly hypnotizable (Spiegel, 1981). The disorder's relationship to suggestion extends beyond veterans; researchers found that sexually abused young girls show symptoms of PTSD and higher than normal levels of hypnotizability (Putnam, Helmers, Horowitz, & Trickett, 1995). People suffering from PTSD are more hypnotizable than are both the general population and those with personality disorders (Spiegel, 1981). PTSD and hypnotic response appear to be intimately related—and one may provide a tool to unlocking the other.

Kandel's early work on the relationship between neuroscience and psychoanalysis lays a foundation for collaboration around an issue such as PTSD (Kandel, 1999). Given that there is growing accord on the definition of PTSD, the challenge remains finding effective treatment. *The Hidden Face of Fear* suggests nonpharmacological prospects but, by the end of the film, opines for a pill.

PTSD, however, may be difficult to fit into a reductionist model as traumatic memory cannot be disentangled from experience. Currently, the most common pharmacological interventions for PTSD are selective-serotonin reuptake inhibitors and their variants—the same pills used to treat myriad disorders including anxiety and depression (Neria, 2009). With recent efforts to prevent and erase the formation of memories (Wang, Alvares, & Nader, 2009), pharmacological treatments for PTSD may live up to futuristic film depictions (Raz & Paasivirta, 2005) and could prove sufficient. As the Iraq War winds down and another generation of veterans returns home, the time for a comprehensive, whole-person approach to PTSD is nigh.

## [References](#)

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

Baxter, L. R., Jr., Schwartz, J. M., Bergman, K. S., Szuba, M. P., Guze, B. H., Mazziotta, J. C., . . . Phelps, M. (1992). Caudate glucose metabolic rate changes with both drug and behavior therapy for obsessive-compulsive disorder. *Archives of General Psychiatry*, 49(9), 681–689.

Kandel, E. R. (1999). Biology and the future of psychoanalysis: A new intellectual framework for psychiatry revisited. *American Journal of Psychiatry*, 156, 505–524.

Raz, A., Bowles, E. (2009). Exploring Posttraumatic Stress Disorder in the Light of Neuroscience. *PsycCRITIQUES*, Vol 54(43).

Neria, Y. (2009). Posttraumatic stress disorder. *Psychiatric Annals*, 39(6), 317–318.

Paquette, V., Lévesque, J., Mensour, B., Leroux, J.-M., Beaudoin, G., Bourgouin, P., & Beauregard, M. (2003). Change the mind and you change the brain: Effects of cognitive-behavioral therapy on the neural correlates of spider phobia. *NeuroImage*, 18, 401–409.

Putnam, F. W., Helmers, K., Horowitz, L. A., & Trickett, P. K. (1995). Hypnotizability and dissociativity in sexually abused girls. *Child Abuse & Neglect*, 19(5), 645–655.

Raz, A., & Paasivirta, M. (2005). The science and fiction of memory removal[Review of the film *Eternal sunshine of the spotless mind*, directed by Michel Gondry]. *PsycCRITIQUES*, 50(42).

Spiegel, D. (1981). Vietnam grief work using hypnosis. *The American Journal of Clinical Hypnosis*, 24, 33–40.

Wang, S.-H., Alvares, L. D. O., & Nader, K. (2009). Cellular and systems mechanisms of memory strength as a constraint on auditory fear reconsolidation. *Nature Neuroscience*, 12(7), 905–912.

Yehuda, R., & LeDoux, J. (2007). Response variation following trauma: A translational neuroscience approach to understanding PTSD. *Neuron*, 56(1), 19–32.

Young, A. (1995). *The harmony of illusions: Inventing post-traumatic stress disorder*. Princeton, NJ: Princeton University Press.

---

This publication is protected by US and international copyright laws and its content may not be copied without the copyright holders express written permission except for the print or download capabilities of the retrieval software used for access. This content is intended solely for the use of the individual user.

**Source:** PsycCRITIQUES. Vol.54 (43)

**Accession Number:** psq-2008-8891-1-2 **Digital Object Identifier:** 10.1037/a0017664