



# Retrieving and Modifying Traumatic Memories: Recent Research Relevant to Three Controversies

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## Abstract

The purpose of this article is to review recent research that is relevant to three controversies concerning memory for trauma. First, we briefly review the debate about recovered memories of childhood sexual abuse, summarizing a third interpretation distinct from both the repression and false-memory accounts. Second, we address new findings related to claims that memories of trauma, especially in people with posttraumatic stress disorder, are especially fragmented and disorganized. Third, we discuss research designed to test whether eye movements in eye-movement desensitization and reprocessing therapy are effective.

## Keywords

memory, trauma, repression, EMDR, posttraumatic stress disorder, eye movements, working memory, modification

Scientific controversies in the field of human memory seldom captured the attention of anyone outside experimental psychology during its first 100 years. Yet everything changed in the years following the centennial of Ebbinghaus's (1885/1913) seminal book. How people encode, recall, and modify memories of trauma has repeatedly been a flashpoint, most notably during the bitter dispute over the authenticity of reports of repressed and recovered memories of childhood sexual abuse. Although belief in repressed memories has declined among practicing clinical psychologists since the 1990s, a substantial minority (24.1%) agrees that people often repress their memories of trauma. However, only a small percentage of applied cognitive psychologists (8.6%) maintain this belief. Yet this notion seems to be resurgent among today's undergraduates, 81% of whom believe that people often repress their memories of trauma (Patihis, Ho, Tingen, Lilienfeld, & Loftus, 2014).

The purpose of this article is to review recent research that is relevant to three controversies concerning memory for trauma. First, we present an interpretation of recovered memories that does not rely on the concepts of repression or false memory. Second, we consider the claim that trauma memories typically lack narrative structure and that such fragmentation fosters

the emergence of posttraumatic stress disorder (PTSD). Third, we discuss research designed to test the utility of eye movements in eye-movement desensitization and reprocessing (EMDR) therapy (Shapiro, 2018), which targets traumatic memories in PTSD. The brevity of our article prohibits covering many other topics concerning trauma and memory (e.g., involuntary memories, over-general autobiographical memories, neuroscientific and psychophysiological correlates of retrieving memories of trauma, longitudinal changes in memories of trauma).

## Controversies Concerning Memories of Trauma

### *A nonrepression account of recovered memories*

According to the *repression perspective*, people become incapable of recalling memories of childhood sexual abuse precisely because these memories are so emotionally traumatic (Spiegel, 1997). Proponents of this view adduced

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studies to support the claim that many survivors encode trauma memories yet become incapable of recalling them, except under special circumstances such as hypnosis (Brown, Schefflin, & Hammond, 1998, p. 647). However, they often misconstrued other memory phenomena as confirming repression. For example, they misinterpreted ordinary forgetfulness as an inability to recall trauma, confused organic amnesia with psychic repression, cited reluctance to disclose one's trauma with an inability to recall it, and confused not thinking about sexual abuse for a long time with an inability to remember it (McNally, 2003, pp. 186–228). In summary, the notion that people can encode terrifying experiences yet become incapable of remembering them until years later is a claim devoid of convincing empirical support. Indeed, an analysis of studies concerning corroborated trauma uncovered no convincing evidence that survivors had forgotten, let alone repressed, their trauma (Pope, Oliva, & Hudson, 1999).

According to the *false-memory perspective*, people who report recovering memories of childhood sexual abuse are likely mistaken, especially if these memories surface during recovered-memory therapy (e.g., Ceci & Loftus, 1994). Although there are many instances of false memories of trauma (McNally, 2003, pp. 229–259), not all recovered memories are false or previously repressed. Some adults report having recalled childhood sexual abuse after many years of not having it come to mind (McNally, 2012). Typical reports mention one or several episodes of fondling by a trusted person who neither threatened nor physically harmed them when they were about 7 years old. They report experiencing confusion, disgust, or anxiety but not the terror that renders trauma so memorable. Not understanding the experience as sexually abusive, they did not think about it for years but readily recalled it later when they encountered reminders of the experience. About one third of them met symptomatic criteria for PTSD after understanding their experience as sexually abusive. Accordingly, victims may fail to think about their childhood sexual abuse for years because they did not experience it as terrifying when it occurred despite its moral reprehensibility.

### ***Are traumatic memories fragmented and incoherent?***

Some theorists hold that memories of trauma, especially among people with PTSD, are fragmented, incomplete, and lack narrative coherence (e.g., Brewin, 2011). They claim that patients must emotionally process intrusive, sensory flashbacks, integrating them into a coherent narrative to achieve recovery.

In a comprehensive study, Rubin, Deffler, et al. (2016) assessed 60 trauma-exposed adults, half of whom had PTSD. The authors matched the groups in terms of

trauma type (e.g., combat, childhood sexual abuse, accidents) and other variables. Participants recounted three traumatic, three very positive, and three very important memories. Each narrative was audiotaped, transcribed, and subjected to 28 measures of coherence. Most measures indicated that trauma memories were as coherent as very positive and very important memories, and participants with PTSD had no less coherent memories than did trauma-exposed participants without PTSD. Trauma memories were slightly less coherent than other memories on some measures but slightly more coherent on other measures. Taken together, these data counter the claim that trauma memories are characterized by a lack of narrative coherence, especially in individuals with PTSD. Although Brewin (2016) challenged this conclusion, Rubin, Berntsen, Ogle, Deffler, and Beckham (2016) convincingly rebutted Brewin's critique.

The importance of the narrative fragmentation of trauma memories is their presumptive effect on the maintenance of PTSD. Presumably, these memories must become integrated and coherent for recovery to occur. Bedard-Gilligan, Zoellner, and Feeny (2017) tested this assumption in a study of PTSD patients who received prolonged exposure therapy or sertraline for PTSD. From each patient, the authors obtained a trauma narrative, a positive narrative, and a negative, nontraumatic narrative. Using self-report ratings, independent ratings, and objective measures of narrative content, the authors evaluated the fragmentation of these memories before and after treatment. The results indicated that across measures, memory fragmentation did not reliably change throughout the course of treatment. Neither treatment type nor response to treatment was related to a change in narrative fragmentation. Pretreatment fragmentation in the negative and positive narratives predicted fragmentation in trauma narratives, implying that fragmentation indices reflect a person's style of recounting autobiographical memories rather than anything specific to trauma memories in people with PTSD.

Memories of trauma are not uniquely fragmented, but they haunt people suffering from PTSD. Erasing them is neither feasible nor wise; remembering danger enables one to subsequently avoid it. Yet one can remember it without emotionally reliving it, and hence, clinicians aim to render such memories less emotionally disturbing.

### ***Are eye movements in EMDR therapy effective?***

A crucial part of standard EMDR therapy is that patients recall a traumatic memory while visually tracking the therapist's fingers as they move back and forth in front of the patient's eyes (Shapiro, 2018). A long-standing

controversy has been whether (and how) eye movements in EMDR possess added benefit to its therapeutically established imaginal exposure component. Indeed, early studies documenting the efficacy of EMDR, but not its distinctive (and defining) eye-movement component, prompted one skeptic to remark: “Therefore, *what is effective in EMDR is not new, and what is new is not effective*” (McNally, 1999, p. 619, emphasis in original). However, a recent meta-analysis of treatment studies indicated that lateral eye movements enhance the efficacy of (desensitizing) exposure to traumatic or distressing memories (Lee & Cuijpers, 2013; see also a critique by Devilly, Ono, & Lohr, 2014, and a rejoinder by Lee & Cuijpers, 2014).

The findings fit with those of analog laboratory experiments in which participants hold a distressing memory in mind with or without making lateral eye movements induced by a moving dot on a computer screen. Lateral eye movements, compared with no eye movements, typically reduce memory-vividness and emotional-intensity ratings after the intervention (see van den Hout & Engelhard, 2012). The effects are not confined to subjective measures (e.g., Houben, Otgaar, Roelofs, & Merckelbach, 2018; Leer et al., 2017).

How do voluntary lateral eye movements modify how a memory is experienced? A placebo effect has been ruled out (Littel, van Schie, & van den Hout, 2017). Presumably, they limit working memory resources needed for memory retrieval (e.g., Gunter & Bodner, 2008), which consists of the recreation, maintenance, and inspection of a visual image (Kosslyn, 1994). When people vividly recall a memory, it can become more distinctive (i.e., *imagination inflation*). When distraction diminishes the capacity for retrieval, imagination deflation occurs (van den Hout & Engelhard, 2012). Working memory is indeed implicated in voluntary eye movement (because of the motor component and changing visual input; Onderdonk & van den Hout, 2016) and in the retrieval of a distressing memory (van Veen, Engelhard, & van den Hout, 2016).

Lab research has tested predictions from the working memory theory. First, consistent with the theory, other dual tasks that compete with memory retrieval also work, including vertical eye movements, counting backward, attentional breathing, and playing the computer game Tetris. Passive dual tasks, such as listening to beeps or finger tapping, barely tax working memory and do not attenuate memory vividness or emotionality as active tasks do (see van den Hout & Engelhard, 2012). Moreover, eye movements are less taxing and effective if they are slow rather than fast (Maxfield, Melnyk, & Hayman, 2008; van Veen et al., 2015) and do not work if they precede memory retrieval (Gunter & Bodner, 2008) or are combined with a different

memory than the one rated in the pre- or posttests (van Veen et al., 2016).

Second, the eye-movement task is more effective for visual memories, whereas an auditory dual task is more effective for auditory memories (Kemps & Tiggemann, 2007; see also Baddeley & Andrade, 2000), but this modality effect was not replicated in a study controlling for cognitive load (Tadmor, McNally, & Engelhard, 2016). More research about modality effects is needed that controls for general load.

Third, as predicted, the eye-movement intervention attenuates not only distressing memories but also imagined future threats (Engelhard, van den Hout, Janssen, & van der Beek, 2010); positive memories, including sexual fantasies (Bartels, Harkins, Harrison, Beard, & Beech, 2018); and substance-related imagery (Littel, van den Hout, & Engelhard, 2016).

The precise mechanism mediating the effects of lateral eye movements on memory remains unknown. Rapid attentional switching between two tasks may be responsible, perhaps by temporarily degrading the memory (Barrouillet & Camos, 2012). Experiencing a weakened form of the aversive memory could encourage reappraisal (e.g., Gunter & Bodner, 2008).

## Future Directions

Our synoptic survey of three specific controversies in the vast field of trauma and memory suggests that some children can experience childhood sexual abuse without understanding it as abuse and without experiencing the terror characteristic of encountering canonical traumatic stressors (e.g., combat, rape, torture). Yet recalling it through the eyes of an adult many years later, they can suffer symptoms of PTSD. Hence, there appear to be cases of recovered memory that were not previously repressed but merely forgotten precisely because they were neither experienced as traumatic at the time of their occurrence nor understood as abusive.

A topic related to the full-blown repression of traumatic memories is the claim that they are fragmented and that such disorganization presages the emergence of PTSD. Yet recent, rigorous research indicates that memories of trauma are not especially fragmented, and when they are, fragmentation is unrelated to recovery from trauma.

Finally, our analysis of eye movements provides provisional answers to earlier questions and raises new ones. There is evidence that eye movements in EMDR add benefit to its therapeutically established imaginal exposure component, and a working memory account seems to explain this apparent efficacy. EMDR, imaginal exposure therapy, and cognitive (processing) therapy, when properly used, can attenuate the emotional

evocative power of traumatic memories, sometimes by rendering them less vivid. Hence, recovery from trauma enables patients to recall their memories in relative tranquility rather than “reliving” them emotionally with an intensity that matches the original experience. All three methods presuppose that patients can readily recall their trauma. These approaches are unrelated to the notorious “recovered-memory therapies” of the 1990s and 2000s. However, because recollection is reconstruction, there is always the possibility of memory distortion with any psychotherapy (see Patihis & Pendergrast, 2018). There may be other unwanted effects of EMDR-like procedures. Lab research using a car-crash video showed that a subsequent eye-movement intervention increased susceptibility to misleading information (Houben et al., 2018). This could be problematic for eyewitness testimony. It is unclear when and which memory features should be therapeutically targeted (Visser, Lau-Zhu, Henson, & Holmes, 2018). To clarify this, we need research on the long-term effects of these interventions on memory distortions.

It also remains unclear how the effects of taxing working memory translate into recovery from PTSD. Some evidence indicates that vividness diminishes before emotionality does during the intervention (Smeets, Dijs, Pervan, Engelhard, & van den Hout, 2012), whereas other studies show that only vividness, emotional intensity, or another aspect of memory declines (e.g., Houben et al., 2018). Some effects may result directly from the cognitive load that modulates emotional brain responses (van Dillen, Heslenfeld, & Koole, 2009).

Moreover, what kind of memory reactivation is necessary or sufficient to accomplish memory change remains unknown. Reactivation can be achieved in various ways from briefly cued to deliberate recall while performing a dual task (Visser et al., 2018). For instance, playing Tetris after cued memory recall reduces intrusive memories (e.g., Holmes, James, Coode-Bate, & Deeprose, 2009), but making eye movements after memory recall does not affect vividness or emotional intensity (Gunter & Bodner, 2008). This suggests that playing Tetris after cued recall capitalizes on a different mechanism. Nevertheless, it is conceivable that reactivation persists. This issue awaits empirical testing.

In conclusion, the common thread running through each of these three controversies is an emphasis on the dynamic character of autobiographical memory. Indeed, its inherent plasticity provides the foundation for therapeutically modifying memories that might otherwise haunt victims for years.

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