EMDR and the Military-In-Action Newsletter
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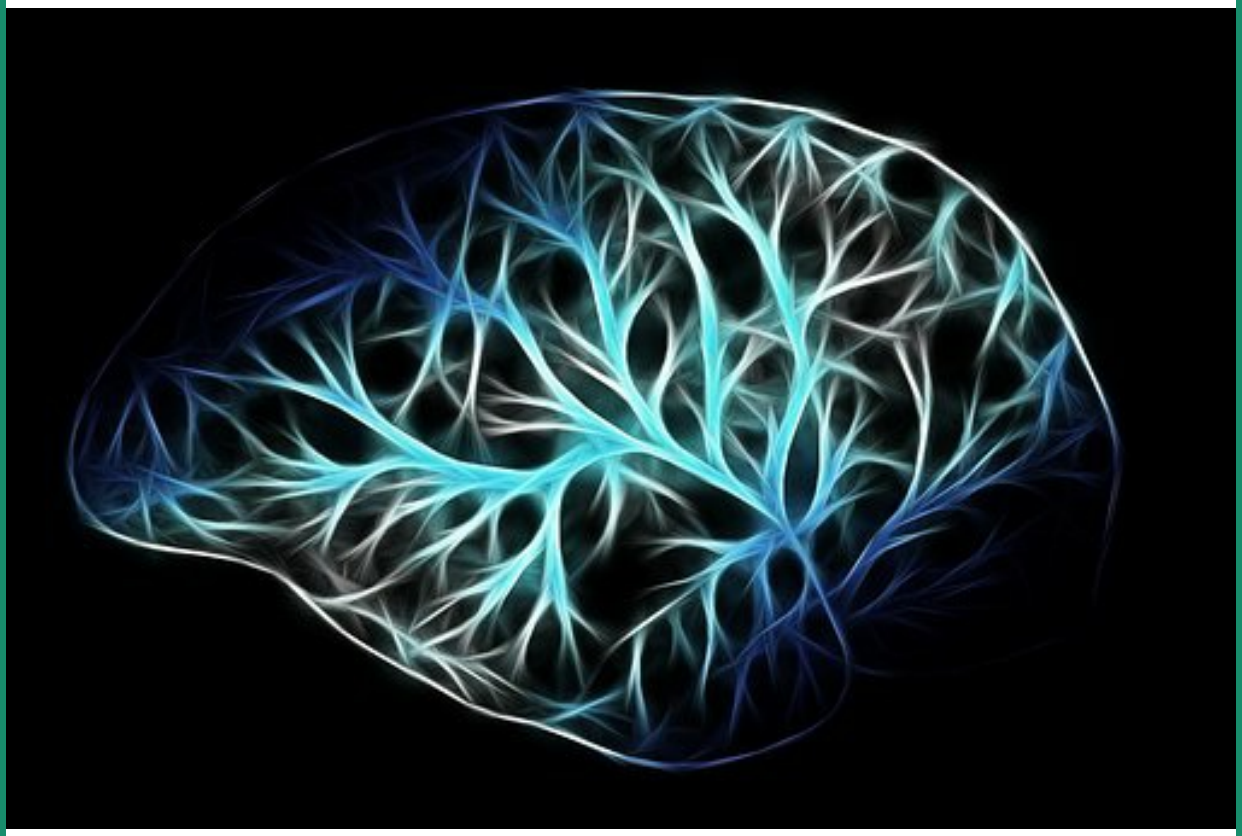
emdr RESEARCH FOUNDATION



# EMDR and Neurobiology

This monthly newsletter was created primarily for our colleagues trained in Eye Movement Desensitization and Reprocessing (EMDR) who work with military, veterans, and their families. The purpose of EMDR and the Military-in-Action Newsletter is to promote continued dialogue regarding the efficacy and current developments with EMDR and its use with these special populations.

**ATTENTION RESEARCHERS:** If you are interested in doing research that addresses EMDR topics related to the military and you need additional funding, consider applying for the $25,000 EMDR Research Grant Award.

$25,000 EMDR Research Grant Award Details:
https://emdrresearchfoundation.org/research-grants/25000-emdr-research-grant-award/#

If you need access to expertise for a research project, don't hesitate to apply for the $1,000 Research Consultation Award.

Research Consultation Award Details:
https://emdrresearchfoundation.org/research-grants/research-consultation-awards

## EMDR Studies

# Eye-Movement Intervention Enhances Extinction Via Amygdala Deactivation

***We look forward to receiving more of these published research studies that* OUR FOUNDATION FUNDS!**

**EMDR Study**

de Voogd, L., Kanen, J.W., Neville, D.A., Roelofs, K., Fernández, G., and Hermans, E.J. (2018) . **Journal of Neuroscience.** DOI: 10.1523/JNEUROSCI.0703-18.2018

## ABSTRACT:

Improving extinction learning is essential to optimize psychotherapy for persistent fear-related disorders. In two independent studies (both n=24), we found that goal-directed eye movements activate a dorsal fronto-parietal network and transiently deactivate the amygdala (n2/p=.17). Connectivity analyses revealed that this down-regulation potentially engages a ventromedial prefrontal pathway known to be involved in cognitive regulation of emotion. Critically, when eye movements followed memory reactivation during extinction learning, it reduced spontaneous fear recovery 24 hours later (n2/p=.21). Stronger amygdala deactivation furthermore predicted a stronger reduction in subsequent fear recovery after reinstatement (r=.39). In conclusion, we show that extinction learning can be improved with a non-invasive eye-movement intervention that triggers a transient suppression of the amygdala. Our finding that another task which taxes working memory leads to a similar amygdala suppression furthermore indicates that this effect is likely not specific to eye movements, which is in line with a large body of behavioral studies. This study contributes to the understanding of a widely used treatment for traumatic symptoms by providing a parsimonious account for how working memory tasks and goal-directed eye movements can enhance extinction-based psychotherapy, namely through neural circuits (e.g., amygdala deactivation) similar to those that support cognitive control of emotion.

# Mechanism -The Working Memory Hypothesis

**EMDR Study**

Onderdonk, S. W., & van den Hout, M. A. (2016). **Comparisons of eye movements and matched changing visual input.** Journal of Behavior Therapy and Experimental Psychiatry, 53, 34-40. doi:10.1016/j.jbtep.2015.10.010.

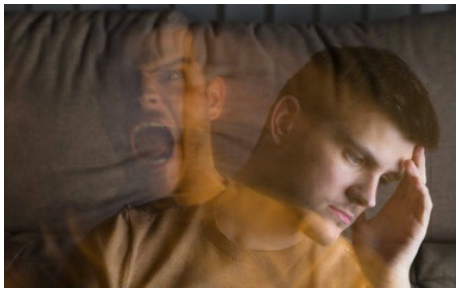
## ABSTRACT:

**Background and Objectives:** During EMDR trauma therapy, performing eye movement (EM) taxes working memory (WM), and simultaneously recalled memories become less vivid. It has been proposed that this WM occupation results from CVI which occurs during EM. This study sought to compare the effects of EM on memory to a task presenting identical visual stimulus to stationary eyes.
**Methods:** In Study 1, participants recorded RT while performing two tasks: EM, and a task with visually identical images displayed on screen. In Study 2, these same tasks were performed while simultaneously recalling negative emotional memories.
**Results:** Study 1 found RT was slowest in the EM condition, while RT in the CVI condition was still slower than in the control condition. Study 2 found decreases in memory vividness and emotionality after EM, while after CVI there was a small decrease in negativity which was not greater than in the control.
**Limitations:** Neither study included EM with no visual input; conclusions cannot be made about the effect of motor movement on WM taxation or recall. As neither study was conducted with trauma patients, it is unknown if the observed effects would be comparable in the population for which EMDR is intended.
**Conclusions:** Performing EM taxes more WM resources and has greater impact on both memory vividness and emotionality than matched CVI. This demonstrates that the effects observed in EMDR treatment are the result of more than occupying WM systems with visual stimuli alone.

# Mechanism - Degrading Traumatic Memories with Eye Movements

### EMDR Study

Thomaes, K., Engelhard, I. M., Sijbrandij, M., Cath, D. C., & Heuvel, O. A. V. D. (2016). **Degrading traumatic memories with eye movements: A pilot functional MRI study in PTSD.** European Journal of Psychotraumatology, 7(0). doi:10.3402/ejpt.v%v.31371.



## ABSTRACT:

**Background:** Eye movement desensitization and reprocessing (EMDR) is an effective treatment for post-traumatic stress disorder (PTSD). During EMDR, the patient recalls traumatic memories while making eye movements (EMs). Making EMs during recall is associated with decreased vividness and emotionality of traumatic memories, but the underlying mechanism has been unclear. Recent studies support a "working-memory" (WM) theory, which states that the two tasks (recall and EMs) compete for limited capacity of WM resources. However, prior research has mainly relied on self-report measures.
**Methods:** Using functional magnetic resonance imaging, we tested whether "recall with EMs," relative to a "recall-only" control condition, was associated with reduced activity of primary visual and emotional processing brain regions, associated with vividness and emotionality respectively, and increased activity of the dorsolateral prefrontal cortex (DLPFC), associated with working memory. We used a randomized, controlled, crossover experimental design in eight adult patients with a primary diagnosis of PTSD. A script-driven imagery (SDI) procedure was used to measure responsiveness to an audio-script depicting the participant's traumatic memory before and after conditions.
**Results:** SDI activated mainly emotional processing-related brain regions (anterior insula, rostral anterior cingulate cortex (ACC), and dorsomedial prefrontal cortex), WM-related (DLPFC), and visual (association) brain regions before both conditions. Although predicted pre- to post-test decrease in

amygdala activation after "recall with EMs" was not significant, SDI activated less right amygdala and rostral ACC activity after "recall with EMs" compared to post-"recall-only." Furthermore, functional connectivity from the right amygdala to the rostral ACC was decreased after "recall with EMs" compared with after "recall-only."

**Conclusions:** These preliminary results in a small sample suggest that making EMs during recall, which is part of the regular EMDR treatment protocol, might reduce activity and connectivity in emotional processing-related areas. This study warrants replication in a larger sample.

# The Effects of Bilateral Stimulation (BLS) on Brain Activity

### EMDR Study

Fleck, J. I., Olsen, R., Tumminia, M., De- Palma, F., Berroa, J., Vrabel, A., & Miller, S. (2018). **Changes in brain connectivity following exposure to bilateral eye movements.** Brain and Cognition, 123, 142-153. doi:10.1016/j.bandc.2018.03.009

## ABSTRACT:

The present research assessed how engaging in bilateral eye movements influences brain activity. Participants had their resting-state brain activity recorded with electroencephalography (EEG) before and after they performed 30 s of bilateral eye movements or a center-control manipulation. We assessed differences in change scores for absolute power and coherence between the eye-movement and center-control conditions. A main effect for handedness was present for EEG power in the theta and beta frequency bands, with inconsistent- handed participants displaying a greater increase than consistent-handed participants in both frequency bands. For theta, the increase in power for inconsistent handers was specific to participants in the bilateral eye-movement condition, whose increase in theta power exceeded the increase in theta power for consistent-handed participants regardless of condition. In contrast, for coherence, a main effect for condition was present for the delta frequency band, with participants in the control condition exhibiting a significant drop in posterior delta coherence pre to post. We suggest that the maintenance of posterior delta coherence over time may be an important factor in sustaining attention. Further, the malleability of EEG power for inconsistent-handed participants reveals the importance of individual-differences variables in the potential for behavioral manipulations to change brain activity.

## What's New?

### NEW for Clinicians, Consultants, and Researchers!

### EMDR Fidelity Rating Scale (Version 2)

**Deborah L. Korn, Psy.D.**
**Louise Maxfield, Ph.D.**
**Robert Stickgold, Ph.D. Medi**
**Nancy J. Smyth, Ph.D.**

**See the new EMDR Fidelity Rating Scale**

### CREATE A FUNDRAISING PAGE!

You have the opportunity to create a fundraising page in which your network can easily donate to the EMDR Research Foundation in honor of a family member, friend, colleague, yourself, or through a special event or occasion like a wedding, graduation, or running in a 5K race!

Spread the word even further about EMDR therapy and create a Facebook Fundraising Page and select EMDR Research Foundation as your nonprofit.

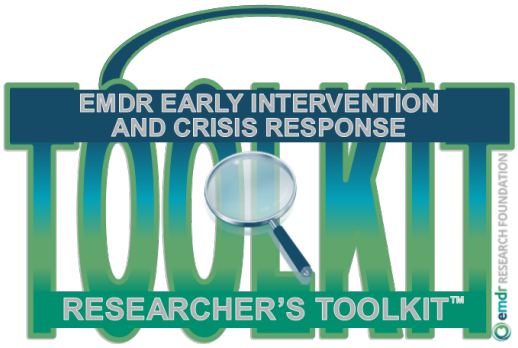
[More Details on Creating a Fundraising Page]

### SEE OUR UPDATED TOOLKIT!

**EMDR Early Intervention and Crisis Response: Researcher's Toolkit**
**Version 03.2018 © 2014-2018**

**Rosalie Thomas, Ph.D., R.N. with formatting/design work by Katy Murray, MSW, LICSW**

[View Our New Researcher's Toolkit]

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