



Eye movement desensitisation and reprocessing

Introduction

Eye movement desensitisation and reprocessing (EMDR) is based on the observation that the intensity of traumatic memories can be reduced through eye movements. While the patient focusses on the traumatic memory or thought, he or she simultaneously moves his or her eyes back and forth, following the movement of the therapist's finger. The exact mechanisms through which EMDR works are not clear, although it is proposed that when a traumatic memory is activated in working memory, and at the same time the patient focusses on the movement of the fingers, the vividness and intensity of the memory are reduced. This blurred memory is restored in the long-term memory, leading to a less emotional reaction at future activation. An alternative theory suggests EMDR elicits an investigatory reflex which first results in an alert response, and then, when it appears there is no threat, produces a sense of relaxation which inhibits negative affect associated with the traumatic memory.

Method

We have included only systematic reviews (systematic literature search, detailed methodology with inclusion/exclusion criteria) published in full text, in English, from the year 2010 that report results separately for people with PTSD. Reviews were identified by searching the databases MEDLINE, EMBASE, and PsycINFO. When multiple copies of review topics were found, only the most recent and comprehensive version was included. We prioritised reviews with pooled data for inclusion.

Review reporting assessment was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist that describes a preferred way to present a meta-analysis¹. Reviews with less than 50% of items checked have been excluded from the library. Note that early reviews may have been guided by less

stringent reporting checklists than the PRISMA, and that some reviews may have been limited by journal guidelines.

Evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach where high quality evidence such as that gained from randomised controlled trials (RCTs) may be downgraded to moderate or low if review and study quality is limited, if there is inconsistency in results, indirect comparisons, imprecise or sparse data and high probability of reporting bias. It may also be downgraded if risks associated with the intervention or other matter under review are high. Conversely, low quality evidence such as that gained from observational studies may be upgraded if effect sizes are large or if there is a dose dependent response. We have also taken into account sample size and whether results are consistent, precise and direct with low associated risks (see end of table for an explanation of these terms)². The resulting table represents an objective summary of the available evidence, although the conclusions are solely the opinion of staff of NeuRA (Neuroscience Research Australia).

Results

We found three systematic reviews that met our inclusion criteria³⁻⁵.

- Moderate quality evidence found a large effect of improved PTSD and depression symptoms with EMDR compared to inactive controls, particularly when compared to waitlist/no treatment than to usual care. The effect for PTSD symptoms was medium-sized at the 3-month follow-up. There was also a small effect of improved PTSD, but not depression, symptoms with EMDR compared to active controls (e.g., CBT, exposure therapy). The effect for PTSD symptoms was large at 3-month follow-up, but small at 6-month follow-up. However, there were larger effect sizes in studies with



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researcher allegiance to EMDR (hypothesis that EMDR was more effective than the active comparator) compared to no/unclear allegiance, and in studies with a high risk of bias compared to studies with a low risk of bias.

- Moderate to low quality evidence found EMDR improved PTSD symptoms when compared to standard care/waitlist (large effect) and when compared to non-specific therapies (small to medium-sized effect) in people with complex PTSD. EMDR may also improve the complex symptoms of negative self-concept and disturbances in relationships. The sample was too small to assess EMDR's effect on affect dysregulation.
- Moderate to low quality evidence found a large effect of reduced PTSD symptom severity compared to waitlist/no treatment following EMDR in children and adolescents. At 1-4 months follow-up, the effect was not maintained in children.



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Cuijpers P, Veen SCV, Sijbrandij M, Yoder W, Cristea IA

Eye movement desensitisation and reprocessing for mental health problems: a systematic review and meta-analysis

Cognitive Behaviour Therapy 2020; 49: 165-80

[View review abstract online](#)

<p>Comparison</p>	<p>Effectiveness of EMDR vs. inactive (waitlist, usual care, relaxation) or active (CBT, exposure therapies, supportive counselling, debriefing, emotional freedom, eclectic therapy, memory training, stress management) control conditions for PTSD symptoms.</p>
<p>Summary of evidence</p>	<p>Moderate quality evidence (unclear sample sizes, mostly inconsistent, precise, mostly indirect) found a large effect of improved PTSD and depression symptoms with EMDR compared to inactive controls, particularly when compared to waitlist/no treatment. The effect for PTSD symptoms was medium-sized at the 3-month follow-up.</p> <p>A small effect of improved PTSD, but not depression symptoms was found with EMDR compared to active controls. The effect for PTSD symptoms was large at 3-month follow-up, but small at 6-month follow-up. There were larger effect sizes in studies with researcher allegiance to EMDR (hypothesis that EMDR was more effective than the active comparator) compared to no/unclear allegiance, and in studies with a high risk of bias compared to studies with a low risk of bias.</p>
<p>PTSD symptoms</p>	
<p><i>A large effect showed improved PTSD and depression symptoms with EMDR compared to inactive controls;</i></p> <p>PTSD: 30 studies, N not reported, $g = 0.93$, 95%CI 0.67 to 1.18, $p < 0.05$, $I^2 = 72\%$ Depression: 18 studies, N not reported, $g = 0.83$, 95%CI 0.58 to 1.08, $p < 0.05$, $I^2 = 57\%$</p> <p>The effect for PTSD symptoms was medium-sized at 3-month follow-up ($g = 0.51$).</p> <p>Subgroup analysis found a larger effect size when EMDR was compared to waiting list than when EMDR was compared to treatment as usual or relaxation ($g = 1.13$ vs. 0.60, $p = 0.03$). Studies conducted in the USA and other Western countries found smaller effect sizes than other countries ($g = 0.78, 0.67$ vs. 1.72, $p < 0.04$).</p> <p>There were no moderating effects of recruitment type (clinical vs. other), sample (military, adults, children, specific trauma, other), or risk of study bias (high vs. low).</p>	



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A small effect showed improved PTSD, but not depression symptoms with EMDR compared to active controls;

PTSD: 23 studies, N not reported, $g = 0.33$, 95%CI 0.13 to 0.54, $p < 0.05$, $I^2 = 56\%$

Depression: 12 studies, N not reported, $g = 0.24$, 95%CI -0.08 to 0.55, $p > 0.05$, $I^2 = 70\%$

The effect for PTSD symptoms was large at 3-month follow-up, but small at 6-month follow-up ($g = 0.81$ vs. 0.10 , $p = 0.06$).

Subgroup analyses found larger effect sizes when there was researcher allegiance to EMDR compared to no/unclear allegiance ($g = 0.93$ vs. 0.17 , $p = 0.03$), and in studies with a high risk of bias compared to studies with a low risk of bias ($g = 0.56$ vs. 0.07 , $p = 0.01$).

A small effect showed improved PTSD symptoms with EMDR compared to CBT/prolonged exposure;

PTSD: 17 studies, N not reported, $g = 0.22$, 95%CI 0.04 to 0.40, $p < 0.05$, $I^2 = 27\%$

Consistency in results[‡]	Mostly inconsistent
Precision in results[§]	Precise
Directness of results	Indirect, mostly mixed control conditions.

Karatzias T, Murphy P, Cloitre M, Bisson J, Roberts N, Shevlin M, Hyland, Maercker P, Ben-Ezra A, Coventry M, Mason-Roberts P, Bradley S, Aoife Hutton P

**Psychological interventions for ICD-11 complex PTSD symptoms:
Systematic review and meta-analysis**

Psychological Medicine 2019; 49: 1761-75

[View review abstract online](#)

Comparison	Effectiveness of psychological therapies vs. standard care/waitlist or non-specific controls in people with complex PTSD.
Summary of evidence	Moderate to low quality evidence (small-medium sample sizes, inconsistent, imprecise, indirect) found EMDR improved PTSD symptoms when compared to standard care/waitlist (large effect) and when compared to non-specific therapies (small to medium-sized effect). EMDR may also improve negative self-concept and disturbances in relationships. The sample was too small to assess affect dysregulation.
PTSD symptoms	



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EMDR showed a large effect of improved PTSD symptoms compared to standard care/waitlist;

4 RCTs, N = 197, $g = -1.26$, 95 CI -2.01 to -0.51, $p = 0.001$, $I^2 = 79\%$

EMDR showed a small to medium-sized effect of improved PTSD symptoms compared to non-specific therapies;

3 RCTs, N = 135, $g = -0.69$, 95 CI -1.35 to -0.03, $p = 0.041$, $I^2 = 70\%$

Negative self-concept

EMDR showed a medium to large effect of improved negative self-concept compared to standard care/waitlist;

1 RCT, N = 83, $g = -0.61$, 95 CI -1.04 to -0.17, $p = 0.006$

EMDR showed a medium to large improvement in negative self-concept when compared to non-specific therapies;

2 RCTs, N = 109, $g = -0.78$, 95 CI -1.56 to -0.01, $p = 0.049$, $I^2 = 75\%$

Disturbances in relationships

EMDR showed a medium-sized effect of improved relationships compared to standard care/waitlist;

4 RCTs, N = 178, $g = -0.76$, 95 CI -1.35 to -0.16, $p = 0.012$, $I^2 = 70\%$

EMDR had no significant effect on disturbances in relationships compared to non-specific therapies.

Affect dysregulation

EMDR showed a large effect of improved affect regulation compared to standard care/waitlist;

1 RCT, N = 23, $g = -1.64$, 95 CI -2.56 to -0.72, $p < 0.001$

EMDR had no significant effect on affect regulation compared to non-specific therapies.

Consistency in results

Inconsistent where applicable.

Precision in results

Imprecise

Directness of results

Indirect; mixed control conditions

Mavranezouli I, Megnin-Viggars O, Daly C, Dias S, Stockton S, Meiser-Stedman R, Trickey D, Pilling S

Research Review: Psychological and psychosocial treatments for children and young people with post-traumatic stress disorder: a network meta-analysis



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<p>Journal of Child Psychology and Psychiatry, and Allied Disciplines 2020; 61: 18-29 View review abstract online</p>	
Comparison	Effectiveness of EMDR vs. waitlist/no treatment for PTSD symptoms in children and adolescents (up to 18 years old).
Summary of evidence	Moderate to low quality evidence (large overall sample, unclear consistency, imprecise, indirect) found large effects of reduced PTSD symptom severity compared to waitlist/no treatment with EMDR following treatment. At 1-4 months follow-up, the effect was not maintained.
PTSD symptoms	
<p><i>EMDR showed large improvements in PTSD symptoms compared to waitlist/no treatment;</i> Network meta-analysis included 29 RCTs, N = 1,960, SMD = -0.99, 95%CrI -1.76 to -0.23 At 1-4 months follow-up, the result for EMDR was not significant.</p>	
Consistency in results	Authors report no inconsistency between direct and indirect evidence. Consistency between individual study results is unclear.
Precision in results	Imprecise
Directness of results	Indirect; network meta-analysis

Explanation of acronyms

CI = confidence interval, CrI = credible interval, *d* or *g* = Cohen's *d* and Hedges' *g*, standardised mean difference, I^2 = the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance), N = number of participants, *p* = statistical probability of obtaining that result, vs. = versus



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Explanation of technical terms

* Bias has the potential to affect reviews of both RCT and observational studies. Forms of bias include; reporting bias – selective reporting of results; publication bias - trials that are not formally published tend to show less effect than published trials, further if there are statistically significant differences between groups in a trial, these trial results tend to get published before those of trials without significant differences; language bias – only including English language reports; funding bias - source of funding for the primary research with selective reporting of results within primary studies; outcome variable selection bias; database bias - including reports from some databases and not others; citation bias - preferential citation of authors. Trials can also be subject to bias when evaluators are not blind to treatment condition and selection bias of participants if trial samples are small⁶.

† Different effect measures are reported by different reviews.

Prevalence refers to how many existing cases there are at a particular point in time. Incidence refers to how many new cases there are per population in a specified time period. Incidence is usually reported as the number of new cases per 100,000 people per year. Alternatively some studies present the number of new cases that have accumulated over several years against a person-years denominator. This denominator is the sum of individual units of time that the persons in the population are at risk of becoming a case. It takes into account the size of the underlying population sample and its age structure over the duration of observation.

Reliability and validity refers to how accurate the instrument is. Sensitivity is the proportion of actual positives that are correctly identified

(100% sensitivity = correct identification of all actual positives) and specificity is the proportion of negatives that are correctly identified (100% specificity = not identifying anyone as positive if they are truly not).

Weighted mean difference scores refer to mean differences between treatment and comparison groups after treatment (or occasionally pre to post treatment) and in a randomised trial there is an assumption that both groups are comparable on this measure prior to treatment. Standardised mean differences are divided by the pooled standard deviation (or the standard deviation of one group when groups are homogenous) that allows results from different scales to be combined and compared. Each study's mean difference is then given a weighting depending on the size of the sample and the variability in the data. Less than 0.4 represents a small effect, around 0.5 a medium effect, and over 0.8 represents a large effect⁶.

Odds ratio (OR) or relative risk (RR) refers to the probability of a reduction (< 1) or an increase (> 1) in a particular outcome in a treatment group, or a group exposed to a risk factor, relative to the comparison group. For example, a RR of 0.75 translates to a reduction in risk of an outcome of 25% relative to those not receiving the treatment or not exposed to the risk factor. Conversely, a RR of 1.25 translates to an increased risk of 25% relative to those not receiving treatment or not having been exposed to a risk factor. A RR or OR of 1.00 means there is no difference between groups. A medium effect is considered if $RR > 2$ or < 0.5 and a large effect if $RR > 5$ or < 0.2 ⁷. InOR stands for logarithmic OR where a InOR of 0 shows no difference between groups. Hazard ratios measure the effect of an explanatory variable on the hazard or risk of an event.

Correlation coefficients (eg, r) indicate the strength of association or relationship



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between variables. They can provide an indirect indication of prediction, but do not confirm causality due to possible and often unforeseen confounding variables. An r of 0.10 represents a weak association, 0.25 a medium association and 0.40 and over represents a strong association. Unstandardised (b) regression coefficients indicate the average change in the dependent variable associated with a 1 unit change in the independent variable, statistically controlling for the other independent variables. Standardised regression coefficients represent the change being in units of standard deviations to allow comparison across different scales.

limit crosses an effect size of 0.5 in either direction, and for binary and correlation data, an effect size of 0.25. GRADE also recommends downgrading the evidence when sample size is smaller than 300 (for binary data) and 400 (for continuous data), although for some topics, these criteria should be relaxed⁸.

‡ Inconsistency refers to differing estimates of effect across studies (i.e. heterogeneity or variability in results) that is not explained by subgroup analyses and therefore reduces confidence in the effect estimate. I^2 is the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance) - 0% to 40%: heterogeneity might not be important, 30% to 60%: may represent moderate heterogeneity, 50% to 90%: may represent considerable heterogeneity and over this is considerable heterogeneity. I^2 can be calculated from Q (chi-square) for the test of heterogeneity with the following formula⁶;

$$I^2 = \left(\frac{Q - df}{Q} \right) \times 100\%$$

|| Indirectness of comparison occurs when a comparison of intervention A versus B is not available but A was compared with C and B was compared with C that allows indirect comparisons of the magnitude of effect of A versus B. Indirectness of population, comparator and/or outcome can also occur when the available evidence regarding a particular population, intervention, comparator, or outcome is not available and is therefore inferred from available evidence. These inferred treatment effect sizes are of lower quality than those gained from head-to-head comparisons of A and B.

§ Imprecision refers to wide confidence intervals indicating a lack of confidence in the effect estimate. Based on GRADE recommendations, a result for continuous data (standardised mean differences, not weighted mean differences) is considered imprecise if the upper or lower confidence



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