



## Update EMDR Therapy

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## Agenda



- EMDR around Europe
- Current developments
- Mattera et al. ‚A Biologically Inspired Neural Network Model to Gain Insight into the Mechanisms of Post-Traumatic Stress Disorder and Eye Movement Desensitization and Reprocessing Therapy‘
- Update AIP Model
- Update on the therapeutic Relationship in EMDR Therapy
- Structure of EMDR Therapy in supervision
- Research



## EMDR Europe



- 31. January 2021
- 36 countries across Europe
- 33'645 Members in the National Associations
  - 8'624 Certified EMDR Practitioners
  - Increase Practitioners > 10% last year
  - 1'190 Consultants



## EMDR Practitioners

National Association	Practitioners 2017	Practitioners 2019	Practitioners 2020	Increase 2019-2020	Practitioners 2021	Increase 2020-2021
Albania		1	1	0%	3	200%
Austria	98	108	106	-2%	115	9%
Azerbaijan			1		1	0%
Belgium	124	170	181	6%	211	16%
Bosnia and Herzegovina	8	8	11	38%	14	23%
Croatia					2	
Czech Republic					5	
Denmark	45	45	45	0%	53	18%
Finland	35	28	37	32%	42	12%
France	750	874	782	-13%	726	-6%
Georgia	25	25	25	0%	44	76%
Germany	1448	1554	1585	1%	1587	1.5%
Greece	18	14	24	71%	17	-30%
Hungary	13	22	14	-35%	19	13%
Iceland	7	7	7	0%	10	42%
UK-Ireland			22		44	100%
Israel	109	83	108	30%	119	10%
Italy	1045	1620	1652	2%	2120	28.5%
Lithuania		15	16	7%	20	25%
Luxembourg	2	14	6	-57%	14	100%
Malta		13	16	23%	15	-7%
Netherlands	704	488	1030	200%	1024	-0.5%
Norway	348	318	332	4%	365	10%
Poland	13	18	19	0%	25	40%
Portugal	26	40	42	0%	42	0%
Romania	7	10	13	30%	13	0%
Russia	12	35	30	-14%	44	50%
Serbia	9	9	10	11%	9	-10%
Slovakia	4	8	14	75%	16	14%
Spain	230	286	306	7%	295	3%
Sweden	185	202	204	1%	191	-6%
Switzerland	234	280	204	-26%	264	1%
Turkey	17	51	73	43%	111	66%
UK (Ireland '19)	504	647	716	11%	867	21%
Ukraine	17	15	18	9%	17	-2%
<b>TOTAL</b>	<b>5997</b>	<b>7230</b>	<b>7799</b>	<b>7.9%</b>	<b>8624</b>	<b>10.6%</b>



## EMDR Consultants

National Association	Consultants 2017	Consultants 2019	Consultants 2020	Consultants 2021
Albania		1	1	1
Armenia				1
Austria	15	19	17	16
Azerbaijan				0
Belgium	8	15	15	17
Bosnia and Herzegovina	1	1	2	2
Denmark	17	15	12	13
Finland	20	21	21	21
France	60	63	65	76
Georgia	0	0	0	0
Germany	133	147	150	155
Greece	4	5	5	5
Hungary	2	2	6	6
Iceland		3	3	3
UK-Ireland				21
Israel	43	50	47	48
Italy	140	170	183	198
Lithuania		0	0	0
Luxembourg	2	2	0	0
Malta		0	0	0
Netherlands	42	63	61	75
Norway	19	23	23	23
Poland	5	4	5	5
Portugal	2	7	13	13
Romania	0	1	2	2
Russia	7	8	8	14
Serbia	5	1	5	3
Slovakia	5	2	4	5
Spain	61	90	101	90
Sweden	35	46	46	42
Switzerland	29	33	35	35
Turkey	9	16	19	19
UK (Ireland '19)	256	248	231	262
Ukraine	1	1	1	12
<b>TOTAL</b>	<b>921</b>	<b>1057</b>	<b>1124</b>	<b>1190</b>



## Research in Europe

- Europe is the hotspot for EMDR research
- Very active ,The Netherlands‘
  - But also much working memory research
- High quality research in
  - Italy
  - Spain
  - Turkey
  - UK



## Background of EMDR Therapy

### Discovery in 1987 – Francine Shapiro

- Discovery of effects of spontaneous eye movements
  - Developed procedures around eye movement

### 1989 – First Controlled Study - EMD

- First controlled studies for PTSD
  - First controlled studies of prolonged exposure, cognitive behavioral therapy and hypnosis with PTSD

### 1990 – EMD developed into EMDR due to spontaneous associations and generalization effects

- Additional forms of bilateral stimulation (BLS)

### 2000 – Studies beyond PTSD - scripted protocols



## A Creative Community

- 8 volumes of scripted protocols
- A community of innovators and integrators
- The dilemma of whether to go for a 2<sup>nd</sup> or 3<sup>rd</sup> “wave of EMDR Therapy”
- The impact on international treatment guidelines
- The impact of the definition on the future EMDR community of professionals
- Sadly Francine passed away



## Future of EMDR Therapy

- FOET Project EMDR International Association
- Steering Committee
- Council of Scholars
- Work Groups
  - Research - Matthijssen et al. J EMDR Volume 14, Number 4, 2020
  - What is EMDR? - Laliotis et al. J EMDR Volume 15, Number 4, 2021
  - Training & Accrediation
  - Clinical Practice



## Future of EMDR Therapy

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  - Research - Matthijssen et al. J EMDR Volume 14, Number 4, 2020



## But Evidence?

- Grade of evidence (Sackett 1989)

Grade	Type of Evidence
I	big RCT's, clear results
II	small RCT's, differing results
III	controlled cohort- and case studies
IV	retrospective cohort- and case studies
V	case series, uncontrolled studies



## Evidence up to Date

- Grade of Evidenz according to Sackett:

Grade	EMDR by:
I	PTBS children and adolescents
I	EMDR and acute trauma
II	combat related PTSD
II	Unipolar Depression
II	Pain



## What is EMDR

- Having a consensus on what EMDR therapy is, how it is taught, and how it is applied clinically will promote best research, training and practice, and provide a base from which future innovations in the field can be evaluated.
- The goal is to preserve the integrity of Shapiros vision of EMDR as a psychotherapeutic approach. This task was particularly challenging given the evolution of EMDR across time, as it progressed from a technique to a protocol, to a comprehensive psychotherapy.
- In order to improve validity, the group used Shapiro's 2018 text to define our terms whenever applicable and to stay faithful to her vision and the AIP perspective.

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## What is EMDR

- The "What is EMDR" workgroup identified the core elements of EMDR therapy through a process of reading F. Shapiro's texts (1995, 2001, 2018) and academic discussion among nine EMDR experts.
- The 'Glossary of Terms' contains the core elements we believe are essential and unique to EMDR therapy in their aggregate form, as opposed to independent elements
- Proposed: Three subcategories of EMDR therapy: EMDR Psychotherapy, EMDR Protocols, and EMDR-derived Techniques

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## What is EMDR

- 'Glossary of Terms' contains the core elements
- The three pronged approach
- Treatment protocol" is understood to be "a plan for a course of medical treatment"
- Reprocessing ( vs. processing )
- Phase 4 = Reprocessing Phase
- Phase 5 = Enhancement Phase
- Probably changing 8 Phases

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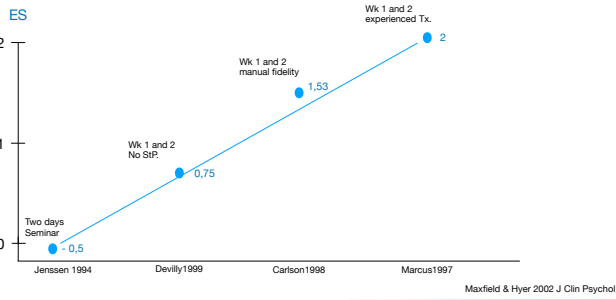
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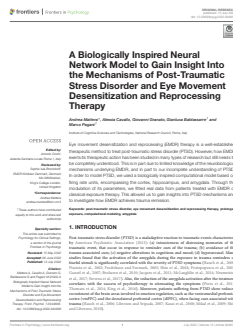
# Fidelity and Efficacy

- EMDR treatment fidelity and efficacy show a correlation



# A model of PTSD, PE and EMDR Therapy

A Biologically Inspired Neural Network Model to Gain Insight Into the Mechanisms of Post-Traumatic Stress Disorder and Eye Movement Desensitization and Reprocessing Therapy



# Remark

- If I mention BLS, it is allways Eye Movements.
- Thanks to Andrea Mattera for letting me use pictures and graphs of the article.



## A Biologically Inspired Neural Network Model to Gain Insight Into the Mechanisms of Post-Traumatic Stress Disorder and Eye Movement Desensitization and Reprocessing Therapy

- Eye movement desensitization and reprocessing (EMDR) therapy is a well-established therapeutic method to treat post-traumatic stress disorder (PTSD). However, how EMDR exerts its therapeutic action has been studied in many types of research but still needs to be completely understood.
- This is in part due to limited knowledge of the neurobiological mechanisms underlying EMDR, and in part to our incomplete understanding of PTSD.
- In order to model PTSD, a biologically inspired computational model based on firing rate units, encompassing the cortex, hippocampus, and amygdala was used.
- Through the modulation of its parameters, real data from patients treated with EMDR or classical exposure therapy were fitted in this model.
- This allowed to gain insights into PTSD mechanisms and to investigate how EMDR achieves trauma remission.

Mattera A et al 2022, Front Psychol

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## PTSD

- Activation of the amygdala during the exposure to trauma reminders or fearful stimuli is significantly correlated with the severity of PTSD symptoms.
- Reduction of the amygdala activation after the treatment correlates with the success of psychotherapy in attenuating the symptoms.
- Patients suffering from PTSD show reduced recruitment of the brain areas involved in emotion regulation, such as the ventromedial prefrontal cortex (vmPFC) and the dorsolateral prefrontal cortex (dlPFC), when facing cues associated with trauma.
- They show reduced activation of vmPFC when confronted with fear inducing cues (predisposition or consequence?).

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## Prolonged Exposure

- It has been suggested that vmPFC activation during exposure and the resulting downregulation of the amygdala are key factors of PE therapy.
- Patients with PTSD in whom the vmPFC is more active during emotional conflict tasks benefit from a greater symptoms reduction after PE.
- This is in agreement with the proposed role of the vmPFC in discriminating safety signals and inhibiting the amygdala during fear extinction.

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# Neural Network Model

$$\tau \cdot \dot{V}_{post} = -V_{post} + I + \sum_{pre} (w_{post,pre} \cdot F_{pre})$$

Leaky units Euler method

$I$  represents depending on the Unit for: activation of sensory cortex; for memory activation of hippocampus; for safety signs of vmPFC in PE or the BLS in EMDR Therapy; for Intensity of experience (Trauma) of Amygdala.

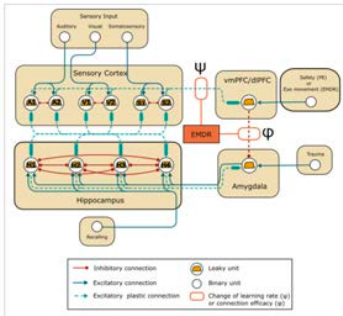
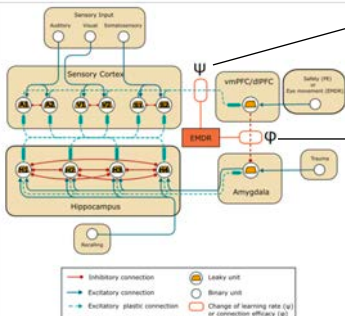


FIGURE 1 EMDR activation unit unit connections in the model. EMDR acts on the strength of the inhibition from the PFC, vmPFC/dPFC and BLS in EMDR to the amygdala through the parameter  $\alpha$ , and on the learning rate of the connection between the sensory units and the PFC through the parameter  $\beta$ .



# Neural Network Model



Learning rate Sens. Cortex / PFC

Stärke der Inhibition Amygdala durch PFC

FIGURE 1 EMDR activation unit unit connections in the model. EMDR acts on the strength of the inhibition from the PFC, vmPFC/dPFC and BLS in EMDR to the amygdala through the parameter  $\alpha$ , and on the learning rate of the connection between the sensory units and the PFC through the parameter  $\beta$ .



# Model of PTSD

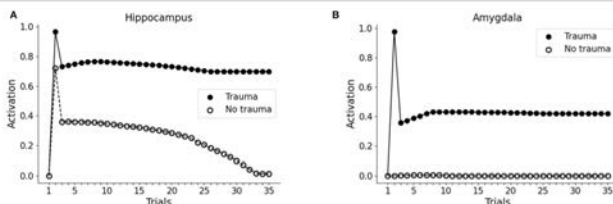
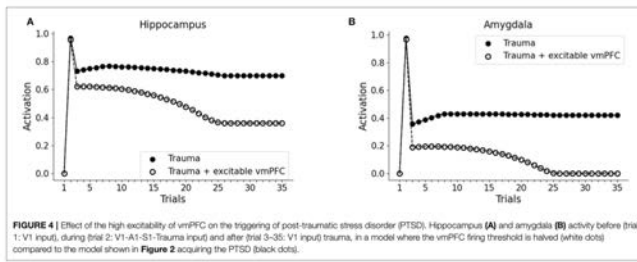


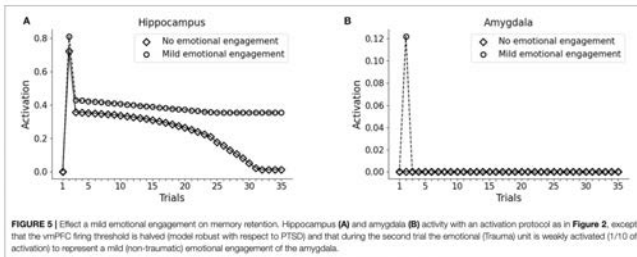
FIGURE 2 | Effect of trauma establishment in hippocampus and amygdala, compared to the control. In the first trial, the baseline activity of the hippocampus (A) and amygdala (B) were measured during the stimulation of the V1 or the V2 sensory units. In trial 2, pattern 1 (A1-S1-V1) was coactivated with the trauma unit; as a control, pattern 2 (A2-S2-V2) was activated with the trauma unit turned off. During trial 3 and succeeding trials, V1 and V2 were repeatedly activated to investigate the dynamics of the hippocampus and amygdala response. After memory establishment in trial 2, V2 stimulation induces the activation of the hippocampus (A, white dots, trials 3-35), but not of the amygdala (B, white dots, trials 3-35). On the other hand, the trauma-associated stimulus V1 induces both hippocampus (A, black dots, trials 3-35) and amygdala (B, black dots, trials 3-35). Over time, the non-traumatic memory trace is lost (A, white dots, trial 35), while traumatic associated stimulus V1 is persistently capable to activate the hippocampus (A, black dots, trial 35) and amygdala (B, black dots, trial 35).



## PFC Activation?



## Emotional Engagement?



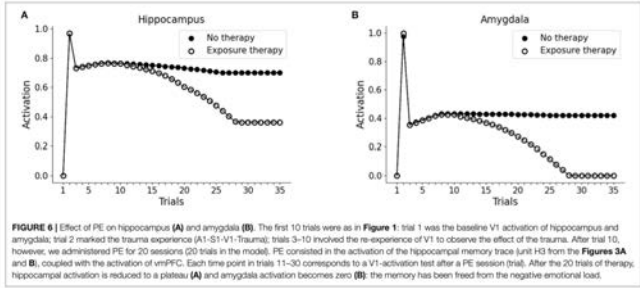
## Model hits on Patients?

- Nijdam et al. compared 'Brief Eclectic Psychotherapy' to EMDR Therapy and checked the time-course of change in symptoms.
- Brief Eclectic Psychotherapy includes exposure in Sensu, thus comparing exposure and EMDR reprocessing Phase 4-6 activities.
- The IES-R score allows to draw conclusions on amygdala activation.
- The IES-R scores were fitted into the model.

Nijdam et al. 2012



## Model hits on Patients?

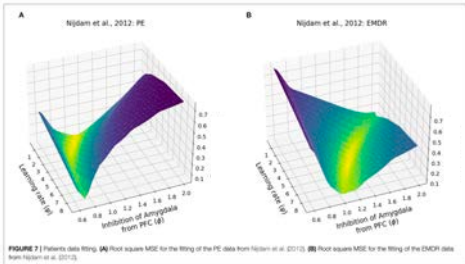


**FIGURE 6** Effect of PE on hippocampus (A) and amygdala (B). The first 10 trials were as in Figure 1: trial 1 was the baseline V1 activation of hippocampus and amygdala; trial 2 marked the trauma experience (A1-S1-V1-Trauma); trials 3-10 involved the re-experience of V1 to observe the effect of the trauma. After trial 10, however, we administered PE for 20 sessions (20 trials in the model). PE consisted in the activation of the hippocampal memory trace unit H3 from the Figures 3A and B, coupled with the activation of dmPFC. Each time point in trials 11-30 corresponds to a V1-activation test after a PE session trial. After the 20 trials of therapy, hippocampal activation is reduced to a plateau (A) and amygdala activation becomes zero (B): the memory has been freed from the negative emotional load.

- Results for prolonged exposure



## Model hits on Patients?

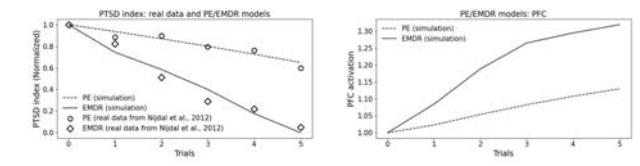


**FIGURE 7** Patients data fitting. (A) Root square MSE for the fitting of the PE data from Nijdam et al. (2012). (B) Root square MSE for the fitting of the EMDR data from Nijdam et al. (2012).

- Comparing prolonged exposure and EMDR



## Model hits on Patients?



**FIGURE 8** Eye movement desensitization and reprocessing therapy is compared to PE therapy. Each dot in (A,B) represents a simulation to fit the data of PE (A) and EMDR (B) in Nijdam et al. (2012). The size and the color from blue to yellow of the dots are proportional to the root square MSE; the best fitting model is marked by a red dot. (C) Comparison between the symptoms remission curves obtained with the model, using the parameter combinations indicated by the red dots in graphs (A) PE and (B) EMDR, and the actual experimental data from Nijdam et al. (2012). For the real data, the PTSD index is represented by the normalized IES-R score (Nijdam et al., 2012; refer to Section 3.4). In the model, the PTSD index represents the normalized amygdala unit activation following the presentation of the reminder cue. (D) PFC activation in correspondence to the simulation trials in (C).

- Comparing prolonged exposure and EMDR
- EMDR reprocessing activates the dlPFC more than PE



## Model hits on Patients?

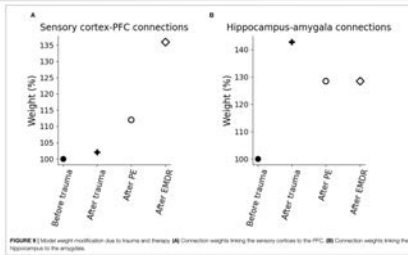


FIGURE 1 | Connection weight modification due to training and therapy. (A) Connection weights linking the sensory cortex to the PFC. (B) Connection weights linking the hippocampus to the amygdala.

- Comparing prolonged exposure and EMDR
- Enhanced connections sensory cortex and PFC with EMDR Therapy = AIP / reprocessing / Phase 5



## Summary 1

- The results of the real-life Study of Nijdam et al. could be reproduced within the model, by using amygdala activation as proxy.
- The parameters found by the grid search analysis suggest that PE and EMDR make use of different mechanisms to exert their therapeutic effect.
- The dlPFC is activated following bilateral eye stimulation.
- EMDR-recruited regions have a higher capacity to inhibit amygdala compared to the regions activated during PE.



## Summary 2

- The parameter  $\psi$ , which is 3.3 times higher in EMDR than PE, indicates an enhanced cortical learning rate during the bilateral stimulation, as suggested by the slow waves recorded during the therapy in patients. (Harper et al., 2009; Pagani et al., 2011, 2012)
- The physiological alternation during sleep between slow waves and rapid eye movement periods promotes memorization and facilitates the elaboration and contextualization of traumatic memories. (Carletto et al., 2017).
- The evidence that EMDR therapy induces the appearance of slow waves concurrently with bilateral stimulation speaks in favor of faster synaptic and neuronal plasticity and hence faster processing of traumatic memories as compared to other psychotherapies (Pagani et al., 2012, 2017).



## The AIP Model and Resources

- The AIP Model is not a model of only the unprocessed dysfunctionally stored memories
- It is also a model of resources!



## The AIP Model and Resources

- Francine Shapiro:
- „Clinicians must understand how to prepare clients appropriately and stay attuned to their individual needs while keeping the information processing system activated so learning can take place. Clinicians must take a comprehensive history to identify the appropriate targets for processing and the developmental deficits to be addressed”.



## The AIP Model and Resources

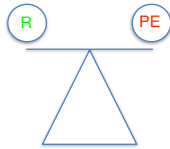
- „Adaptive memory networks consist of associated memories that are processed and integrated. Includes negative experiences that are resolved; i.e., the information is congruent with the emotional response and are no longer disturbing. Also includes positive life experiences (images, thoughts, feelings, physical sensations, beliefs) that, when accessed, can be strengthened and enhanced through applying bilateral stimulation. Adaptive memory networks need to be present and accessible for reprocessing to occur. Therapeutic relationship is part of an adaptive memory network.“



## The AIP Model and Resources

- The AIP model is a model of pathogenic memories ( PM ) and of resources ( R ).
- ‚Adaptive memory networks need to be present and accessible for reprocessing to occur.’

Shapiro & Laliotis, 2017



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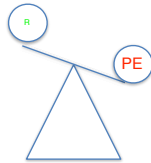
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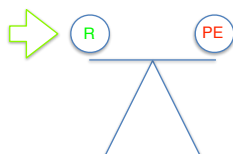
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Shapiro & Laliotis, 2017



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## Enhancement and Development of Positive Memory Networks

- Positive memory networks need to be present in order for reprocessing to occur
- Positive life experiences strengthened and enhanced
- Therapeutic relationship is a positive memory network

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## Psychotherapy Approach

„A theory of psychotherapy acts as a roadmap for psychologists: It guides them through the process of understanding clients and their problems and developing solutions.“

<https://www.apa.org/topics/psychotherapy/approaches>

- **Theory**
  - Pathogenesis and change
  - Idea of man
  - Definition of therapeutic relationship
- **Treatment plans** for important mental disorders
- **Techniques** to deal with problems and find solutions

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## What is missing?

- A description of the therapeutic relationship in EMDR Therapy.
- Francine stressed the importance of the therapeutic relationship.
- Francine described therapist behavior, like being supportive, stay out of the way.
- But didn't describe the therapeutic relationship in detail.

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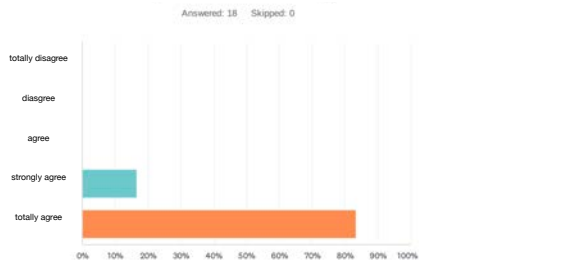






## Results

**Q 1: I experience the actions of my therapist trying to forge a connection between my current problems and experiences in the past as agreeable.**



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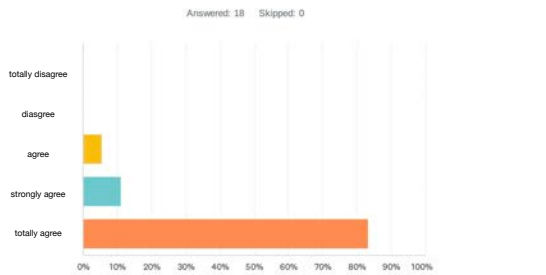
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## Results

**Q5: That the therapist reacts immediately to changes within the EMDR session is agreeable.**



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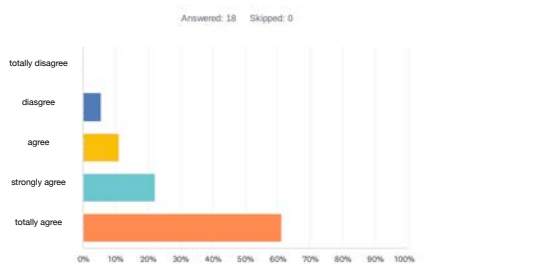
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## Results

**Q6 The repetitive questions or statements (e.g. ,What do you get now?'. ,Follow my fingers ...') by the therapist induces a sense of safety.**



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# Results

**Q9 The structure in the EMDR reprocessing (working through a memory) given by the therapist (briefly talking about the memory - followed by eye movements e.g. - short feedback – eye movements e.g. - ...) induces a sense of safety.**

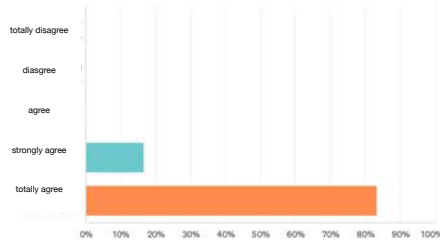
Answered: 18 Skipped: 0



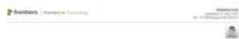
# Results

**Q 12: During an EMDR session patient and therapist are working together collaboratively.**

Answered: 18 Skipped: 0



# EMDR is a sensitive therapy!



## The Therapeutic Relationship in EMDR Therapy

**Abstract** The purpose of this study was to investigate the relationship between the therapist and the client during EMDR reprocessing. The study was conducted with 18 therapists and 18 clients. The results showed that the relationship between the therapist and the client is a significant factor in the success of EMDR therapy. The study also found that the relationship between the therapist and the client is a significant factor in the success of EMDR therapy.

**Introduction** The therapeutic relationship is a central concept in many forms of psychotherapy. It is the relationship between the therapist and the client that is believed to be the primary mechanism of change in therapy. In EMDR, the relationship between the therapist and the client is particularly important because it is the relationship that provides the safety and support needed for the client to access and process traumatic memories.

Sensitive Behavior	EMDR Therapy
Speech	Help to elicit cognitions; verbal support during set
Rhythm	Bilateral stimulation; timing of sets and breaks
Eye Contact	Aware of facial expression; Eye Movements
Touch	Tactile Stimulation
Perception of client	Awareness during BLS
Not misinterpreting	Refraining from comments; 'stay out of the way'
Prompt and appropriate	Keep client in stimulation and react promptly to affective stress of client

Table 1: Sensitivity and EMDR Therapy



## EMDR Therapy ...

- is a sensitive therapy!
- This explains the often rapid development of the therapeutic relationship.
- If we adhere to the manualized procedures we act reliable and predictable!
- Strengthening of the therapeutic relationship das always helpful and a must with attachment deficit patients.
- Ressourcing ist empowering the patient and a prerequisite for successful reprocessing.



## AIP Model Revisited

- Shapiro: an ,innate‘ system
- Let’s consider...
- There are other ,innate‘ systems - attachment.
- But: There is CNS development. Systems as well!
- How does the AIP-system develop?
- Consequences?
- We need a developmental-bio-sozio-psychological perspective!



## Structure of EMDR Therapy

**frontiers**  
in Psychology

ORIGINAL RESEARCH  
published: 02 September 2015  
doi: 10.3389/fpsyg.2015.00102

### The Structure of EMDR Therapy: A Guide for the Therapist

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Since the introduction of EMD by Dr. Shapiro in 1987, which led to the development of EMDR Therapy, clinical experience and research contributed to a variety of protocols and procedures. While this dynamic evolution within EMDR Therapy is offering more options to treat a variety of patients suffering from various disorders, there is a greater need of attention from the core framework of this approach that would no longer be understood as EMDR Therapy. While research shows that following Shapiro's standard protocols and procedural steps is essential to achieve positive treatment effects, it seems prudent to define the core elements in EMDR Therapy beyond adherence to the standard protocol given the complexity of clinical demands in a variety of treatment contexts. The author proposes that best practice requires not only an adherence to the fidelity of the model, but a willingness to adapt the model in order to best meet the needs of our clients in a variety of clinical contexts. Defining the core elements that constitute EMDR Therapy offers both a structure that has been well established and offers a foundation from which clinical adaptations can be made that are within the realm of what is widely accepted as EMDR Therapy. Such a structure could also be used to define research as well as clinical applications. Additionally EMDR Therapy as a comprehensive psychotherapy approach implies that the therapeutic relationship is an important component and should be considered a core element of this methodology.

**Keywords:** EMDR therapy, adaptive information processing, therapeutic relationship, trust, communication, research, self-regulation, readiness, validation

**INTRODUCTION**

Eye Movement Desensitization and Reprocessing Therapy (EMDR) consists of a structured set of protocols and procedures based on the adaptive information processing (AIP) model (Shapiro and Lubkin, 2012). EMDR was introduced as EMD in 1987 (Shapiro, 1989) as treatment for PTSD and was developed into the comprehensive therapy approach termed EMDR Therapy over the course of time. Shapiro developed EMDR to be compatible with all major orientations to psychotherapy.

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## EMDR and Epigenetics

- Epigenetic mechanisms play a role in the detrimental effects of traumatic stress and the development of post-traumatic stress disorder (PTSD).
- Successful treatment of PTSD by EMDR Therapy or CBT was accompanied by significant changes in DNA methylation at 12 differentially methylated regions (DMRs) in the genes.
- Of the 12 DMRs related to PTSD symptom reduction, consistent prospective evidence was found for ZFP57 methylation changes related to changing PTSD symptoms ( $B = -0.84$ ,  $t = -2.49$ ,  $p = 0.014$ ).
- Increasing ZFP57 methylation related to PTSD symptom reduction was present over and above the relation with symptoms, suggesting that psychological treatments exert biological effects independent of symptom reduction.

Vinkers et al. *Molecular Psychiatry* (2021) 26:1264–1271

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## EMDR and Epigenetics

- Adverse childhood experiences (ACEs, i.e., abuse, neglect, household dysfunction) represent a potential risk factor for a wide range of long-lasting diseases and shorter life expectancy.
- A 1-week residential group program, based on mindfulness training, artistic expression and EMDR group therapy (IGTP), significantly reduced PTSD-related symptoms and increased attention/ awareness-related outcomes in adolescent girls with multiple ACEs in a randomized controlled study.
- Saliva samples from all participants ( $n = 44$ ) were collected and genomic DNA was extracted prior (T1) and following (T2) the intervention. Genome-wide DNA methylation analysis using the MethylationEPIC beadchip array (Illumina) revealed 49 differentially methylated loci (DML;  $p$  value  $< 0.001$ ; methylation change  $> 10\%$ ) that were annotated to genes with roles in biological processes linked to early childhood adversity (i.e., neural, immune, and endocrine pathways, cancer and cardiovascular disease).
- Methylation changes in SIRT5 and TRAPPC2L genes showed associations with changes in trauma-related psychological measures.
- Results suggest that this multimodal group program for adolescents with multiple victimization modulates the DNA methylome at sites of potential relevance for health and behavioral disorders associated with ACEs.

Kaliman et al. *Sci Rep* (2022) 12:17177

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