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Case Series on Applications of EMDR to OCD

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ABSTRACT

This paper is an attempt to draw a parallel between the exposure and response prevention (ERP) procedures in CBT (cognitive behaviour therapy) and the desensitisation procedures in EMDR (eye movement desensitisation processing). This paper also suggests an alternative targeting sequence that follows from the standard EMDR protocol to draw upon the strengths and application of ERP procedures in the treatment of OCD (obsessive compulsive disorder).

INTRODUCTION

A review by Marsden, Lovell, Blore, Ali and Delgadillo (2016) has explained that ERP procedures in CBT are recommended by clinical guidelines as a first line psychological treatment for OCD. As indicated by Marsden, et al. (2016), some studies have suggested that patients find it difficult to tolerate exposure exercises and tend to drop out of treatment (Abramowitz, Taylor & McKay, 2005).

Notwithstanding the limitations of CBT exposure exercises in adversely influencing the drop out rates of some patients, some researchers have suggested the possibility of using EMDR as an alternative. As cited in the review by Marsden, et al. (2016), a number of uncontrolled case studies have reported the successful application of EMDR in reducing the symptoms of OCD (e.g., Bekkers, 1999; Bohm & Volderholzer, 2010; Keenan, Keenan, Ingham, & Farrell, 2014; Marr, 2012). Hitherto the only controlled trial was undertaken by Nazari, Momeni, Jarlani, and Mohammad (2011); 90 OCD patients were randomised to either EMDR or pharmacotherapy, with the results showing significantly lower symptoms in the EMDR group (mean Yale Brown obsessive compulsive scale score = 13.6) compared to the pharmacotherapy group (mean Yale Brown obsessive compulsive scale score = 19.02) after 12 weeks of treatment.

EMDR integrates elements of imaginal exposure, cognitive therapy and somatic therapies (Nazari, Momeni, Jariani, Tarrahi, 2011). It also uses the unique element of bilateral stimulation (i.e., moving the eyes back and forth). For this purpose the patient generates a number of lateral eye movements while following the therapist's fingers moving side to side for approximately 20 seconds. Then the patient is asked to report current sensations, cognitions, and affect, followed by another set of eye movements. This process is repeated again and finishes when the patient reports a 0 or 1 on Wolpe's Subjective Units of Distress Scale (SUDS) to the traumatic memory. Negative cognition is replaced with positive cognition and patient provides a validity of cognition rating to indicate the extent to which he/she feels that the positive cognition is true (Shapiro, 1995).

Indeed, there are a good number of researchers who argue that EMDR is nothing more than a repackaged exposure treatment (e.g., Herbert, et al., 2000; Lohr et al., 1999; McNally, 1999). Proponents of EMDR, however, have indicated that the dual stimulation or alternating eye movements goes beyond the standard exposure procedures in the way that bilateral stimulation facilitates the integration of information at a neural level (Levin, Lazrove & van der Kolk, 1999), adds significantly positive treatment outcomes (Wilson, et al., 1996), enhances processing (Renfrey & Spates, 1994), and reduces vividness of memory (Lee & Drummond, 2008).

Going further along this line of reasoning that bilateral stimulation facilitates the integration of information at a neural level, a recent article by Holmes (2019) reporting on the study by Baek, et al. (2019) has shed some light on the neurobiological mechanism by which EMDR works. Essentially, Baek and colleagues demonstrated there was a two-step process inhibiting the connection between the mediodorsal thalamus and the 'fear-encoding' basolateral nucleus of the amygdala (BLA). In summary, these findings point to a model in which firstly, the exposure to alternating bilateral visual stimuli (ABS) is required for extinction in feared memory and reduction in feared behaviour, and secondly, how extinction and EMDR procedures work in parallel to enhance the neuronal pathway that links the superior colliculus and the mediodorsal thalamus. In conclusion, Baek and colleagues have therefore proposed that ABS shifts the balance between competing brain circuits, engaging one set of neural pathways that favour fear extinction to overshadow the influence of other pathways that favour the persistence of fear.

In view of some similarities between EMDR and exposure therapy, some researchers have advocated a combination of EMDR and exposure and response prevention (ERP) approaches in the treatment of OCD. Beyond the connection between traumatic life events and OCD, Holmes (2019) has indicated rather insightfully that it is often the case that the individual is still experiencing symptoms after the past events have been fully processed.

Much of the research previously done with EMDR has targeted the trauma history of the OCD individual. For example, Cromer et al. (2006) found that 54 percent of individuals with OCD had experienced at least one traumatic event. The research by Jordan et al. (1991) has pointed to a high incidence of OCD in combat soldiers as compared to controls. The risk of developing OCD is also 10 times greater in individuals with a history of post-traumatic stress disorder (Helzer, Robins, & McEvoy, 1987). The adaptive processing model of EMDR is based on the premise that psychological symptoms often result from unprocessed traumatic material (Shapiro & Forrest, 2004).

While many studies surrounding EMDR applications have indicated a clear link between the content of obsessive intrusions as encapsulated in the symptomatology of OCD and the context of traumatic events, there are certainly other streams of literature (in the minority) that have applied EMDR to OCD without focusing primarily on the trauma history or traumatic/stressful life event. These are generally studies that have compared the efficacies of ERP/CBT and EMDR, and have positioned EMDR as another exposure-based therapy (e.g., Marsden et al., 2016; Marr, 2012; Bohm, & Volderholzer, 2010). Marsden, et al. (2016) has pointed out the most obvious change mechanism in common between EMDR and ERP/CBT is that of exposure to anxiety-provoking stimuli, which EMDR applies imaginally and CBT applies both in-vivo and imaginally. In addition, Marr (2012) has suggested that EMDR could target the fears and ritualised behaviours of OCD to

decrease the range of symptoms in the present before proceeding to process past events linked to the onset of OCD symptoms. In this regard, Marr has suggested a treatment plan in the following order for the EMDR processing of OCD symptoms: current triggers of obsessions and compulsions, installing a future template, and then processing any past related disturbing events. The processing of past related disturbing events may not be necessary for some OCD individuals without a trauma history.

The present paper makes a suggestion, in the treatment of OCD, to build targeting sequences around memories of the OCD symptoms, in addition to processing the triggers of obsessions and compulsions (as indicated by Marr, 2012). Targeting memories and triggers of OCD symptoms builds on the perspective that EMDR procedures are similar to exposure and response prevention procedures in these two aspects:

Firstly, there are similarities between EMDR and ERP procedures because of the exposure to the constellation of OC symptoms elicited under certain conditions. With EMDR, the exposure is to the *memory* and *triggers* of OC symptoms under imaginary exposure conditions; with ERP procedures, the exposure is to the range of feared stimuli (or triggers) that elicits the OC symptoms under imaginary and in-vivo conditions. The second similarity is that both EMDR and ERP procedures include the aspect of response prevention of the neutralising response. With EMDR, the neutralising response is prevented from emerging because of the ongoing processing (or bilateral stimulation). For ERP protocols, the response prevention of the neutralising response is derived from the process of habituation to the fear-provoking stimulus.

Similar to the research questions as posed by Marr (2012), the present study is an examination of the idea that OCD treatment is successful when it focuses on processing present experiences (triggers or events that precede the OCD symptoms) and memories of the symptoms elicited on exposure to the feared stimuli. The two patients that are featured in the present case series follow the targeting sequence of triggers (or events) then symptoms (or more specifically, memories of the symptoms), or symptoms then triggers. In both procedures and for both patients, there was no necessity to process early events as the OCD behaviours and obsessions seems to have little or no relationship with a trauma history.

METHODOLOGY

Case One

The patient ES, a 23-year-old young lady, was first seen by a psychiatrist for medications between 2010 and 2014 for OCD symptoms. While her compulsions and ritualised behaviour have improved significantly in the years of seeing the psychiatrist, she continues to have obsessions or mental rituals that serve to neutralise her anxieties in response to some feared stimuli. Her feared outcomes are, in the main, related to “hurting someone with her words”, “disappointing people”, and “not making it in life”. She copes with neutralising the thoughts of the feared outcomes by running through in her mind some vulgar thought or vulgar expression. In some situations, she has actually articulated out aloud the vulgar expression in her mind; she recounts embarrassingly how her family members and friends have been shocked or surprised by her vocal utterances or expression of vulgarities. The estimated daily frequency of the occurrences of the three feared stimuli (related to “hurting someone with her words”, “disappointing people”, and “not making it in life”) are ten times a day; the daily occurrences of neutralising sentences in her mind or vocal

utterances are, as estimated by the patient, five times a day. While the neutralising sentences in her mind and vocal utterances have been attended by a subsequent relief of the anxiety surrounding the feared stimuli, the escalation of vocal utterances through the years from 2010 and 2019 is, by her own admission, "worrying and increasingly embarrassing". She saw a school counselor in 2016 for ten CBT/ERP sessions for her mental obsessions (her vocal utterances of vulgarities were not evident then in 2016), but according to her feedback, progress was not evident because "the counselor found it hard to target the occurrences of avoidance behaviour". Not surprisingly, Marr (2012) has made similar comments that ERP therapy may not be as effective for individuals who experience obsessions without compulsions.

In December 2018, the patient ES was subsequently referred to the psychologist — who is also the author of this article — to deal with her anxieties regarding her triggers (or feared stimuli) and also her increasing level of neutralising sentences in her mind and vocal utterances related to the expression of vulgarities.

Case Two

The patient JC, a 35-year-old young man, started seeing this psychologist in February 2019 for OCD symptoms, largely for obsessions about scrupulosity and concerns about "whether he has raped a girl in his vicinity".

The obsessions are a feature of thought-action fusion, a phenomenon commonly observed in OCD sufferers who have the idea that thinking certain thoughts is tantamount to performing the thoughts. He works as a school-teacher, and whenever he sees a student girl or female teacher in the vicinity or school compound, he would start asking himself whether he has raped the girl. JC's neutralising response in the early days of the obsessional anxieties was to convince himself with reasoning and rationale about how difficult or impossible it was for him to touch the girl (or any girl) because of the distance or proximity. The neutralising response has later morphed to putting his hands up to cover his chest, to convince himself that he has not touched the girl with a reasoning like 'how can I touch the girl if I have put my hands up?' His feared outcomes are related to getting into trouble with the law, and started on 3rd January of 2019 with an obsessional thought related to "did I accidentally touch her, did I do something even more, and did I squeeze her butt". The nature of his obsessions generally has not shifted significantly during the course of the sessions, but the context shifted from "did I rape the girl" to "did I have sex with the dog" to "did I have sex with the man" with the fears emanating from different places that include lifts and toilets. The estimated daily frequency of the occurrences of the more common feared stimuli (related to "spotting someone at the toilets", "spotting a girl in a crowded lift") are approximately ten times a day; the daily occurrences of neutralising sentences in his mind are, as estimated by the patient, twenty to thirty times a day before seeing this psychologist.

MEASURES

Outcome Rating Scale

The Outcome Rating Scale (ORS) is part of a change outcome management system developed by Miller and Duncan (2004). The ORS contains 4 items and is a self-report, visual analogue scale that is available in computerised, written, and oral forms. It was developed as a measure to track the progress of clients during therapy across three main areas of client functioning: interpersonal relations, symptomatic/individual functioning, and performance in social roles (Miller & Duncan,

2004; Miller, Duncan, Brown, Sparks, & Claud, 2003). On the visual analogue scale, clients are asked to mark on a 10-cm line their respective levels of functioning, with high ranking (good ratings) toward the right and low (poor ratings) to the left. The scores of the clients are based on the sum of all 4 items marked out of 10, with a highest score of 40. The estimated internal consistency (Cronbach's coefficient alpha) for the ORS is .93 (Miller et al., 2003). The clinical cutoff for the client to move from the dysfunctional range to normal functioning is a score of 25 and the reliable change index at 5 points.

A.S.I.S.T. for Agencies

A computer-based version of the ORS is used with the patient, which includes the administration, scoring, interpretation, and data storage tool (ASIST; Elliot et al., 2007). This program provides a comprehensive and practical means of administering, scoring, and interpreting ORS scores in the session. If access to a computer was not available on that day, therapists could use paper version of the ORS, with the scores subsequently inputted into the ASIST program.

PROCEDURE

At the beginning of the session, both patients were provided with an information sheet outlining the study and the use of the ORS. The patients were invited to ask any question they had regarding the study and to sign a consent form if they agreed to participate. A client-debriefing sheet was provided to the patients at the end of the first therapy session.

EQUIPMENT

The TheraTapper is used for Alternating Bilateral Stimulation with both cases. With the application of TheraTapper, the patient holds the pulsars for about 10 minutes before the device is stopped and the patient probed on questions about distress ratings (Subjective Units of Distress).

TREATMENT

Case One

The patient was seen over 19 sessions; the first session was an intake-interview to set up essentially the targeting sequence for EMDR processing. To this end, the decision was undertaken to process first the triggers (T) and then the memories (MO) of the obsessional rituals which serve as neutralising responses to the triggers or feared/avoided stimuli.

The triggers or feared stimuli are, in the main, related to

a. Hurting someone with her words (T1)
b. Disappointing people (T2)
c. Not making it in life (T3)

Some examples of scripts that would evoke a memory of the obsessional rituals include:

1. Bring up a picture of yourself thinking to yourself those vulgarities in your mind. Notice them. [Do BLS].
2. Notice the emotions and how you feel about those vulgarities in your mind. [Do BLS].
3. Notice the body sensations when you have those vulgarities in your mind. [Do BLS].

An inspection of the table would show the respective Subjective Units of Distress ratings for the processing of T or MO in the various sessions.

Table 1: SUDs ratings after each session for Case 1

	Initial ratings of SUDs	Final ratings of SUDs	Comments
Session 1	NA	NA	Assessment session
Session 2	8/10	1/10	Process conversations related to T1
Session 3	9/10	3/10	Process triggers of thoughts related to "self hatred" on the T2 channel
Session 4	10/10	9/10	Process triggers of thoughts related to "self hatred" on the T2 channel
Session 5	9/10	5/10	Process triggers of thoughts related to "self hatred" on the T2 channel
Session 6	5/10	1/10	Process triggers of thoughts related to "self hatred" on the T2 channel
Session 7	10/10	7/10	Process triggers of thoughts related to "distress and anxiety" on the T3 channel
Session 8	5/10	3/10	Process triggers of thoughts related to "distress and anxiety" on the T3 channel
Session 9	3/10	2/10	Process triggers of thoughts related to "distress and anxiety" on the T3 channel
Session 10	2/10	0/10	Process triggers of thoughts related to "distress and anxiety" on the T3 channel
Session 11	NA	NA	Installation of Positive Cognition (PC) of "I am in control" to VOC of 7/7.
Session 12	10/10	8/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 13	8/10	5/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 14	5/10	3/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 15	3/10	2/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 16	2/10	1/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 17	1/10	0/10	Process MO in the form of neutralizing sentences in the thoughts/mind
Session 18	NA	NA	Installation of Positive Cognition (PC) of "I am in control" to VOC of 7/7.
Session 19	NA	NA	Installation of future templates

The target memories of T1, T2 and T3 (feared stimuli related to "hurting someone with her words", "disappointing people", and "not making it in life"), as well as MO (the memory of the obsessional rituals) were completely processed by the 18th session. The target memories of T1, T2 and T3 were processed and desensitised to a SUDs rating of 0/10 in the tenth session, with a full VOC of 7/7 achieved in the presence of a PC of "I am in control" in the 11th session. For the target

memory of MO (memory of the obsessions), a full VOC of 7/7 was attained in the 18th session after the SUDs ratings of 0/10 were achieved in the 17th session. Because of the considerable progress that the patient made in the 19 sessions, the patient was discharged from psychological care and given an open appointment.

Subsequent checks with the patient also indicated that she has made considerable progress with no further expression of vulgarities or running through of neutralising sentences in her mind. These checks were done 1 month, 3 months, and 5 months after her discharge from psychological care.

Case Two

The patient was seen over 19 sessions; the first session was an intake-interview to set up essentially the targeting sequence for EMDR processing. The decision was undertaken to process first the memories (MO) of the OCD symptoms (for example, the neutralising responses to the triggers or feared stimuli, the suppressed thoughts related to the feared outcome, the neutralising behaviour that reduces the feared outcomes, and then the triggers (T).

The triggers or feared stimuli are, in the main, related to

4. Spotting someone at the toilets (T4)
5. Spotting a girl in a crowded lift (T5)
6. Spotting someone in the vicinity or school compound (T6)

Some examples of scripts that would evoke a memory of the neutralising responses include:

1. Bring up a picture of yourself thinking to yourself performing the neutralising responses [in a certain area]. Notice them. [Do BLS].
2. Notice the emotions and how you feel when you are performing the neutralising responses [in a certain area]. Notice them. [Do BLS].
3. Notice the body sensations when you are performing the neutralising responses [in a certain area]. Notice them. [Do BLS].

An inspection of the table would show the respective Subjective Units of Distress ratings for the processing of MO or T in the various sessions.

Table 2: SUDs ratings after each session for Case 2

	Initial ratings of SUDs	Final ratings of SUDs	Comments
Session 1	NA	NA	Assessment session
Session 2	7/10	4/10	Process emotions and body sensations related to memories of the neutralising responses
Session 3	7/10	6/10	Process the suppressed thoughts/cognitions related to memories of the OC symptoms
Session 4	6/10	4/10	Process the suppressed images related to memories of the OC symptoms
Session 5	3/10	0/10	Process the suppressed images related to memories of the the OC symptoms
Session 6	8/10	6/10	Process triggers of thoughts related to "urges and fears" on the T4 channel
Session 7	6/10	4/10	Process triggers of thoughts related to "distress and anxiety" on the T5 channel
Session 8	NA	NA	Did RDI of positive experiences of being able to let go of worries and concerns
Session 9	8/10	7/10	Process triggers of thoughts related to "urges and fears" on the T4 channel
Session 10	7/10	6/10	Process triggers of thoughts related to "distress and anxiety" on the T5 channel.
Session 11	4/10	1/10	Process triggers of thoughts related to "distress and anxiety" on the T6 channel.
Session 12	1/10	0/10	Process triggers of thoughts related to "distress and anxiety" on the T6 channel.
Session 13	2/10	0/10	Process triggers of thoughts related to "distress and anxiety" on the T4, T5 channels.
Session 14	3/10	0/10	Process triggers of thoughts related to "distress and anxiety" on the T4, T6 channels.
Session 15	4/10	2/10	Process triggers of thoughts related to "false guilt" on the T6 channels.
Session 16	5/10	0/10	Process triggers of thoughts related to an imagined rape situation on the T4, T5 and T6 channels.
Session 17	6/10	0/10	Process MO in the form of neutralizing sentences (convince himself about the impossibility of touching someone) in the thoughts/mind
Session 18	6/10	0/10	Process MO in the form of neutralizing/safety behaviour (through putting his hand up to convince himself about the impossibility of touching someone) in the thoughts/mind
Session 19	NA	NA	Installation of Positive Cognition (PC) of "I am in control" to VOC of 7/7. Installation of future templates
Session 20	NA	NA	Installation of future templates

The target memories of T4, T5 and T6 (feared stimuli related to spotting someone in the toilets (T4), lifts (T5) and in the vicinity of the school (T5) and triggering off questions of whether he has

raped that individual), as well as MO (the memory of the obsessional rituals that include neutralising sentences and behaviour) were completely processed by the 16th session. The target memories of T4, T5 and T6 were processed and desensitised to a SUDs rating of 0/10 in the 16th session, with a full VOC of 7/7 achieved in the presence of a PC of "I am in control" by the 19th session. For the target memory of MO (memory of the obsessional rituals), a full VOC of 7/7 was attained in the 19th session after the SUDs ratings of 0/10 were achieved in the 17th session. Because of the considerable progress that the patient made in the 19 sessions, the patient was discharged from psychological care and given an open appointment.

Subsequent checks with the patient also indicated that he has made considerable progress with no further expression of neutralsing or safety behaviour or running through of neutralising sentences in his mind. These checks were done 1 month, 3 months, and 5 months after the discharge from psychological care.

RESULTS

Case 1

The patient demonstrated ORS scores which were consistent with her reported progress. In the first session, she indicated an ORS score which was in the clinical range (score = 24/40), progressing to 25/40 in the tenth session before providing a final score of 39.5/40 in the 18th session. A higher score indicates better levels of functioning, with an ORS score higher than 36/40 as a cutoff indicative of progress in the nonclinical range. Specifically, the patient has moved into the nonclinical range of functioning by the end of 19 sessions and maintained her progress after discharge.

Case 2

The patient demonstrated ORS scores consistent with his reported progress. In the first session, he indicated an ORS score in the clinical range (score = 15/40), progressing to 25/40 in the tenth session before providing a final score of 38/40 in the 18th session. A higher score indicates better levels of functioning, with an ORS score higher than 36/40 as a cutoff indicative of progress in the nonclinical range. Specifically, the patient has moved into the nonclinical range of functioning by the end of 18 sessions and maintained his progress after discharge.

DISCUSSION

The present paper is an attempt to extend the mechanisms of action in EMDR beyond the processing of past traumatic experiences. Since the original pioneering work of applying EMDR to PTSD, protocols have been developed – in the literature of EMDR applications – for a range of clinical disorders that include generalised anxiety disorder (Gauvreau & Bouchard, 2008), bulimia nervosa (Kowal, 2005) and phobia (De Jongh et al., 1999), notwithstanding the treatment of OCD with EMDR as well. The two subjects in the case series have not processed past traumatic experiences, and have attained significant progress with processing firstly, memories of triggers based in recent events and secondly, memories of obsessional rituals based in neutralising sentences and behaviours (safety behaviours). That these two cases show positive outcomes indicate that OCD treatment is successful when it focuses on processing recent experiences (triggers or events that precede the OCD symptoms) and memories of the symptoms elicited on exposure to the feared stimuli. Insofar as EMDR in the processing of recent experiences is akin to

ERP procedures in its exposure to recent triggers suggests a certain similarity in the mechanism of actions between EMDR and ERP procedures.

One clear similarity between EMDR and ERP procedures for the present study is the length of the alternating bilateral stimulation extending beyond the usual 20-30 passes of eye movements (which would be for a duration of approximately 30 seconds) to 10 minutes of processing, as has been highlighted in the section on methodology with the application of the TheraTapper. Solomon and Shapiro (2008), in their seminal article on the mechanisms of action of EMDR have pointed out that EMDR is not an exposure-based approach, basing their rationale on the understanding that in EMDR, the exposure to the stimuli is too brief to be considered an exposure based therapy. In the words of the authors, the primary agent of change is not the prolonged exposure, albeit the extended focused attention to the event. Earlier researchers (e.g., Rogers and Silver, 2002) have also indicated that the information processing paradigms postulated by Shapiro (Shapiro, 1985) is unlike that of the concepts expressed in flooding/systematic desensitisation or cognitive therapy.

While it is clear to the present author that lengthening the alternating bilateral stimulation to approximately 10 minutes per round would considerably enhance the duration of exposure, the present author is certainly **not** suggesting that EMDR has become more of an exposure based approach and less driven by an information processing paradigm with use of a thera tapper! Rather than being caught in this divide between proponents of EMDR being driven by tenets of the information-processing paradigm or EMDR being a repackaged form of exposure therapy (as has been highlighted in earlier sections of the Introduction by researchers that include Marsden et al., 2016, Marr, 2012, Bohm & Volderholzer, 2010, Herbert, et al., 2000, Lohr et al., 1999 and McNally, 1999), the present author is suggesting that if the duration of exposure is extended beyond the usual 20-30 passes of eye movements per round, EMDR would increasingly take on both aspects of exposure and desensitisation/reprocessing in its treatment effects. Indeed, the author of the present study maintains that both exposure and desensitisation have taken place for the two cases as indicated, mainly for reasons attributed to the longer duration of exposure contributing to exposure effects and the alternating bilateral stimulation accounting for the desensitisation/reprocessing effects.

In other words, the positive outcomes of the two cases in the present study are both attributed to exposure and desensitisation/reprocessing effects. The introduction section of the present paper has highlighted similarities between EMDR and ERP procedures because there is exposure to the constellation of OC symptoms and the range of feared stimuli (or triggers) elicited under memory recall or imaginary exposure conditions.

However, the EMDR procedures have involved an additional alternating bilateral stimulation procedure that can further contribute as desensitisation and reprocessing effects. While exposure contributes to corrective information through the disconfirmation of feared and danger experiences with the application of systematic desensitisation and habituation, EMDR reprocesses information by making links between memory associations and channels. However, both processes – EMDR and exposure procedures – contribute to inhibitory learning. Exposure procedures contribute to inhibitory learning through the disconfirmation of feared expectations and inducing emotional or physiological responses incompatible with each other, a process known as reciprocal inhibition. In a similar vein, the installation of Positive Cognitions (PCs) in EMDR

procedures with bilateral stimulation counters the Negative Cognitions, and facilitates inhibitory learning through linking in with another adaptive memory that overrides the original maladaptive memory. In other words, the facilitation of inhibitory learning with the desensitisation of negative memories through the bilateral stimulation creates an integration with information from the adaptive memory network that results in a change of perspective, a phenomenon known in EMDR terminology as "reprocessing".

Going further along this line of reasoning that bilateral stimulation facilitates the integration of information at a neural level, a recent article by Holmes (2019) reporting on the study by Baek, et al. (2019) has shed some light on the neurobiological mechanism by which EMDR works. Essentially, Baek and colleagues demonstrated there was a two-step process inhibiting the connection between the mediodorsal thalamus and the 'fear-encoding' basolateral nucleus of the amygdala (BLA). In summary, these findings point to a model in which firstly, the exposure to alternating bilateral visual stimuli is required for extinction in feared memory and reduction in feared behaviour, and secondly, how extinction and EMDR procedures work in parallel to enhance the neuronal pathway that links the superior colliculus and the mediodorsal thalamus. To a large extent, the study by Baek, et al. (2019) has demonstrated the overlap in effects between extinction, exposure and bilateral stimulation.

The author of the present study is also suggesting that the key reason for the positive outcomes for the two cases, specifically applying EMDR to OCD without focusing primarily on trauma history or traumatic/stressful life event, can be attributed to the role of inhibitory learning in inhibiting the Negative Cognition and then facilitating the Positive Cognition by linking into the adaptive memory network that results in reprocessing.

With due acknowledgement to the researchers who have gone ahead and established EMDR as an Adaptive Information Processing model with the emphasis on linking in with positive associations through the adaptive memory network, the present article is also to urge further research along lines of inhibitory learning for applications and mechanisms of EMDR.

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