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The messy landscape of eye movements and false memories

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ABSTRACT

Eye-Movement Desensitisation and Reprocessing (EMDR) therapy is a common treatment for PTSD. However, skeptics like James Ost question the theoretical underpinnings, highlight inconsistency of empirical findings surrounding the efficacy of such therapy, and warn against unknown drawbacks. Little is known about the impact of the eye movements, a critical component in EMDR, on susceptibility to false memories, and the existing literature is contradictory. We review the literature and present new findings to help tell the story of the effects of eye movements on memory. Taken as a whole, this small body of work suggests that eye movements do not reliably affect susceptibility to misinformation, nor do they appear to enhance memory, but they do seem to increase spontaneous false memories.

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EMDR; eye movements; false memory; misinformation

It was once argued that "the only active component of EMDR is already part of what appears to be a successful, and widely used, intervention for post trauma psychological difficulties (e.g., CBT)" (Ost & Easton, 2006, p. 6). EMDR (Eye-Movement Desensitisation and Reprocessing), a therapeutic technique commonly used for post-traumatic stress disorder (PTSD), has patients move their eyes horizontally while recalling traumatic memories (Shapiro, 1999). Support for efficacy and use of EMDR therapy is certainly mixed in the research community. Some tout the use of EMDR due to studies showing trauma symptom reduction following treatment (van den Hout & Engelhard, 2012), while others question whether the eye movements contribute additional therapeutic benefit beyond already used exposure techniques (Davidson & Parker, 2001). James Ost was a supporter of the latter, and warned against blanket acceptance of EMDR, citing skepticism and concern over unintended consequences expressed by the psychological community (Ost & Easton, 2006). Among these reservations is the idea that EMDR may provide opportunity for the memory to be contaminated by misinformation (Houben et al., 2018). Ost's skepticism, in combination with his programme of research largely focused on memory in applied contexts, certainly would have made him a prominent voice in today's ongoing debates surrounding potential hazards of EMDR therapy.

The controversy around EMDR

EMDR is a therapeutic technique pioneered by clinical psychologist Francine Shapiro (Shapiro, 1989b). EMDR works to treat PTSD symptoms through having patients recall a traumatic memory while performing lateral eye movements (van den Hout & Engelhard, 2012). During treatment, patients are instructed to focus on the traumatic memory and think about how it makes them feel, focusing on the cognitions and emotions associated with the traumatic memory at this point in time (Shapiro, 1999). Simultaneously, the therapist guides the patient to move their eyes horizontally, either following the therapist's finger or a moving electronic dot (Houben et al., 2020). However, the technique gained popularity far quicker than it was validated for its efficacy, leading to criticism in the field (Herbert et al., 2000). Early critics argued that EMDR was developed without a solid theoretical foundation, highlighting the lack of support for the unique contribution of the eye movements (the "EM" component of EMDR; Leer et al., 2014). As EMDR gained traction, many theories emerged attempting to explain why EM added benefits in the therapeutic setting, such as the idea that EM stimulate beneficial "interhemispheric communication" (Shapiro, 1999). Though the most validated explanation for the efficacy of EM – the "working memory (WM) account" – posits that the two tasks of completing EM and recalling the memory compete for the limited resources of the WM (Gunter & Bodner, 2008). Visual recollection is thought to require significant executive resources. Therefore, creating a higher load on executive resources through EM should result in impaired visual memory, thereby decreasing the vividness and emotionality of the memory (Engelhard et al., 2010; Engelhard et al., 2011; van den Hout et al., 2010). However, empirical support for the contribution of EM is mixed at best and many critics of such work have since spoken up (Davidson & Parker, 2001; Lohr et al., 1998; Muris & Merckelbach, 1999).

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In 2006, Ost stepped into this battlefield when he criticised the endorsement of EMDR by NICE (National Institute for Health and Care Excellence) in England, stating evidence that "a closer look at dismantling studies would have shown that only the desensitisation component (D) appears to be active, whilst the novel eye movement (EM) and reprocessing (R) components appear to be inert and have no coherent theoretical underpinning" (Ost & Easton, 2006, p. 6). Indeed, dismantling studies (i.e., studies looking at the individual effects of each component of EMDR therapy) have found that EM do not have additional benefits when it comes to inhibition of negative emotions (Muris & Merckelbach, 1999), or therapeutic outcomes (Cahill et al., 1999). Further, there is currently no evidence that trauma symptom reduction is linked to the decreases in vividness and emotionality due to EM (van Schie et al., 2019). Evidence also exists suggesting that reprocessing (R) does not bear additional therapeutic benefits (Herbert et al., 2000). Thus, the desensitisation component of EMDR, which closely resembles beneficial components of existing exposure therapies, such as cognitive behavioural therapy (CBT), may be the only efficacious part of the treatment, leading critics to suggest that EMDR is merely another brand of exposure therapy (Lohr et al., 1998).

While the discussion surrounding the consequences of EM remains active, some evidence appears to exist for this notion that EMDR is just another exposure therapy. While some studies have found that EMDR is more effective than some treatments, such as pharmacologic therapies (van der Kolk et al., 2007), EMDR as a whole has not proven more efficacious than other existing therapies, such as trauma-focused CBT (Seidler & Wagner, 2006). In fact, a meta-analysis of trauma-focused CBT and EMDR therapies found no statistically significant difference in efficacy (Seidler & Wagner, 2006). Lilienfeld (2007) warns that while many therapies "tend to be approximately equivalent in efficacy" (otherwise known as the Dodo Bird Verdict, Lilienfeld, 2007, p. 54), evidence suggests not all therapies are created equal and, in fact, some therapies may produce harm in individuals. In whatever way this lively debate plays out, it is important to understand the possible drawbacks of novel therapies such as EMDR in addition to testing their efficacy in reducing symptoms.

EMDR and false memories

Do eye movements enhance memory?

While critics of EMDR would claim that EM do not enhance treatment of PTSD in clinical settings, they note the importance of further exploring unintended consequences. The impact of EMDR on false memory susceptibility was first explored by Parker et al. (2009) using the misinformation paradigm. In their study, they showed participants an event using a slideshow of photos accompanied by a spoken narrative. After a delay, participants were exposed to misinformation items about the event through leading questions. Next, participants were randomly assigned to one of three EM conditions: horizontal EM, vertical EM, or no EM (fixation). The two EM conditions involved participants following a dot on the screen (moving either horizontally or vertically) while keeping their heads stationary. In the fixation condition, participants stared at the dot as it flashed in the centre of the screen. It is important to note that the EM phase did not have participants recall the event during the eye movements – a crucial divergence from a true EMDR paradigm. Following the EM phase, all participants completed a memory test for the events depicted in the slideshow.

Results showed not only a higher accuracy rate in the horizontal EM condition compared to the vertical and fixation conditions, but also no significant difference between the vertical and fixation conditions. Further, for the misinformation items, the horizontal EM condition showed less misinformation endorsement than both the vertical and fixation conditions. Again, there was no significant difference between the vertical and fixation conditions. According to these results, it seems that horizontal EM are substantively different from vertical EM. The vertical condition followed the same pattern as the fixation condition, while the horizontal condition impacted memory quality. That is, it is not merely any movement of the eyes, but specifically this left to right movement that is important in EMDR. However, it is important to note that previous research has found that vertical eye movements do result in a similar reduction in vividness and emotionality compared to horizontal eye movements, which offers support for the WM account rather than the interhemispheric account (Gunter & Bodner, 2008). Moreover, this study concludes that horizontal EM enhance memory through an increase of accurate recall and a decrease in misinformation endorsement, resulting in a reduction in magnitude of the misinformation effect. However, to our knowledge, there have been no direct attempts at replicating or validating these findings.

Does EMDR increase false memory susceptibility?

Nearly a decade later, another research group became interested in the influence of EMDR on misinformation endorsement (Houben et al., 2018). They sought out to examine the issue using a more clinically relevant paradigm. While Parker et al. (2009) included the misinformation *before* the EM, Houben and colleagues argue that patients may be exposed to misinformation *after* the EMDR session in the form of follow-up questions by the therapist. This distinction is important for two reasons. First, research has shown that therapists are misinformed about some memory issues (Ost et al., 2013; Patihis et al., 2014), prompting concern about the potential for therapists to unintentionally introduce misinformation during the follow-up interview. Second, research on the efficacy of EMDR has shown that the technique does effectively

decrease vividness and emotionality of the traumatic memory (van den Hout & Engelhard, 2012). Research on the misinformation effect shows that memories are more susceptible to incorporating misinformation when the memory is weaker (Loftus, 2005). Therefore, the effects of EMDR on memory vividness may actually increase susceptibility to subsequent misinformation, potentially introduced during the follow-up interview.

In their study, Houben et al. (2018) had participants view an event using a trauma film paradigm and then rate the vividness and emotionality of the event. Next, participants were randomly assigned to either (horizontal) EM or control (fixation). Notably, during the EM phase, participants in both conditions were told to think about the event in the video and how it made them feel, paralleling techniques used in therapeutic practices. Following the EM phase, participants again rated the vividness and emotionality of the event. Next, participants read an eyewitness narrative that contained misinformation and completed a memory test.

Results from this study seem to contradict the earlier findings of Parker et al. (2009), demonstrating that EM participants showed reduced accuracy and increased misinformation endorsement on the memory test compared to controls. Further, the change in both emotionality and vividness scores pre-test to post-test did not differ by EM condition. Participants in both conditions showed a decrease in both vividness and negative emotionality. However, the authors note that while the change scores were not statistically significant between conditions, the effect sizes for vividness change scores for EM participants were substantially larger than for control participants. The authors conclude that EM pose a major drawback through diminishing memory accuracy and heightening misinformation susceptibility, positing that these drawbacks may be due to their reduction of memory vividness. They suggest this finding may be explained by the discrepancy detection principle (Tousignant et al., 1986), whereby people may be less susceptible to misinformation when there is a discrepancy between the original memory and misinformation. Here, it is possible that the EM decreased vividness, making the original memory less discernible from the misinformation.

Houben et al. (2018) proposed a theoretical mechanism explaining increased misinformation susceptibility following EMDR: EM decrease memory vividness[1] which in turn makes the memory less detailed. Based on fuzzy trace theory (Reyna & Brainerd, 1995), participants must then rely more on gist memory as opposed to verbatim memory. This leaves them more vulnerable to miss discrepancies between the original memory and subsequent misinformation.

Interestingly, subsequent research found that, after a delay, EM were related to higher rates of both correct memories and spontaneous false memories compared to a control of no EM (Houben et al., 2020). This study, using a DRM paradigm to measure spontaneous false memory, showed participants a word list with negative and neutral words and then had participants recall the word list while either performing EM or not. Some participants recalled the word list immediately and others after a 48-hr delay. For the immediate recall, there was no significant difference in correct or false recall. However, after the 48-hr delay, EM participants scored significantly higher on correct recall as well as spontaneous false memory rates compared to the control.

Another study used an aversive conditioning task to study the impact of EM on memory for faces (Leer & Engelhard, 2020). In this study, participants were shown a series of faces, some of which were accompanied by a shock. Next, participants were asked to recall the target face, either while completing EM or not. Either immediately or the next day, participants were asked to discriminate between their memory of target images (the faces paired with a shock) and non-target images. Results showed that the EM group had a higher false-positive rate (identifying a non-target face as a target face) compared to control after the 24-hr delay, but not when tested immediately. Because the discrimination test contained only non-target faces, the correct hit rate could not be calculated for this study. The findings of this study suggest that EM may have a delayed effect on memory. This is a critical when we consider that, as more time passes, the original memory becomes weaker and more susceptible to outside influence such as misinformation (Loftus, 2005). It is possible that EM may exacerbate this effect of time. This study has implications for eyewitness memory, suggesting caution when an eyewitness has undergone EMDR prior to an identification. These results, paired with the findings of Houben et al. (2020), further muddy our understanding of how EM impact memory accuracy.

A University of California, Irvine study

These mixed results, showing both higher rates of correct recall as well as higher rates of false memory, motivated us to replicate and extend the findings of Houben et al. (2018). Based on the theory of discrepancy detection, we proposed a mediation model through which EM increase misinformation susceptibility (see Figure 1). We

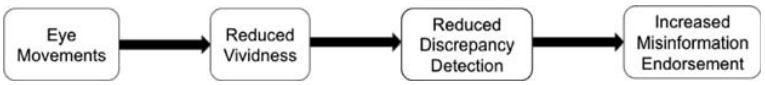

Figure 1. Proposed mechanism through which eye movements increase misinformation endorsement, adapted from Houben et al. (2018).

hypothesised that EM decrease vividness, which then decreases participants' ability to detect discrepancies between the original memory and misinformation, therefore increasing misinformation endorsement.

The present study followed the same procedure as Houben et al. (2018) and used the original materials, accessed via Open Science Framework (OSF) at https://osf.io/j479p/. The sample size was determined using an a priori power analyses with a medium to large effect size ($d = 0.6$) and a power of 0.80. The effect size was chosen based on previous research (e.g., Houben et al., 2018). Participants were 86 undergraduate students from University of California, Irvine (UCI). The event depicted a graphic, multi-victim car accident, and participants were asked to watch the video carefully. Immediately after, each participant rated the vividness and emotionality of the event, which were both assessed on a 0–10 point sliding scale. They were then randomly assigned to the EM condition or fixation (control) condition. These conditions also used the materials from Houben et al. (2018) and were modelled to be identical to their procedure, where participants were instructed to think about the event and how it made them feel while either following the dot on the screen (EM) or staring at the stationary dot on the screen (control). Participants then rated vividness and emotionality a second time and read an eyewitness narrative that contained misinformation. The narrative was substantively identical to that of Houben et al. (2018) but was doctored to look like an authentic police report of an eyewitness statement to increase the perceived credibility of the source of misinformation and therefore strengthen the misinformation effect, as has been shown by previous research (e.g., Dodd & Bradshaw, 1980; Echterhoff et al., 2005; Pena et al., 2017; Sacchi et al., 2007).

Finally, participants completed a memory test, which – departing from the procedure of Houben et al. (2018) – included a modified measure of discrepancy detection (Butler & Loftus, 2018). In this task, embedded within the memory test, participants were asked a series of multiple questions such as "What was the man who approached the woman's car wearing?". Each question had two parts. Participants were given each question and asked to answer what they saw "in the video?" and then asked what they read "in the eyewitness report?". Each question featured identical multiple-choice options: the correct answer, the misinformation (if it was a critical item), and 1–2 fillers (2 fillers were present for items that were non-critical and therefore did not have an answer pertaining to misinformation in the eyewitness report).

We did not find evidence to support the hypothesis that EM reduce memory accuracy and increase misinformation endorsement. The means for memory accuracy and misinformation endorsement can be found in Table 1. EM participants ($M = .81$, $SD = .11$) were not more accurate on the memory test than control participants ($M = .80$, $SD = .11$), t (84) = −0.37, $p = 0.72$, $d = -0.079$. The Bayes factor was $BF_{10} = 0.24$, with an inverse of 1 / 0.24 = 4.17, which indicates moderate evidence in favour of the null hypothesis that there is no difference in memory accuracy between the two conditions.

Participants in the EM condition ($M = .23$, $SD = .19$) did not endorse misinformation at higher rates than participants in the control condition ($M = .23$, $SD = .17$), t (84) = 0.19, $p = 0.85$, $d = 0.041$. The Bayes factor was $BF_{10} = 0.23$, with an inverse of 1 / 0.23 = 4.41, which indicates moderate evidence in favour of the null hypothesis that there is no difference in misinformation endorsement between the two conditions.

Table 1 shows mean scores for vividness and emotionality. A quick glance at the data shows that vividness decreased somewhat for both the EM and the control groups. A repeated measures ANOVA for vividness revealed a significant decrease in vividness when collapsing across both conditions, F (1, 84) = 24.97, $p < 0.001$, $\eta^2 = 0.058$. There was no significant effect of condition, F (1, 84) = 2.98, $p = 0.09$, $\eta^2 = 0.026$, and no significant interaction, F (1, 84) = 0.34, $p = 0.56$, $\eta^2 < 0.001$. Control participants showed a decrease in vividness ($M_{T1} = 8.54$, $M_{T2} = 7.78$) similar to EM participants ($M_{T1} = 8.07$, $M_{T2} = 7.11$). In contrast, a repeated measures ANOVA revealed no significant change in emotionality, F (1, 84) = 2.70, $p = 0.10$, $\eta^2 = 0.005$, no significant effect of condition on emotionality, F (1, 84) = 0.95, $p = 0.33$ $\eta^2 = 0.009$, and no significant interaction, F (1, 84) = 2.09, $p = 0.14$ $\eta^2 = 0.004$.

While differences in discrepancy detection between the EM ($M = 0.52$, $SD = 0.24$) and control conditions ($M = 0.42$, $SD = 0.25$) did not reach significance, t (84) = −1.70, $p = 0.092$, $d = -0.37$, the Bayes Factor, $BF_{10} = 0.79$ with an inverse of 1 / 0.79 = 1.26, indicates only anecdotal evidence in favour of the null hypothesis that there is no difference in discrepancy detection between EM condition. Thus, we conducted correlations between discrepancy detection and misinformation endorsement, vividness, and emotionality, separating by EM condition (see Table 2). Notably, differences emerged. While the correlation between discrepancy detection and misinformation endorsement was small and non-significant for the control group, $r = -0.19$, $p = 0.25$, this correlation was moderate and significant for the EM group, $r = -0.53$, $p = 0.002$. This suggests that, for the EM group, higher discrepancy detection is associated with lower misinformation

Table 1. Means (and SD) for the memory test, as well as vividness and emotionality ratings pre- and post- eye movement sessions.

	Condition	
Measure	Eye movements	Control
Memory test		
Accuracy	.81 (.11)	.80 (.11)
Misinformation endorsement	.23 (.19)	.23 (.17)
Vividness		
Pre	8.07 (1.59)	8.54 (1.45)
Post	7.11 (2.05)	7.78 (1.73)
Emotionality		
Pre	2.42 (1.79)	1.85 (1.80)
Post	2.44 (1.77)	2.32 (1.82)

Table 2. Correlations with discrepancy detection.

		Misinformation Endorsement	Vividness (Pre)	Vividness (Post)	Emotionality (Pre)	Emotionality (Post)
Discrepancy Detection	EM	−0.53***	0.27	0.33*	−0.31*	−0.31**
	Control	−0.19	−0.03	0.20	−0.22	−0.32*

Results marked with *, **, *** are significant at the .05, .01, and .001 alpha level, respectively.

endorsement. Further, time two vividness was significantly correlated with discrepancy detection for the EM group ($r = 0.33$, $p = 0.03$), but not the control group ($r = 0.20$, $p = 0.21$), illustrating that, for the EM group, increased vividness is associated with increased discrepancy detection. Together, these findings offer some support to the proposed model.

In this study, misinformation endorsement did not differ between conditions and vividness decreased at time two in both conditions. The results do not support the findings from either Parker et al. (2009), who found that EM enhance memory, or the results of Houben et al. (2018), who found that EM impair memory accuracy.

Failure to replicate

We were not alone, however, in our interest in understanding the potential influence of EM on misinformation susceptibility. Two replication studies published shortly after our study concluded revealed similar findings. First, van Schie and Leer (2019) conducted a direct replication of Houben et al. (2018), failing to replicate the findings. In this study, the researchers found that EM did not significantly impact either accuracy or misinformation endorsement. Similar to Houben et al., vividness and emotionality decreased over time. Further, emotionality scores showed that EM participants rated emotions as less negative than control participants (and the authors note that the interaction between condition and time approached significance). The authors also conducted a correlation between the change in vividness and misinformation endorsement to investigate the hypothesis presented by Houben et al. (2018) that misinformation endorsement increases as vividness decreases. The correlation was non-significant. They also conducted a post-hoc correlation on the data from Houben et al. (available on OSF), finding the correlation in that study was also non-significant. Taken together, these findings call into question, first, whether EM do in fact influence misinformation susceptibility and, if so, whether a reduction in vividness is the mechanism through which they work.

Around the same time, Calvillo and Emami (2019) also conducted a direct replication of Houben et al. (2018). This study, however, included a source memory task in which, after each of the recognition test questions, participants were asked to indicate the source of the response. Participants were given the following options: "(a) saw it in the video only, (b) saw it in the eyewitness statement only, (c) saw it in the video and the eyewitness statement and they were the same, (d) saw it in the video and the eyewitness statement and they were different, or (e) guessed" (Calvillo & Emami, 2019, p. 1907). This source memory test was used as an indicator for robust false memory when participants chose either "saw it in the video only" or "saw it in the video and the eyewitness statement and they were the same."

Following the same pattern as the previous replication attempt, these researchers found no significant effect of EM on accuracy, misinformation endorsement, or presence of a robust false memory (as indicated by the source memory test). Moreover, results also showed a decrease in vividness over time, although the change in vividness was significant only for the EM participants and not for the control participants. This study found no significant change in emotionality for either condition. This study also correlated time two vividness with misinformation endorsement to test the hypothesis presented by Houben et al. (2018). Interestingly, they found a significant positive correlation – signalling that as vividness increases, so does misinformation endorsement. The authors acknowledge that this relationship should be negative (as it was for the Houben et al., 2018 data) and emphasise the need for future research on this relationship.

Mini meta-analysis

The research on EM and false memories is clearly muddled. While Parker et al. (2009) found that EM were associated with lower rates of misinformation endorsement, Houben et al. (2018) found that EM were associated with higher rates of misinformation endorsement. Further, three studies attempting to replicate Houben et al. (2018) failed to find any association between EM and higher *or* lower endorsement. In the search for clarity on this issue, we conducted a mini meta-analysis (Goh et al., 2016), which allows us to summarise data from the four studies – Houben et al. (2018) and the three replication studies – for a robust test of the role of EM in misinformation endorsement.

We conducted a random effects analysis on the effects of EM on both misinformation endorsement and accuracy. We used the provided Cohen's *d* effect sizes from Houben et al. (2018), van Schie and Leer (2019), Calvillo and Emami (2019), and the effect sizes calculated from the UCI study presented here (for a summary of effect sizes used, see Table 3). We first analysed the effect of EM on misinformation endorsement, finding a small, positive, and non-significant effect, $M_d = 0.038$, $z = 1.58$, $p = 0.12$, 95% CI [−0.009, 0.086]. There was significant heterogeneity among the four effect sizes $Q(3) = 9.17$, $p = 0.027$. When looking at the distribution of the effect sizes, three effect

Table 3. Cohen's *d* effect sizes used in the mini meta-analysis.

Study	Misinformation Endorsement	Accuracy
Houben et al. (2018)	0.77	−0.88
UCI	0.041	−0.079
van Schie and Leer (2019)	0.063	−0.166
Calvillo and Emami (2019)	0.02	0.07

sizes were closely clustered, with the effect size from Houben et al. (2018) driving this significant heterogeneity. To test this, we ran sensitivity analyses by removing the Houben et al. (2018) effect size from the analysis. This resulted in a still small, positive, and non-significant effect, $M_d = 0.031$, $z = 1.27$, $p = 0.20$, 95% CI [−0.017, 0.079], with a now non-significant test of homogeneity, $Q(2) = 0.31$, $p = 0.86$.

We then ran analyses on the effects of EM on accuracy, using Cohen's *d* effect sizes from the same four studies. Analyses revealed a small, negative, and non-significant effect, $M_d = -0.148$, $z = -1.10$, $p = 0.27$, 95% CI [−0.41, 0.12]. This analysis also revealed significant heterogeneity around the effect, $Q(3) = 41.30$, $p < 0.001$, so we again ran sensitivity analyses by removing the effect size from Houben et al. (2018) since it was significantly above the others. While the resulting overall effect was still small, negative, and non-significant, $M_d = -0.028$, $z = -0.42$, $p = 0.67$, 95% CI [−0.16, 0.10], the analysis still revealed significant heterogeneity, $Q(2) = 32.62$, $p < 0.001$. This finding could be attributed to the larger variability in effect sizes for accuracy from the three replication studies, even though all are considered "small" under the conventional interpretation of Cohen's *d* (see Table 3; Aron et al., 2013). This variability is consistent with mixed findings in the literature for whether EM increase or decrease correct recall (e.g., Houben et al., 2020). Overall, the mini meta-analysis revealed a consistent message illustrating that the effect of EM on both misinformation endorsement and accuracy is non-significant.

Final remarks

Over the years, memory scientists have expressed great concern over the suggestive nature of the therapeutic setting. Ost et al. (2001), for example, compare the experience of some retractors (adults who previously claimed childhood abuse and then later retract those claims) to the framework of the false confession literature, illuminating the potentially harmful effects of social pressure between therapists and their patients. Part of the concern with the influence of EMDR therapy, in particular, is that it leaves patients' memories more vulnerable to outside influence, heightening the risks of misinformation susceptibility. If the dynamic of the therapeutic setting during EMDR therapy introduces social pressure, whereby the patient feels pressured to accept the therapist's interpretations, inadvertent misinformation exposure may be particularly influential. This concern is even more crucial considering that many EMDR practitioners believe memories can be repressed, and that these repressed memories can be accurately retrieved during therapy (Houben et al., 2019).

The concern surrounding EMDR's influence on false memory susceptibility is an important consideration for memory researchers and clinicians. It appears that when we consider the misinformation effect, we do not have strong evidence that EM affect susceptibility to misinformation one way or another. That is, the EM involved in EMDR do not appear to consistently enhance memory, nor do they appear to consistently increase misinformation endorsement. Results presented here suggest that impaired discrepancy detection may play a role in the influence of EM on misinformation susceptibility, though the further research is needed to parse apart this effect. It is clear, however, that EM do interact with memory to some capacity – whether through decreasing the vividness of the memory or undermining memory in general – though this interaction is inconsistent and needs to be explored further. The picture becomes even more blurred when we consider studies finding that EM increase spontaneous false memory rates, and may even simultaneously increase correct recall (Houben et al., 2020). These messy findings indicate a need for caution when approaching memories that may have been influenced by EMDR.

There are some limitations to the studies discussed. Considering the studies showing EM involved in increased rates of spontaneous false memory – as well as increased correct recall – after a delay (Houben et al., 2020; Leer & Engelhard, 2020), it is possible that these findings on the misinformation effect may appear differently after a delay as well. Further research on the effects of EM on misinformation endorsement after a delay is necessary. Further, while the studies presented did not find that EM significantly reduced vividness as compared to control, previous research has found a significant vividness reduction from EMDR (Lee & Cuijpers, 2013). One possible explanation for the null effects of EM on misinformation endorsement in the three replication studies is that the EM were not sufficient in mitigating the vividness and emotionality of the memory. All three studies found a main effect of vividness from time one to time two, essentially indicating an effect of time. However, none of the three studies found a differential effect of vividness change scores between the EM and control. Perhaps this is because these studies are testing the effects of EM in a situation akin to EMDR therapy (horizontal EM while recalling the target memory), while not truly capturing the whole experience of an EMDR therapy session. However, a prior meta-analysis found a large effect size for vividness reduction in non-therapy laboratory studies (Lee & Cuijpers, 2013). Furthermore, the studies examining the influence of EM on vividness and emotionality are similar in that they are not embodying the entire therapeutic experience as they, too, focus on the contribution of EM

rather than the complete protocol of EMDR. Thus, it remains unclear why discrepancies exist between studies concerning the relationship between EM and vividness.

Yet, if vividness is in fact reduced by EM, this reduction does not seem to be beneficial in treatment outcomes, as studies have concluded that EMDR does not differ in efficacy compared to already existing therapies (Davidson & Parker, 2001), and in some studies appears to be weaker than existing therapies (Taylor et al., 2003). While the studies presented paint a clearer picture of the impact of EM on memory, this package of studies is not sufficient to conclude that EMDR is harmless. Much of research on different therapeutic techniques focuses on whether or not a therapy is empirically supported, however Lilienfeld (2007) urges a shift to prioritise identifying potentially harmful therapies. It is possible for two therapies to appear equivocal in efficacy, however one may unknowingly present harm to some patients. While research investigating the efficacy of EMDR as well as the theoretical underpinnings of the EM is essential, it is also imperative to examine possible harmful drawbacks of the therapy before wide acceptance is warranted. Future research is necessary to truly understand the benefits, faults, and appropriate uses of EMDR therapy.

Note

1. see Lee and Cuijpers (2013) and Leer et al. (2014) for empirical review of the relationship between EMDR and vividness.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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