

# Randomized Controlled Trial: EMDR Early Intervention With and Without Eye Movements for Learned Helplessness State

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Learned helplessness (LH) is considered a psychological trait, which occurs after repeated exposure to aversive and uncontrollable situations (Seligman, 1975). Such an exposure is found to lead motivational, cognitive, and emotional deficits. LH has also been linked to different psychological disorders such as depression, anxiety, posttraumatic stress disorder (PTSD), and trauma-related depression. Eye movement desensitization and reprocessing (EMDR) therapy has been accepted as an efficacious treatment for PTSD, but evidence for its effectiveness as an early intervention is still preliminary. Also, there is some uncertainty regarding the role of eye movements in EMDR. The current randomized controlled study investigated whether a single 15-minute session of EMDR's Recent Traumatic Episode Protocol (R-TEP) could reduce the effects of laboratory-induced LH. The study further investigated whether R-TEP without eye movements would have the same effect. Using established experimental tasks, an LH state was induced via unsolvable maze tasks with effects measured by the participants' performance in solving anagrams. Results revealed that an LH state was successfully induced by the unsolvable mazes. R-TEP effectively reversed the negative effects of the LH state and was significantly more effective than no treatment controls and the R-TEP condition without eye movements, which was essentially a narrative exposure intervention. Results suggest that R-TEP can be successfully administered immediately following a distressful event, and that eye movements appear to be a necessary component of EMDR in reversing the cognitive, motivational, and/or emotional deficits induced by LH.

**Keywords:** eye movement desensitization and reprocessing (EMDR) therapy; EMDR early intervention (EEI); Recent Traumatic Episode Protocol (R-TEP); learned helplessness; randomized controlled study; eye movements.

**N**umerous studies have examined the effectiveness of eye movement desensitization and reprocessing (EMDR) for the treatment of posttraumatic stress disorder (PTSD) (for a review see Wilson et al., 2018). Today, EMDR is accepted as an evidence-based psychotherapy for PTSD (World Health Organization [WHO], 2013). However, the efficacy of EMDR early intervention (EEI) protocols is less established and requires further investigation (Shapiro, Laub, & Rosenblat, 2018).

In this study, nonpathological college students participated in a randomized controlled experiment, where EEI was applied following a lab-induced

learned helplessness (LH) state. This state is considered to share a similar mechanism with real-life traumatic experiences, in which the perception of uncontrollability of an aversive event results in cognitive, emotional, and behavioral deficits (Overmier, 2002). Since previous studies have revealed that the laboratory-induced LH state fades away within 2 hours (Young & Allin, 1985), the current study implemented the EMDR Recent Traumatic Episode Protocol (R-TEP), an intervention widely used for recent stressful experiences (Gil-Jardiné et al., 2018; Shapiro & Laub, 2008, 2014).

EMDR therapy contains a unique component of eye movements or other bilateral stimulation. This study also sought to determine if R-TEP without eye movements would have the same effect as standard R-TEP on the LH state.

## Learned Helplessness

The original theory of LH (Maier & Seligman, 1976; Maier, Seligman, & Solomon, 1969; Seligman, 1975) proposed that continued exposure to aversive uncontrollable events would produce an expectation that the individual's actions have no control over the outcome. It is inferred that it would further lead to motivational, cognitive, and emotional deficits (Maier, 1984), which resembles the symptoms of depression (e.g., Bodner & Mikulincer, 1988; Maier, 1984, Simson & Weiss, 1988) and PTSD (Foa, Zinbarg, & Rothbaum, 1992; Yehuda & Antelman, 1993). More specifically, being exposed to uncontrollable events, in which participants felt helpless, resulted in deficits in behavioral coping, associative learning, and emotional expression (Overmier & Seligman, 1967).

Early LH studies were focused on the effects of uncontrollable events on animals, and found that such events led to some behavioral changes in animals (Maier & Seligman, 1976). Then the studies shifted their endeavor to human settings. This branch of work was conducted both in analog settings with non-clinical participants (e.g., Hiroto & Seligman, 1975) and with clinical samples (e.g., Miller & Seligman, 1976; Seligman, 1974). In addition, another group of researchers focused on the attributional aspect of LH: more specifically, how individuals explain the causal links between the event and the outcome (Abramson, Seligman, & Teasdale, 1978; Alloy, Peterson, Abramson, & Seligman, 1984). This third dimension also linked LH with depression (e.g., Ozmen & Lester, 2001) and PTSD (e.g., McKeever, McWhirter, & Huff, 2006).

## Real-Life Expressions of LH

Since early studies implied a great deal of resemblance between LH and different mood disorders, later studies started to use the LH paradigm in order to investigate various aspects of psychological disorders and/or their treatments. For example, in one study, Bargai, Ben-Shaker, and Shalev (2007) found LH as a mediator in the relationship between violence and PTSD, and depression. In the same study, LH was also considered as a risk factor for prolonged exposure to violence, and therefore, the authors highlighted

the importance of empowerment as a therapeutic goal. In another study (McKeever et al., 2006), LH was found to be associated with childhood abuse and PTSD symptom severity of male Vietnam veterans. In their study, River, Borelli, Vasquez, and Smiley (2018) found that mothers' low self-efficacy and locus of external control predicted subsequent LH in their children, which also had an indirect effect on depressive symptoms over time. Furthermore, researchers also focused on the overlapping neurobiology of LH and PTSD (Hammack, Cooper, & Lezak, 2012) and depression (Maier & Seligman, 2016).

In addition to the clinical setting, other studies linked LH with difficulties in various contexts. Faulkner (2001) investigated the effects of LH in elder hospitalized individuals and found a strong association between LH and potential risk of retarded self-care performance. Chaney et al. (1999) focused on the effects of LH deficits in long-standing asthma and found that older adolescents and young adults specifically showed impaired problem solving following an LH manipulation. Other studies (e.g., Martinko & Gardener, 1982; Tayfur, Karapinar, & Camgoz, 2013) examined the relationship between LH and job dissatisfaction and turnover intentions.

**Laboratory-Induced LH and Treatment.** Klein and Seligman (1976) defined LH as a "laboratory model of depression in man" (p. 11) and their findings inspired researchers to implement an LH state to investigate effects of different therapeutic interventions in a controlled environment. That is, such laboratory environments enable control over the manipulations, and hence reduce the possible confounding effects (i.e., idiosyncratic characteristics of individuals).

An early study (Raps, Reinhard, & Seligman, 1980) tested the efficacy of Velten's mood-induction treatment technique in reversing performance-related deficits and decreasing the low mood in a group of individuals with clinical depression and a medical patient population who received LH training. The findings revealed that the technique decreased the low mood and performance deficits for both groups. Another study (Cemalcilar, Canbeyli, & Sunar, 2003) examined the effect of a simple cognitive therapy technique, which consists of reevaluation of failures of performance in a maze task through success feedback. The findings revealed the success of both the helplessness induction and the therapy technique. Ulusoy and Duy (2013) aimed to investigate the effects of a psychoeducation program on LH and irrational beliefs of children. Findings of the study suggested that the psychoeducation program was an effective technique

to decrease the irrational beliefs, but not LH. And one other study (Hooper & McHugh, 2013) compared the effectiveness of acceptance-based coping strategies (cognitive defusion and experiential avoidance) with a control group, to reduce the negative effects of LH induction tasks. The results showed that participants in the cognitive defusion group performed better than the other groups.

As can be seen from these studies, the LH paradigm provides a convenient framework to investigate the deficits related with stressful, negative, and uncontrollable life events, and efficacy of different treatment methods in reversing such deficits. Therefore, this model could serve as a controlled condition in clarifying whether EEI is effective in reducing LH.

## EMDR Therapy

EMDR is an evidence-based psychotherapy method for PTSD, and highly credited associations such as American Psychiatric Association (APA, 2004) and the WHO (2013) suggest EMDR as a treatment of choice. The procedure is based on the Adaptive Information Processing (AIP) model (Shapiro, 2001). Accordingly, the model suggests that new experiences are stored into existing memory networks after assimilation through an innate information processing system (Landin-Romero, Moreno-Alcazar, Pagani, & Amann, 2018). The model assumes that most psychopathologies are rooted in disturbing memories that are stored without being adequately processed at the time of the event and that remain unlinked and unintegrated from the available knowledge base (Shapiro, 2001). Therefore, they can easily be triggered by various internal and external stimuli, leading to experiences of emotional, cognitive, and physical symptoms (Landin-Romero et al., 2018; Solomon & Shapiro, 2008).

### EMDR's Eye Movement Component

During EMDR therapy, clients focus on aspects of the distressing memory while simultaneously moving their eyes from side to side (or experiencing bilateral stimulation, i.e., alternating taps or tones). Although the eye movement component was originally viewed with skepticism (e.g., Cahill, Carrigan, & Frueh, 1999; Lohr, Lilienfeld, Tolin, & Herbert, 1999), a large body of research has shown that eye movements have a number of unique effects which appear to contribute to treatment outcome (for a review, see Landin-Romero et al., 2018). For example, eye movements reduce the vividness and emotionality of unpleasant memories (e.g., Onderdonk & Van den Hout,

2016; Van Veen, Engelhard, & Van den Hout, 2016), decrease physiological arousal (e.g., Schubert, Lee, & Drummond, 2016), and appear to enhance cognitive flexibility (Kuiken, Bears, Miall, & Smith, 2002). No study has yet investigated whether EMDR can reverse the effects of laboratory-induced states, such as LH, and if so, whether eye movements contribute to this effect.

### EMDR Early Intervention

Unlike memories of past events, memories of recent life events have not been yet consolidated into the memory network, and their assimilation process is still ongoing. Interventions for a recent disturbing event must address the fragmented, disorganized, and less integrated quality of such memories. Early interventions differ from the standard EMDR protocol in which treatment effects are assumed to generalize to all parts of the memory.

Several different EEI protocols have been developed (see Luber, 2013). Despite sharing major commonalities, each protocol has unique elements. And there may be differences in when, how, and why each is implemented. A critical question is how soon after the traumatic event EMDR interventions can be provided (Shapiro & Laub, 2009). Since the question remains unanswered in the field, the current study could be considered as an attempt to find an answer to this critical question. Furthermore, although numerous studies have attempted to investigate the effectiveness and efficacy of various early intervention protocols, most were case studies, and there have been few randomized controlled studies (see Maxfield, 2018). In fact, despite APA's (2004) recognition of EMDR as an effective treatment method for recent traumatic events, EEI effectiveness was found in the 2018 NICE guidelines to lack sufficient empirical evidence (National Institute for Health and Care Excellence, 2018). In addition, little is known about the effects and mechanisms of these interventions. Therefore, the current randomized controlled study aimed to add to the body of knowledge, by examining whether an immediate EEI (specifically, R-TEP) would be effective in reducing lab-induced LH.

### The Recent Traumatic Episode Protocol

The R-TEP was developed by Shapiro and Laub (2008, 2014) in order to facilitate processing of a recent, ongoing traumatic episode (T-episode). More specifically, the authors postulated that as the intervention takes place before the experience is processed, consolidated,

and integrated into the existing memory network, R-TEP would facilitate both treatment of the distressed event's effects and prevent its accumulation of traumatic memories. In doing so, R-TEP focuses on multiple fragments of the T-episode, rather than focusing on only the initial event. Each fragment consists of disturbing sensory data, body sensations, emotions, and thoughts (points of disturbance [PoD]), and each PoD is processed using R-TEP's eight phases.

The protocol starts with the episode narrative, where the client is asked to narrate the traumatic episode out loud while simultaneously engaging in eye movements. Then, the client is asked to search for PoDs in a nonsequential way (Google search). As in the previous step, the Google search is also applied with continuous eye movement. After the search for PoDs, each disturbing fragment, with its four modalities (somatic, sensory, emotional, and cognitive) is fully processed with eye movements. The protocol provides a brief and rapid treatment, which requires at least two sessions (one session for follow-up).

## Method

### Procedure

The study was a between-subject experimental design, with four experimental groups and one control group. All eligible participants were randomly assigned to one of five groups. Participants in each of the four experimental groups engaged in unsolvable maze tasks, intended to induce LH. The first experiment group (LH + R-TEP) received a R-TEP protocol ( $N = 20$ ); whereas participants in the second group (LH + R-TEP-no-eye-movement) received a modified R-TEP procedure, which included all elements except for eye movements ( $N = 20$ ). The length of both conditions was 15 minutes. Although the remaining two experimental groups also completed unsolvable maze tasks, they did not receive any intervention. Participants in one condition (LH + Wait) waited 15 minutes (equal time as the R-TEP interventions) before taking the posttest ( $N = 20$ ), and the other group (LH + NoWait) completed the posttest immediately after the unsolvable maze task ( $N = 20$ ). Finally, the control group was given solvable versions of the same mazes ( $N = 20$ ). The dependent variable of the study was the total numbers of anagrams solved (TNAS).

One reason for the various experimental groups was to determine if the LH induction worked successfully. This was done by comparing the scores of those with solvable mazes (control group) with those who had unsolvable mazes and no intervention (LH

+ Wait, LH + NoWait). Second, as mentioned above, laboratory-induced LH state dissipates within 2 hours (Young & Allin, 1985). Therefore, to control for the passage of time and to confirm that the differences between groups were not due dissipation per se, the scores of the LH + Wait and LH + NoWait participants were compared.

The experiment was carried out in three phases. The first phase (described in the Participant section) was recruitment and selection. In the second phase, the participants were randomly assigned to one of five conditions. All the participants in all groups were first provided an example of a solvable maze to make sure that they understood the task. Participants then completed the maze task and their assigned treatment condition. In the final phase of the study, 15 six-letter anagrams were given to all participants as a posttest measure and TNAS was calculated for each participant. A debriefing was provided to all participants in the experimental groups, and they were informed that the mazes were unsolvable. The contact information of the researchers was also provided to the participants for any further questions or discomfort due to the applications.

The experimental procedures were administered and data collected by three volunteer graduate students. The data from the LH + R-TEP and LH + R-TEP-no-eye-movement groups were collected by a Europe EMDR Association-certified therapist. The remaining groups' data were collected by the two other graduate students, who were also supervised by the researchers. Independent sample  $t$  test results revealed that there were no significant differences in posttest results in terms of the experimenters ( $t = -1.60, p = .115$ ).

**Analog Treatment Conditions.** Prior to this study, a pilot study with 10 undergraduate students was conducted in order to determine the average duration necessary for desensitizing the individuals via R-TEP protocol. The criterion to end the sessions was based on participants' reports regarding their subjective units of disturbance (SUD) being zero. For a randomized control research, standardization is crucial. Therefore, with the help of a pilot study, the average time necessary in reversing the LH effects was determined, which was 15 minutes. This differs from the provision of clinical treatment in which clients address uncontrollable events, and the therapist is encouraged to be flexible regarding the time needed for treatment (Shapiro, 2001).

**Maze Task.** In order to induce an LH state, an unsolvable maze task, which was developed by Bulduk (1998), was used. The task consists of six mazes formed

**TABLE 1. Groups Included in the Research Design**

Groups	Name	N	Exercise Maze	Maze Task	Intervention	Duration of Experiment Manipulation	Outcome Measure
Experimental Group	LH + RTEP	20	Solvable	Unsolvable	R-TEP	15 minutes	Anagrams Task
Comparison Groups	LH + R-TEP-no-eye movements	20	Solvable	Unsolvable	Narrative Exposure (R-TEP without BLS)	15 minutes	Anagrams Task
	LH + Wait	20	Solvable	Unsolvable	Waiting	15 minutes	Anagrams Task
	LH + No Wait	20	Solvable	Unsolvable	No Wait	–	Anagrams Task
Control Group	Control Group	20	Solvable	Solvable	No Wait	–	Anagrams Task

Note. BLS = bilateral stimulation; LH = learned helplessness; R-TEP = Recent Traumatic Episode Protocol.

by lines, but to make the task unsolvable the lines between the starting and finishing points were disconnected. All the mazes were drawn on 30 × 20-cm red cardboards, and each maze specified the starting (“S”) and finishing (“F”) points. The participants were prevented from seeing the entire maze with the help of a second cardboard, which had a 0.5-cm-diameter hole at the center. Using the whole in this second card, they were asked to trace the lines between the starting and finishing points. For each maze task they had 1 minute to complete. The same mazes were given to the control group; only their mazes’ lines were not disconnected, which made the task solvable.

**Recent Traumatic Episode Protocol.** As an early EMDR intervention to reverse the effects of laboratory-induced LH, R-TEP protocol as described above was followed in this study. In the experiment, the T-episode was failure to solve the mazes, and therefore the participants were asked to narrate the episode out loud from the beginning of the event (entering the experiment room) till the end (being told to stop the trials by the researcher). Then, the participants were asked to search for PoDs in a non-sequential way (Google search). After the search for PoDs, each disturbing fragment was then processed, until the participant reported an SUD of zero. Shapiro and Laub (2008) offer a three-strategies approach (EMD narrow focus, EMDR wider focus, and EMDR broad focus) in order to facilitate processing, called Telescopic Processing. The narrow focused EMD processing in which the chains of association were limited to the event was chosen for this study.

**LH + R-TEP-No-Eye-Movement.** In this procedure, participants received the full R-TEP procedure with the eye movement component omitted. They were asked for their experience of the experiment (images, sensations, feelings, and thoughts) from the beginning (entering the room) till the end (being told to stop by experimenter), without engaging in eye movements. In other words, they first narrated the episode and then identified the most disturbing points of their experience (PoDs), without receiving any eye movements. Instead of EMD or EMDR processing of the PoDs, the participants were asked to imagine the PoDs and express their thoughts, feelings, and sensations regarding the disturbance. The condition also lasted for 15 minutes. Moreover, in order to eliminate any possible confounding related to the therapists, the EMDR therapists carried out both R-TEP and the R-TEP-no-eye-movement conditions.

## Measures

**Screening Measures.** The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to screen participants in accordance with exclusion criteria. The BDI is a 21-item scale that measures the severity of depression symptoms on a scale value 0 to 3. Higher scores indicate higher levels of depressive symptoms, and the scale provides a cut-off score. The inventory was adapted into Turkish by Hisli (1988, 1989), with resulting sufficient psychometric properties. Scores above 17 were accepted as an

indication of clinical depression (Hisli, 1988). The cut-off score for inclusion in the study was having a score of below 17.

A demographic information questionnaire was prepared by the researchers. The form included information regarding the participants' demographics (e.g., age, gender, education level), as well as their psychological treatment history and traumatic event experiences in the past 6 months, in order to identify participants who met the exclusion criteria.

**Outcome Measure: Anagrams Task.** In LH studies, to facilitate generalization of the LH state into posttest measures, the manipulation and posttest measures should function through the same mechanisms (Bulduk, 2002). Therefore, in the current study, an anagram-solving task was chosen as a postmeasure since both were performance-based tasks. In fact, anagrams are being used in LH studies (e.g., Cemalclar et al., 2003; Chaney et al., 1999). For this reason, in the current study 15 different six-letter, single-solution anagrams were presented for 6 seconds to the participants. They were asked to unscramble each anagram consecutively and the total number of correct answers was calculated for each participant.

## Participants

Study participants were 154 undergraduate psychology students, who were given extra credit in their introductory psychology course. They were provided with an online link to complete the screening measures and a form to arrange an appointment for the experiments. Of these 154 students, 100 met the inclusion criteria and were randomly assigned to one of the five conditions.

**Exclusion Criteria.** In order to eliminate any possible confounding factors related to individuals' current states, three exclusion criteria were set. More specifically, the LH model has been also linked to depression and used to explain depressive symptoms (Klein & Seligman, 1976; Peterson, Maier, & Seligman, 1993; Qian & Alvermann, 1995; Seligman & Schulman, 1986). Therefore, it would be difficult to distinguish the effects of an experimentally induced LH state from depressive symptoms. Consequently, those individuals who were already experiencing depressive symptoms were excluded from the study. For this reason, 36 individuals with high levels of depressive symptoms, as indicated by a score on the BDI of 17 or greater, were excluded from the study.

Similarly, in order to distinguish an experimentally induced helplessness state from real-life traumatic experiences, individuals who had been exposed to any traumatic event listed in a trauma checklist in the past 6 months were also excluded from the study ( $N = 12$ ). Finally, having a diagnosis of any psychological disorder and/or receiving either psychotherapy or drug treatment was another exclusion criterion study ( $N = 6$ ).

## Results

Results of the demographic information questionnaire showed that participants had a mean age of 21.87 (standard deviation [ $SD$ ] = 4.11), and 80% of participants ( $N = 80$ ) were female.

Posttest results (number of anagrams completed) was compared among the five groups (LH + R-TEP, LH + R-TEP-no-eye-movement, LH + Wait, LH + NoWait, and control group) by one-way analysis of variance (ANOVA) followed by a post hoc analysis, using Fisher's least significant difference (LSD). The ANOVA found significant differences among the groups,  $F(4, 1) = 10.92, p = .001$ . The LSD is the smallest difference between means that is significantly different at the  $p = .05$  level. In this study, the LSD was .37. The results of the analyses are presented in Table 2.

Participants who received the R-TEP procedure after being exposed to the unsolvable maze task performed significantly better than all other experimental groups. There was no significant difference between their performance and that of the control group who were given solvable mazes.

Participants who received LH + R-TEP-no-eye-movement solved significantly fewer anagrams than participants in the R-TEP group and those who received solvable mazes (control group). Their performance was significantly better than those who were given the unsolvable mazes and who waited before the anagram test (LH + Wait group), and no different than those who completed the anagrams immediately (LH + NoWait group). The results also revealed no significant differences in LH + Wait and LH + NoWait groups, indicating that whether or not the participants waited before the posttest appeared to have no effect on their anagram-solving performance.

## Discussion

There are three important findings in this study. First, results showed that R-TEP appeared to successfully

**TABLE 2. One-Way ANOVA Results Regarding the Differences of Groups in Anagram Performance**

	LH + R-TEP N = 20	LH + R-TEP-no-eye-movements N = 20	LH + Wait N = 20	LH + NoWait N = 20	Control Group N = 20	<i>F</i> (4, 95)	$\eta^2$
TNAS	9.65 <sup>a</sup>	7.20 <sup>b</sup>	5.80 <sup>b,c</sup>	5.10 <sup>c</sup>	8.85 <sup>a</sup>	10.92*	.31

Note. ANOVA = analysis of variance; LH = learned helplessness; R-TEP = Recent Traumatic Episode Protocol; TNAS = total number of anagrams solved.

Means sharing a subscript are not significantly different ( $p < .05$ ). \*  $p < .001$ .

reverse the induced LH state. Second, eye movements appeared to be essential for this effect. Third, it was possible to effectively provide R-TEP immediately following the stressful event.

### Learned Helplessness

The results of the study revealed that an LH state was successfully induced by unsolvable mazes. The experimental groups who did not receive any intervention (LH + Wait and LH + NoWait) performed significantly worse on anagrams than all the other groups. As in the original studies of LH on humans, repeated exposure to an unsolvable situation creates temporary LH effects. Moreover, as waiting prior to posttest showed no significant difference from not waiting, this finding implies that the LH state did not dissipate during the time that elapsed between pre- and posttest.

According to Seligman (1975), LH causes cognitive, motivational, and emotional deficits in responding to stressful situations. Although distinguishing cognitive deficits from motivational deficits based on the tasks performed is problematic (Mikulincer, 1994), LH studies reveal a reduction in the performance of participants who were exposed to uncontrollable stressful situations (e.g., Cemalcılar et al., 2003; Hooper & McHugh, 2013; Ulusoy & Duy, 2013). Accordingly, the decrease in anagram-solving performance of those who were in the LH groups and did not receive R-TEP suggests that the induced LH state produced some deficits either or both in cognitive and motivational levels.

### The Effectiveness of R-TEP in Reversing Induced LH State

In terms of the main aim of the current study, the results revealed that R-TEP was effective in reversing the negative effects of the LH state, as the participants in the R-TEP group showed a similar performance to the control group (those who did not receive an LH inducement task) on the anagram task. Since one

of the aims of the study was to answer the question of whether an immediate intervention with EMDR would be helpful, the findings showed that applying R-TEP immediately after the inescapable event (being exposed to unsolvable maze task) appeared to prevent the negative effects of LH. It is possible that R-TEP may facilitate the information processing system to adapt negative experiences.

### The Role of Eye Movements

The results also suggest that the eye movement is an important element for EMDR treatment, as the R-TEP-no-eye-movement group had significantly lower scores than the R-TEP group. The findings of this study add to the literature which has demonstrated that eye movements reduce memory vividness and emotionality (Onderdonk & Van den Hout, 2016; Van Veen et al., 2016) and that they may facilitate cognitive flexibility (Kuiken et al., 2002). The findings of the current study provide evidence that eye movements are a necessary component of EMDR in reversing the cognitive, motivational, and/or emotional deficits induced by LH.

### Narrative Exposure

The R-TEP-no-eye-movement condition was essentially a narrative exposure intervention. Participants were asked to engage in imaginal exposure by focusing on the disturbing points and then to express related thoughts, sensations, feelings, and senses. Therefore, they were provided an opportunity to process the disturbances via expressing themselves. The R-TEP condition was significantly superior to the exposure condition in reducing the negative effects of the induced LH state. The experimental comparison of conditions in this study highlights the differences between the two kinds of processing and reveals the difference in outcome.

## Possible Clinical Relevance

Reactions to traumatic events include cognitive impairments, specifically in declarative memory (Bremner et al., 1993, Bremner et al., 1995) and in attention (e.g., Vasterling, Braailey, Constants, & Sutker, 1998). In a study on the effects of recent trauma, Brandes et al. (2002) found that a recent event impaired attention. Therefore, the apparent benefit shown in this study, of R-TEP eliminating LH-related cognitive deficits, may have clinical relevance. It may be that R-TEP facilitates reversing/diminishing such impairments in individuals who were exposed to recent events by facilitating adaptive information processing. In fact, Kuiken et al. (2002) found that EMDR enhanced cognitive flexibility in traumatized individuals despite the negative events of stress. Similarly, in the current experiment, participants who received R-TEP performed equally to those who completed solvable mazes, in other words, to those who were not exposed to a stressful situation, suggesting lack of a cognitive deficit or impairment.

## Limitations

The findings of the study showed that early EMDR intervention using R-TEP successfully reversed the laboratory-induced negative effects of an induced LH state. Since the study aimed to simulate a real-life event (traumatic or disturbing life event) in a laboratory environment, whether or not the findings can be generalized to real-life circumstances requires further clinical research. Likewise, the current study included only healthy participants in order to eliminate any possible confounding effect of the participants' personal history. Therefore, future study could also include participants with a trauma history.

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