MASTERTHESIS

Exploring the mechanism underlying the working memory account of EMDR:

The effect of fading in and fading out of negative and arousing images on emotionality, vividness, completeness and detail recall of traumatic memories

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PREFACE

This thesis is based upon a study conducted at the Department of Clinical and Health psychology from the Utrecht University in the Netherlands, from January to June 2010.

Both authors were interested in Eye Movement Desensitisation and Reprocessing (EMDR) as a psychological intervention for posttraumatic stress disorder (PTSD). Therefore, we were motivated to study the fading in and fading out of traumatic images as an underling mechanism of EMDR, under supervision of Prof. Dr. Marcel van den Hout. It was interesting and instructive to conduct an experimental study in the laboratory, as opposed to our bachelorthesis which was accomplished with questionnaires.

Throughout the whole process of conducting this masterthesis, we as researchers worked in good cooperation. Furthermore, we would like to express our gratitude to our supervisor Prof. Dr. Marcel van den Hout. His support and advice helped us much in accomplishing our masterthesis.

Finally, we wish to express our greatest thanks to our family and friends who have supported us.

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ABSTRACT

Eye Movement Desensitization and Reprocessing (EMDR) is a psychological intervention for the treatment of posttraumatic stress disorder (PTSD). Currently, the working memory account gives the best explanation for the functionality of EMDR. This account states that conducting a dual task, mostly horizontal eye movements, while retrieving a traumatic memory will make this memory less emotional, vivid and complete. It was hypothesized that the fading in and/or fading out of traumatic images are in itself causally contributing to the reduced emotionality, vividness and completeness of the recalled memories. This experimental study (N=27) examined the fading in (the image starts vague and gets more clear) and fading out (the image starts clear and gets more vague) of traumatic images as an underlying mechanism of the working memory account. By using a within-subject design, participants engaged in three conditions (fading in, fading out and control) in which they had to rate their memories on emotionality, vividness and completeness. A detail recall test was also conducted for all conditions. No significant differences were found between the three conditions on emotionality, vividness and completeness. However, a trend was found indicating that fewer details were recalled in the fading out condition. Based on these results, the hypothesis that fading in or fading out will result in diminishing emotionality, vividness and completeness was not confirmed. Shortcomings of the experiment and implications for future research are addressed.

Keywords: EMDR, working memory account, fading in, fading out, traumatic image

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INTRODUCTION

Eye Movement Desensitization and Reprocessing (EMDR) is a psychological intervention for the treatment of posttraumatic stress disorder (PTSD). Independent meta-analyses indicate that the effects of EMDR are substantial and may be as effective as cognitive behavioral therapy (CBT; American Psychiatric Association, 2004; Bisson, Ehlers, Mathews, Pilling, Richards & Turner, 2007; Davidson & Parker, 2001; Van den Hout, Engelhard, Smeets, Hornsveld, Hoogeveen, de Heer et al., 2009). Shapiro (2001) originated and developed EMDR and her protocol is currently still used. Following this protocol, the therapist asks the client to hold a distressing memory in mind along with accompanying emotions and a negative cognition associated with that memory. The therapist concurrently provides some form of bilateral stimulation. Most commonly, horizontal eye movements are elicited by having the client follow a repetitive side-to-side motion of the therapist's index finger. A set of 20 or more eye movements is performed while the memory is held in mind. The client then reports current sensations, cognitions, and emotions. Sets are repeated until the client reports minimal distress associated with the memory. The therapist then guides the client to replace the negative cognition with a client-generated positive one (Gunter & Bodner, 2008; Shapiro, 2001). A wide range of research shows that the eye movements during the recall of aversive memories reduce their vividness and emotionality (Andrade, Kavanagh, & Baddeley, 1997; Barrowcliff, Gray, Freeman, & MacCulloch, 2004; Gunter & Bodner, 2008; van den Hout, et al., 2009; van den Hout, Muris, Salemink, & Kindt, 2001; Kavanagh, Freese, Andrade, & May, 2001; Kemps & Tiggemann, 2007; Maxfield, Melnyk, & Hayman, 2008).

According to Gunter & Bodner (2008) there are three accounts that try to explain how eye movements reduce the vividness and the emotionality of unpleasant autobiographical memories, namely the investigatory-reflex account, the increased hemispheric communication (IHC) account and the working memory account (Gunter & Bodner, 2008). According to Gunter & Bodner (2008), the working memory account gives the best explanation for the functionality of EMDR (see Gunter & Bodner, 2008 for more information on the other two accounts). The working memory account posits that retrieving memories during EMDR requires working memory (WM) resources that are limited. During recall, memories become 'labile' and experiences during recall effect the reconsolidation of the memories (Baddeley, 1998). Overtaxing the working memory with a secondary task while retrieving memories will affect the reconsolidation of the recalled memories because fewer working memory resources will be available for the recall and therefore, it is more difficult to focus on the memory. For this reason, the recalled memories will be experienced as less emotional and less vivid and will be stored likewise in the long-term memory (Gunter & Bodner, 2008; Van den Hout et al., 2009; Van den Hout, Engelhard, Rijkeboer; Koekebakker, Hornsveld, Toffolo et al., 2010). The

horizontal eye movements in the process of EMDR can be seen as the secondary task overtaxing the working memory and in this way, reduce the emotionality and vividness of traumatic memories. Several studies have indicated that not only horizontal eye movements can induce this effect and that for example vertical eye movements, drawing complex figures or repeating presented words can be equally effective (Gunter & Bodner, 2008).

Besides the diminishing vividness and emotionality as a result of overtaxing the WM, Gunter & Bodner (2008) also found that EMDR reduces completeness of the image held in mind. This is in line with clinicians' observations that traumatic events seem less complete during eye movements, such that details are lost, or the metal images seem fragmented or smaller (Shapiro, 2001). Furthermore, a study of Lee, Tayler and Drummond (2006), pointed out that detaching oneself from the trauma image during EMDR helps clients to process their traumatic memories in an emotional detached fashion and reduces symptoms of PTSD. In this study a coding system was used to measure detachment. Detachment was coded for when participants said things that indicated participants were not reliving the trauma during EMDR, but rather regarded it as a past experience. Distancing encompassed participants said thinks like: 'the faces seem all blurred', 'it is harder to see the knife', 'it does not seems so real'.

Although this was not an experimental study, the above findings implicate that the images that are held in mind during EMDR seem to fade in different ways: images tend to get less emotional, vivid, complete, detailed or sometimes seem to totally vanish. This fading can be explained by the dual focus of attention process that takes place during EMDR (Lee et al., 2006). That is, participants need to be simultaneously aware of the trauma material and also of being in the present. The dual focus of attention concept refers to maintaining an optimal balance between a focus on the traumatic material and a sense of not being part of the trauma (Shapiro, 2001; Lee, et al., 2006). This means that attention is constantly taken away from the trauma image to being in the present (in the therapists office), and/or vice versa, from the present back to the trauma image (Gunter & Bodner, 2008). Shifting attention from the image of the trauma to the present may result in fading out of the memory, while shifting attention from the present to the image of the traumatic event, may result in fading in of the memory. Both processed may play a role in EMDR, reducing the emotionality, vividness and completeness of traumatic memories.

As poined out earlier, overtaxing the working memory with a secondary task while retrieving memories will reduce the emotionality, vividness and completeness of the recalled memories. The purpose of this study is to examine if the fading in and fading out of traumatic images during this recall is in itself causally contributing to the reduced emotionality, vividness and completeness of the recalled memories. The hypothesis that follows from the above reasoning is that fading in or fading out, or both, underlie the working memory account, and

result(s) in diminishing emotionality, vividness and completeness of traumatic memories. To our knowledge this is the first study that examines the fading of mental images in EMDR.

Several studies in cognitive neuroscience indicated that there are resemblances between mental imagery (which occurs during EMDR) and visual perception (which occurs during looking at a picture). For example, previous studies have documented functional similarities between visual mental imagery and perception as well as corresponding activated brain regions (Borst & Kosslyn, 2008; Ganis, Thompson & Kosslyn, 2004). So, in this experiment, we try to induce an analogue 'traumatic' memory by presenting the participants with a highly negative and arousing picture. The EMDR procedure was operationalised by showing this picture, while it was faded in (starts vague en gets more clear) or faded out (starts clear and gets more vague), and it is examined if the memory of the picture became less emotional, less vivid and less complete as a result of the fading. The effects of fading in and fading out conditions were compared with a control condition in which participants had to read an article about an entirely different subject. We did not use existing autobiographical memories of the participants because of the inability to manipulate the fading in and fading out of these images. It was predicted that, if the original picture was presented under fading in and/ or fading out condition, later recall of that picture would be less emotional, less vivid and less complete.

METHOD

Participants

A total of 27 undergraduate students (18 women) from Utrecht University participated for course credit or a financial reward. Their mean age was 22.7 (*SD* = 4.0). The participants were recruited through advertisements on campus of the Utrecht University.

Design

The experiment constituted a within-subjects 2 X 3 ANOVA (Time vs. Condition), that was conducted for the three dependent variables: emotionality, vividness and completeness.

Measures

In order to obtain a pre and post treatment measure, participants were asked to recall the memory of the picture twice during each condition of the experiment. Participants were then asked to rate the emotionality, vividness and completeness of the memory on a 100 mm Visual Analogue Scale (VAS) that ranged from 0 (not negative, not vivid, not complete) to 100 (very

negative, very vivid, very complete). These are the same measures that were used by Gunter & Bodner (2008).

Participants were also presented with a detail-recall list. For each picture shown in the experiment, participants had to indicate for 20 details whether they saw it in the picture or not. Half of these details were truly in the picture and half of the details were made up. Each correct answer was given one point.

At last, participants were asked about their expectations of the experiment. An open-ended question was asked about whether they had guessed the purpose of the experiment. Two points were given for a completely correct answer, one point for a partially correct answer and no points for a completely wrong answer. A closed-question was asked to indicate whether participants thought that the blurred pictures sharpened their memories, made their memories less sharp or that they did not know.

Materials

Pictures

Three highly arousing pictures (number 9400, 9410 & 9921) were selected from the International Affective Picture System (IAPS; Lang, Bradley & Cuthberth, 1999). The selection was based on high arousal scores and low scores on valence. Furthermore, a pilot study pointed out that people were most affected by pictures showing other people in dreadful situations so this was also included in the selection criteria. To make a selection from the remaining pictures that met the above criteria, only the pictures with people helping each other were selected. In this way, three pictures with a related content were included.

Hardware

A HP pavilion dv6500 notebook pc with a 15.4 inch screen with a 1280x800 resolution was used to conduct this experiment.

Software

Adobe Premiere Pro CS4 was used to adjust the pictures to create the fading in and fading out conditions. The pictures were accommodated with a minimum of 20% blur and a maximum of 70% blur. In the fading in condition the pictures faded in from 70% to 20% blur in 5 seconds. In the fading out condition the pictures faded out from 20% to 70% blur in 5 seconds. The pictures were not shown in full sharpness in these conditions, because this may result in learning effects and may strengthen the memories of the shown pictures.

Windows media player was used to show the pictures in all three conditions.

Procedure

After participants gave their informed consent, they were presented with all three conditions in a randomised order. At the beginning of all three conditions, participants were presented with a different highly negative and arousing picture for 10 seconds to induce a minor traumatic memory. Next, participants were offered a black screen for 20 seconds, so a memory of the picture was consolidated into the long-term memory. After this, participants were asked to recall the memory and to rate the emotionality, vividness and completeness of that memory on a VAS (0-100). Participants were then presented with one of the three conditions: fading in, fading out or the control condition. During the fading in condition, participants were presented with the same picture while it was faded in twelve times from 70% to 20% blur, within 5 seconds per fading occasion. In the fading out condition, participants were presented with the same picture while it was faded out twelve times from 20% to 70% blur, within 5 seconds per fading occasion. In the control condition, participants had to read an article about a new mail delivery system which took about the same time as the fading in and fading out condition. After each condition, participants were asked to recall the memory of the picture when they saw it for the first time, and rate its emotionality, vividness and completeness on a VAS (0-100). After each condition participants had a 60 seconds break before the next condition was started.

After the participants completed all three conditions they were presented with a list of 20 details for each picture they saw in the experiment. Half of these details were truly in the picture and half of these details were made up. Participants had to indicate for each detail if they saw it in the picture or not. This was to investigate whether the fading in and/or fading out influenced the detail recall of the memory.

Finally, participants were asked about their expectations about the purpose of the experiment, to exclude that demand affected the results. First, an open-ended question was asked about whether they had guest the purpose of the experiment. Next, by the means of a closed-question, participants indicated whether they thought that the blurred pictures sharpened their memories, made their memories less sharp or that they did not know.

The protocol that was used by the researchers to instruct the participants during the experiment is included in appendix A

RESULTS

Emotionality

Table 1 presents the means and standard deviations on emotionality for the three conditions.

Table 1. Emotionality scores on pretest, posttest and pretest minus posttest, for the fading in, fading out and control condition

Condition	Fading-in		Fading-out		Control	
	M	SD	M	SD	M	SD
Pretest	67.5	17.9	69.3	12.7	65.1	14.0
Posttest	63.3	17.6	63.0	15.3	59.5	15.7
Pretest minus posttest	4.2	11.2	6.4	10.7	5.6	8.1

A within-subjects 2 X 3 ANOVA with time (pretest and posttest) and condition (fading-in, fading- out, control) was conducted for emotionality scores. The partial eta squared (η_p^2) is also reported as an indication of effect size. The main effect of condition (fading-in, fading-out, control) was not significant: $F(2,52) = 0.65$, $p = 0.53$, partial $\eta^2 = 0.02$. The main effect of time (pretest and posttest) was significant: $F(1,26) = 24.02$, $p = 0.01$, partial $\eta^2 = 0.48$ and indicated that emotionality scores decreased over time. There was no significant interaction between condition and time: $F(2,52) = 0.31$, $p = 0.73$, partial $\eta^2 = 0.01$.

Vividness

Table 2 presents the means and standard deviations on vividness for the three conditions.

Table 2. Vividness scores on pretest, posttest and pretest minus posttest, for the fading in, fading out and control condition

Condition	Fading-in		Fading-out		Control	
	M	SD	M	SD	M	SD
Pretest	71.1	17.3	71.1	15.0	69.4	18.0
Posttest	64.5	20.4	60.3	23.6	55.2	20.5
Pretest minus posttest	6.6	13.7	10.7	18.2	14.3	21.2

The 2 X 3 ANOVA revealed no main effect for condition (fading-in, fading-out, control): $F(2,52) = 1.83$, $p = 0.17$, partial $\eta^2 = 0.07$. There was a significant main effect of time (pretest and posttest): $F(1,26) = 23.190$, $p = 0.01$, partial $\eta^2 = 0.47$, that indicated that vividness scores

decreased over time. There was no significant interaction between condition and time: $F(2,52) = 1.36$, $p = 0.27$, partial $\eta^2 = 0.05$.

Completeness

Table 3 presents the means and standard deviations on completeness for the three conditions.

Table 3. Completeness scores on pretest, posttest and pretest minus posttest, for the fading in, fading out and control condition

Condition	Fading-in		Fading-out		Control	
	M	SD	M	SD	M	SD
Pretest	70.0	17.0	69.2	20.4	71.4	18.0
Posttest	64.2	21.8	59.9	23.9	63.0	17.4
Pretest-posttest	5.8	18.3	9.3	15.7	8.5	16.2

There was no main effect of condition (fading-in, fading-out, control): $F(2,52) = 0.44$, $p = 0.65$, partial $\eta^2 = 0.02$. The main effect of time (pretest and posttest) was significant: $F(1,26) = 19.63$, $p = 0.01$, partial $\eta^2 = 0.43$ and indicated that completeness scores decreased over time. There was no significant interaction between condition and time: $F(2,52) = 0.31$, $p = 0.73$, partial $\eta^2 = 0.01$.

Detail recall

Table 4 shows means and standard deviations on details recall for the three conditions.

Table 4. Correct detail recall per condition

Fading-in		Fading-out		Control	
M	SD	M	SD	M	SD
14.5	1.9	13.4	2.3	14.6	2.1

To explore the detail recall in each condition, a within-subjects one-way ANOVA was conducted. There were no significant differences in the recall of details in the three conditions (fading-in, fading-out, control): $F(2,52) = 2.71$, $p = 0.076$, partial $\eta^2 = 0.094$, but the results indicated a trend. To further explore this trend, paired samples T-tests were conducted. However, no significant difference in detail recall was found comparing the fading in and fading out condition: $t = 1.91$, df = 26, $p = 0.068$, comparing the fading in and control condition: $t = -0.07$, df = 26, $p = 0.095$ and comparing the fading out and control condition: $t = -2.02$, df = 26, $p = 0.054$. The graph below shows the number of details recalled for the three conditions.

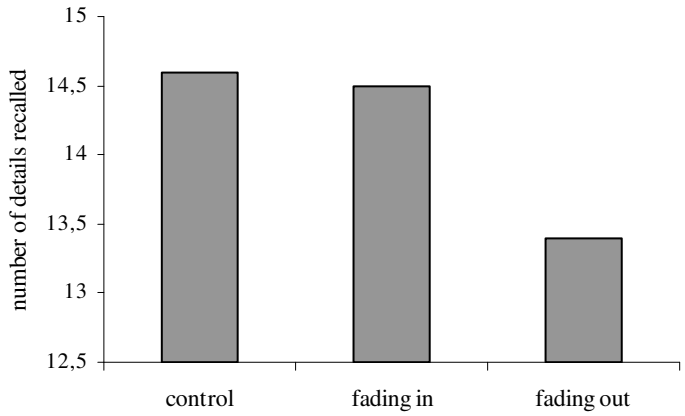

Figure 1. Mean number of details recalled for the three conditions

Expectancies

Regarding the experimental demand two questions were asked. First, an open-ended question was asked about whether participants had guessed the purpose of the experiment. The inter-rater reliability was determined by calculating Cohen's kappa, which is an indication of the degree of agreement or consensus among raters. The answers were scored by two researchers, on the following three categories: completely wrong, partially right and completely right. The inter-rater reliability of the scoring of the open-ended question was acceptable (Cohen's kappa = 0.65). 78% of the participants were completely wrong, 22% of the participants were partially right and none of the participants were completely right in their prediction of the purpose of the experiment.

Second, a closed-question pointed out that 14 participants declared that blurring the pictures sharpened their memory, 11 participants declared that blurring the pictures made their memories less sharp and 2 participants reported that they did not notice a difference or that they did not know.

DISCUSSION

The results of the experiment indicated that the fading in, fading out and control condition did not differ significantly in their effects on the emotionality, vividness and completeness measures. There was a significant effect of time, which indicated a decrease of these scores over time. There was no interaction effect of condition and time. Based on these results, we conclude that although the scores on emotionality, vividness and completeness decreased over time, this can not be assigned to the effect of the fading in and fading out conditions, because the scores also decreased in the control condition. This indicates that emotionality, vividness and

completeness decreased as a result of simply the passing of time, which probably is the result of natural recovery and not the experimental manipulations in this study. It is also possible that the control condition was not well designed. At the end of the discussions this option will be further addressed. Overall, the results do not support our hypothesis that the fading-in and/or fading-out of images are an underlying mechanism of the working memory account of EMDR. This subsequently indicates that we did not find any evidence that the fading of images can be explained by the dual focus of attention process that takes place during EMDR (Lee et al., 2006). This concept refers to maintaining an optimal balance between a focus on the traumatic material and a sense of not being part of the trauma (Shapiro, 2001; Lee, et al., 2006), whereby attention is constantly taken away from the trauma image to being in the present (in the therapists office), and/or vice versa, from the present back to the trauma image (Gunter & Bodner, 2008).

A potential deviation from these null results were the findings on the detail recall measure which indicated a trend. Namely, that fewer details were recalled in the fading out condition in comparison to the control condition. Although this result must be interpreted with great caution, it is in line with our theory that the fading out of traumatic memories may be an underlying mechanism of the working memory account of EMDR. An explanation of why the fading out might diminish the traumatic memories is given by a study of Lee, et al. (2006) who pointed out that detaching oneself from the trauma image during EMDR helps clients to process their traumatic memories in an emotional detached fashion and reduces symptoms of PTSD. This corresponds to the fading out condition, where images were presented sharp at first and were then slowly blurred. In this way, participants were literally distanced from the image.

To our knowledge, this is the first study to examine the effects of fading images on traumatic memories. Logically there are substantial limitations to this study. One of the main limitations is the within-subjects design. In this design, the participants were presented with all three conditions. In our opinion, this biased the results in two ways. First, the three different conditions/images could have been mingled in the memories of the participants during the experiment, which could account for the fact that no differences were found between the conditions. More time between the different conditions could probably solve this problem. Second, the researchers observed that participants got bored throughout the experiment. Most likely, this was a result of repetition: during the three conditions, participants were asked to watch five films and fill out the VAS-scales for emotionality, vividness and completeness six times. Participants tended to fill out the VAS-scales with less care and attention throughout the experiment. This while attention was one of the main factors in the theory, which states that the effect of the fading of images can be explained by the dual focus of attention process that takes place during EMDR (Lee et al., 2006). Attention is constantly taken away from the trauma

image to being in the present and/or vice versa, from the present back to the trauma image (Gunter & Bodner, 2008). These two effects could have biased the results, so that no differences were found between the conditions of fading in, fading out and the control condition.

Another limitation of the study could be that the constructs of emotionality, vividness, and completeness are too subjective. It is possible that participants ascribe different meanings to these constructs, which may affect the validity of the experiment. This reasoning is supported by the results that were found using the detail recall list, which is a more objective measure. However, correlation analysis indicated that emotionality, vividness and completeness are three different constructs (see appendix 1 for the correlation analysis), and other authors (Gunter & Bodner; van den Hout, et al., 2009) did found effects of their manipulations on these constructs. This effect could also be explained by the above mentioned shortcomings of the within-subject design of the study.

Moreover, the images that were used in the experiment might have been unsuitable to induce a minor traumatic memory. Observations of the researchers suggested that participants found the images rather shocking, but they were not personally or emotionally touched by them. This seems essential for creating a traumatic memory. When a traumatic memory was not conducted in the first place, it is logical that no effects of fading in and fading out were found. In future research, it might be more appropriate to present people with more personal relevant pictures or to show them motion pictures to induce a trauma. Moving images supported by sound may get participants more personally involved. This is in line with findings of a review by Holmes & Bourne (2008), who outline the possibilities of inducing and modulating traumatic memories by using the trauma film paradigm. Typically, the basic methodology in recent trauma film studies involves participants complete a raft of baseline measurements (‘pre-film measures’) to check for pre-existing vulnerabilities or trait biases, as well as state levels of certain variables, before viewing a short (8–12-min) film depicting traumatic events (e.g. scenes of injury or death). The trauma film paradigm can induce analogue PTSD-like symptoms, namely intrusions, fear, avoidance, and arousal). These findings support the assumption that the trauma film paradigm provides a useful analogue to real life trauma. In future research the trauma film paradigm should be used. After participants have seen a traumatic film, they might be asked which moment/image of the film was the most intense, frightening or emotional to them. Later, participants can be presented with this particular image in the fading in and fading out condition. It is also possible that researchers use the same image for all participants. Consequently, the study has more resemblances with real trauma experience and the EMDR procedure, wherein the client is asked to go back to the worst moment/image of the traumatic memory and to concentrate on that specific moment (Shapiro & Maxfield, 2002).

Furthermore, the time that the images were presented (10 seconds) and the time participants got to consolidate the images into a memory (20 seconds) might have been too short to induce a traumatic memory. Additionally, the presentation time of the fading in and fading out condition might also be to short and the speed by which the images were blurred might have been tot fast or to slow. The fading in and fading out conditions resemble one EMDR session, while some people need more sessions for EMDR to be effective (Shapiro, 2001). The same could be true for this experiment. So, future research could extend the presentation time of the images to increase the possibility that a traumatic memory is formed, and to repeat de fading in and fading out session several times to resemble the EMDR procedure more closely. However, another option for future research is to examine people's experiences with EMDR. These people could be asked how they experienced the alteration of their memories through EMDR. An interview or questionnaire could be constructed to find out how the blurring of memories is experienced during EMDR. Furthermore, the material of this study could be presented to these individuals to trace if it has any resemblance with their own experiences. This way, a clearer concept of fading of mental images during EMDR could be determined.

The control condition is the last limitations of this study. Overall, the results indicated a decrease of emotionality, vividness and completeness in all three conditions over time. This means, that despite possible learning effects of being confronted with the same picture more than once in the fading in and fading out condition, the memory of the picture decreased in these conditions. This leads to the assumption that fading in and fading out probably had an effect, but that the problem lies in the control condition where the same effect was found. It is possible that the control task was to distracting and therefore, the traumatic memory decreased. Future research should use a less cognitive demanding control task. A suggestion is to let the participants go on with their daily lives in the control condition, and ask them to come back after a certain period of time to fill out the posttest. An advantage of this approach is that this procedure is more in line with real life, so it betters the validity of the study. On the other hand, there is no control over the activities participants undertake between pretest and posttest, so this could suppress the reliability of the study.

The strengths of this study were the statistical power that was achieved by the within-subject design in combination with the number of participants, and the fact that the depended variables were separate construct as was pointed out by a correlation analyse (see appendix B.) In conclusion, this study did not yield many results, but is has rendered much implications for further research on fading in and fading out of traumatic images as an underlying mechanism of the working memory account of EMDR.

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APPEDIX A. PROTOCOL OF THE EXPERIMENT

Instructie onderzoek

"Dit onderzoek gaat over het verwerken van visuele informatie. Het zal ongeveer 20-25 minuten duren. Per onderdeel krijgt je steeds voldoende instructies, zodat je weet wat er van je wordt verwacht. Je krijgt zo dadelijk een aantal akelige foto's te zien. Mocht je zeer gevoelig zijn voor akelige beelden dan raad ik je aan om niet deel te nemen aan dit experiment."

Als de pp vraagt hoe heftig de precies foto's zijn of wat er op de foto's staat vertel hem/haar dan het volgende:
"Ik kan je niet precies vertellen wat er op de foto's staat, want daarmee zou ik je reacties op het experiment kunnen beïnvloeden en dat is niet de bedoeling. Het gaat om het soort beelden dat ook regelmatig te zien is op het nieuws of in oorlog- en rampenfilms."
Bij vragen over hypothesen:
"Daar kan ik nu niet precies op ingaan. Na het onderzoek kan ik je meer vertellen over de bedoeling van dit onderzoek en we kunnen je na het onderzoek op de hoogte brengen van de resultaten. Daarvoor kan ik je e-mail adres noteren."
Schrijf deze gegevens eventueel op het aftekenformulier.

Toestemming voor deelname aan het onderzoek (informed consent)

"Als je zeker weet dat je mee wilt doen aan het onderzoek, dan heb ik je toestemming nodig. Deze kun je geven door je naam en handtekening op dit formulier te schrijven. Lees het even rustig door."

Wanneer de pp wil deelnemen aan het onderzoek laat deze dan het informed consent formulier tekenen.

Praktische zaken

"Voordat we beginnen met het experiment wil ik graag nog wat dingen weten. Ten eerste wil ik graag weten of je geld of een half ppu wilt als beloning voor je deelname?"

Noteer welke beloning de pp wil op het proefpersoonformulier en aftekenformulier.
Noteer ook het geslacht van de pp op het proefpersoonformulier.

"Wat is je leeftijd?"

Noteer de leeftijd van de pp op het proefpersoonformulier.
Als deze gegevens zijn genoteerd kan het experiment beginnen.

Instructie VAS schaaltjes

"Tot slot nog wat instructie bij het invullen van de vragen tijdens het experiment. Er zal je meerdere keren worden gevraagd een aantal vragen te beantwoorden. Deze zien er als volgt uit."

Toon de deelnemer een formulier met de VAS schaaltjes.

"Hierbij wordt je gevraagd op een schaal van 0 tot 100 een score te geven over hoe emotioneel, levendig en compleet je herinnering is aan de foto is die je te zien hebt gekregen is. Is dit duidelijk of heb je nog vragen."

Leg de pp eventueel uitgebreider uit hoe deze de VAS schaaltjes ingevuld moeten worden.

"Oké, dan kunnen we gaan beginnen met het onderzoek. Houd altijd in je achterhoofd dat je vrijwillig mee doet aan dit onderzoek en dat je op elk moment mag stoppen. Is alles duidelijk voor je? Heb je nog vragen?"

"Zou je je jas uit willen doen en je mobieltje uit willen zetten? Bedankt."

Het experiment

"Het experiment gaat nu beginnen. Ik zet even de dingen klaar op de computer, oké?".

Controleer conditievolgorde en de filmpjes.

Hierna worden de instructies voor de condities chronologisch gepresenteerd

1. Fading-in conditie (verscherpen)

! Start 60 seconden na afloop van de nameting van de vorige conditie !

a) Fading-in-foto

"Je krijgt zo meteen een foto te zien en daarna een zwart scherm. In totaal duurt dit ongeveer een halve minuut. Oké, we gaan beginnen."

Start het eerste deel van het filmpje (de foto 10 sec. en een zwart scherm 20 sec.).

"Oke, dat was het".

Draai de laptop weg van de pp naar jezelf, om de pp niet af te leiden en zodat je het volgende filmpje kunt klaarzetten.

b) Fading-in-voormeting

Geef de pp de drie VAS schaaltjes van de voormeting (emotionaliteit, levendigheid en compleetheid) van de fading-in conditie.

"Kun je nu terugdenken aan de foto, van de - brandweer met slachtoffer / man met kind / soldaten - die je zonet hebt gezien en dan de vragen invullen."

Zet ondertussen het fading-in filmpje goed.
Neem de VAS schaaltjes in, waarop de antwoorden van de voormeting staan.

"Bedankt."

c) Fading-in-filmpje

"Okee, zo meteen krijgt je een filmpje te zien. In totaal duurt dit filmpje ongeveer een minuut. Oké, we gaan beginnen."

Start het tweede deel van het filmpje (de foto gaat nu 12 keer gedurende 5 seconden van onscherp naar scherp: totaal 60 sec). Het filmpje stopt vanzelf, het beeld is dan zwart. Draai de laptop weg van de pp naar jezelf, om de pp niet af te leiden en zodat je het volgende filmpje kunt klaarzetten.

"Oke, dat was het".

d) Fading-in-nameting

"Ik ga je zo dadelijk opnieuw vragen terug te denken aan de foto - van de brandweer en slachtoffer / man met kind / soldaten - zoals je deze voor het eerst hebt gezien. Het is dus de dat je terug denkt aan de foto toen je deze voor het eerst zag, en niet aan het filmpje dat je zonet hebt gezien. Begrijp je wat ik bedoel?"

Wacht enkele seconden tot de pp antwoord geeft op je vraag of bevestigd door ja te zeggen of te knikken.

Geef de pp de drie VAS schaaltjes van de post-test (emotionaliteit, levendig en compleet) van de fading-in conditie .

"Kun je dan nu terugdenken aan de foto van de - brandweer met slachtoffer / man met kind / soldaten - zoals je deze voor het eerst hebt gezien en de vragen invullen?"

Laat de pp de VAS schaaltjes invullen en neem deze in.

"Bedankt, we gaan nu naar het volgende onderdeel van het onderzoek."

2. Fading-out conditie (vervagen)

! Start 60 seconden na afloop van de nameting van de vorige conditie !

a) Fading-out-foto

"Je krijgt zo meteen een foto te zien en daarna een zwart scherm. In totaal duurt dit ongeveer een halve minuut. Oké, we gaan beginnen".

Start het eerste deel van het filmpje (de foto 10 sec. en een zwart scherm 20 sec.).

"Oke, dat was het".

Draai de laptop weg van de pp naar jezelf, om de pp niet af te leiden en zodat je het volgende filmpje kunt klaarzetten.

b) Fading-out-voormeting

Geef de pp de drie VAS schaaltjes van de voormeting (emotionaliteit, levendigheid en compleetheid) van de fading-out conditie.

"Kun je nu terugdenken aan de foto, van de - brandweer met slachtoffer / man met kind / soldaten - die je zonet hebt gezien en dan de vragen invullen."

Zet ondertussen het fading-out filmpje goed.

Neem de VAS schaaltjes in, waarop de antwoorden van de voormeting staan.

"Bedankt."

c) Fading-out-filmpje

"Okee, zo meteen krijgt je een filmpje te zien. In totaal duurt dit filmpje ongeveer een minuut. Oké, we gaan beginnen".

Start het tweede deel van het filmpje (de foto gaat nu 12 keer gedurende 5 seconden van scherp naar onscherp: totaal 60 sec). Het filmpje stopt vanzelf, het beeld is dan zwart. Draai de laptop weg van de pp naar jezelf, om de pp niet af te leiden en zodat je het volgende filmpje kunt klaarzetten.

"Oke, dat was het".

d) Fading-out-nameting

"Ik ga je zo dadelijk opnieuw vragen terug te denken aan de foto - van de brandweer en slachtoffer / man met kind / soldaten - zoals je deze voor het eerst hebt gezien. Het is dus de dat je terug denkt aan de foto toen je deze voor het eerst zag, en niet aan het filmpje dat je zonet hebt gezien. Begrijp je wat ik bedoel?"

Wacht enkele seconden tot de pp antwoord geeft op je vraag of bevestigd door ja te zeggen of te knikken.
Geef de pp de drie VAS schaaltjes van de post-test (emotionaliteit, levendig en compleet) van de fading-out conditie .

"Kun je dan nu terugdenken aan de foto van de - brandweer met slachtoffer / man met kind / soldaten - zoals je deze voor het eerst hebt gezien en de vragen invullen?"

Laat de pp de VAS schaaltjes invullen en neem deze in.

"Bedankt, we gaan nu naar het volgende onderdeel van het onderzoek."

3. Controle conditie (stukje tekst)

! Start 60 seconden na afloop van de nameting van de vorige conditie !

a) Controle-foto

"Je krijgt zo meteen een foto te zien en daarna een zwart scherm. In totaal duurt dit ongeveer een halve minuut. Oké, we gaan beginnen".

Start het eerste deel van het filmpje (de foto 10 sec. en een zwart scherm 20 sec.).

"Oke, dat was het".

Draai de laptop weg van de pp naar jezelf, om de pp niet af te leiden en zodat je het volgende filmpje kunt klaarzetten.

b) Controle-voormeting

Geef de pp de drie VAS schaaltjes van de voormeting (emotionaliteit, levendigheid en compleetheid) van de controle conditie.

"Kun je nu terugdenken aan de foto, van de - brandweer met slachtoffer / man met kind / soldaten - die je zonet hebt gezien en dan de vragen invullen."

Zet ondertussen de controletaak goed.
Neem de VAS schaaltjes in, waarop de antwoorden van de voormeting staan.

"Bedankt."

c) Controle-taak (stukje lezen)

"Ik zou je willen vragen om de tekst op het beeldscherm te lezen. Je kunt de tekst rustig lezen, snelheid is niet van belang."

Zet de tekst klaar en laat de pp deze rustig lezen. Als de pp na 60 seconde nog niet klaar is onderbreek je hem/haar.

"Oke, dat was het".

d) Controle-nameting

Geef de pp de drie VAS schaaltjes van de nameting (emotionaliteit, levendigheid en compleetheid) van de controle conditie.

"Zou je opnieuw willen terugdenken aan de foto - van de brandweer en slachtoffer / man met kind / soldaten – die je zonet hebt gezien en vragen invullen?

Laat de pp de VAS schaaltjes invullen.

"Bedankt, we gaan nu naar het volgende onderdeel van het onderzoek."

Detail Recall Test (getailleerdheid van herinnering)

! Start 60 seconden na afloop van de nameting van de vorige conditie !

"In dit onderdeel van het onderzoek krijg je zo meteen een vragenlijst. In de vragenlijst wordt per foto een lijst met details gegeven. Kun je steeds aangeven of je een bepaald detail hebt gezien op de foto (JA) of dat je een bepaald detail niet hebt gezien op de foto (NEE). Is dit duidelijk of heb je nog vragen?"

Geen de pp de vragenlijst met dezelfde volgorde als waarin deze foto kreeg aangeboden. Zie erop toe dat geen enkel item wordt overgeslagen.

Neem de vragenlijst in.

"Bedankt, we gaan nu naar het laatste onderdeel van het onderzoek."

Verwachtingen

"Tot slot heb ik nog twee vragen. Zou je deze willen bentwoorden?"

Geef de pp het formulier waarop de vragen staan m.b.t. verwachtingen:

1. Wat denk je dat het doel van het onderzoek is? Kun je dit uitleggen?

2. Twee van de foto's werden opnieuw aangeboden, maar op een wazige manier. Een andere afbeelding werd niet meer herhaald. Wat denk je dat het effect is van de herhaalde aanbiedingen van de wazige foto's?
a) de herinnering wordt scherper
b) de herinnering wordt minder scherp
c) maakt niet uit/weet niet.

"Oke, dit was het onderzoek. Ik wil je vragen of het goed is als we de debriefing over het doel van het onderzoek naar je mogen e-mailen wanneer we alle proefpersonen getest hebben. Dit om te voorkomen dat de resultaten van andere proefpersonen beïnvloed worden doordat zij al meer weten over het doel van het onderzoek. Als ik uw e-mailadres mag noteren zal ik erop toezien dat het onderzoeksverslag via de mail verstrekt wordt wanneer alle resultaten binnen zijn."

Als de pp akkoord gaat kun je het e-mailadres noteren. Zo niet dan zal de volgende debriefing moeten worden gegeven:

"In ons onderzoek proberen we te achterhalen hoe EMDR werkt. EMDR is een therapievorm voor de behandeling van posttraumatische stress. Een verklaring voor de werking van EMDR is de werkgeheugentheorie. Tijdens EMDR wordt het werkgeheugen overladen, omdat men enerzijds herinneringen ophaalt en anderzijds de vinger van de therapeut volgt, die heen en weer wordt bewogen.

In ieder geval is er tijdens EMDR sprake van een dubbeltaak die moet worden uitgevoerd. Door deze dubbeltaak blijft er onvoldoende capaciteit van het werkgeheugen over om de herinneringen volledig op te halen en vast te houden. Dit zorgt ervoor dat het werkgeheugen wordt overbelast. Uit eerder onderzoek blijkt dat hierdoor herinneringen minder emotioneel, levendig en compleet worden.

Met ons onderzoek proberen wij na te gaan hoe dit dan precies werkt. Wij veronderstellen dat door het uitvoeren van de dubbeltaak tijdens EMDR, de aandacht steeds van de herinnering afgehaald wordt, maar ook weer terug gericht wordt op de herinnering. Dit komt omdat men zich steeds weer opnieuw probeert te concentreren op de herinnering tijdens een EMDR sessie. Dit hebben wij geprobeerd na te bootsen door de foto's te vervagen (de aandacht gaat er vanaf), of scherper te laten worden (de aandacht gaat er naar toe). Hopelijk vinden wij een effect van deze manipulaties, op de mate van emotionaliteit, levendigheid en compleetheid van herinneringen.

Verder heb je een vragenlijst ingevuld waarmee we wilden kijken hoeveel details je nog correct kon herinneren van de foto's die je hebt gezien. Dit om na te gaan in hoeverre de manipulaties van de foto's (vervagen/verscherpen) een effect hebben op de mate van gedetailleerdheid van herinneringen"

"Heel erg bedankt voor je deelname aan het onderzoek. Ik zal je geld/ppu voor je pakken."

Geef de pp zijn/haar beloning voor deelname en laat de pp tekenen voor ontvangst.

APPEDIX B. CORRELATION ANALYSIS

Table A. Correlations of emotionality, vividness and completeness for the three conditions

		Fading in			Fading out			Contole		
		Emotionality	Vividness	Completeness	Emotionality	Vividness	Completeness	Emotionality	Vividness	Completeness
Fading in	Emotionality	1	0.324	0.395*	0.150	-0.181	0.078	0.015	-0.203	-0.097
	Vividness	0.324	1	0.371	-.0.098	0.386*	0.605**	-0.022	0.343	0.498**
	Completeness	0.395*	0.371	1	0.018	0.316	0.484**	0.358	0.194	0.316
Fading out	Emotionality	0.150*	-0.098	0.018	1	0.207	0.313	0.259	0.233	0.048
	Vividness	-0.181	0.386*	0.316	0.207	1	0.551**	0.189	0.545**	0.708**
	Completeness	0.178	0.605**	0.484*	0.313	0.551**	1	0.274	0.459*	0.619**
Control	Emotionality	0.150	-0.022	0.358	0.259	0.189	0.274	1	0.231	0.108
	Vividness	-0.203	0.343	0.194	0.233	0.545**	0.459*	0.231	1	0.292
	Completeness	-0.079	0.498**	0.316	0.048	0.708**	0.619**	0.108	0.292	1

* $p < .05$, ** $p < .01$