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Is It Possible to Enhance Intensity in Guided Imagery Exercises? An Experimental Study

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Objective: Guided imagery exercises can have a powerful impact on distressing mental images. Clinically, it is usually recommended to experience these exercises as intensely as possible. However, patients sometimes object to the related instructions. In this study, we tested whether typical clinical instructions aiming at increasing intensity led to a stronger effect of the exercise. *Methods:* Sixty-four healthy participants watched a trauma movie clip. Then they were pseudo-randomized into one of two strategies (intense, less intense) or a waiting control condition. Dependent variables were self-reported emotional intensity and psychophysiology measures. *Results:* Participants in the intense ImRS strategy did not experience the exercise as more intense than those in the less intense ImRS strategy on any outcome measure. Both ImRS strategies showed increased sympathetic activation compared to a decrease of activation in the waiting control group. *Conclusions:* Our results suggest that emotional intensity in guided imagery exercises may not depend very much on the therapist's instructions.

Keywords: guided imagery exercises; imagery rescripting; emotional intensity; trauma film paradigm

Since the beginning of psychotherapy, imagery techniques have been used to change the implicational meaning of distressing memories and intrusive images (Edwards, 2007). Imagery interventions can have a more powerful impact on positive and negative emotions as compared to verbal information (Arntz & Weertman, 1999; Holmes, Arntz, & Smucker,

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2007; Holmes & Mathews, 2005). Various imagery intervention techniques address negative intrusive images and promote new, positive mental images (overview in Hackmann, Bennett-Levy, & Holmes, 2011). Among them, imagery rescripting (ImRS) has gained increasing attention in recent years. In ImRS, distressing memories or mental images are activated and subsequently changed into positive or more helpful images that fulfill patients' needs for safety, acceptance, or inclusion (Arntz, 2012). Corrective information is provided and the meaning of the distressing images and associated core believes are modified (for a comprehensive description of the treatment technique, see Arntz, 2011 and Hackmann, Bennett-Levy, & Holmes, 2011). ImRS seems to work by the revaluation of unconditioned stimuli (UCS) in the aversive memory (Arntz, 2012). This is different to the procedure of imaginal exposure (IE) exercises, the current state-of-the-art technique to deal with trauma memories. In IE, underlying mechanisms are mainly habituation to fear and acceptance of the trauma. We chose ImRS since it represents a guided imagery intervention with evidence for effectiveness in several psychological disorders as a combined treatment or as a stand-alone intervention. A meta-analysis by Morina, Lancee, and Arntz (2017) shows overall very good effectiveness in reducing symptoms, comorbid depression, and aversive imagery across disorders.

Although effectiveness of guided imagery exercises has been demonstrated a number of times, questions in regard to the best approach and optimal instructions are still open (Arntz, 2012; Morina et al., 2017). Clinicians typically assume that imagery exercises should be experienced as intense as possible to implement a powerful new image, as the activation of relevant emotions is crucial for emotional processing and therapeutic change (Whelton, 2004). Therefore, existing instructions usually recommend to make the patient live the intervention as vivid and emotionally intense as possible (Hackmann, Bennett-Levy, & Holmes, 2011). Hackmann, Bennett-Levy, and Holmes (2011) spare a whole chapter in their *Guide to Imagery in Cognitive Therapy* on how to enhance imagery vividness and immediacy in imagery exercises. They suggest to focus on bodily sensations, to imagine details, and to use first-person present tense. Moreover, it is assumed that through one's own eyes, the images are more likely to involve realistic re-experiencing of the event. Therefore, they advise that the patient should take the field perspective. Other authors summarize similar instructions (e.g., in his review about ImRS in personality disorders, Arntz (2011) likewise suggests that the therapist should advise the patient to close their eyes, take the field perspective, use the present tense, and describe the situation in here-and-now terms). All these recommendations serve to make the imagery process as vivid and intense as possible to implement a powerful new image (Arntz, 2011; Arntz & Jacob, 2012). Vivid imagery is associated with strong emotions which seem to be a generic determinant of psychotherapeutic success (Greenberg & Safran, 1989; Hackmann, Bennett-Levy, & Holmes, 2011; Hautzinger & Eckert, 2007; Whelton, 2004).

However, emotions associated with mental images in patients with psychological disorders are usually negative (Hackmann, Bennett-Levy, & Holmes, 2011) and according to wide clinical experience, patients are often not willing to follow such instructions intensifying their emotions during imagery exercises. They are afraid of reliving distressing emotions, prefer a more cautious approach, or feel simply uncomfortable with some recommendations. Correspondingly, therapists feel under pressure to follow these instructions, and may feel uncomfortable when pushing their patients into this direction.

However, only few of these instructions that aim at enhancing emotional intensity have been subject to empirical research. Pearson, Deeprose, Wallace-Hadrill, Burnett Heyes, and Holmes (2013) report no systematic differences in the vividness of imagery exercises under *eyes-open* and *eyes closed* conditions. Regarding the perspective (field perspective vs. observer perspective), findings are mixed. Some studies suggest that the field perspective increases positive affect (Holmes, Coughtrey, & Connor, 2008; McIsaac & Eich, 2004) or emotional intensity (Terry & Horton, 2007)

in imagery exercises. Others do not find differences between field and observer perspective (Nelis, Vanbrabant, Holmes, & Raes, 2012). According to Bernsten and Rubin (2006), the field perspective is emotionally more intense only when taken naturally, but not when instructed. Vella and Moulds (2014) even found that instructing subjects to switch from observer to field perspective resulted in reduced vividness.

We aimed to investigate whether it is actually possible to enhance emotional intensity in imagery exercises via specific instructions. The procedure of ImRS was chosen to investigate this subject. We conducted an experimental analogue trauma film study with a healthy student sample. The trauma film paradigm has often been used in this type of studies and can be regarded as a standard approach to assess peri-traumatic processes in experimental psychopathology (Holmes & Bourne, 2008; Holmes, Brewin, & Hennessy, 2004). We compared an intense ImRS strategy with a less intense ImRS strategy. Furthermore, a waiting control condition was used. Outcomes were self-reported intensity, bodily sensations and psychophysiology.

Along with clinical recommendations, we hypothesized that participants in the intense ImRS strategy would experience stronger increases in negative emotions (anger, helplessness, anxiety, aggression, sadness, disgust) and decreases of positive emotions (safety, relaxation). Furthermore, we expected that participants in the intense ImRS strategy would report higher intensity of the exercise than participants in the less intense ImRS strategy. Emotional activation, in particular fear, comes along with physiological activation (see, e.g., Whelton, 2004). Therefore, we hypothesized that participants in the intense ImRS strategy would experience increased sympathetic activation (heart rate [HR], skin conductance level [SCL], and pulse transit time to the finger [PTTV]) during the exercise.

Methods

Participants

A healthy student sample with a mean age of 21.6 years ($SD = 2.78$) was recruited ($N = 64$). Only female participants were included to ensure that all subjects were able to identify with the female victim in the stimulus material. Participants were asked for prior traumatic experiences as victim or observer to avoid retraumatization by the stimulus material. Only one participant reported a prior experience as a victim of violence. However, she did not reject study participation and did not have to stop the experiment prematurely. Psychometric data indicate low psychopathology (SCL-9: $M = .83$; $SD = .58$), rather low anxiety scores (STAI: $M = 2.35$; $SD = .24$), and average imagery trait characteristics (SUIS: $M = 3.15$; $SD = .54$). There were no significant differences between the three groups in regard to any of the psychometric variables.

Power Analysis

Power analysis was calculated with the program G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). We assumed a small-to-medium effect size of ca. f = .25. With an alpha error of 5% and beta of 95%, the total sample size needed was 54 subjects. We recruited a total of 64 participants.

Measures

Questionnaires. To assess general psychopathology, we used the SCL-K9, a short 9-item version of the Symptom-Checklist-90R (SCL-90R). Participants rate on 9 items psychological distress over the last week from 1 (not at all) to 5 (very much). The SCL-K9 shows good validity and reliability and is broadly used (Klaghofer & Brähler, 2001).

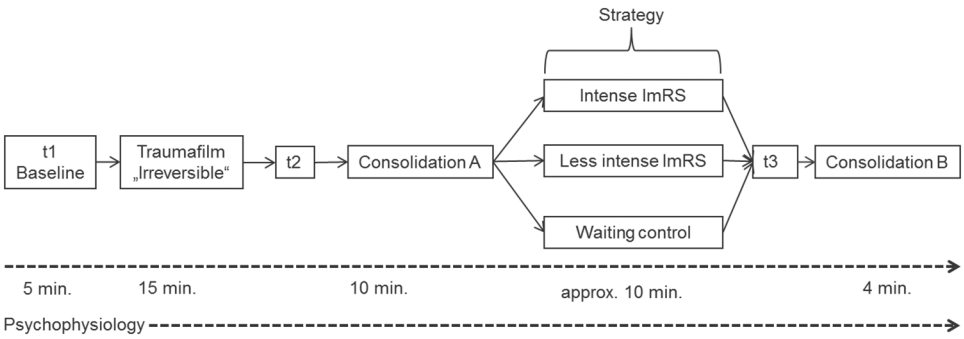

Figure 1. Experimental procedure.

Anxiety was assessed with the trait subscale (STAI-T) of the State Trait Anxiety Inventory (Laux, Glanzmann, Schaffner, & Spielberger, 1981). It consists of 20 general statements on trait anxiety with a 4-point answering format (e.g., 1 [almost never] – 4 [very often]). The STAI-T has good internal consistency and high retest reliability (Spielberger, Sydeman, Owen, & Marsh, 1999).

The Spontaneous Use of Imagery Scale (SUIS) was used to assess habitual use of mental imagery (Reisberg, Pearson, & Kosslyn, 2003). It comprises 12 items, describing common situations of mental imagery. Answers range from 1 (never appropriate) to 5 (completely appropriate) The authors report high internal consistency (Reisberg et al., 2003).

Emotion Ratings. In the experimental procedure, self-rated emotions were assessed before and after the trauma film. Participants rated their current experience of eight different emotions (anger, helplessness, safety, anxiety, aggression, sadness, disgust, relaxation) on 10 cm visual analogue scales (0 = not at all; 10 = very intense).

Psychophysiology. We included physiological measures in our experiment to track sympathetic activity during the whole experimental procedure (see Figure 1). Following the example of Gross (1998), we assessed sympathetic activation by measuring HR, SCL, PTTV.

Procedure

Trauma Film Paradigm. This study was conducted with the trauma film paradigm (Holmes & Bourne, 2008; Holmes et al., 2004). The film clip (12 min) for mood induction was taken from the commercial movie *Irreversible* (Cassel, Chioua, & Noé, 2003), depicting the violent rape of a women in a passage underground. In a study by Weidmann, Conradi, Groger, Fehm, and Fydrich (2009) this film segment performed best among different trauma films in inducing distress, intrusions, and increased heart rate in healthy subjects.

Procedure. Figure 1 gives an overview of the experimental procedure. The experiment took place in a laboratory room. Participants were informed about the study, particularly about the violent content of the experimental stimuli. After giving informed consent, participants filled in the questionnaires (t1). The experimenter attached the electrodes, left the room, and started the trauma film, which was followed by the second emotion rating (t2). Next, participants waited for 10 minutes for the consolidation of trauma memory. Subsequently participants were pseudo-randomized into one of three strategies (1. Intense ImRS, 2. Less intense ImRS, 3. Waiting control). In strategy 1 and 2, the experimenter returned and applied one of the two ImRS strategies, which lasted an average of 10 minutes. All imagery exercises were audiotaped. In case of strategy 3, participants waited for 10 minutes. Participants in the two ImRS strategies were asked to indicate on visual analogue scales (1 = not at all; 100 = very much) how intense they had experienced the exercise and to which extent they had felt bodily sensations during the exercise (t3). Furthermore,

TABLE 1. Manipulation of Intensity in the ImRS Strategies

Manipulation of Intensity	Intense ImRS	Less intense ImRS
Eyes closed/open	Eyes closed	Eyes open
Bodily sensation	Specific instruction to locate emotions as bodily sensation	No specific instruction
Emotional focus	Specific instruction to focus on emotions of anxiety and helplessness	No specific instruction
Perspective	Field perspective of the victim	Observer perspective

Note. ImRS = imagery rescripting.

an adaption of the Observer vs. Field Visual Analogue Scale (VAS; Hackmann, Surawy, & Clark, 1998) was used, a 4-point scale assessing the participant's perspective during the experiment (observer/mainly observer/mainly field/field). Subsequently, participants waited for another 4 minutes to assess the course of the psychophysiological measures. Questionnaires, instructions, and the trauma film were presented with the program Presentation.

Imagery Strategies

Imagery strategies were applied by three trained experimenters. Participants in both ImRS strategies were to imagine a specific film scene and to recapture associated emotions. The scene in the beginning of the movie was chosen to give participants the opportunity to prevent the trauma, which Hagenaars and Arntz (2012) had found to be most effective in ImRS. All participants spontaneously reported negative emotions. Participants rated anxiety and helplessness on a scale from 0 (not at all) to 100 (very intense). Table 1 summarizes the different ImRS procedures of strategy 1 and 2. All instructions were given in the beginning of the exercise. In both strategies, participants followed the standard ImRS procedure (Arntz, 2012) and were therefore guided to change the situation in a way that was helpful for the victim. Imagery exercises took about 10 minutes. Participants were asked to act creative in imagery by imagining any changes of the scene which seemed helpful to them (e.g., introducing a helpful figure). Participants described their imaginations, and all experiments were audiotaped to check for correct application. An imagery exercise ended when the participant reported a significant reduction of negative emotions.

Statistical Analysis

Cronbach's α was calculated for the mood ratings (anger, helplessness, anxiety, aggression, sadness, disgust, and reversed scores for safety and relaxation). For the manipulation check of the trauma film, emotion ratings in the three experimental strategies were analyzed with two-factors MANOVA. Factors were strategy (intense ImRS, less intense ImRS, waiting control) and repeated measures (t1, t2). Self-rated emotions were entered as dependent variables. Two-factorial ANOVA with repeated measures was used to compare sympathetic activation between the three strategies. For each measure of sympathetic activation (HR, SCL, PTTV), a mean score for the last 2 minutes (as suggested by the Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996) of the following periods was calculated: (a) Baseline, (b) Trauma film, (c) Consolidation A, (d) Strategy, (e) Consolidation B. Repeated measures for the manipulation check of the trauma film paradigm were mean baseline score and mean trauma film score. To compare sympathetic activation in the different strategies, repeated

measures were mean Consolidation A score, mean Strategy score, and mean Consolidation B score.

First, both ImRS strategies were compared in regard to psychophysiological activation. Then all three strategies were compared in regard to psychophysiological activation. T-tests were used to compare self-rated intensity, bodily sensations, and anxiety and helplessness during the imagery exercise between the intense and less intense ImRS strategy. The statistical software package IBM SPSS Version 20 was used.

Results

Manipulation Check Trauma Film

Emotion Ratings. The items anger, helplessness, anxiety, aggression, sadness, disgust, safety, and relaxation showed good internal consistency at all times ($.73 \leq \alpha \leq .94$). As expected, the movie segment significantly increased all negative emotions (anger, helplessness, anxiety, aggression, sadness, disgust) and significantly reduced positive emotions (safety, relaxation). The multivariate analysis showed a significant main effect for factor time (F [8, 16] = 143.81, $p < .01$, η^2_p .95). The main effect for strategy (F [16, 110] = .73, $p = .77$, η^2_p .19) and the interaction effect strategy × time (F [16, 110] =.87, $p = .59$, η^2_p .23) were not significant. Univariate analysis showed a significant main effect of time and no significant interaction effect strategy × *time for each single emotion.

Psychophysiology. A main effect of time was found in all three psychophysiology measures: HR (F [1, 59] =31.89, $p < .01$, $\eta^2 = .35$) and SCL (F [1, 60] =31.80, $p < .01$, $\eta^2 = .35$) significantly increased during the trauma film; PTTV significantly decreased (F [1, 58] = 73.73, $p < .01$, $\eta^2 = .56$). As expected, the main effect for strategy (HR: F [2] =.8, $p = .45$, $\eta^2 = .03$); SCL: F [2] = .87, $p = .42$, $\eta^2 = .03$; PTTV: F [2] = .89, $p = .41$, $\eta^2 = .03$) and the interaction effect strategy × time (HR: F (2, 59) = 1.83, $p = .17$, $\eta^2 = .06$); SCL: F (2, 60) = 2.72, $p = .07$, $\eta^2 = .83$; PTTV: F (2, 58) = 3.07, $p = .054$, $\eta^2 = .09$) were not significant for any of the psychophysiology measures.

Intensity During ImRS

Intensity. In Table 2, differences in self-rated intensity in the intense and less intense ImRS strategies are depicted. *Overall intensity*: There was overall a large variety of self-rated intensity in both ImRS strategies (range: 7–100; $M = 70.7$; $SD = 23.73$). However, no significant difference in the self-rated intensity between the two ImRS strategies was found. *Bodily sensations*: Participants in both ImRS strategies did not differ significantly in regard to reported intensity of bodily sensations. There was a tendency for subjects in the less intense ImRS strategy to report stronger bodily sensations. *Emotional focus:* Results show no significant differences regarding self-rated anxiety

TABLE 2. Differences in Self-Reported Intensity in the ImRS Strategies

	Intense ImRS	Less Intense ImRS	*p*
Overall intensity: *M* (*SD*)	71.00 (26.23)	70.38 (21.45)	.933
Bodily sensation: *M* (*SD*)	62.23 (24.35)	72.48 (23.34)	.167
Anxiety: *M* (*SD*)	83.86 (17.85)	72.02 (22.36)	.061
Helplessness: *M* (*SD*)	87.43 (17.03)	78.00 (21.67)	.123

Note. ImRS = imagery rescripting.

TABLE 3. Mean Psychophysiology During Trauma Consolidation A, Strategy, and Consolidation B

		Intense ImRS	Less Intense ImRS	Waiting Control
HR	Consolidation A (*M* [*SD*])	72.2 (9.6)	74.4 (8.2)	75.5 (9.1)
	Strategy (*M* [*SD*])	78.1 (9.6)	77.5 (9.8)	75.2 (9.1)
	Consolidation B (*M* [*SD*])	71.8 (8.5)	72.8 (8.1)	75.5 (9.2)
SCL	Consolidation A (*M* [*SD*])	3.6 (2.2)	4.2 (3.3)	4.3 (3.0)
	Strategy (*M* [*SD*])	3.8 (1.8)	4.6 (3.7)	4.1 (2.8)
	Consolidation B (*M* [*SD*])	3.4 (1.8)	4.1 (3.1)	4.2 (2.7)
PTTV	Consolidation A (*M* [*SD*])	265.2 (21.6)	271.1 (39.9)	261.5 (20.6)
	Strategy (*M* [*SD*])	256.3 (22.9)	261.1 (41.8)	263.3 (21.3)
	Consolidation B (*M* [*SD*])	266.8 (20.5)	272.6 (36.9)	263.53 (20.7)

Note. ImRS = imagery rescripting; HR = heart rate; SCL = skin conductance level; PTTV = pulse transit time to the finger.

or helplessness in the beginning of the ImRS. By trend, subjects in the intense ImRS strategy reported stronger anxiety and helplessness.

Perspective/Eyes Open/Closed. Most subjects in both strategies took the perspective they were instructed for. In the intense ImRS strategy, 72.8% took the field perspective. Nearly all subjects (90.5%) in the less intense ImRS strategy took the observer perspective. All participants in both strategies followed the respective instructions regarding opening or closing their eyes.

Psychophysiology. The comparison of the two ImRS strategies with two-factorial ANOVA with repeated measures revealed that sympathetic activation increased in both ImRS strategies during the imagery exercise (see Table 3). The main effect of time was significant for HR (F [1.24, 44.55] = 28.38, $p < .01$, $\eta^2 = .44$) and PTTV (F [1.61, 57] = 42.53, $p < .01$, $\eta^2 = .54$) but not significant for SCL (F [1.13, 41.97] = 1.29, $p = .27$, $\eta^2 = .03$). However, no significant differences between the two ImRS strategies in any of the psychophysiological measures were found. The interaction effect strategy × time was not significant for HR (F [1.24, 44.6] = 3.33, $p = .07$, $\eta^2 = .09$), SCL (F [1.13, 42] = .42, $p = .55$, $\eta^2 = .01$), or PTTV (F [1.61, 58]) = .09, $p = .88$, $\eta^2 = .01$).

A comparison between all three strategies revealed meaningful differences of the two ImRS strategies compared to the waiting control strategy. While sympathetic activation increased in both ImRS strategies, activation remained constant or decreased in the waiting control strategy (see Table 3). Interaction effect strategy × time was significant for HR (F [3.2, 88.08] = 9.32, $p < .01$, $\eta^2 = .25$) and PTTV (F [3.43, 94.19] = 11.52, $p < .01$, $\eta^2 = .29$), but not significant for SCL (F [2.32, 65.04] =.86, $p = .44$, $\eta^2 = .03$).

Discussion

The aim of this study was to investigate whether it is possible to experimentally manipulate intensity (self-rated and psychophysiology) in guided imagery exercises using the example of ImRS. The trauma film paradigm was applied to induce analogue trauma in healthy participants. We compared an intense ImRS strategy to a less intense ImRS and a waiting control condition.

The hypothesis that emotional intensity of the ImRS exercise was increased by our instructions could overall not be confirmed. Though there was a tendency for participants in the intense ImRS condition to report more anxiety and helplessness during the exercises, there was no difference in regard to self-rated intensity or the degree of reported bodily sensations compared to less

intense ImRS strategy. Moreover, no significant differences in sympathetic activation were found between the two ImRS strategies.

Our attempt to increase intensity during guided imagery was effected along clinical recommendations (manipulation: eyes open/closed, perspective field/observer, focus on emotions of anxiety and helplessness, focus on bodily sensations). Although the overall convention suggests to close the eyes during imagery exercises (Arntz, 2011), it did not have a systematic impact on intensity in our study. Taking the field perspective is likewise recommended to enhance intensity (Hackmann, Bennett-Levy, & Holmes, 2011). The present study however could not find differential effects of field or observer perspective, even when one takes into account that eight participants were not compliant to the instruction on perspective. Compliance with perspective was lower in the field perspective condition than in the observer perspective condition. This may be due to rescripted material—a film clip, which had previously been watched from the observer perspective. Our results suggest that neither closed eyes nor field perspective can effectively promote intensity in the imagery experience. Another recommendation to enhance intensity in the imagery experience is a focus on bodily sensations (Arntz & Jacob, 2012). However, in our study, participants in the less intense ImRS condition tended to report somewhat (though not significantly) stronger bodily sensations although they were not explicitly instructed to focus on them.

One could argue that the construct of subjective intensity is unclear. However, Cui, Jeter, Yang, Montague, and Eagleman (2007) were able to show that self-reported vividness correlated with objective measures of brain activity and therefore may be a rather valid indicator for vividness. Moreover, the objective psychophysiological measures used in our study did not show any differences on the level of psychophysiological arousal between the two ImRS groups.

Our study suggests that it might not be possible to influence the intensity in which participants experience imagery exercises with these clinically recommended instructions. This assumption is supported by findings of Rademaker and Pearson (2012) showing that it is not possible to improve imagery vividness by training. Research on exposure therapy provides some interesting ideas on how to enhance intensity, like the removal of safety signals (e.g., familiar therapist, cell phones) during the exercise (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). However, it is unclear whether this can be transferred to ImRS, since feelings of safety are an essential aim of ImRS.

In line with other research (Cui et al., 2007), we found a large variety of self-rated intensity which was however not related to the experimental condition. Maybe intensity of imagery-related emotions is rather a trait characteristic than a state which can be easily manipulated by instructions.

Further research is needed to replicate our results in a clinical population in the treatment of real trauma or aversive mental images. Because of much stronger personal involvement, one would expect imagery exercises in general to be more emotionally intense. If our results hold true in a clinical population, instructions on enhancing intensity during imagery exercises might be less important than many therapists believe. This would make the application of imagery techniques easier for some patients and their therapists. Note that we only tested whether specific instructions intensify the experience. Another research question would be to test whether more intense imagery experiences actually lead to better outcomes in terms of reduced psychopathology (e.g., less intrusions).

This study had several methodological limitations. We only investigated a sample of young, healthy, female participants. Results cannot be generalized to other populations. We used the trauma film paradigm to induce analogue trauma with psychological and physiological stress reactions (Holmes & Bourne, 2008; Weidmann, Conradi, Groger, Fehm, & Fydrich, 2009). A strong advantage of the trauma film paradigm is the possibility to control for dose and nature of the analogue trauma. However, laboratory stressors cannot be fully compared to real trauma

because they are not personally relevant. Furthermore, nonclinical subjects and patients may differ with regard to memory and information processing.

A main outcome measure in this study was self-reported intensity, which might have been influenced by memory effects or social desirability. Another assessment of intensity like ratings of vividness during the exercise may have shown different results. However, objective measures of psychophysiology also did not show differences between the ImRS strategies.

Manipulation of intensity was realized according to the most common clinical recommendations. However, there may be other ways to enhance emotional intensity that have not been used in this study. We chose a healthy sample because of ethical objections against the use of trauma films in patients who suffer from posttraumatic stress disorder. Therefore, generalization of our findings to clinical samples is strongly limited. Further research is needed to investigate the manipulation of intensity in a clinical setting.

Conclusion

- We instructed healthy subjects to experience Imagery Rescripting (ImRS) more or less intense on the basis of established clinical recommendations (e.g., closed/open eyes).
- This did not influence subjective emotional intensity or psychophysiological activation during the imagery exercise.
- Clinically it may not be highly necessary to insist on these instructions aimed at increasing the emotional experience of imagery exercises.

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