Mental Imagery Rescripting: A Comparison of an Active versus Passive Approach on Post-Intervention Levels of Mastery and Self-Efficacy

Hannah Katharina Kambach

2377004

Faculty of Social and Behavioural Sciences

Utrecht University

Clinical Psychology

Supervisor: Franziska Lechner-Meichsner

17/03/2024

Number of words: 4998

Table of Contents

Abstract

Mental imagery rescripting (ImRs) is a therapeutic technique effective for various disorders. By rescripting previously aversive memories, negative meanings and emotions may decrease while new positive associations can develop. ImRs can be divided into two approaches: an active (ImRs-A) and a passive approach (ImRs-P). Within ImRs-A, patients imagine themselves performing, e.g., by enacting previously suppressed actions. Patients within ImRs-P picture another person intervening in their memory. Previous studies have established the impact of ImRs on perceived mastery and self-efficacy, suggesting their role as possible working mechanisms through expressing actions that were suppressed during the original memory, gaining control over the memory, and increasing positive self-beliefs. This study investigated the differential role of mastery and self-efficacy within ImRs-A and ImRs-P by using participants' autobiographical memories in an ImRs session, hypothesizing that ImRs-A will be more impactful. Results revealed higher mastery and self-efficacy levels right after the intervention and at a follow-up compared to pre-intervention levels. However, no difference was found between ImRs-A and ImRs-P. Thus, this study highlights that mastery and self-efficacy play a role within ImRs, while the approaches do not seem to impact the results' significance differently.

Mental Imagery Rescripting: A Comparison of an Active versus Passive Approach on Post-Intervention Levels of Mastery and Self-Efficacy

Within the realm of modern psychotherapy, mental imagery rescripting (ImRs) has emerged as a promising therapeutic tool aiming at reducing symptoms stemming from clients' aversive memories. ImRs is built on the assumption that a memory's mental imagery profoundly impacts our emotions and that by changing negative images, emotional and cognitive shifts can occur (McCarthy et al., 2022). Mental imagery refers to the mental portrayal of sensory experiences in absence of external stimuli (Schwarz et al., 2020). It occurs when recalling sensory information, leading to the sensation of seeing with the "mind's eye" (Kosslyn et al., 2001). Imagery is more powerful in influencing positive and negative emotions than verbal processing (Holmes et al., 2007). Therefore, research suggests that imagery should increasingly be incorporated into therapeutic assessments and treatments.

ImRs-provoked emotional and cognitive shifts may arise by giving a new meaning to a distressing memory, changing negative core beliefs, and reducing maladaptive associations with the event, such as feelings of helplessness (Çili et al., 2016). Moreover, the technique aims to induce positive and more accessible mental images (Holmes & Matthews, 2010). Thus, the emergence of more adaptive representations of a situation without denying the actual memory is facilitated through revisiting and restructuring distressing memories (Arntz et al., 2007). Furthermore, ImRs allows clients to express emotional and behavioral responses that were inhibited during the original memory and provide reforming information about the event (Arntz & Weertman, 1999).

Effectiveness of ImRs

While ImRs has mainly been studied as a therapeutic approach for PTSD, especially childhood trauma, it has also shown effectiveness as a stand-alone treatment for diverse types

of disorders, including simple and social phobia, depression, obsessive-compulsive disorder (OCD), as well as eating and personality disorders (Arntz, 2011; Brewin et al., 2009; Kip et al., 2023; Kroener et al., 2023). Research suggests that ImRs for depression may work by decreasing negative images, allowing for accessing and processing emotions, as well as positively altering imagery content (Pile et al., 2021). Moreover, studies have highlighted ImRs' effectiveness in treating OCD and social anxiety disorder by enabling access to positive memories and reducing imaginal distortions about the self (Holmes et al., 2007; Lee & Kwon, 2013; Strachan et al., 2020). In addition to the treatment of formal psychopathologies, ImRs has been found to decrease the frequency of intrusive images, anxious cognitions, nightmares, and aversive memories (Arntz, 2011; Morina et al., 2017; Kunze et al., 2019). The findings underline that individuals without the diagnosis of a mental disorder display reduced negative feelings about an aversive memory, higher self-esteem, and reduced anxious symptoms after an ImRs intervention (Çili et al., 2016). Newman-Taylor and colleagues (2019) demonstrated ImRs' benefits for a non-clinical sample for enhanced self-esteem and positive affect. Effectiveness has also been shown for a combined approach of ImRs and imaginal exposure (IE), leading to decreased feelings of anger and guilt as well as fewer drop-out rates and therapist favorability compared to non-combined approaches (Arntz et al., 2007). Another study emphasized an efficacious cognitive-behavioral combination of ImRs and exposure for treating specific fears (Hunt & Fenton, 2007).

ImRs offers advantages for treating various patient types. First, the treatment is flexible and can be adapted to patients' needs and preferences, during which a detailed confrontation with traumatic experiences is not required (Boterhoven de Haan et al., 2020). In line with ImRs being less confronting than other treatment forms, studies comparing ImRs and exposure-based interventions revealed lower distress levels of participants during ImRs (Dibbets & Arntz, 2016). Furthermore, ImRs is adaptable to various cultures and religious

backgrounds, offering an effective treatment for a variety of client populations, including refugees (Lechner-Meichsner et al., 2023). Moreover, ImRs procedures may be completed within a few sessions, thus being shorter than the treatment as usual for disorders like PTSD and depression (Brewin et al., 2009; Steil et al., 2021). In contrast to exposure-based interventions like IE, ImRs effectively treats affective components, including non-fear emotions such as anger or guilt (Arntz et al., 2007; Grunert et al., 2007).

Research has established a range of factors impacting the effectiveness of ImRs interventions. For instance, Bosch and Arntz (2023) underlined the importance of the quality of the therapeutic alliance for participants and, therefore, for therapy outcomes. Furthermore, as Lechner-Meichsner and colleagues (2023) suggested, more sessions might be needed for more complex cases, particularly when involving passivity and helplessness during rescripting.

ImRs Procedures and Conditions

During ImRs, clients rescript an aversive memory into a more positive one with the help of a therapist (Strohm et al., 2019). Rescripting is usually done in three phases, where memory activation is the first step by recalling vivid details of the adverse event (Siegesleitner, 2020). During memory activation, the adverse event is retold as vividly as possible while including essential context information as well as all physical sensations, cognitions, and emotions experienced during the original situation (Arntz, 2012). As highlighted by a study conducted by Dibbets and Arntz (2016), to enhance beneficial outcomes and reduce vivid intrusions, the most negatively arousing part, the hotspot, should be included.

In the next phase, the intervention phase, the memory is targeted. The aversive core of the experience is altered into a more positive one to satisfy patients' needs and change existing schematic beliefs (Kip et al., 2023; Kroener et al., 2023). This goal is accomplished

by having the client reimagine the memory as if it were in the present and do anything necessary to fulfill previously unmet needs, possibly also using magic or superpowers (Prinz et al., 2021).

Lastly, a sense of comfort and safety is provided to ensure long-term benefits of the intervention (Lechner-Meichsner et al., 2023).

ImRs can be delivered within an active (ImRs-A) or a passive approach (ImRs-P). Within ImRs-A, clients intervene and alter the imagined course of events themselves. This approach encourages clients to take an assertive role in restructuring their memory, which might be particularly empowering through acting out suppressed actions themselves (Siegesleitner et al., 2020; Arntz, 2012; Kunze et al., 2019). In the passive condition, clients imagine a supportive and trusted person to improve the recalled situation. As suggested by Siegesleitner and colleagues (2020), this approach is anchored in social modeling, thus, clients may benefit from it through observational learning (Bandura, 1999). Evidence supports that both approaches increase positive affect following the intervention (Siegesleitner et al., 2020; Twardawaski et al., 2021). However, Twardawski and colleagues (2021) revealed significantly higher feelings of empowerment in the active than in the passive approach.

Underlying Mechanisms

Despite the established effectiveness of ImRs, the mechanisms behind its functioning still need to be determined. Mastery and self-efficacy have both been suggested as key working mechanisms of ImRs based on significant findings on their mediation of posttraumatic recovery (Benight & Bandura, 2004; Kunze et al., 2016; Long & Quevillon, 2009; Smucker et al., 1995). Mastery is the degree to which somebody perceives a situation to be under control, thus the perceived power over a situation (Hornby, 2005). Mastery may be relevant to the effectiveness of ImRs due to its importance in enabling individuals to alter

mental imagery actively and to enact actions that were suppressed during the original situation (Strohm et al., 2019). Self-efficacy refers to one's sense of being able to control a situation and is related to the construct of self-confidence (Siegesleitner et al., 2020). Several studies have highlighted a decrease in negative self-beliefs, an arguably related construct to self-efficacy, in patients who received treatment with ImRs (Mancini & Mancini, 2018).

During ImRs, mastery and self-efficacy may increase by establishing more affirmative self-images of capability to initiate action through acting out suppressed actions during the time of the event and gaining control over the memory (Siegesleitner, 2020). A potential factor impacting mastery and self-efficacy is the level of activity a client takes up during the treatment, where a more active role, i.e., intervening in the adverse situation oneself, has been hypothesized to bring about a more significant change (Siegesleitner, 2020). A study conducted by Twardawaski and colleagues (2021) revealed that only an approach with the client intervening themselves led to increased feelings of empowerment, a construct closely related to self-efficacy. In contrast, Siegesleitner and colleagues (2020) compared the active and the passive conditions and hypothesized differential effects of the ImRs-A and ImRs-P conditions on mastery and self-efficacy, which was not met. The researchers assumed the active nature of a client-guided ImRs approach itself to be a possible reason for failing to meet the hypothesis, i.e., clients actively developed the new script themselves in both conditions. Furthermore, the study used a trauma film paradigm (TFP) to create an aversive memory. Personal memories are likely to be more emotionally salient, credible, and relevant to a person's lived experience than TFPs, thereby increasing participants' resonance and engagement with the treatment, possibly resulting in greater therapeutic benefits. Thus, we assume that applying ImRs to a personal memory might lead to a more significant difference between the active and passive approaches. This study is the first to compare ImRs-A and ImRs-P using actual memories instead of TFPs (e.g., compared to Siegesleitner et al., 2020).

Research Question & Hypotheses

Based on the background of ImRs' effectiveness and the hypothesized underlying mechanisms, this study investigated the following research question: Is an active ImRs approach associated with higher post-intervention levels of mastery and self-efficacy compared to a passive approach? In line with this research question, the following hypotheses are made:

I. Levels of mastery and self-efficacy will be higher post-intervention.

II. Levels of mastery will be higher in the ImRs-A than in the ImRs-P condition.

III. Levels of self-efficacy will be higher in the ImRs-A than in the ImRs-P condition.

This research offers the potential to fill the gap in the current understanding of ImRs' underlying mechanisms. It aims to advance theoretical knowledge and provide insights for clinicians about ImRs' working mechanisms.

Methods

Participants

Participants were recruited on the Utrecht University campus via posters and social media postings. The inclusion criteria comprised having an aversive memory from an event that happened within the past 24 months that is still distressing to the participant. The memory must not have been related to death and not met criterion A for PTSD. For ethical reasons and the study design's purpose of only including healthy individuals, other a priori exclusion criteria were severe medical conditions, pregnancy, and psychological disorders such as PTSD, bipolar disorder, or psychotic disorders, and being in therapy.

A total of 47 participants aged between 18 and 38 (M_{Age} = 24.54, SD_{Age} = 6.67) were recruited and randomized into the conditions (N_{Active} = 25, $N_{Passive}$ = 22). Thirty-five participants were female, 11 were male, and one did not indicate their gender. Two

participants dropped out after the first session due to appointment scheduling problems, while one dropped out due to illness. Seven additional participants were excluded due to missing data at the later time points. The measure of self-efficacy was completed fewer times than the measure of mastery, presumably because the former was merely assessed online. This resulted in two final samples, which are described below.

Utrecht University first year students were rewarded SONA credits for their participation as reimbursement.

Instruments

Mastery

Participants rated their perceived level of mastery by answering one question on a visual analogue scale (VAS): „How controllable do you experience the situation in your memory?“. The VAS ranged from 0 [*not at all controllable*] to 100 [*very controllable*]. This method of measuring mastery has been successfully used in previous studies (e.g., Strohm et al., 2019).

Self-efficacy

The General Self-Efficacy Scale (GSES, Schwarzer & Jerusalem, 2010) was used to assess self-efficacy. The GSES consists of 10 items on a 4-point scale [1 = *not at all true*, 4 = *exactly true*] and measures individual positive self-belief, i.e., the conviction that one can perform well at new tasks and cope with stressful situations and setbacks (Schwarzer, 1992). See Appendix A for the full scale. In various samples, Cronbach's alpha ranged from .76 to .90, while a value of .91 was found in this study's sample. Positive correlations with positive emotions, optimism, and job satisfaction have shown criterion-related validity.

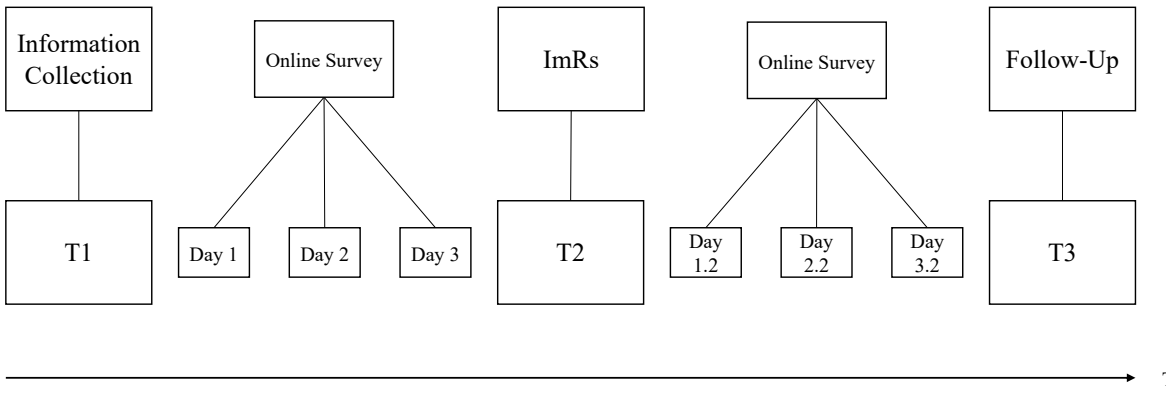
Design

This experimental study comprised three sessions, each at least three days apart. Participants were assigned one of the five experimenters for the conduction of the first two sessions. The experimenters were Master-level students who had received training in ImRs prior to the study.

Before the first session, participants' eligibility was assessed by checking for exclusion criteria during the online sign-up. Participants received detailed information about the study, including its purpose, risks and benefits, and data protection. When no exclusion criteria were met, consent was obtained online by letting the participants agree to the study participation and the permission to have their data used for research. The study received approval from the Faculty's Ethical Review Board (FERB) of Utrecht University. The study's schematic overview can be seen in Figure 1.

Figure 1

Schematic Overview of the Study Procedure



Note. The arrow represents time.

Session 1 (T1)

Session 1 took place in a lab at Utrecht University but was later also conducted online (N_{online} = 19) due to recruitment difficulties. The participant was welcomed by the

experimenter and received verbal information about the study's objectives. Basic information on the participant's aversive memory, such as the place, time, and relevant people, was collected. Furthermore, potentially excluding information of the memory regarding life threats, serious injuries, sexual violence, and death of a close person was gathered. In the case of participant inclusion, the detailed memory, including the hotspot, was recollected. Participants answered the mastery VAS, the GSES, and sociodemographic questions regarding age, gender, and occupation on a computer. Lastly, session 2 was scheduled, and the participants were informed about the surveys they would receive the following three days.

Day 1 to 3

After session 1, participants were randomized into one of four conditions. This thesis will focus on the summarized active and passive conditions, which are later described in this chapter. In addition, participants completed online questionnaires comprised of the mastery VAS and the GSES.

Session 2 (T2)

Similar to T1, T2 took place in a lab at Utrecht University or online (N_{online} = 25). This session included the experimental intervention. Participants were informed about the ImRs condition they were assigned to and received details about it. Information about ImRs was provided and practiced using the example of imagining a lemon. The participant's aversive memory from T1 was reviewed. Furthermore, participants were encouraged to imagine the event as detailed and vividly as possible during the subsequent phases. Memory activation took place by having the participant describe the memory in present tense and from the first-person perspective while having their eyes closed. All sensory information, emotions, and cognitions of the memory were included. On average, this activation phase took 11 minutes. After reaching the hotspot, participants were asked about their mastery level, and the ImRs phase began. The intervention was done following either an ImRs-A or an ImRs-P script.

They were then asked if there was something else they needed to happen. If the answer was "yes", the same procedure was repeated, if the answer was "no", the ImRs ended by holding the final positive image. The rescripting phase took 18 minutes on average.

Again, participants were informed about the following questionnaires and the follow-up survey.

Day 1.2 to 3.2

Participants completed online questionnaires comprised of the mastery VAS and the GSES. These answers were used for T2 in the analyses.

Follow-up (T3)

As a follow-up, participants completed an online survey. In addition to completing the mastery VAS and the GSES, they could request a debriefing session with an experimenter.

Conditions

This thesis focuses on the active (ImRs-A) and passive (ImRs-P) conditions. In the ImRs-A condition, participants were encouraged to act themselves within the rescripted scenario. After describing the hotspot during ImRs-A, participants were asked what would need to happen to make them feel better. They were then instructed to imagine doing whatever needed themselves. The participants were asked what was happening, what they felt, and what they thought. These steps were repeated until all needs of the participant were satisfied.

Within ImRs-P, participants were instructed to vividly imagine the experimenter or another person in the scene. They were then asked what this person needed to do to make them feel better. The subsequent steps were congruent with those of the ImRs-A condition.

Both conditions used either a client-guided or experimenter-guided approach, however, this thesis focused on the difference between ImRs-A and ImRs-P.

Statistical Analysis

Two separate repeated measures ANOVAs were calculated to assess the effects of ImRs on mastery and self-efficacy. Specifically, to test whether the two interventions led to differences in perceived levels of mastery, a 3 x 2 repeated measures ANOVA with time (T1, T2, T3) as the within-subject factor and the condition (ImRs-A, ImRs-P) as the between-subject factor was administered. Similarly, to examine differences between the conditions concerning self-efficacy during the intervention, a 3 x 2 repeated measures ANOVA was calculated with time (T1, T2, T3) and condition (ImRs-A, ImRs-P). Due to three drop-outs and five additional missing values, data from 39 participants was available for the mastery analysis (N_{Active} = 20, $N_{PAssive}$ = 19, N_{Female} = 29, N_{Male} = 9, N_{Other} = 1). With two more missing values, data from 37 participants (N_{Active} = 19, $N_{PAssive}$ = 18) was available for the self-efficacy analysis with one less female and "other" participant each.

The assumptions of a repeated measures ANOVA were checked as follows. The normal distribution of the continuous dependent variable was checked by skewness and kurtosis values. Mann-Whitney U-tests were calculated in case of assumed violation of the normality assumption. Potential outliers were detected using graphical representations, followed by careful removal or retention investigation. Potential outliers caused by aberrant measurements were removed, while outliers appearing to be true measurements were retained for the analysis. Lastly, sphericity, i.e., equal variance across time points, was checked using Mauchly's Test of Sphericity. Greenhosue-Geisser correction was used to adjust the analysis' degrees of freedom in case of a sphericity violation. None of the assumptions were violated and one outlier was found, however, it was not removed as it was a true measurement.

Post-hoc Bonferroni t-tests were calculated for significant interaction effects using pairwise comparisons, and levels of the within-subject factors were compared. Significance was set at $\alpha = .05$ for all analyses. Partial eta-squared (η_p^2; small ≥ .01, medium ≥ .06, large ≥

.14) was used as the effect size. Because this study was a pilot study, no a priori power analysis was run.

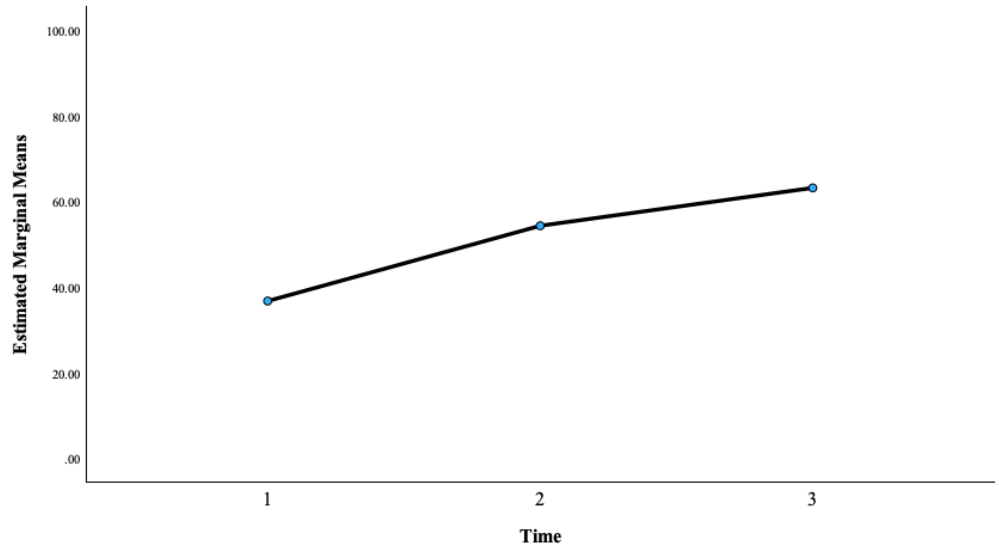
Results

Hypothesis 1 – Increased Mastery and Self-Efficacy over Time

As expected, the repeated measures ANOVA for mastery revealed a significant main effect of time, $F(2,74) = 17.756$, $p < .001$, $\eta_p^2 = .324$. Following up on this significant main effect, a pairwise comparison using Bonferroni correction showed that T1 ($M = 36.86$) differed significantly from T2 ($M = 54.43$), $p = .004$ and T3 ($M = 63.28$), $p < .001$. Moreover, an increase in mastery scores was found from T2 to T3, however, this finding was not statistically significant ($p = .134$). The time effect of mastery can be seen in Figure 2.

Figure 2

Estimated Marginal Means of Mastery



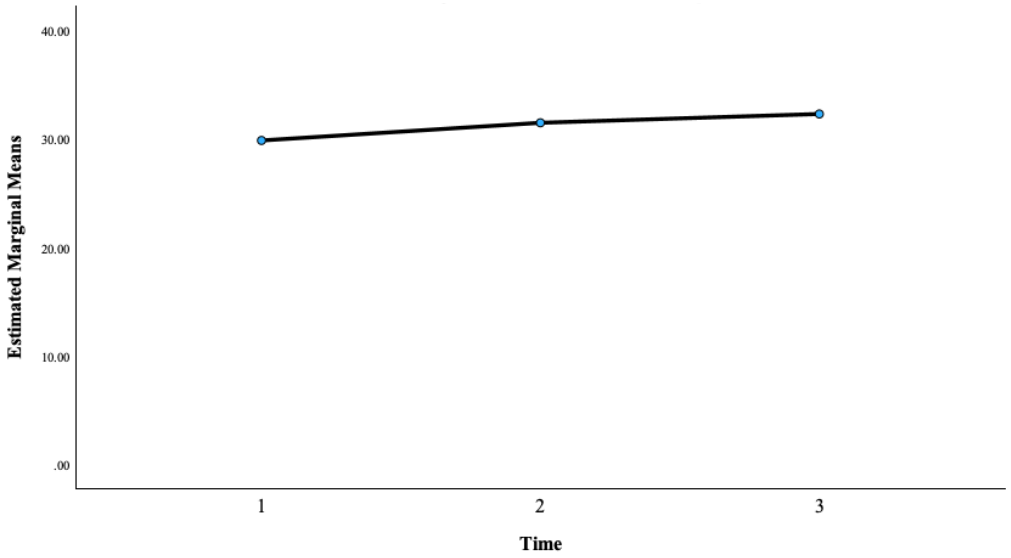
Note. 1, 2, and 3 refer to the time points T1, T2, and T3, respectively.

Similarly, the repeated measures ANOVA showed a significant main effect of time for self-efficacy, $F(2,70) = 16.314$, $p < .001$, $\eta_p^2 = .318$. Pairwise comparisons with

Bonferroni correction displayed significant differences between T1 (M = 29.89) and T2 (M = 31.52), p = .005 and T1 and T3 (M = 32.33), p < .001. Although there was an increase, no significant difference was found between T2 and T3 (p = .081). Figure 3 displays the estimated marginal means of self-efficacy.

Figure 3

Estimated Marginal Means of Self-Efficacy



Note. 1, 2, and 3 refer to the timepoints T1, T2, and T3, respectively.

Hypothesis 2 – Mastery Differences between Conditions

No significant main effect was found for the between-subjects factor condition on mastery, $F(1,37) = .129$, $p = .721$, $\eta_p^2 = .003$. Pairwise comparisons were therefore not further investigated. No significant interaction effect of Time (T1 vs. T2 vs. T3) x Condition (ImRs-A vs. ImRs-P) was shown for mastery, $F(2,74) = 3.003$, $p = .0.056$, $\eta_p^2 = .075$. The estimated marginal means of mastery per condition at the three time points can be seen in Table 1.

Table 1

Estimated Marginal Means of Mastery with Time and Condition

	Estimated Mean		
Condition	T1	T2	T3
Passive	29.21	55.21	66.05
Active	44.50	53.65	60.50

Hypothesis 3 - Self-Efficacy Differences between Conditions

An insignificant main effect of condition was established for self-efficacy, $F(1,35) = .062$, $p = .805$, $\eta_p^2 = .002$. Furthermore, an insignificant interaction effect was found for Time (T1 vs. T2 vs. T3) x Condition (ImRs-A vs. ImRs-P), $F(2,70) = .167$, $p = .846$, $\eta_p^2 = .005$. Table 2 depicts the estimated marginal means for self-efficacy within the interaction of time and condition.

Table 2

Estimated Marginal Means of Self-Efficacy with Time and Condition

	Estimated Mean		
Condition	T1	T2	T3
Passive	29.89	31.77	32.56
Active	29.90	31.32	32.11

Overall, we found that adherence to the conditions was followed. Only three cases deviated from the original condition, in which participants either automatically took the lead within therapist-guided ImRs or acted themselves within ImRs-P.

Discussion

This study examined whether applying ImRs to an aversive memory is associated with higher post-intervention scores in mastery and self-efficacy. Specifically, we investigated whether an active approach leads to higher mastery and self-efficacy scores than a passive ImRs approach.

As hypothesized, participants displayed greater post-intervention levels of mastery and self-efficacy compared to pre-intervention levels, both right after the intervention and at a follow-up. The effect sizes of these results were large. This finding adds to a great range of research outlining the effectiveness of ImRs interventions (e.g., Arntz et al., 2011; Kunze et al., 2019). As the mastery and self-efficacy questionnaires targeted the original, not the rescripted memory, the high post-intervention levels might indicate that a reevaluation of the memory took place, possibly by satisfying participants' previously unmet needs, resulting in increased control and power over the situation (Strohm et al., 2019). Therefore, results support mastery and self-efficacy as potential working mechanisms of ImRs and indicate that individuals feel more empowered as well as self-confident over an aversive situation after having undergone an ImRs intervention (Mancini & Mancini, 2018; Twardinski et al., 2021). The variables' role is further highlighted by studies demonstrating the association between increased self-esteem, a related construct to the two factors, and reduced negative symptoms as well as elevated positive affect (Çili et al., 2016; Newman-Taylor et al., 2019). The present study used participants' memories, not TFPs as done by most research. In contrast to Siegesleitner and colleagues (2020), the present study could promote self-efficacy, possibly due to using autobiographical memories. A possible explanation for this different finding is that using personal memories in ImRs directly relates to the own experience of overcoming or dealing with difficult situations and that by rescripting these more salient, relevant, and credible memories, participants' confidence in managing similar future situations may

increase more than with TFPs. It can be assumed that if participants perceived more self-efficacy regarding their own memories in this study, symptoms might decrease more using autobiographic memories than when using TFPs. Moreover, participants displayed a range of aversive memories, including interpersonal issues, work- and study related problems, and health worries. Thus, this study demonstrates that ImRs might help increase self-efficacy and mastery in a variety of problems.

In incongruence with the second and third hypotheses, no significant difference was found between the active and passive ImRs approach. This finding implies that participants' mastery and self-efficacy levels were not meaningfully different between the conditions. This finding is in line with the results by Siegesleitner and colleagues (2020), who compared an ImRs-A to an ImRs-P approach while looking at mastery and self-efficacy. Opposingly, our study stands in contrast to another study's finding, reporting a significant increase in empowerment in an active condition (Twardawaski et al., 2021). However, the researchers applied ImRs to minor injustice cases for which self-efficacy scores might arguably increase more rapidly. Thus, our study strengthens the finding that ImRs-A and ImRs-P do not affect mastery and self-efficacy differently, which might be related to the severity of memories.

Several reasons may explain these results. Firstly, they might imply that there was no difference between the two conditions and that all conditions are equally effective in increasing mastery and self-efficacy. Although participants might benefit more from higher activity levels during rescripting, Looney and colleagues (2021) suggest that initial therapist guidance during ImRs, thus more passivity in inventing the script, is associated with greater symptom reduction. Therefore, both ImRs approaches offer benefits and might thereby increase self-confidence regarding an adverse memory. Secondly, no difference was made between therapist or client-guided ImRs-A and ImRs-P. There are differing levels of activity within the actual script and in inventing the script. Hypothetically, being active in inventing

the script as done in client-guided ImRs can have similar effects as being active within the script. Therefore, clients who developed their own script in the passive condition might have had increased activity levels comparable to the active conditions.

Similarly, despite the assignment of participants to one of the conditions, there have been minor differences in the implementation and adherence to the conditions. Therefore, some participants in the ImRs-P condition still had a degree of input into the script creation process, which could have attenuated differences between the groups. Future studies ensuring a therapist-guided condition in which participants are entirely passive in the script creation might adjust for the heightened activity level in this study's ImRs-P condition and might lead to differential findings. Lastly, all participants were unfamiliar with the process of imagery rescripting and might have felt overwhelmed by the script development and imagining themselves in the recalled situation. Therefore, active participants might not display higher mastery and self-efficacy levels than participants in the passive condition, who pictured another person in the remembered scene.

Future studies should investigate whether higher mastery and self-efficacy levels are indeed related to a decrease in symptoms. For this purpose, randomized control trials (RCTs) could be conducted to establish a causal relationship between ImRs and symptom reductions, followed by an investigation of mastery and self-efficacy as possible mechanisms by adherence to the detailed criteria suggested by Kazdin (2007). Moreover, to ensure symptom ratings' validity, in addition to self-reports, physical reactions and clinical ratings could be taken.

Limitations

This study holds some limitations regarding its design. Firstly, no control group was included to compare the intervention group's results to. Thus, it remains unclear whether the

significant effect on mastery and self-efficacy was due to ImRs or rather a general "therapeutic effect" initiated by talking about the aversive memory with a neutral experimenter. Further studies could add to this study's results by including a control condition and comparing ImRs to other interventions. Moreover, the design was not entirely balanced as more females than males participated in the study. The sample can furthermore be considered to have a low age average of 24 years, making the results hard to generalize. Lastly, the small sample size after dropouts and missing values limits the overall generalizability of this study. Thus, further studies may use bigger and more varied samples to ensure the generalizability of findings.

Furthermore, the mastery VAS led to considerable confusion among participants. Mostly, participants showed uncertainty about whether the question should be answered regarding the original or the rescripted memory, and whether they felt control over it in the original moment or in the present. Although the experimenters provided explanations, participants' answers after these confusions might deviate from the ones that did not require additional clarification.

Lastly, several participants did not complete the follow-up survey and were contacted three weeks later for completion. Consequently, some answers were given shortly after the intervention, while some were recorded weeks later. This might have led to an altered perception of participants' controllability and self-confidence over the situation, possibly distorting the findings of mastery and self-efficacy. Nevertheless, it can be assumed that these variable ratings should be highest close to the intervention, and the fact that answers were similarly high at a later follow-up may serve as support for the study's findings.

Conclusion

This study was the first to apply ImRs to an autobiographic memory while comparing ImRs-A and ImRs-P. It thereby revealed an association between an ImRs intervention and the mechanisms of mastery and self-efficacy. However, no differences were found between ImRs-A and ImRs-P. These findings underscore the importance of mastery and self-efficacy within ImRs, thereby providing guidance for future research that could focus on the relationship between mastery levels and symptom reduction as well as on reasons for the nondifference between ImRs-A and ImRs-P.

References

Arntz, A. (2011). Imagery rescripting for personality disorders. *Cognitive and Behavioral Practice*, *18*(4), 466–481. https://doi.org/10.1016/j.cbpra.2011.04.006

Arntz, A. (2012). Imagery rescripting as a therapeutic technique: Review of Clinical Trials, basic studies, and research agenda. *Journal of Experimental Psychopathology*, *3*(2), 189–208. https://doi.org/10.5127/jep.024211

Arntz, A., Tiesema, M., & Kindt, M. (2007). Treatment of PTSD: A comparison of imaginal exposure with and without imagery rescripting. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*(4), 345–370. https://doi.org/10.1016/j.jbtep.2007.10.006

Arntz, A., & Weertman, A. (1999). Treatment of childhood memories: Theory and practice. *Behaviour Research and Therapy*, *37*(8), 715–740. https://doi.org/10.1016/s0005-7967(98)00173-9

Bachrach, N., Giesen, S., & Arntz, A. (2022). Blended delivery of imagery rescripting for childhood PTSD: A case study during the COVID-19 pandemic. *Clinical Psychology in Europe*, *4*(3). https://doi.org/10.32872/cpe.7815

Bandura, A. (1999). Social Cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, *2*, 21–41.

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour Research and Therapy*, *42*(10), 1129–1148. https://doi.org/10.1016/j.brat.2003.08.008

Bosch, M., & Arntz, A. (2023). Imagery rescripting for patients with posttraumatic stress disorder: A qualitative study of patients' and therapists' perspectives about the elements of change. *Cognitive and Behavioral Practice*, *30*(1), 18–34. https://doi.org/10.1016/j.cbpra.2021.08.001

Boterhoven de Haan, K. L., Lee, C. W., Fassbinder, E., van Es, S. M., Menninga, S., Meewisse, M.-L., Rijkeboer, M., Kousemaker, M., & Arntz, A. (2020). Imagery rescripting and eye movement desensitisation and reprocessing as treatment for adults with post-traumatic stress disorder from childhood trauma: Randomised clinical trial. *The British Journal of Psychiatry*, *217*(5), 609–615. https://doi.org/10.1192/bjp.2020.158

Brewin, C. R., Wheatley, J., Patel, T., Fearon, P., Hackmann, A., Wells, A., Fisher, P., & Myers, S. (2009). Imagery rescripting as a brief stand-alone treatment for depressed patients with intrusive memories. *Behaviour Research and Therapy*, *47*(7), 569–576. https://doi.org/10.1016/j.brat.2009.03.008

Çili, S., Pettit, S., & Stopa, L. (2016). Impact of imagery rescripting on adverse self-defining memories and post-recall Working Selves in a non-clinical sample: A pilot study. *Cognitive Behaviour Therapy*, *46*(1), 75–89. https://doi.org/10.1080/16506073.2016.1212396

Dibbets, P., & Arntz, A. (2016). Imagery rescripting: Is incorporation of the most aversive scenes necessary? *Memory*, *24*(5), 683–695. https://doi.org/10.1080/09658211.2015.1043307

Dibbets, P., Poort, H., & Arntz, A. (2011). Adding imagery rescripting during extinction leads to less aba renewal. *Journal of Behavior Therapy and Experimental Psychiatry*, *43*(1), 614–624. https://doi.org/10.1016/j.jbtep.2011.08.006

Grunert, B. K., Weis, J. M., Smucker, M. R., & Christianson, H. F. (2007). Imagery rescripting and reprocessing therapy after failed prolonged exposure for post-traumatic stress disorder following industrial injury. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*(4), 317–328. https://doi.org/10.1016/j.jbtep.2007.10.005

Holmes, E. A., Arntz, A., & Smucker, M. R. (2007). Imagery rescripting in cognitive behaviour therapy: Images, treatment techniques and outcomes. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*(4), 297–305. https://doi.org/10.1016/j.jbtep.2007.10.007

Holmes, E. A., & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review*, *30*(3), 349–362. https://doi.org/10.1016/j.cpr.2010.01.001

Hornby, A. (2005). *Oxford advanced learner's dictionary* (7th ed.). Oxford University Press.

Hunt, M., & Fenton, M. (2007). Imagery rescripting versus in vivo exposure in the treatment of snake fear. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*(4), 329–344. https://doi.org/10.1016/j.jbtep.2007.09.001

Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, *3*(1), 1–27. https://doi.org/10.1146/annurev.clinpsy.3.022806.091432

Kip, A., Schoppe, L., Arntz, A., & Morina, N. (2023). Efficacy of imagery rescripting in treating mental disorders associated with aversive memories – an updated meta-analysis. *Journal of Anxiety Disorders*, *99*, 102772. https://doi.org/10.1016/j.janxdis.2023.102772

Kosslyn, S. M., Ganis, G., & Thompson, W. L. (2001). Neural Foundations of Imagery. *Nature Reviews Neuroscience*, *2*(9), 635–642. https://doi.org/10.1038/35090055

Kroener, J., Hack, L., Mayer, B., & Sosic-Vasic, Z. (2023). Imagery rescripting as a short intervention for symptoms associated with mental images in clinical disorders: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *166*, 49–60. https://doi.org/10.1016/j.jpsychires.2023.09.010

Kunze, A., Arntz, A., Morina, N., Kindt, M., & Lancee, J. (2019). Treatment efficacy of imagery rescripting and imaginal exposure for nightmares. evidence from a randomized wait-list controlled trial. *Sleep Medicine*, *40*. https://doi.org/10.1016/j.sleep.2017.11.521

Landkroon, E., Meyerbröker, K., Salemink, E., & Engelhard, I. M. (2022). Future-oriented imagery rescripting facilitates conducting behavioral experiments in social anxiety. *Behaviour Research and Therapy*, *155*, 104130. https://doi.org/10.1016/j.brat.2022.104130

Landkroon, E., Salemink, E., Meyerbröker, K., Barzilay, S., Kalanthroff, E., Huppert, J. D., & Engelhard, I. M. (2022). The effect of imagery rescripting on prospective mental imagery of a feared social situation. *Journal of Behavior Therapy and Experimental Psychiatry*, *77*, 101764. https://doi.org/10.1016/j.jbtep.2022.101764

Lechner-Meichsner, F., Ehring, T., Krüger-Gottschalk, A., Morina, N., Plankl, C., & Steil, R. (2023). Using imagery rescripting to treat posttraumatic stress disorder in refugees: A case study. *Cognitive and Behavioral Practice*, *30*(4), 646–656. https://doi.org/10.1016/j.cbpra.2022.06.002

Lee, S. W., & Kwon, J.-H. (2013). The efficacy of imagery rescripting (IR) for social phobia: A randomized controlled trial. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*(4), 351–360. https://doi.org/10.1016/j.jbtep.2013.03.001

Long, M. E., & Quevillon, R. (2009). Imagery rescripting in the treatment of posttraumatic stress disorder. *Journal of Cognitive Psychotherapy*, *23*(1), 67–76. https://doi.org/10.1891/0889-8391.23.1.67

Looney, K., El-Leithy, S., & Brown, G. (2020). The role of simulation in imagery rescripting for post-traumatic stress disorder: A single case series. *Behavioural and Cognitive Psychotherapy*, *49*(3), 257–271. https://doi.org/10.1017/s1352465820000806

Mancini, A., & Mancini, F. (2018). Rescripting memory, redefining the self: A meta-emotional perspective on the hypothesized mechanism(s) of imagery rescripting. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.00581

McCarthy, A., Bank, S. R., Campbell, B. N. C., Summers, M., Burgess, M., & McEvoy, P. (2022). An investigation of cognitive and affective changes during group imagery rescripting for Social Anxiety Disorder. *Behavior Therapy*, *53*(5), 1050–1061. https://doi.org/10.1016/j.beth.2022.04.012

Morina, N., Lancee, J., & Arntz, A. (2017). Imagery rescripting as a clinical intervention for Aversive Memories: A meta-analysis. *Journal of Behavior Therapy and Experimental Psychiatry*, *55*, 6–15. https://doi.org/10.1016/j.jbtep.2016.11.003

Moritz, S., Ahlf-Schumacher, J., Hottenrott, B., Peter, U., Franck, S., Schnell, T., Peter, H., Schneider, B. C., & Jelinek, L. (2018). We cannot change the past, but we can change its meaning. A randomized controlled trial on the effects of self-help imagery rescripting on depression. *Behaviour Research and Therapy*, *104*, 74–83. https://doi.org/10.1016/j.brat.2018.02.007

Newman-Taylor, K., McSherry, P., & Stopa, L. (2019). Imagery rescripting in non-clinical paranoia: A pilot study of the impact on key cognitive and Affective Processes. *Behavioural and Cognitive Psychotherapy*, *48*(1), 54–66. https://doi.org/10.1017/s1352465819000419

Pile, V., Smith, P., & Lau, J. Y. (2021). Using imagery rescripting as an early intervention for depression in young people. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.651115

Prinz, J., Rafaeli, E., Wasserheß, J., & Lutz, W. (2021). Clients' emotional experiences tied to therapist-led (but not client-led) physiological synchrony during imagery rescripting. *Entropy*, *23*(12), 1556. https://doi.org/10.3390/e23121556

Schwarz, S., Grasmann, D., Schreiber, F., & Stangier, U. (2020). Mental imagery and its relevance for psychopathology and psychological treatment in children and adolescents: A systematic review. *International Journal of Cognitive Therapy*, *13*(4), 303–327. https://doi.org/10.1007/s41811-020-00092-5

Schwarzer, R. (1992). *Self-efficacy: Thought control of action* (1st ed.). Taylor & Francis.

Schwarzer, R., & Jerusalem, M. (2010). The general self-efficacy scale (GSE). *Anxiety, Stress, and Coping*.

Siegesleitner, M. (2020). *Imagery rescripting of distressing memories: experimental studies on effects and working mechanisms* (Doctoral dissertation, LMU).

Siegesleitner, M., Strohm, M., Wittekind, C. E., Ehring, T., & Kunze, A. E. (2020). Improving imagery rescripting treatments: Comparing an active versus passive approach. *Journal of Behavior Therapy and Experimental Psychiatry*, *69*, 101578. https://doi.org/10.1016/j.jbtep.2020.101578

Smucker, M. R., Dancu, C., Foa, E. B., & Niederee, J. L. (1995). Imagery rescripting: A new treatment for survivors of childhood sexual abuse suffering from posttraumatic stress. *Journal of Cognitive Psychotherapy*, *9*(1), 3–17. https://doi.org/10.1891/0889-8391.9.1.3

Steil, R., Fischer, A., Gutermann, J., & Rosner, R. (2022). Mental imagery in adolescent PTSD patients after Child abuse: A comparison with matched healthy controls. *BMC Psychiatry*, *22*(1). https://doi.org/10.1186/s12888-022-03706-8

Strachan, L. P., Hyett, M. P., & McEvoy, P. M. (2020). Imagery rescripting for anxiety disorders and obsessive-compulsive disorder: Recent advances and Future Directions. *Current Psychiatry Reports*, *22*(4). https://doi.org/10.1007/s11920-020-1139-4

Strohm, M., Siegesleitner, M., Kunze, A. E., Ehring, T., & Wittekind, C. E. (2019). Imagery rescripting of aversive autobiographical memories: Effects on memory distress, emotions, and feelings of mastery. *Cognitive Therapy and Research*, *43*(6), 1005–1017. https://doi.org/10.1007/s10608-019-10021-2

Twardawski, M., Gollwitzer, M., Altenmüller, M. S., Kunze, A. E., & Wittekind, C. E. (2021). Imagery rescripting helps victims cope with experienced injustice. *Zeitschrift Für Psychologie*, *229*(3), 178–184. https://doi.org/10.1027/2151-2604/a000450

Appendix A

The General Self-Efficacy Scale (GSE)

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in a bind, I can usually think of something to do.
10. No matter what comes my way, I'm usually able to handle it.

Note. This questionnaire is measured on a scale ranging from 1 = *not at all true* to 4 = *exactly true*.