Imagery rescripting and negative self-imagery in social anxiety disorder: A systematic literature review

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Abstract

Background: Imagery rescripting (IR) is an effective intervention for Social Anxiety Disorder (SAD) that targets memories of distressing formative events linked to negative self-imagery (NSI).

IR is thought to update unhelpful schema by addressing the needs of the younger self within the memory. An accumulating body of evidence indicates that by modifying NSI, IR can significantly affect distressing imagery, memory appraisal, and beliefs about the self.

Objective: This systematic review aims to critically evaluate and synthesise literature investigating the existing research on the effects IR has on NSI in SAD.

Method: A systematic electronic search of Academic Search Complete, ProQuest, Medline, Scopus and Pubmed was performed in February 2021 using predefined criteria. Ten studies met the inclusion criteria and were selected for review.

Results: Analysis of the reviewed articles' findings identified three main themes: *Changes to negative self-images*, *Memories linked to images* and *Encapsulated beliefs*. IR was associated with significant decreases in image distress, image vividness, memory vividness, memory distress, and encapsulated beliefs. Although reductions were found with image frequency, they were nonsignificant. Interpretation of results is limited by the small number of studies.

Conclusion: IR appears to effectively alter images, memories and beliefs in SAD in as little as a single session. The findings indicate that IR could be utilised as a cost-effective intervention for SAD. However, additional studies and longer-term follow-ups are needed.

Keywords: Social anxiety disorder, imagery rescripting, negative self-imagery, early memories, systematic literature review.

Introduction

Social anxiety disorder

Social anxiety disorder (SAD) is characterised by an intense and persistent fear of negative judgment in social or performance situations (DSM-V; American Psychiatric Association, 2013). Individuals fear that they will appear or behave embarrassingly, avoiding social situations or enduring them with intense anxiety. Common concerns include appearing dull or stupid, or looking anxious (Stein & Stein, 2008). Development of SAD typically occurs during the early to mid-teens, although a small subgroup of people develop the condition in later years (Stein & Stein, 2008). It is one of the most common anxiety disorders, with a lifetime prevalence rate of approximately 12% (Kessler et al., 2005). SAD is associated with economic disadvantages and poorer quality of life (Patel el al., 2002; Dryman et al., 2016). Despite the considerable suffering, impediment and cost associated with SAD, only about 45% of individuals with the condition ever seek treatment, and most often do so after two decades (Wang et al., 2005).

In the UK, cognitive behavioural therapy (CBT) is the first-line psychological treatment for SAD (National Institute for Health and Care Excellence [NICE], 2013). Two well-established CBT models, Clark and Well's model (1995) and Rapee and Heimberg's model (1997), are recommended by NICE. These models of SAD, as well as Hofmann's model (2007), which extends their work, indicate that negative self-imagery (NSI) play a pivotal role in maintaining the disorder. NSI are distorted images linked to memories of significant, negative social experiences (Hackmann et al., 2000) where a social schema is formed that encapsulates negative appraisals (Çili & Stopa, 2015). These images are commonly recurrent, spontaneous and from a third-person's perspective (Hackmann et al., 2000). Research has found that, during an anxiety-provoking social task, high social anxiety individuals more commonly experienced negative images and memories (Chiupka et al., 2012) and were more likely to report an observer's perspective (Ashbaugh et al., 2019) compared to low social anxiety individuals. Studies have found that holding an NSI (compared to a neutral self-image) is associated with an increase in safety-seeking behaviours, anxiety and critical appraisals of social performance (Hirsch et al., 2004; Ng et al., 2014).

The intrusive nature of NSI may be explained by neurobiological theories, such as the revised dual representation theory (DRT; Brewin et al., 2010). DRT proposes that overwhelming experiences can be processed in two memory systems that work in parallel: contextual accessible memories (C-reps) and situationally accessible memories (S-reps). C-reps are coherent, accurate in spatial and temporal context, voluntarily retrieved, updated over time and transferred to long-term memory. In contrast, S-reps are compromised of largely perceptual and affective information stored primarily in the amygdala

and insula, disconnected from areas of the brain that provide contextual information, such as the hippocampus. Thus, uncontextualised S-reps may form the basis of intrusive imagery, such as NSI.

Imagery Rescripting

Imagery rescripting, (IR) - an intervention used to treat NSI, received increased attention among researchers in recent years (Arntz, 2012; Holmes et al., 2007; Stopa, 2011). IR is a collection of therapeutic imagery techniques aiming to update negative appraisals encapsulated in memories of painful past events. IR is thought to modify negative mental self-representation by meeting the younger self's unfulfilled needs within a memory (Arntz & Weertman, 1999; Arntz, 2012). IR was first used to treat SAD by Clark et al. (2006) among a subgroup of patients who had a modest response to standard interventions. The authors believed IR contributed to the positive results observed, but as they did not evaluate IR separately they could not support this hypothesis. Wild et al. (2007; 2008) assessed IR's effects as a standalone intervention for SAD and found that it was associated with significant improvements to the vividness and disturbance of imagery and memories as well as negative encapsulated beliefs. An encapsulated belief can be understood as a summary of beliefs about the self, others and the world in relation to the imagery and/or memory (Wild et al. 2007).

Various theoretical frameworks can explicate IR's underlying working mechanisms. Contemporary learning models assume negative memories to be unconditioned stimuli (UCS), their triggers conditioned stimuli (CS) and symptomatology the conditioned response (CR; Mineka & Zinbard, 2006). Davey's conditioning theory (1997) hypothesises that the UCS mediates the strength of the CR to CS. When the subjective meaning of the USC is altered in IR, so is the CR. This theory has been termed *US-revaluation* (Davey, 1989; Arntz & Weertman, 1999). *US-revaluation* shares many features with memory reconsolidation, the process of long-term (consolidated) memories entering a state of plasticity after reactivation, similar to the conditions observed shortly after acquisition, leaving them susceptible to modification. Whereas traditional exposure therapy has been shown to develop new neural pathways, e.g. an alternative memory trace (Bouton, 2001), reconsolidation changes existing emotional memory at the synaptic level (Beckers & Kindt, 2017). Memory reconsolidation includes four phases: access, reactivation, mismatch and erasure (Beckers & Kindt, 2017), all of which exist during the three stages of IR. Alternatively, Brewin's (2006) retrieval competition hypothesis suggests that rather than modifying the negative memory, IR may develop a new adaptive memory that competes with the original memory during instances of subsequent retrieval. From a DRT perspective, IR utilises the contextualised C-rep memories to project a memory representation while incorporating the sensory-bound S-reps. This supports the contextualisation of the S-rep memory before a new, positive, more elaborated memory is formed that wins the retrieval competition, reducing distress (Brewin et al., 2010).

IR has been administered in individual and group settings as a standalone intervention and part of a CBT protocol to treat SAD. As a standalone approach, IR has shown to reduce fear, avoidance, negative evaluation, performance anxiety and social anxiety (Wild et al., 2007; Nilsson et al., 2012; Reimer & Moscovitch; Lee & Kwon, 2013; Norton & Abbott, 2016). Hyett et al. (2018) has evaluated IR as a standalone intervention in group sessions and found no significant differences in self-report measures of SAD between a single session of group IR, group cognitive restructuring (CR) and a waitlist. However, compared to CR and a waitlist, IR was associated with modulating heart rate variability, an indicator of greater emotion regulation. As part of multicomponent CBT intervention for individuals, IR was associated with significant reductions in the frequency and severity of socially anxious beliefs and fear of negative evaluation (Wild et al., 2007; Takanashi et al., 2019).

Two studies have integrated IR into a group CBT intervention. McEvoy and Saulsman's (2014) study found imagery-enhanced CBT, compared to non-imagery CBT, was associated with reliable improvements in social interaction anxiety at post-treatment and one-month follow-up. However, no group differences were found in improvements to performance anxiety. Ahn and Kwon (2018) found IR influenced group CBT was comparable to standard group CBT on all measures post-treatment. However, IR influenced group CBT was associated with significant improvements in interaction and performance anxiety at three-month follow-up.

Rationale and aims

Given the central role of imagery in the development, maintenance and treatment of SAD, an increased understanding of the relationship between IR and NSIs will facilitate more advanced treatment approaches to modify this maintaining factor. This may be particularly valuable for more chronic cases of SAD where traditional verbal based techniques have limited effect.

This study had two aims. Firstly, to conduct a systematic review to synthesize and critically evaluate empirical literature on IR used for patients with SAD. Secondly, to perform a meta-analysis to calculate pooled estimates of the effects of IR on imagery, memories and encapsulated beliefs linked to NSI based on the available evidence. It was hypothesised that, across studies, those who receive IR would report a reduction in anxiety associated with the imagery, reduced image vividness and frequency and less memory distress. With respect to encapsulated beliefs, it was expected that there would be a significant change in these appraisals, becoming more positive.

Methodology

Database Search

Following ethical approval, a comprehensive literature search was conducted in February 2021. Searches were completed in the following databases: Academic Search Complete, ProQuest, Medline, Scopus and Pubmed.

Search Terms

The search terms used were ‘Social anxiety disorder’ OR ‘social phobia’ AND ‘imagery rescripting’ AND ‘memory" OR ‘negative imagery’. A manual search was also conducted.

2.2 Inclusion and Exclusion Criteria

INSERT TABLE 1

One hundred sixteen articles were generated in total. All came from the five databases as no further articles were identified through the manual search. Search results were first imported to RefWorks, where 34 duplicates were removed. Upon completing screening the titles and abstracts, 53 articles were excluded as they met the exclusion criteria (Table 1). The remaining articles were selected for full-text analysis, where a total of 10 articles were deemed acceptable. Figure 1 shows the procedure used for selecting articles following PRISMA guidance (Moher et al., 2009).

Systematic Search Results

INSERT FIGURE 1

Quality Assessment of Studies

The *Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields* (Kmet et al., 2004) was used to assess the 10 articles' quality. This assessment tool was used as it allowed for the appraisal of multiple research designs. It uses 14 items for quantitative studies and 10 items for qualitative studies. Fully, partially and not met criteria scored 2, 1 and 0 respectively. If a criterion was not applicable it was excluded from the summary score. Two reviewers

independently evaluated the included studies and discussed any difference in ratings until a consensus was reached.

Results of Quality Appraisal

Assessment scores ranged from 60% to 96% indicating good quality. Interrater reliability tests were carried out on all papers. The Cohen's kappa value was .780, demonstrating moderate to strong inter-rater agreement (Altman, 1999).

Results

INSERT TABLE 2

INSERT TABLE 3

Synthesis of the findings

Where studies have used the same measurements and reported the necessary data, generic inverse variance meta-analysis are used to derive conclusions about that body of research. Where this has not been possible, a narrative summary is made. Nilsson et al. (2012) and Knutsson et al. (2019) did not report the necessary data to for inclusion in some of the meta-analyses.

INSERT FIGURE 2

Images

Image vividness

Eight studies examined the impact of IR on image vividness (Wild et al., 2007; Nilsson et al., 2012; Lee & Kwon, 2013; Norton & Abbott, 2016; Knutsson et al., 2019; Nilsson et al., 2012; Takanashi et al., 2020; Lee and Kwon, 2013). Considering the three studies that performed pre-session versus within-session comparisons, meta-analysis showed an overall decrease in image vividness (weighted mean difference (WMD) 27.41, 95% confidence interval (*CI*) 19.36 to 35.47; standardized mean difference (SMD) 0.98, Z=3.21, p=0.001) and the presence of heterogeneity among studies (I^2=77%, p=0.01) (Figure 2a). Considering the two studies that performed pre-session versus 1-week follow-up comparisons (Wild et al., 2007; Wild et al., 2008), there was again an overall decrease in

image vividness (WMD 26.17, 95% *CI* 11.53 to 40.81, SMD 0.58, Z=3.50, p=0.0005), with no heterogeneity between studies (I^2=0%, p=0.78) (Figure 2b). Likewise, Takanashi et al. (2020) found that median within-session image vividness scores were lower than median pre-IR scores (p=0.05), and Lee and Kwon (2013) found that a decrease in mean image vividness scores was maintained at 3-month follow-up (p<0.001). By contrast, no significant changes in image vividness were found in studies that performed a post-session IR versus control group comparison (Nilsson et al., 2012); a pre-session versus immediate post-session, 2-week follow-up, and 1-month follow-up comparisons (Knutsson et al. 2019); and a pre-session versus 1-week follow-up comparison (Nilsson et al. 2020).

Image distress

Seven studies examined the impact of IR on image distress (Wild et al., 2007; Wild et al., 2008; Nilsson et al., 2012; Lee & Kwon, 2013; Norton & Abbott, 2016; Knutsson et al., 2019; Takanashi et al., 2020). Considering the four studies that performed pre-session versus within-session comparisons (Lee & Kwon, 2013; Norton & Abbott, 2016; Wild et al., 2007; Wild et al., 20080), meta-analysis showed an overall decrease in image distress (WMD 26.15, 95% *CI* 20.83 to 31.47; SMD 0.77, Z=9.64, p<0.0001) and the presence of heterogeneity among studies (I^2=91%, p<0.00001) (Figure 2c). Considering the two studies that performed pre-session versus 1-week follow-up comparisons (Wild et al., 2007; Wild et al., 2008), there was again an overall decrease in image distress (WMD 28.48, 95% *CI* 14.90 to 42.06; SMD 1.14, Z=4.11, p<0.0001) with no heterogeneity between studies (I^2=0%, p=0.94) (Figure 2d). Likewise, Nilsson et al. (2012) reported that IR reduced image distress as compared with a control group (p=0.03), and Takanashi et al. (2020) found that median within-session image distress scores were lower than median pre-IR scores (p<0.001). Furthermore, Lee and Kwon (2013) found a decrease in image distress between a pre-IR session and 3-month follow-up (p<0.001). By contrast, no significant changes in image distress were found in a study that performed an post-IR versus control group comparison and pre-IR versus 2-week and 1-month follow-up comparisons (Knutsson et al., 2019).

Image frequency

Three studies examined the impact of IR on image frequency (Wild et al. 2008; Nilsson et al. 2012; Knutsson et al. 2019). Wild et al. (2008) and Nilsson et al. (2012) found a non-significant reduction in image frequency immediately after IR and at 1-week follow-up, although the authors of both studies proposed that stronger effects of IR on image frequency would be observed with longer follow-ups. Indeed, Knutsson et al. (2020) found a significant reduction in image frequency at 4-week follow-up (p<0.001).

INSERT FIGURE 3

Memory

Memory vividness

Four studies examined the impact of IR on memory vividness (Wild et al., 2007; Lee & Kwon, 2013; Takanashi et al., 2020; Romano et al., 2020a). Considering the two studies that performed pre-session versus within-session comparisons (Wild et al., 2007; Lee & Kwon, 2013), meta-analysis showed an overall decrease in memory vividness (WMD 35.14, 95% *CI* 25.37 to 44.92; SMD 0.73, Z=7.05, p<0.00001) and the presence of heterogeneity between studies (I^2=73%, p=0.05) (Figure 3a). Likewise, Takanashi et al. (2020) found that median within-session memory vividness scores were lower than median pre-IR scores (p=0.015), and Wild et al. (2007) and Lee and Kwon (2013) found that this decrease was maintained at 1-week (p=0.004) and 3-month follow-up (p<0.001), respectively. By contrast, Romano et al. (2020a) found that IR, imaginal exposure, and supportive counselling decreased memory vividness over time, but the main effects of condition and time and their interaction were not significant.

Memory distress

Eight studies examined the impact of IR on memory distress (Wild et al., 2007; Wild et al., 2008; Nilsson et al., 2012; Lee & Kwon, 2013; Knutsson et al., 2019; Takanashi et al., 2020; Reimer and Moscovitch, 2015; Romano et al., 2020a). Considering the four studies that performed pre-session versus within-session comparisons, meta-analysis showed an overall decrease in memory distress (WMD 40.90, 95% *CI* 33.18 to 48.61; SMD 0.68, Z=10.39, p<0.00001) with no significant heterogeneity among studies (I^2=58%, p=0.07) (Figure 3b). Considering the two studies that performed pre-session versus 1-week follow-up comparisons (Wild et al., 2007; Wild et al., 2008), there was again an overall decrease in memory distress (WMD 47.05, 95% *CI* 36.87 to 57.23; SMD 0.54, Z=9.06, p<0.00001) with the presence of heterogeneity between studies (I^2=93%, p=0.0002) (Figure 3c). Likewise, Nilsson et al. (2012) reported that IR decreased memory distress compared with a control group (p=0.01), and Takanashi et al. (2020) observed that median within-session memory distress scores were lower than median pre-IR scores (p=0.006). At 1-week follow-up, Nilsson et al. (2012) found less memory distress in the IR group compared with the control group (p=0.01) and Reimer and Moscovitch (2015) observed higher ratings for positive emotions (p=0.003) and lower ratings for negative emotions (p<0.001) as a result of IR. Furthermore, Lee and Kwon (2013) found that a reduction

in memory distress was maintained at 3-month follow-up (p<0.001). By contrast, Romano et al. (2020a) found that IR was associated with a non-significant reduction in memory distress at 3-month follow up.

INSERT FIGURE 4

Encapsulated beliefs

Ten studies examined the impact of IR on encapsulated beliefs (Wild et al., 2007; Wild et al., 2008; Lee & Kwon, 2013; Knutsson et al., 2019; Takanashi et al., 2020; Nilsson et al., 2012; Reimer & Moscovitch, 2015; Norton & Abbott, 2016; Romano et al. 2020a; Romano et al. 2020b). Considering the four studies that performed pre-session versus within-session comparisons (Wild et al., 2007; Wild et al., 2008; Lee & Kwon, 2013; Knutsson et al., 2019), meta-analysis showed an overall decrease in encapsulated beliefs (WMD 29.74, 95% *CI* 24.34 to 35.13; SMD 0.62, Z=10.80, p<0.00001) and the presence of heterogeneity among studies (I^2=76%, p=0.005) (Figure 4a). Considering the two studies that performed pre-session versus 1-week follow-up comparisons (Wild et al., 2007; Wild et al., 2008), there was again an overall decrease in encapsulated beliefs (WMD 46.34, 95% *CI* 30.69 to 61.99; SMD 0.86, Z=5.80, p<0.0001), with no heterogeneity between studies (I^2=0%, p=0.57) (Figure 4b). Likewise, Takanashi et al. (2020) found that median within-session encapsulated belief scores were lower than median pre-IR scores (p<0.001), and Lee and Kwon (2013) found that a reduction in encapsulated beliefs was maintained at 3-month follow-up (p<0.001. Nilsson et al. (2012) found that IR led to beneficial shifts in statements about the meaning of memories and images, with significant differences in negative/positive (p<0.001), helplessness/capacity (p<0.001), and unattractiveness/attractiveness (p<0.001) dimensions compared with the control group. Furthermore, Reimer and Moscovitch (2015) found that IR produced positive changes in perceived validity of core beliefs about the self (p<0.001), others (p=0.001), and the world (p=0.001).

Norton and Abbott (2016) investigated the impact of IR following an impromptu public speaking task and found that IR resulted in a moderate yet non-significant decrease in the strength of beliefs from pre-speech to immediately post-IR, but this decrease was not observed at 1-week follow-up. Romano et al. (2020a) found that IR was more likely to lead to updating of core beliefs about the self compared with supportive counselling (p=0.024), but there was no significant difference between IR and imaginal exposure. Also, there were no significant differences among groups for updating core beliefs about others. Finally, in a qualitative follow-up study, Romano et al. (2020b) interviewed 12 participants to understand their perception of memory changes due to IR. Nine participants reported changes in their experience of the memory as a result of IR, including changes in its emotional salience

and/or its effect on their lives. Two participants reported that the memory had not come to mind during the follow-up period, and one reported no change in the memory.

Limitations of the studies

There were several limitations to the studies. While findings are promising, sample sizes were small, with the majority of studies consisting of university students or non-treatment seeking participants (Nilsson et al., 2012; Reimer & Moscovitch, 2015; Norton & Abbott, 2016; Knutsson et al., 2019; Romano et al., 2020a; Romano et al., 2020b). These samples may differ from samples of treatment-seeking individuals in a primary care or hospital setting and were not designed to investigate clinical or sociodemographic moderators. This resulted in a narrow age range, high education levels and risk of selection bias, limiting the strength of the conclusions. Interventions generally had short follow-ups (one week; Wild et al. 2007; Wild et al. 2008; Nilsson et al., 2012; Reimer & Moscovitch, 2015; Norton & Abbot, 2016; Takanashi et al., 2020). Studies would have benefited from a longer follow-up period to track duration of changes and how they unfolded as stronger effects were anticipated to occur over time (Wild et al., 2008; Nilsson et al., 2012). It is unclear which aspects of IR are most effective as none of the studies analysed separate components of the procedure. Non-specific factors may play some role in positive outcomes of IR, e.g., imagery interview or support from the therapist. Although not technically a component of IR, the imagery interview may help participants link NSI and earlier memories, leading to a reappraisal of the image, memory, and the encapsulated belief. Equally, the support of the therapist may contribute to therapeutic changes. The majority of measures used across the studies were single-item measures. Although there was some evidence to suggest that the correlations of the association between the ratings before and after the control session were moderate to strong (Wild et al., 2008), single-items are more vulnerable to random measurement errors. The general nature of these measures may not capture more personal changes resulting from IR. Furthermore, unmeasured variables may have significantly contributed to IR's effectiveness, such as mental imagery ability or the severity of the traumatic experience. Lee and Kwon's (2013) findings showed that mental imagery ability and the severity of the traumatic experience did not influence the outcome of IR, but more research is needed. Nilsson et al. (2012), Norton and Abbott (2016), and Knutsson et al. (2019) gave limited information meaning that future studies would not be reproducible.

Discussion

We conducted a systematic review and meta-analysis to synthesize and evaluate the empirical literature on the use of IR for treating individuals with SAD, which extends previous reviews by Arntz (2012) and Morina et al. (2017), and to calculate pooled estimates of the effects of IR on imagery,

memories, and encapsulated beliefs linked to NSI across studies. Our results indicate that IR reduces aspects of imagery, memory, and associated beliefs among individuals with SAD. This analysis adds to the growing body of evidence showing that IR is an effective CBT intervention for various psychological disorders (Holmes et al., 2007).

The results of our meta-analysis indicate that IR significantly reduces image and memory vividness and distress for up to 1 week post-IR. However, Knutsson et al. (2019) and Takanashi et al. (2020) reported little evidence that IR reduces image and memory vividness and distress and vividness, perhaps due to a mismatch between the individual's memory and current imagery. Therefore, more careful consideration and psychoeducation during the preparation phases may increase therapeutic benefits. By contrast, there was no significant reduction in image frequency 1 week following IR. Wild et al. (2008) speculated that as participants undergoing IR spend more time thinking about images during treatment, thoughts about the images may also arise more frequently during the subsequent week. However, Knuttson et al. (2019) found a 50% decrease in image frequency at 4-week follow-up, suggesting that image frequency may decrease after the week following IR.

Our meta-analysis also indicated that IR significantly reduces negative encapsulated beliefs for up to 1 week post-IR, which is supported by studies employing other measures of encapsulated beliefs such as memory appraisal (Reimer & Moscovitch, 2015), imagery meanings (Nilsson et a. 2016) and core beliefs (Romano et al. 2020a; Romano et al. 2020b). Interestingly, Norton and Abbott (2016) reported that IR does not reduce maladaptive self-beliefs. They posit that CR, which is designed to address verbal cognitive processes, is necessary to achieve changes in maladaptive self-beliefs and also suggest that changing longstanding core self-beliefs requires multiple sessions. However, multiple studies included in this review show that single session of IR without CR can significantly reduce negative self-beliefs (Nilsson et al., 2012; Reimer & Moscovitch, 2015; Knutsson et al., 2019; Romano et al. 2020a; Romano et al. 2020b). Therefore, together with previous research, our findings suggest that IR is a powerful and efficient method for accessing, addressing, and reducing negative beliefs (Arntz & Weertman, 1999; Arntz, 2012; Stopa, 2009).

Limitations

This systematic review has some limitations. First, the number of included studies was small, and each included study tended to have a small (average of 14) number of participants per IR condition. Thus, the relatively large effect sizes found were likely due to studies' within-subjects designs. Second, there was variation among studies in how IR was conducted, with studies differing in when they first elicited imagery, whether they used CR prior to IR, and whether they used a specific memory or a representation of a memory, which could explain the significant heterogeneity among studies found for

several outcome measures. However, estimates of the I^2 measure of heterogeneity[1] can be inaccurate when included study sizes are small (Borenstein et al., 2009) and biased when a small number of studies is included in a meta-analysis (von Hippel, 2015), which can results in overestimations of the degree of heterogeneity present among studies. Third, search results were confined to studies published or accepted for publication in English peer-reviewed journals. Fourth, inter-rater reliability was not calculated for data selection.

Clinical Implications and Research Recommendations

Our findings support the use of IR as a brief standalone treatment that can alleviate patients' negative self-imagery, early traumatic memories, and related beliefs. The potential efficacy of IR is complemented by its efficiency, as only one to two sessions were applied in most of the included studies, indicating that IR may have both clinical and economic advantages.

IR is a unique alternative treatment in that it does not rely on social engagement. This is particularly relevant during the COVID-19 pandemic, during which physical distancing recommendations pose difficulties for treating SAD with CBT, which largely relies on the use of *in vivo* exposure therapy (NICE, 2013). Traditional exposure also requires the patient's commitment and motivation to continue therapy and relies on them actively working on their problems between sessions. Indeed, homework non-compliance is considered a main reason for unsuccessful CBT (Helbig & Fehm, 2004), with non-adherence reaching 20% to 50% (Helbig & Fehm, 2004; Kazantzis et al., 2005). Because it does not require exposure or homework, IR may reduce the drop-out rate, although future research is needed to investigate this possibility.

Future research should also address at which point in therapy IR might be most usefully introduced. Core beliefs, potentially encapsulated in images and memories, are not usually appropriate early treatment targets due to how entrenched and rigid they can be (Beck et al., 2005). The therapist risks losing credibility and endangering the therapeutic relationship if they question the validity of core beliefs too early (Beck & Beck, 1995). However, the available evidence base suggests that a single session of IR could result in substantial changes in patients' core beliefs without requiring the scaffolding that is generally considered necessary for such work. Future research would help ascertain for whom, using which variation, and at what stage in therapy IR would be most effective.

[1]An I^2 value of 0%, 25%, 50%, and 75% indicates no, low, moderate, and high heterogeneity among studies, respectively (Higgins et al., 2003).

To improve the rigor, generalizability, and impact of future studies, larger samples of participants representative of patients in clinical settings could be examined in comparison with a standardised control group, which would help provide stronger conclusions and provide more robust indications of the true effect size of IR. Temporally sequenced longitudinal designs accompanied by follow-up assessments at regular intervals would help examine IR's effectiveness across time. The conclusions of future research could be strengthened by assessing test-retest reliability on single-item measures, using valid and reliable multiple-item measures such as the Vividness of Visual Imagery Questionnaire (*Marks, 1973*), or by developing and validating new scales, such as a memory distress scale. Furthermore, as there are multiple factors involved in IR, a component analysis study is needed to clarify the effect of each component and elucidate the underlying mechanism of IR.

Conclusion

This review aimed to explore and synthesise the therapeutic effects of IR on NSI in individuals with SAD. More specifically, the images, memories and beliefs linked to NSI. Reductions in distress and vividness of images and memories were observed, as well as affirmative changes to encapsulated beliefs. Image frequency was the one dimension with opposing results, although given the trajectory of continued improvement in IR conditions, longer follow-ups, as evidenced by Knutsson et al. (2019), may have demonstrated more reductions in image frequency. Preliminary data are promising, but further research, including larger sample sizes, longer follow-ups and point of therapy use are warranted. It is hoped that the findings of this review will increase clinicians' understanding, expectations and confidence in the effectiveness of IR to ensure that evidence-based treatment is being provided to individuals with SAD.

Ethical statement: The authors have abided by the Ethical Principles of Psychologists and Code of Conduct, as set by the APA (2017).

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