



Imagery rescripting of early memories in health anxiety disorder: A feasibility and non-randomized pilot study

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ABSTRACT

Background and objectives: Health anxiety is a common problem and is associated with frequent primary care visits, increased health care costs, and poor prognosis and low recovery rates. Previous research shows that imagery rescripting (IR) is a promising treatment technique for various disorders. To date, IR has not been examined as a viable treatment for health anxiety. The purpose of the present feasibility and pilot study was to test one session of IR of early anxiety-laden health-related memories in a small sample of patients suffering from HA.

Methods: A within-groups design was used with a sample of 18 patients suffering from HA, who first underwent a control condition (reading about CBT), and then one week later a session of IR. After another week, the effects were measured on self-reported health anxiety and early anxiety provoking health-related mental images (memories).

Results: After the IR intervention, significant reductions of health anxiety and health worry, as well as image and memory distress, vividness and frequency were observed.

Limitations: Among the most important limitations are the absence of an active control group, the small size of the sample, the absence of a longer follow-up, and the use of only self-report measures.

Conclusions: The results suggest that IR is a feasible technique in the treatment of health anxiety, and that more controlled research along these lines may be worthwhile.

1. Introduction

Individuals suffering from health anxiety experience excessive health and illness worries. These symptoms range from mild to severe and may form when bodily sensations are interpreted as signs of severe illness. This triggers anxiety, rumination and maladaptive checking of the body and may lead to frequent visits to health services in search of reassurance of good health (Rachman, 2012; Taylor & Asmundson, 2004). Elevated health anxiety is associated with deterioration in self-rated health (Fink, Ørnbø & Christensen, 2010), and distress and impairment in family and occupational functioning (Sunderland, Newby, & Andrews, 2013).

HA is fairly common. In the adult population, 1–3% suffers from severe HA (Creed & Barsky, 2004; Martin & Jacobi, 2006) and more than a third of all primary care visits concern patients presenting symptoms not found to have somatic causes (Barsky, Orav, & Bates, 2005). Moreover, the condition is associated with poor prognosis, low

recovery rates around 30–50% (Olde Hartman et al., 2009) as well as increased health care costs on a societal level (Martin & Jacobi, 2006; Sunderland 2013). Even though a recent meta-analysis by Olantunji and colleagues (2014) gave evidence that cognitive behaviour therapy (CBT) was an effective treatment for HA showing large effect sizes at post-treatment, effect sizes dropped over time and for some patients the treatment was not beneficial (Olantunji et al., 2014).

Recurring, distressing and intrusive images related to the illness, such as seeing oneself becoming seriously ill, as in HA; being ridiculed in public, as in social anxiety; or seeing oneself frozen and surrounded by an intimidating crowd, as in agoraphobia, are common in many anxiety disorders (Holmes & Mathews, 2010). Reported rates of such images vary, and numbers between 100% for social phobia (Hackmann, Clark, & McManus, 2000) and agoraphobia (Day, Holmes, & Hackmann, 2004) and 69% for specific phobia (Pratt, Cooper, & Hackmann, 2004) have been reported. For health anxiety, Muse and colleagues reported rates at 78% in a sample of 55 participants (Muse, McManus,

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Hackmann, Williams, & Williams, 2010). These intrusive images however, are not directly addressed by current treatment protocols for HA (Wells & Hackmann, 1993). With the aim to improve on current treatments the present study explores the feasibility of single session imagery rescripting (IR) of anxiety-related health memories. Furthermore, the study aims to assess whether the effects of IR indicates that a larger randomized controlled study is worthwhile.

1.1. CBT for health anxiety

Since symptoms of HA are found to overlap partly with symptoms of panic disorder and obsessive compulsive disorder, there is reason to expect underlying cognitive and behavioural processes that have elements in common with other anxiety disorders (see Olatunji, Deacon, & Abramowitz, 2009 for a discussion). Consistent with these assumptions, Salkovskis and Warwick (2001) developed a cognitive model for HA. In line with this, early research showed that CBT focussing on anxiety symptoms using cognitive restructuring and exposure was indeed effective in treating HA (Speckens et al., 1995; Visser & Bouman, 2001). Comparing the two techniques (cognitive restructuring and exposure) in a sample of 84 health anxiety patients, Weck and colleagues (Weck, Neng, Richtberg, Jakob, & Stangier, 2015) found that both techniques show high efficacy, although exposure was more effective in reducing anxiety levels and safety behaviours. Furthermore, cognitive interventions were not necessary to reduce dysfunctional HA cognitions (Weck et al., 2015).

Turning to long-term effects of CBT for health anxiety, research indicates positive effects after 12 months (Seivewright et al., 2008) and longer. A recent multicentre randomized controlled study (Tyrer et al., 2014) involving 417 participants showed that the 10 sessions of CBT (compared to standard care) were effective two years later; twice as many patients receiving CBT achieved normal levels of health anxiety (HAI ≤ 10) compared to the control group. Moreover, Weck, Nagel, Höfling, and Neng (2017) showed remission rates after CBT twice as high (68%) as in untreated samples three years after receiving either cognitive restructuring or exposure, with no overall differences between the two techniques. Even though research, including the studies discussed above, has established that CBT is effective in treating HA (see Olantunji et al., 2014 for a meta-analysis), the aforementioned treatment studies also show that some patients respond only partially or not at all to treatment, implying that protocols need to be developed further.

1.2. The role of mental imagery in health anxiety

One under-researched area that may be important for the further development of CBT for HA, is the role of anxiety-related imagery in the illness. Mental imagery occurs when perceptual information is accessed from memory, experienced as “seeing or hearing with the mind’s eye” (Kosslyn, Ganis, & Thompson, 2001, p. 635). In the last decade, the role of spontaneous, intrusive and anxiety provoking mental imagery in several anxiety disorders such as social anxiety (Hackmann, Surawy, & Clark, 1998; Homer & Deeproose, 2017), obsessive compulsive disorder (Veale, Page, Woodward, & Salkovskis, 2015), posttraumatic stress disorder (PTSD) and test-anxiety (Prinz, Lutz, Bar-Kalifa, & Rafaeli, 2016) has received much attention. Research suggests that intrusive recurrent “catastrophic” images often are linked to memories of adverse events that occurred around the time of onset of the anxiety disorder and often in childhood (Hackmann et al., 2000). The mental imagery activates the structures in the emotional and anxious brain (i.e., the amygdala) acting as an emotional amplifier, partly inhibiting higher level processing by cortical areas (see discussion by Holmes & Mathews, 2010). These processes are linked to maladaptive responses such as rumination, thought suppression and distraction (Steil & Ehlers, 2000) or neutralizing, distraction, avoidance and reassurance seeking (Speckens, Hackmann, Ehlers, & Cuthbert, 2007) that contribute to the

maintenance of the anxiety disorder (Holmes & Mathews, 2010).

1.3. IR and the treatment of anxiety disorders

Hackmann et al. (2000) found that patients current “catastrophic” images are perceptions of the present, “coloured” by distorted meanings of early adverse memories. The images appeared to “correspond to the abstracted essence of the memory” (p. 605). Also, the authors observed that patients, at the time for the interview, were not aware of the link between the present images and the memories of early adverse events subsequently recalled. Hence, they suggested that treatment should focus directly on early memories, having patients to relive the memory in order to access the distorted meanings and “then transforming the memory” (Hackmann et al., 2000, p. 605) to generate less distorted meanings. Suggesting a similar approach, Brewin et al. (2009), argued that the function of therapy is to “create alternative, more positive memories that are more accessible and hence are retrieved in preference to the dominant negative memories” (p. 570). These ideas have inspired researchers to explore IR and the intervention was successfully applied in the treatment of various disorders (see review by Arntz, 2012 and the meta-analysis by Morina, Lancee, & Arntz, 2017) such as social phobia (e.g. Lee & Kwon, 2013; Nilsson, Lundh, & Viborg, 2012; Wild, Hackmann, & Clark, 2007, 2008), PTSD (e.g. Arntz, Tiesema, & Kindt, 2007; Grunert, Weis, Smucker, & Christianson, 2007), OCD (Veale et al., 2015), depression (Brewin et al., 2009) and bulimia nervosa (Cooper, Todd, & Turner, 2007). Spontaneous intrusive imagery has also been identified among clients suffering from health anxiety (Muse et al., 2010; Wells & Hackmann, 1993), suggesting that health-related intrusive images, even those representing hypothetical catastrophic content, may be linked to early memories of fearful experiences, hence amenable to IR. However, to our knowledge, there is as yet no treatment research with IR for HA.

1.4. Aims

The present feasibility and pilot study (see Eldridge et al., 2016 for a conceptual framework on feasibility and pilot studies) was a first preliminary attempt to investigate whether IR of early anxiety-laden health-related memories would be feasible and helpful in reducing self-reported health anxiety, health worry and fearful imagery if given to an unselected group of HA patients (i.e., patients with HA including comorbid disorders). Thus, we attempted to explore in a small sample whether the results indicate that the intervention may merit further testing. Furthermore, it aimed to pilot the integrity of the testing procedures in preparation for a larger trial, i.e. to try out whether the different materials and components and how they are administered in the study can all work together.

Specifically, we predicted (1) that IR is feasible and that the participants would accept participation and complete the three different sessions of the procedure. Further, in line with research on IR discussed above, especially the single-session treatments of social phobia (Wild, Hackmann, & Clark, 2008; Nilsson et al., 2012), we predicted that the participants, after IR, would report (2) fewer symptoms of HA and health worry, and (3) reduced distress, vividness and frequency of health-related images (memories and current images).

2. Method

2.1. Study design

A within-subjects, repeated-measures design was employed, all participants serving as their own control. Ethical approval was provided by the Regional Ethics Committee at Lund University (Dnr: 20147320 EPN). An a priori power analysis was performed for sample size estimation, based on data from Nilsson et al. (2012), who compared one-session imagery rescripting to a RT in patients with social anxiety

disorder. The effect sizes (ES) in this study were moderate to large (e.g., $d = 0.63$ on a measure of social anxiety, and 1.38 on memory distress). With an $\alpha = .05$ and power = 0.80, the projected sample size needed for an ES of 0.63 (GPower 3.1) is approximately $N = 18$ for a within group comparison.

2.2. Participants

Participants were recruited from psychiatric out-patient clinics and health care centres in two major cities of southern Sweden. Participants were 18 outpatients (five male) suffering from HA according to the DSM-5 criteria for Illness Anxiety Disorder (APA, 2013), ranging in age from 20 to 56 years (mean age = 33.5, $SD = 9.00$). Patients were diagnosed and referred to the study by psychiatrists not involved in the study, and, for the purpose of background data collection, interviewed by a clinical psychologist (the third author). In addition participants underwent a medical examination to exclude somatic causes of the reported symptoms. Most participants suffered from co-morbid disorders, including panic disorder (28%), social anxiety disorder (11%), generalized anxiety disorder (6%), obsessive-compulsive disorder (6%), and depression (6%). The majority of the participants reported having suffered from HA for several years, four participants had lifelong symptoms, and one participant had an onset only eight months prior to the study.

2.3. Imagery interview

To obtain participants descriptions and meanings of recurrent imagery in situations with elevated health anxiety, a semi-structured interview (Hackmann et al., 2000; Wild et al., 2008) of 30 min duration was conducted. The questions were standardised and asked in a fixed order. The following instructions, translated from Swedish and adapted from social anxiety to health anxiety, started off the interview: "I'd like to talk to you about some of the things that go through your mind when you get anxious about your health. Usually when people are very anxious a mixture of thoughts and images or fleeting pictures go through their minds. I'm especially interested in any pictures or images you have popping into your mind when you are anxious. Do you recall a recent event, during this week, when you worried about your health? Can you tell me if any spontaneous images came to mind at that occasion?" (Adapted from Wild et al., 2008, p. 603). All participants reported having images. Then, they were asked to recall such an image and to describe it (if more than one image appeared they were instructed to choose the one that appeared first), and it was explored whether this image recurred in health anxiety situations.

To establish the meaning of the image, participants were asked what was the worst thing about the image and what it said to the participant. Then, dwelling on the image, they were requested to rate how distressing and vivid it appeared, and how often the image had occurred during the past week (see section "Instruments"). Participants were also requested to identify and describe a memory of an event where they had felt the same way as they did in their image: "When did you first experience this feeling? How old were you? Please describe the memory." Similarly, as with the image, participants were also asked what was the worst thing about the memory and to rate how distressing it was. Finally, participants were asked to summarise the meaning of both memory and recurrent images: "I'd like you to give one or two sentences that encapsulate the meanings of your memory and image".

2.4. Instruments

2.4.1. The Short Health Anxiety Inventory (SHAI: Salkovskis, Rimes, Warwick, & Clark, 2002)

The SHAI is an 18-item self-report measure of health anxiety. It was found useful for screening health anxiety by differentiating well between hypochondriacal patients and other anxiety disorder patients

(Salkovskis et al., 2002). SHAI items are rated on a scale from 0 (no symptoms) to 3 (severe symptoms). SHAI total scores range from 0 to 54, with higher scores reflecting higher levels of health anxiety. SHAI was found to have an excellent internal consistency (Cronbach's $\alpha = 0.95$) and the test-retest reliability was good ($r = 0.90$) (Salkovskis et al., 2002). The internal consistency of the Swedish version of SHAI in this study was excellent (Cronbach's $\alpha = 0.93$).

2.4.2. The anxious thoughts inventory (AnTi: Wells, 1994)

The AnTi is a 22-item self-report measure of three basic worry-dimensions: social worry, health worry, and meta-worry. Items are rated on a scale from 1 (almost never) to 4 (almost always). The subscale health worry of the AnTi includes 8 items, the total scores of which range from 8 to 32, with higher scores representing higher health worry. Wells (1994) reported a reliable 3-factor structure that was moderately independent and showed high test-retest correlations across a six-week period. In the present study only the health related items were used with a good internal consistency (Cronbach's $\alpha = .90$).

2.4.3. The beck depression inventory – second edition (BDI-II: Beck, Steer, & Brown, 2005)

The BDI-II is a 21-item self-report designed to measure depression. Items are rated on a scale from 0 (no symptoms) to 3 (severe symptoms) assessing the presence and strength of cognitive, behavioural, emotional, and somatic symptoms of depression. BDI-II total scores range from 0 to 63, with higher scores indicating severe depression. BDI-II is a revised version of the original BDI, first published in 1961 (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The Swedish translation of the BDI-II shows good reliability and validity (Beck et al., 2005) and the internal consistency in these studies was acceptable, the Cronbach's α ranging from 0.77 to 0.93.

2.4.4. Memory distress (MD)

Participants were asked to retrieve their early memory and to stay with it. They were then asked to rate how distressing it was on a scale from 0 (*not at all*) to 100 (*extremely*).

2.4.5. Imagery ratings: distress (ID), vividness (IV), and frequency (IF)

Participants were asked to conjure up their negative image and to stay with it. They were asked to rate how distressing the image was on a scale from 0 (*not at all*) to 100 (*extremely*). Participants also rated how vivid it was on the same scale and finally, asked to rate how often the image had occurred during the last week on a scale from 0 (*not at all*) to 100 (*all the time*).

2.5. Imagery rescripting (IR)

This intervention built on Arntz and Weertman's (1999) procedure in three phases: reliving, mastering, and compassion. However, drawing from clinical practice, we also asked participants to dwell upon an image of a secure and safe place (of the participants' own choice, e.g., taking a bath, or resting on a quiet place in a garden) just prior to, and at the conclusion of the rescripting intervention (Leuner, 1994). During reliving participants were first asked to imagine the memory, at the age at which the event occurred, and to relive it as if it was happening just now. The participant was asked to describe the episode in a present tense (e.g., "I see my father lying on the bed he's pale and skinny he murmurs and his breath is hissing and I'm terrified"). Secondly, in the mastering phase, participants were instructed to imagine the same scene as a bystander at their current age. In this phase, participants were instructed to watch what was happening to their younger self and to describe their reactions as well as saying how they could help their younger self. Generally, the participants intervened in order to help or correct and sometimes to address the younger self, conveying a sense of security and encouraging the child to act in an assertive way. In the third phase of compassion and comfort, patients were asked to

relieve the memory as the younger self with the adult self present and were asked to explore what actions would be necessary for the younger self to feel better and prompted to ask for this. This stage was generally marked by the need for extra nurturing and compassion. Lastly, the participant once again dwelled upon an image of a safe place.

2.6. Reading task

For the purpose of providing a control condition participants were asked to read an introductory text on cognitive behaviour therapy. This reading task (RT) covered the general basics of CBT but contained no specific information on HA or CBT for HA.

2.7. Procedure

In session 1, lasting an hour, having given informed consent, the participants were asked to complete the symptom measures (SHAI, AnTI and BDI-II). Next, the imagery interview (Hackman et al., 2000) was conducted and HA-images were described, explored and rated (Time 1) for distress, vividness and frequency (MD, ID, IV and IF). The ratings were directly followed by the RT after which participants once more (Time 2) were asked to complete the memory and imagery ratings (MD, ID, IV). Notice that this session involved the exploration of early memory and recurrent images but without challenging or updating their meaning.

In session 2, seven days later, participants again completed symptom measures (SHAI and AnTI), and made the imagery ratings (Time 3). Subsequently, the imagery rescripting procedure (IR) was administered, followed by the post-IR imagery and memory ratings (Time 4). The length of this session was also 1 h. At the follow-up (session 3), a week later (Time 5), the participants were again asked to complete the SHAI and AnTI measures, as well as the memory and imagery ratings (MD, ID, IV and IF). Finally, participants were debriefed, residual anxiety symptoms were treated according to best practice, and advice on self-help literature was given.

3. Results

3.1. Integrity of procedure and feasibility of IR for HA

The protocol held well throughout the pilot. All 18 of the recruited participants accepted participation and completed the study and attended all three separate sessions, indicating that the intervention seemed acceptable to them.

3.2. Within-session change for IR and control sessions

We computed within-session change for MD, ID, and IV by subtracting ratings just after the intervention (rescripting or RT) from ratings before the intervention. Paired samples *t*-tests were used to compare the mean within-session change in the IR-session with the same measure in the RT control session. Results are displayed in Table 1. The results showed that the reduction of MD was larger after rescripting compared to control RT, $t(17) = 2.21, p = .04$, Cohen's $d = 0.52$. The mean within-session change on the other two measures of imagery did not differ significantly between the two sessions: ID, $t(17) = 0.80, p = .44$, Cohen's $d = 0.19$, and IV, $t(17) = 0.37, p = .72$, Cohen's $d = 0.00$.

3.3. Effects of IR over time

A series of repeated-measures ANOVAs was carried out on HA-measures and image ratings with three levels: pre-control (Time 1), follow-up control/pre-rescripting (Time 3), and follow-up rescripting (Time 5). Mean scores and standard deviations at the 3 different time points and significance levels of paired *t*-tests are presented in Table 2.

Table 1

Means and standard deviations of within-session change for memory, distress, image distress and vividness.

Measure	Within-Session Change	
	Control Session	Rescripting Session
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
MD	8.61 (14.53)	25.56 (27.11)*
ID	3.44 (21.16)	10.00 (27.01)
IV	4.72 (21.73)	1.28 (28.46)

Note: MD = Memory Distress; ID = Image Distress; IV = Image Vividness. Higher scores indicate greater improvement.

* $p < .05$ (paired samples *t*-test).

We found significant time effects for both the SHAI scores, $F(2,28) = 5.317, p = .011, \eta^2 = 0.275$ and the AnTI health anxiety scores, $F(2,34) = 10.264, p < .000, \eta^2 = 0.385$. Post-hoc examination of these results using paired *t*-tests revealed significant reductions one week after the rescripting session (Time: 3 vs 5) for SHAI, $t(15) = 2.136, p = .050$, and for AnTI, $t(17) = 3.608, p = .002$. As expected, scores after the control session (Time: 1 vs 3) showed no significant changes: SHAI, $t(14) = 1.832, p = .09$, and AnTI, $t(17) = 1.269, p = .222$.

As regards memory and imagery ratings, there were significant time effects on all ratings: MD, $F(4,68) = 13.943, p < .000, \eta^2 = 0.451$, statistical power = 1.00; ID, $F(4,68) = 5.495, p = .001, \eta^2 = 0.244$; IV, $F(4,68) = 7.290, p < .000, \eta^2 = 0.300$; IF, $F(2,34) = 8.016, p = .001, \eta^2 = 0.320$. In line with our expectations, pair-wise comparisons showed significant decreases on all ratings 1 week after the rescripting session: ID, $t(17) = 2.887, p = .010$; IV, $t(17) = 5.451, p = .000$; IF, $t(17) = 3.476, p = .003$. In contrast, 1 week following the control session, we observed no significant changes: ID, $t(17) = 1.430, p = .171$; IV, $t(17) = 0.535, p = .600$; and IF, $t(17) = 1.201, p = .246$ (see Table 2). Unexpectedly, the comparisons showed that MD had significantly decreased 1 week after both the rescripting and the control sessions: $t(17) = 2.917, p = .010$ (Cohen's $d = 0.69$) and $t(17) = 3.289, p = .004$ (Cohen's $d = 0.78$) respectively.

4. Discussion

The present feasibility and pilot study was a first preliminary attempt to investigate whether IR of early anxiety-laden health-related memories would be feasible and helpful if given to an unselected group of HA patients (i.e., patients with HA including comorbid disorders). Based on research on other anxiety disorders discussed above, we expected imagery rescripting to be an acceptable intervention for these clients and to be associated with reduced symptoms of health anxiety and health worry as well as reductions on the distress, vividness and frequency related to intrusive images. The results were clearly in line with these expectations.

Thus, IR was found to be a feasible intervention in a clinical group of patients with health anxiety, with promising effects in comparison with a RT control session. It was associated with reduction, albeit fairly weak, of symptomatology, but robust decreases in the distress caused by memory and intrusive images. The findings suggest that IR may be a candidate for integration into current treatment protocols for health anxiety. More research is needed however to confirm the effects in more controlled trials, and to learn where in the treatment process it might be introduced and to what extent it may act as an alternative to in vivo exposure.

To make our data comparable with those of Wild et al. (2008), we decided to compare ratings and measures from before and one week after each session, as can be seen in Table 2. While significant changes following the control session were not expected, we did predict

Table 2

Means and standard deviations at pre-session, post-session and one week follow-up on measures of health anxiety, memory and imagery.

Measure-ments	Pre-Control		Post-Control		Follow-up ctrl/Pre-IR		Post-IR		Follow-up		Analysis		Significance of	
	Time 1		Time 2		Time 3		Time 4		Time 5		F	df	Paired Comparisons	
	M	SD	M	SD	M	SD	M	SD	M	SD			1 vs. 3	3 vs. 5
SHAI	52.53	4.16			48.87	5.66			46.73	6.12	5.32*	2,28	0.088	0.05
AnTi	19.39	2.70			18.39	3.05			15.78	2.58	10.63***	2,34	0.222	0.002
MD	61.94	27.34	53.33	25.84	52.22	24.81	26.67	26.40	32.78	27.02	13.94***	4,68	0.004	0.010
ID	56.5	21.93	53.06	20.37	47.22	24.57	37.22	24.51	30.56	23.38	5.50***	4,68	0.171	0.010
IV	58.33	20.07	53.61	19.08	54.72	20.83	53.44	24.39	30.83	20.31	7.29***	4,68	0.600	0.000
IF	36.11	31.65			28.06	26.63			10.83	13.31	8.02***	2,34	0.246	0.003

Note. SHAI = Short Health Anxiety Inventory; AnTi = Anxious Thought Inventory (health subscale); MD = Memory Distress; ID = Image Distress; IV = Image Vividness.

IF = Image Frequency. Repeated measures analyses of variance conducted with three levels (pre-control; follow-up control/pre-rescripting; and follow-up re-scripting).

* $p < .05$; *** $p < .001$.

significant changes following the rescripting session. Indeed, our data demonstrated substantial and clinically meaningful reductions for all measures after IR. A somewhat surprising additional finding was that memory distress was significantly reduced also after the control. Reductions, although not significant, was also seen for the other HA-measures. Three explanations can be mentioned briefly; first, merely meeting with the therapist may have introduced response expectancies, placebo, and/or participation effects (Kirsch, 1999; Price, Finnis, & Benedetti, 2008). Second, the RT per se could be partly responsible; even though it was short and fairly general, it did contain some remarks on the relations between thoughts, behaviours and emotion that may be useful to people with anxiety disorders. A third, perhaps more viable explanation is that the procedure of rating memories and images in the control session reduced anxiety. This included asking the participant to conjure up the memory in the mind and sit with it for a while. Even though no mastery or rescripting was done, this introduced an element of imaginal exposure. Previous research have shown that a high degree of overlap exists regarding which areas of the brain that are activated when one actually experiences events and when recalling them, and that the memory of events can be seen as a “mental simulation” of actual perceived and, in this case, health anxiety provoking events (Kent & Lamberts, 2008). As in vivo exposure is a potent treatment procedure for anxiety (Abramowitz, Deacon, & Whiteside, 2011) the element of imaginal exposure may be accountable for these effects.

However, the results also showed that merely dwelling on and rating the health anxiety memories was less effective than rescripting them. As noted by Wild et al. (2008), IR adds several elements to recall, such as elaborating the image with new information (cognitive restructuring) and introducing a compassionate perspective and experience. The contribution of these different parts of IR to the effects has not, to our knowledge, been investigated, which may be a fruitful focus of future studies.

Muse et al. (2010) found that 78% of participants reported intrusive health-related mental images. In the current study, each of the 18 patients reported such images. The participants in Muse et al. were diagnosed according to DSM-IV-TR criteria for diagnosis of hypochondriasis (APA, 2000), but in the present study DSM-5 (2013) criteria for illness anxiety disorder were used, which might in part account for the differences.

The current study has a number of limitations to consider. First, an important limitation is the absence of an active control condition, where the participants carried out some kind of exercise (e.g., relaxation, or physical exercise) that is associated with increased well-being without including any imagery rescripting. Second, the size of our sample was small. Despite this, statistical power was seen to reach high levels (ranging from 0.80 to 0.98) and significant changes were demonstrated following the rescripting session. However, a larger sample

would have strengthened the conclusions. Third, the generalizability of the findings are affected by the inclusion of patients fulfilling the criteria for the DSM-5 category of illness anxiety disorder (IAD). Unlike the DSM-5 diagnosis of somatic symptom disorder, this category excludes somatic symptoms (except for very mild symptoms). The absence of somatic symptoms limits the range of generalization to a smaller number of clients. However, researchers differ on the number, reporting estimations of the proportion cases of health anxiety detected by IAD, ranging from approximately 25% (e.g., Bailer et al., 2016) to 50% (e.g., Newby, Hobbs, Mahoney, Wong, & Andrews, 2017). Fourth, the order of the IR and the RT was fixed, the RT being offered first followed by the IR. Counterbalancing might have been possible by removing the RT from the first session, and devoting an entire session to it together with repeated memory and imagery ratings, either as session 2 (with IR in session 3) or as session 3 (with IR in session 2), and the follow-up session as session 4. This would have made it possible to test the alternative hypothesis that what was effective was the repeated memory and imagery ratings, rather than the IR in itself. Fifth, although our choice of a within-subjects design, starting off with the control session, gave us the benefit of following the process over time, we cannot rule out the possibility that the control session may have increased the effects of the rescripting session. Therefore, an additional study employing an experimental between-groups design would be desirable to eliminate these sequence effects. Sixth, we relied on single-item rating scales. Our aim to make this study comparable to the Wild et al. (2008) study justified the choice. Although the use of one-item measures might cause loss of sensitivity there is some support for doing so; for example, Davey, Baratt, Butow, and Deeks (2007) have demonstrated that a one-item measure of state anxiety adequately predicted the score of the State-Trait Anxiety Inventory-State (Spielberger, Gorsuch, & Lushene, 1970) and hence could replace the latter. Also, considering the need for several measurements, the use of questionnaires would have made the investigation time-consuming and less manageable. Seventh, a longer follow-up period would have been of great interest, but in accord with our wish to make the study comparable with Wild et al. (2008), we decided to use one week. Further studies should benefit from offering longer follow-up periods. Finally, as Wild et al. (2008) pointed out, it would be desirable to supplement self-report measures with “objective” methods, such as behavioural or physiological measures.

In conclusion, the results indicate that imagery rescripting of anxiety-related health memories, even in a one-session format, is a feasible and potentially effective intervention in the treatment of health anxiety. Given the limitations outlined above, a next step might be a larger controlled pilot study (e.g., with 70–100 participants) with an active control condition, to estimate between-group variability in effects and address some of the other methodological limitations, which

could then inform a larger study.

Conflicts of interest

We can confirm that there are no conflicts of interest. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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