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Exploratory study of imagery rescripting without focusing on early traumatic memories for major depressive disorder

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Background. Mental imagery has a more powerful impact on our emotions than thinking in words about the same material. Treating intrusive images with imagery rescripting (IR) has been reported for various disorders, including post-traumatic stress disorder, social anxiety disorder, and bipolar disorder. There has been less research about IR as a major depressive disorder (MDD).

Aims. We examined whether IR without focusing on early traumatic memories is effective in MDD.

Methods. We enrolled 19 participants with MDD, who received 15 weekly sessions of full CBT, including two sessions for IR of intrusive images and, separately, for memory rescripting. Before and after the IR intervention, participants were asked to rate the intrusive images they experienced against, an intrusion index that included difficulty (interference with daily life), uncontrollability, distress caused by the negative image, and vividness. We recorded the contents of each participant's negative and positive imagery to classify these.

Results. The intrusion index scores decreased after the IR sessions. Negative images experienced by the participants while in a depressive mood were categorized into three different types: blame, social exclusion, and loneliness. The rescripted positive images were categorized into good relations and worthy self (competent self).

Conclusions. These results suggest that IR of intrusive images without focusing on early traumatic memories may usefully be incorporated into routine CBT sessions for MDD.

Beck, Rush, Shaw, and Emery (1979) stated that cognition could be 'either a thought or a visual image'. The value of using mental imagery in cognitive behavioural therapy (CBT) was recognized early by Beck (2002), and researchers have subsequently developed theories that mental imagery may play a pivotal role in human cognitions and behaviours

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(Brown & Clark, 2015). Imagery has been described in various ways in the recent literature.

Mental imagery frequently consists of visual images; it can refer to images in any of the five senses (sight, hearing, taste, smell, and touch) (Brown & Clark, 2015). Moreover, Kosslyn, Ganis, and Thompson (2001) have observed that although mental images often take a visual form, they might include other sensory modalities, such as auditory, olfactory, and kinesthetic (Holmes, Arntz, & Smucker, 2007; Pearson, Deeprose, Wallace-Hadrill, Heyes, & Holmes, 2013). Perception occurs when information is registered directly from the senses (Kosslyn, 2005), and perceptual imagery is emotional (Holmes *et al.*, 2007). The imagery of sensory modalities in mental images is thought to have a particularly great influence on emotion.

Brewin (2006) stated that 'CBT does not directly modify negative information in memory but produces changes in the relative activation of positive and negative representations such that the positive ones are assisted to win the retrieval competition' (p. 765). Holmes, Geddes, Colom, and Goodwin (2008) reported that mental imagery has a more powerful impact on our emotions than verbal processing of the same material, and Holmes *et al.* (2007) suggested that negative imagery might inhibit access to positive memories.

It is difficult to distinguish between images and memories. In the current study, images are defined as still and static pictures for a very short time, such as flashbacks. Conversely, memories are defined as moving and dynamic pictures for a longer time, such as autobiographical memories. A memory consists of serial images. For example, many patients with PTSD experience flashbacks as still and static images as one of the fragmented and disorganized trauma memories. In CBT progress, some patients with PTSD could tell their therapists a more coherent, organized, and detailed trauma memory as a story (Gray & Lombardo, 2001).

Imagery rescripting (IR) has been described as instructing a patient to change a problematic image into a more benign form (Holmes & Mathews, 2010). IR has many associated techniques for tackling problematic imagery in various ways (Holmes *et al.*, 2007). Recently, there has been considerable interest in imagery techniques in CBT, and treating intrusive images with IR has featured prominently in current theoretical accounts for disorders such as post-traumatic stress disorder (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000), social phobia (Clark & Wells, 1995; Rapee & Heimberg, 1997), and bipolar disorder (Holmes *et al.*, 2008). In contrast, there has been less research about the use of IR in major depressive disorder (MDD) (Holmes, Blackwell, Heyes, Renner, & Raes, 2016), and research into mental imagery in depression is at an early stage. However, in a case series study of 10 MDD patients with depression who experienced intrusive memories, Wheatley *et al.* (2007) and Brewin *et al.* (2009) tested the use of IR as a stand-alone treatment with an average of 8 sessions of IR per patient.

Recently, many types of IR have been described. Holmes *et al.* (2007) have described imagery techniques as having two dimensions. The first dimension includes addressing intrusive negative imagery (e.g., rescripting image-based memory) and promoting positive imagery (e.g., positive interpretation bias training via the use of imagery). The second dimension is working with the image either directly (e.g., building compassionate imagery) or indirectly (e.g., mindfulness-based cognitive therapy).

In this study, we used two image technique tools each based on these two dimensions: memory rescripting, which involved addressing negative imagery and working with the image directly, and IR, which involved promoting positive imagery and working with the image directly. We used these tools as a part of a full CBT programme in a clinical setting. This study had three aims: to evaluate the effectiveness of our study's protocol for IR without focusing early traumatic memories for people with MDD, to investigate and

classify the content of the imagery experienced by the participants, and to investigate how the classified contents and properties of the participants' images influenced their mood.

Methods

Participants

This study was associated with a single-arm, uncontrolled trial of CBT on mental defeat and cognitive flexibility in patients with depression who remain symptomatic following pharmacotherapy, registered in the National UMIN Clinical Trials Registry (ID: UMIN000023320) (Murata *et al.*, Unpublished data). For the present study, we enrolled one more participant in addition to the 18 participants of Murata's study.

The 19 participants (11 women and eight men) were evaluated by a psychiatrist and all met the criteria for MDD according to DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision) (American Psychiatric Association, 2010). To ensure that our study conditions were similar to those of a clinical setting, comorbidities were permitted if they were clearly secondary (i.e., the most severe issue causing the greatest impairment to the participant was MDD).

Exclusion criteria included psychosis, antisocial personality disorder, mental retardation, autism spectrum disorders, substance abuse or dependence within 12 months prior to enrolment, current high risk of suicide, or any unstable medical condition (such as a progressive physical disease). Ethical approval for this study was given by our institution's Institutional Review Board (reference number: 1730), and written informed consent was obtained from all participants.

Table 1 summarizes the participants' baseline clinical characteristics. Their ages ranged from 25 to 65 years, with a mean (standard deviation) of 38.4 (11.3) years. Their mean score in the Japanese version of the Beck Depression Inventory II (Beck, Steer, & Brown, 1996; Kojima *et al.*, 2002) was 29.00 (5.96). Some participants also met the criteria for social anxiety disorder ($N = 3$), panic disorder ($N = 2$), bulimia nervosa ($N = 1$), and generalized anxiety disorder ($N = 1$). The age of onset for major depression ranged from 19 to 50 years, with a mean of 30.50 (7.96) years. The mean duration of the disorder was 6.53 (5.08) years.

The CBT programme

The sessions on IR of intrusive images and memory rescripting were conducted as two separate parts of the individual 15 weekly full CBT sessions. Each session lasted 50 min,

Table 1. Baseline characteristics for the participants ($N = 19$; 11 women and eight men)

	Mean	*SD*
Age (years)	38.4	1.30
Education	15.7	1.49
Onset age	30.5	7.96
Illness duration	6.53	5.08
BDI-II		
Pre-CBT (1st session)	29.00	5.96
Pre-IR (7th session)	25.32	11.29
Post-CBT (15th session)	18.11	10.54

Note. BDI-II = Beck Depression Inventory II; CBT = cognitive behavioural therapy; IR = imagery rescripting; *SD* = standard deviation.

and the two assessment sessions and the CBT programme consisted of 15 sessions that included the development of an individualized version of the cognitive behavioural model of MDD, including sessions on psychoeducation, case conceptualization, goal setting, activity scheduling, cognitive restructuring (×2), IR of intrusive images (×2), assertiveness training, problem solving, memory rescripting work (×2), schema work, relapse prevention, and termination. The IR sessions were conducted as the seventh and eighth sessions of the 15 full CBT sessions. BDI-II was used to measure depressive symptoms before the first and seventh sessions (i.e., prior to the whole programme and the IR session) and after the 15 full CBT sessions.

The IR sessions

We divided the IR protocol for early traumatic memories into IR sessions for negative images, which were limited only to mental imagery but not memories, and rescripting sessions for early traumatic memories (memory rescripting), as described somewhere by our research team (Hiramatsu *et al.*, unpublished data). The IR for negative images, based on the work of Arntz and Weertman (1999), consisted of two consecutive weekly sessions each lasting 50 min. In brief, the participant was asked to identify a negative image when feeling in a depressive mood and to portray the image using various sensory modalities. Next, during the first IR session, he or she was asked to identify the meaning of the image and to restructure its negative meaning. Then, during the second IR session, he or she was asked to generate a positive image using IR.

The IR sessions were conducted by eight therapists (five clinical psychologists, one psychiatrist, and two psychiatric social workers) as a part of the full CBT programme. All the therapists had completed the Chiba Improving Access to Psychological Therapies Project (Chiba-IAPT CBT) training course (Kobori *et al.*, 2014). They were trained to deliver our IR protocol by the first author (FY, a licensed clinical psychologist) and supervised by a senior supervisor (ES, an experienced psychiatrist) on a weekly basis. The participants rated the intrusiveness of the images (in terms of difficulty, uncontrollability, distress, and vividness) before and after the two IR sessions.

Protocol for IR

Holmes *et al.* (2007) classified IR techniques as types A, in which a pre-existing negative mental image is transformed into a more benign image, and type B, which involves rescripting negative schematic beliefs by using a fresh positive image. We modified the semistructured interview of an IR protocol for social anxiety disorder by Hackman and colleagues (Hackmann, Clark, & McManus, 2000; Wild, Hackmann, & Clark, 2007, 2008) for patients with MDD in order to identify recurrent depressive images and their meanings. The questions were standardized and asked in a fixed order.

First, the participant was provided with psychoeducation about intrusive imagery in the following way: The intrusive image repeats and cannot be controlled, and it is able to amplify emotion. Its particularly negative world image and self-image contain an abstract of the personal beliefs. The negative self-image persists and is difficult to update automatically through new experiences. It is therefore important that you visualize the image and renew its meaning (Wheatley & Hackmann, 2011). Next, the participant was asked to identify a negative image that enters his or her mind when he or she feels in a depressed mood. 'I want to talk about a mental image that appears in your mind when you are depressed. When you feel depressed, a thought,

an image and/or a picture over quickly usually appear in your mind. At that time, what kind of image emerges for you?'

The therapist then asked the participant to portray the image in terms of various sensory modalities. What do you see in your image? What do you hear? What do you taste? What do you smell? What do you feel in your body, not only outside it (exteroceptive), but also inside (interoceptive/visceral)? The participant was asked to rate the negative image according to an intrusion index (Wheatley *et al.*, 2007). As we excluded 'frequency', the intrusion index has four items as follows: its difficulty (interference with daily life), uncontrollability, distress, and vividness of the image. Each was scored on a scale from 0 (not at all) to 100 (extremely severe), and the intrusion index was calculated as the mean of these four scores.

The participant was asked to identify the meaning of the image. What kind of meaning does the image have for you? What does it mean about you as a person? What does the image tell you about the world around you or your future? What underlies the meaning of the image? The participant was then asked to rate the certainty of his or her subjective belief about the meaning of the negative image as a certainty factor from 0 (not sure at all) to 100 (completely sure). The first IR session ended with the therapist guiding the participant in reconstructing the negative meaning into a positive one through generating counterevidence regarding the meaning of the negative image.

The following week, the participant was guided to generate a positive image from the negative image, as with the IR at the end of the previous session. Psychoeducation was provided about mastery imagery and compassionate imagery. What would need to happen in the image for you to feel better? If you feel helpless, you can use mastery imagery that shows you can control the situation by yourself. If you experience shame, self-blame, or self-attacking, you can use compassionate imagery to comfort yourself.

Following the IR, the participant was asked to rate again the certainty factor of the negative meaning. This concluded the second IR session. The participant was also asked to rehearse the rescripted positive imagery every day and to rate the intrusion index of the negative image again at this post-IR time point as homework.

Statistical analyses

We used IBM SPSS Statistics for Windows, version 23 (IBM, Armonk, NY, USA), to compare baseline and post-intervention image ratings, and certainty factor percentages using Student's *t*-test. We corrected *p*-values for multiple comparisons using Bonferroni method. We divided each *p*-value .05 (two-tailed) by 6 (numbers of t-tests). Therefore, we considered $p = .083$ as statistically significant. We assessed BDI-II at three time points, namely immediately before the session 1, immediately before the session 7, and immediately after the session 15. We compared BDI-II scores of its three time points using one-way analysis of variance (ANOVA) followed by post-hoc Bonferroni test. As an effect size, Cohen's *d* was calculated using the following formula: $d = (M1 - M2)/\sqrt{SD1^2 + SD2^2/2}$, where M1 and M2 are pre- and post-mean scores of the measure. SD1 and SD2 are pre- and post-standard deviations. The value was interpreted as small >0.2, medium >0.5, or large >0.8.

Qualitative analyses

We analysed the transcripts of patients on the basis of results of thematic analysis. In this study, Yamada F and Shimizu E analysed the patients' transcripts on the basis of the phase

of thematic analysis as follows: Phase 1, familiarizing yourself with your data → Phase 2, generating initial codes → Phase 3, searching for themes → Phase 4, reviewing themes → Phase 5, defining and naming themes (Braun & Clarke, 2006). Furthermore, Hiramatsu Y and Takanashi R analysed the data and inspected rates of agreement on a scale of 'not agree', 'agree', and 'absolutely agree'; we adopted the themes only after their approval (agree and absolutely agree).

About the other papers resulting from this trial

The contents of two papers (Hiramatsu *et al.*, unpublished data; Murata *et al.*, unpublished data), which report results of trials, do not overlap with the contents of our study. The first of the previous studies (Murata *et al.*, unpublished data) investigated mental defeat and cognitive flexibility in patients whose depressive symptoms did not alleviate after pharmacotherapy, whereas the second study (Hiramatsu *et al.*, unpublished data) investigated memory rescripting work and its contents in the same patient groups.

Results

Effectiveness of the IR sessions

Table 2 presents the values before and after IR for the image intrusion scores. All post-IR scores, with the exception of those for image difficulty, were significantly lower than the pre-IR scores (image uncontrollability: $t = 3.00$, $p = .008$; image distress: $t = 5.41$, $p < .001$; image vividness: $t = 5.22$, $p < .001$; intrusion index, $t = 5.63$, $p < .001$; certainty factor: $t = 5.14$, $p < .001$). The effect sizes were large, except for difficulty (small). Table 3 summarizes the changes in BDI-II scores at pre-, mid-, and post-full CBT sessions. ANOVA on the scores yielded a significant variation among three time points, (F: $1.97, 35.52) = 12.88, p < .01$. In pairwise comparison using post-hoc Bonferroni test, the BDI scores at mid-CBT (25.32 ± 11.29) and at post-CBT (18.11 ± 10.54) were significantly lower than those at pre-CBT (29.00 ± 5.95). The effect size (Cohen's d) between

Table 2. Image intrusion scores before and after imagery rescripting (IR)

	Total sample (N = 19)						
	Pre-IR		Post-IR		Analysis		
Measure	Mean	*SD*	Mean	*SD*	*t*	*p*	Cohen's *d*
Image difficulty	45.56	28.74	35.56	21.21	1.58	.132	0.39
Image uncontrollability	57.22	27.82	33.33	28.28	3.00	.008	0.85
Image distress	81.39	13.04	40.00	29.70	5.41	<.001	1.80
Image vividness	66.94	23.83	40.00	26.79	5.22	<.001	1.06
Intrusion index[a]	62.48	16.93	36.50	22.09	5.63	<.001	1.16
Certainty factor[b]	82.50	16.93	46.88	26.70	5.14	<.001	1.59

Notes. IR = imagery rescripting.

[a]The intrusion index was calculated as the mean of the four item scores for difficulty, uncontrollability, distress, and vividness.

[b]The certainty factor represents the participant's degree of subjective belief about the meaning of the image.

Table 3. Comparison of pre-, mid-, and post-The Program of 15 CBT Sessions outcome measure scores

	Pre		Mid		Post			Pairwise comparisons (p)			Cohen's *d* condition		
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	Pre- to post	Pre- to mid	Mid- to post	Pre- to post	Pre- to mid	Mid- to post
	29.00	5.96	25.32	11.29	18.11	10.54	$F(1.97, 35.52) = 12.88^{**}$	<0.001	0.274	0.012	1.27	0.41	0.66

Notes. BDI-II = Beck Depression Inventory-II. Post-hoc test (Bonferroni). $^{**}p < .01$.

pre- and post-CBT scores was 1.27. The effect size (d = 0.66) was larger from mid- to post-CBT programme (from the seventh session to the fifteenth session) than that (d = 0.41) from pre- to mid-CBT programme (from the first session to the sixth session).

Properties of the negative images (see Figure 1)

We categorized the negative images identified by the 19 participants when in a depressive mood into three different types with regard to social pressure from others: blame, social exclusion, and loneliness. Seven participants described experiencing blame, six patients described experiencing social exclusion, and six patients described their experience of loneliness.

Next, the sensory modality types (sight, hearing, taste, smell, and touch) involved in the negative images were determined. Nine of the participants expressed three sensory modalities for their negative image, seven participants expressed two modalities, one participant expressed four, one participant expressed five, and one participant expressed only one. Visual, auditory, olfactory, gustatory, and body sensation modalities were expressed 19, 9, 3, 3, and 14, respectively.

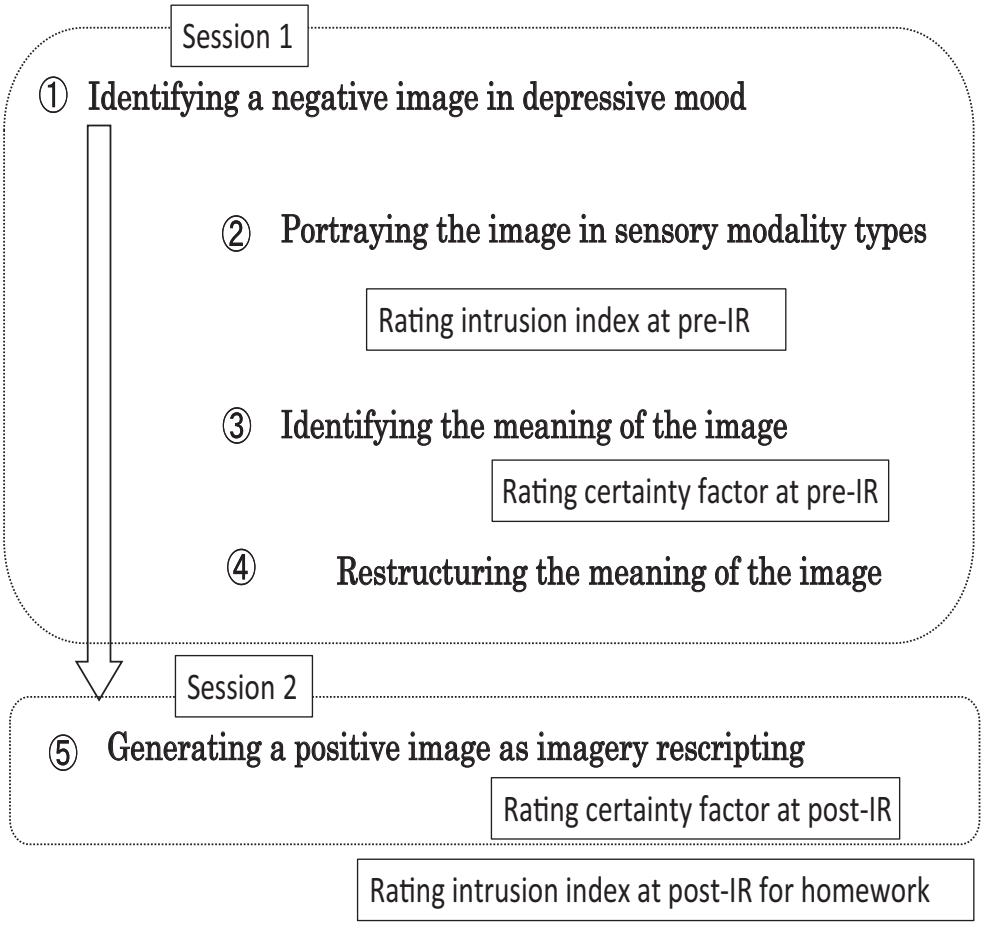

Figure 1. Process for the imagery rescripting of an intrusive image.

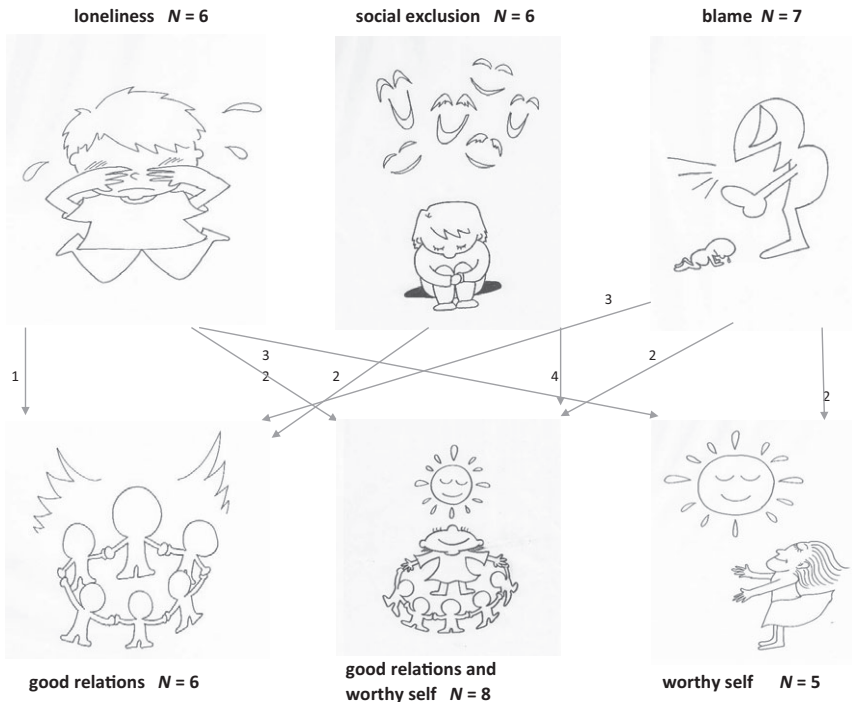

Figure 2. Changes from negative imagery into positive imagery. The three images in the upper row represent the three classifications of the 19 participants' negative images: loneliness, social exclusion, and blame. The images in the lower row represent the classifications of the participants' positive images after imagery rescripting (IR): 'worthy self', 'good relations', or both. The arrows and numbers indicate the number of participants whose negative imagery was changed after IR into each of the positive imagery categories.

We categorized the meanings of the negative images using Beck's cognitive triad of negative views of oneself, the world, and the future. The meanings were categorized as follows: negative self and world (5 participants), negative self (5), negative world (4), negative future (3), and negative self and future (2).

The positive images

We categorized the positive images after IR into two overlapping types: worthy self (competent self) and good relations. The positive images of eight participants included both worthy self and good relations, six included good relations, and five included worthy self (Figure 2). The arrows and associated numbers in Figure 2 indicate the changes from negative categories to positive categories and number of participants who experienced each of these changes. Table 4 describes the negative image and transition for each participant individually.

Discussion

Table 3 presents that the intervention of our study's CBT programme might have a large effect on BDI-II scores. Furthermore, the latter half of the CBT manual including IR could

Table 4. Imagery rescripting work for the intrusive images of 19 participants with major depressive disorder

ID	Age (year)	Sex	Negative image	Category	Sensory modality (number)	Meaning of negative image	Type of meaning	Positive image	Category
P 13	44	Female	My mother-in-law's angry face looks like a demon. Her eyes become a golden colour. She is screaming and about to attack me.	Blame	Visual, auditory (scream), body (wincing involuntarily, pain) (3)	I am a punching bag. Others do not treat me as a human being.	World	My husband helps me. For me, he tells my mother-in-law that she is wrong.	Good relations
P3	31	Female	The president of my company tells me, with a laugh, that I cannot work anywhere.	Blame	Visual, auditory (voice), body (sweating, tense) (3)	I cannot do anything.	Self	My boss tells me that I do a good job while looking me in the eye.	Good relations
P1	27	Female	When I am not with my co-workers, they backbite me (speak ill of me) in the office.	Blame	Visual, auditory (voice), body (sweating) (3)	Others tell me that I am useless, and what I do is meaningless.	World, self	An older woman gentles on my back and tells me that I am OK.	Good relations
P4	55	Female	I am rejected by my mother, sister, or brother. I am beaten by them.	Blame	Visual, Body (dull, chest pain, tense) (2)	I am always the odd one out. I do not know why I make other people feel uncomfortable.	World, self	I do good work. I am an important person for others. I am a delight. People respect me.	Good relations and worthy self
P 15	65	Female	I am scolded by someone in a public space.	Blame	Visual, body (restlessness, tense, buzzing in chest) (2)	I am not an important person. It's no use.	Self	I behave proudly in a public place. I am confident,	Worthy self
P5	25	Female	I am jeered by people who look at me with cold eyes.	Blame	Visual, auditory (voice), body (tense, choking) (3)	I do not contribute to society. I am useless.	Self	I have a talent. I have original ideas that others have never have.	Worthy self
P7	38	Female	Strong women, such as my grandmother and aunt, talk me down. I cannot talk back to them. Other weak women, including my mother, do not help me. I put	Blame	Visual, Auditory (giggling voice), Body (tense) (3)	Nobody helps me. I have been hated by others.	World	I am independent and active. People accept me the way I am.	Good relations and worthy self

Continued

Table 4. (*Continued*)

ID	Age (year)	Sex	Negative image	Category	Sensory modality (number)	Meaning of negative image	Type of meaning	Positive image	Category
			on a fake smile in front of them.						
P9	36	Male	Although my co-workers in the hospital can successfully perform physical therapy for a patient in front of students, I cannot perform well as a therapist.	Social exclusion	Visual, olfactory (smell of hospitals), body (palpitations) (3)	I do not have any skills. I am ashamed of myself.	Self	I am able to consult my superiors and co-workers. With their help, I can do good work.	Good relations and worthy self
P 16	34	Male	When I did the same failure at my desk in the office, I did not know what to do. People are watching me, but do not help me.	Social exclusion	Visual, auditory (telephone, voice), body (palpitations, choking) (3)	I am ashamed of myself. Other people think I am useless. Nobody helps me.	Self, World	I do good work speedily. People around me are kind and talk to me with care.	Good relations and Worthy self
P2	43	Female	The children of my husband and his ex-wife say nothing to me, even when I give them handmade gifts at my mother-in-law's house,	Social exclusion	Visual, auditory (voice), body (palpitations) (3)	My bad situation will continue for 20 years.	Future	I have done good things. I feel a sense of accomplishment. With my husband, I am the centre of attention in my family.	Good relations and worthy self
P 18	34	Female	At a social gathering party of twenty people, I am alone in the corner of the pub restaurant. People carry on a conversation, but I do not speak much.	Social exclusion	Visual, auditory (noise, murmur) (2)	I do not have communication skills. I should not be here.	Self	At a social gathering party of twenty people, I am in the centre of the pub restaurant. I talk to others with a smile, feeling relaxed.	Good relations
P6	40	Female	People around me are enemies and do not support me. They look friendly, but only in a superficial way.	Social exclusion	Visual, body (palpitations, buzzing in chest, choking) (2)	There are no supporters for me in the world. Life is hard. I have no power to survive.	World, self	I make enough money to survive. I am independent. I am an attractive woman	Good relations and worthy self

Continued

Table 4. (*Continued*)

ID	Age (year)	Sex	Negative image	Category	Sensory modality (number)	Meaning of negative image	Type of meaning	Positive image	Category
								surrounded by my loved ones.	
P8	48	Male	People look away from me, when my boss accused me of being sarcastic at the office.	Social exclusion	Visual, body (palpitations, sweating, hot flush in head) (2)	I can't trust anyone. Others are unreliable.	World	I consult my colleagues, feeling relaxed. I can say no to my boss.	Good relations
P 11	26	Male	I am working alone at a laboratory bench.	Loneliness	Visual (1)	Wasted, meaningless time passes. I continue to live my life in vain.	Future	My current experiment has led to a new discovery. Out of work, I make friends to attend enrichment lessons or a hobby group. I have fun. I am doing meaningful things.	Good relations and worthy self
P 10	57	Male	I am sick in bed and see the ceiling in the dark.	Loneliness	Visual, gustatory (bitter, sour), body (dull, pain) (3)	I am useless and a loser. Things always go wrong. My future is hopeless.	Self, future	I am living a healthy lifestyle. I hang out the laundry on a sunny day in the morning in summer. Against the blue sky and white clouds, a pure white T-shirt is fluttering in the wind.	Worthy self
P 12	29	Male	I am drifting in a dark place and cannot see anything.	Loneliness	Visual, body (floating) (2)	No one helps me. I cannot consult anyone.	World	I ask for help. When the sun rises, I am standing in a huge building, surrounded by several people with unfamiliar faces, who look kind.	Good relations
P 14	25	Female		Loneliness					

Continued

Table 4. (*Continued*)

ID	Age (year)	Sex	Negative image	Category	Sensory modality (number)	Meaning of negative image	Type of meaning	Positive image	Category
			In a large barren land, such as a red desert, I am surrounded by a black wall which hides me from others.		Visual, Gustatory (dry mouth), Olfactory (smell of grass), Body (feeling electricity shoot, chest pain) (4)	I should not show myself to others. I make others feel uncomfortable. People avoid me.	Self, World	I am surrounded by many sheep, which look like a warm wall, in a green grassland. I can relate to people through the herd of sheep, feeling relaxed.	Good relations and worthy self
P 17	35	Male	I am holding my knees in my dark room in the evening, with a dark expression on my face, thinking I cannot work properly.	Loneliness	Visual, auditory (caw of a crow, crying baby, sound of cooking), olfactory (smell of cooking), gustatory (salty), body (tense, body temperature, breathing, heartbeat) (5)	I am incompetent and a loser. I cannot do anything forever.	Self, future	I stand up and go downstairs from the dark room and enter a new, wonderful world.	Worthy self
P 19	25	Male	A hanging rope for suicide is chasing me.	Loneliness	Visual, body (palpitations, chest pain) (2)	Life is hard. Living remains painful and difficult.	Future	I feed the hanging rope to jaws (a giant shark). Or, I change the hanging rope into a gummy candy or a soft rubber and cut it down from my neck.	Worthy self

be more effective than the former half including cognitive restructuring. As we divided original version of IR of traumatic memory into (1) IR work in the seventh and eighth sessions and (2) memory rescripting work in the eleventh and twelfth sessions in the programme, the results of this study indicate that IR without focusing on early traumatic memories was effective in reducing the distress from intrusive negative images as well as their vividness, uncontrollability, certainty factor in 19 participants with MDD. The results suggested that it might be better to address negative images separately from traumatic memories, which could be delicate to handle (Wheatley *et al.*, 2007; Young, Klosko, & Weishaar, 2003). The previous study of IR for people with MDD (Wheatley *et al.*, 2007) involved the IR of memory for ten cases as stand-alone treatment. To the best of our knowledge, the present study is the first study of a case series for MDD including as many as 19 participants and using IR of negative images as part of a programme of 15 CBT sessions.

Pearson *et al.* (2013) reported that it could be difficult to generate a positive image in patients with MDD. Furthermore, Holmes *et al.* (2016) reported that patients with MDD did not report the property of their mental images unless explicitly asked about them. In the present study, we first provided psychoeducation for the participants and then conducted IR carefully according to our protocol. This allowed all 19 participants to generate positive images, with the results indicating that IR was associated with a significant reduction in the participants' distress resulting from the intrusive imagery.

This approach could bring the benefit of widening the application of IR for patients, such as for those with a taboo memory. Such patients may in future be helped by an IR protocol for MDD that does not address invasive traumatic memories. There has been no previous study of IR that did not focus on early traumatic memories. In the present study, therefore, we started by classifying transcripts of the participants' statements, repeatedly reading these to gather the attractive features of the data and then define the themes, finally naming these as blame, social exclusion, and loneliness. After categorization of the participants' negative images accordingly, we examined whether the categorized themes showed any association with the theoretical background in psychopathology of MDD. Bonnan-White, Hetzel-Riggin, Diamond-Welch, and Tollini (2015), in a study of 63 college students, showed that victim blame by the first disclosure partner was associated with greater trauma-related distress and negative cognitions. Zahn *et al.* (2015) found that self-blaming emotions occurred in over 80% of 132 patients with remitted MDD. Taken together, it was assumed that the theme of 'blame' in negative image could be associated with depressive mood. From a national cohort study of 4,040 people, Stoetzer *et al.* (2009) reported that social exclusion at work could be a determinant of depression. In a nationally representative cross-sectional study, Barger, Messerli-Bürgy, and Barth (2014) reported that loneliness had the strongest association with depressive disorder.

When considering the correspondence between the three themes of blame, social exclusion, and loneliness, of negative imagery and Beck's cognitive triad (Abela & D'Allessandro, 2002), all 19 participants' negative images could be seen to depict the concept of self in the world, that is, 'self who was blamed by the world', 'self who was socially excluded from the world', and 'self who was left alone in the world'. However, the meanings of the images relate variously to self, the world, and the future.

The two themes for the rescripted positive images were 'good relations' and 'worthy self', with the third category incorporating both of these. In a cohort study of 4,642 American adults, Teo, Choi, and Valenstein (2013) found that poor quality of relationships increased the risk of depression. Sowislo and Orth (2013) reported that low self-esteem contributed to depression in a meta-analysis of longitudinal studies. Good relations relates

to the world, and worthy self relates to the self. The eight participants (P2, 4, 6, 7, 9, 11, 14, and 16) whose positive images included both good relations and worthy self all showed an improvement in the intrusion index (with a mean reduction of 37.7 compared with a mean reduction of 19.5 for the participants in the other categories). This suggests that, when generating positive imagery, IR for MDD might be better to take account of both self and the world. However, in the present study, this result was not confirmed by statistical analysis because of the small sample size.

In a previous study of IR with 22 social anxiety disorder patients, Hackmann *et al.* (2000) reported that 86% of the patients reported visual imagery, 82% body sensation imagery, and 32% auditory imagery, whereas none reported olfactory and gustatory imagery. In the present study, all 19 participants exhibited sensory modalities of imagery, with 18 reporting multiple modalities of imagery, including one participant who reported five sensory modalities. Compared with the results of Hackmann *et al.* (2000), each type of modality was reported by a higher proportion of the participants in the present study: visual 100%, body sensation 89%, auditory 47%, and olfactory and gustatory 21%. These results suggest that many MDD patients have multiple sensory modalities for their negative imagery.

Morina, Deeprose, Pusowski, Schmid, and Holmes (2011) reported that both patients with anxiety disorders and those with MDD provided poorer vividness ratings for deliberately generated prospective positive scenarios compared to the control participants. They also observed that patients with anxiety disorders showed a greater ability to vividly generate imagery for prospective negative scenarios than both patients with MDD and control participants. In the current study, patients with MDD showed relatively higher vividness rating for their negative images. As the psychoeducation before the IR, we emphasized the importance of visualization of the images. This allowed the patients' careful identification of intrusive images, including visualization. However, our study did not have data from patients with anxiety disorders or control participants for the same condition. Therefore, it cannot be argued that the vividness ratings in depressed patients in the current study were because of inconsistent methods. But, on the basis of these findings, we believe that therapists had better help patients with MDD to remember the rescripted positive images. The accessibility and strength of the new positive image may be enhanced by repetition, and the vividness may be strengthened by focusing on all the modalities of the newly generated pictures in IR. Therefore, as in our study's protocol in future, the newly generated positive images may be rehearsed with focusing on the modalities of its images daily for a week.

Brewin (2006) hypothesized a retrieval competition account theory that many positive and negative imagery representations may compete in the human mind. It is assumed that in the presence of external or internal cues, all these representations compete with success depending on established factors likely to affect involuntary retrieval, that is, activation level, encoding specificity, distinctiveness, and valence. According to his theory, the purpose of CBT is to select and create positive representations that are assisted to win the retrieval competition and restore more positive mood states, particularly when patients have depressive symptoms. Our findings suggest that, when rescripting imagery, patients with MDD may probably generate positive images that are easy to activate and win the retrieval competition.

This study had some limitations. First, we demonstrated the effectiveness of the IR sessions but our study did not have a control group and is not a single case series design. Second, our study's sample size was small. Third, we classified the transcription of participants' images using a method similar to that of a qualitative study; but, because the

transcripts were short, this was not true qualitative analysis. Forth, the patients we recruited for this study were outpatients in an academic clinic of a university hospital. A majority of the treatment-resistant patients following pharmacotherapy by primary care doctors are cared for in the clinic to be treated with cognitive behavioural therapy. Therefore, all our study participants were patients who remained symptomatic following antidepressant treatment; this may exert effects, such as deflection. Five, the expectation of the participant for IR sessions might deflect the result of this study.

Taking the above into consideration, a future study with a larger sample size is required to evaluate the effectiveness of this IR protocol as an adjunct to a standard CBT programme for MDD.

In conclusion, the results of this study suggest that IR of intrusive images without focusing on early traumatic memories may usefully be incorporated into routine CBT sessions for MDD in some cases.

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