Group imagery imagery rescripting via telehealth decreases dysfunctional personality beliefs and the meta-emotional problem but does not increase positive self-compassion

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Abstract

Imagery rescripting (ImR) has shown to reduce negative belief about the self, negative emotions and emotional dysregulation. However, the mechanisms through which this improvement in emotion regulation takes place is currently the object of investigation. An untested hypothesis is that ImR reduces the negative emotional response to primary emotions (i.e. the Meta-emotional problem) associated to difficulties in emotional regulation. In this study, the researchers aimed to investigate the impact of group ImR delivered via telehealth on dysfunctional personality beliefs, the Meta-emotional problem, difficulties in emotional regulation, and self-compassion in a non-clinical sample of participants. A total of 45 community sample participants received three sessions of group ImR delivered via telehealth. Personality dysfunctional beliefs, meta-emotions, self-compassion and emotional dysregulation were measured before ImR and in three follow-up sessions. Dysfunctional personality beliefs, specifically those associated with the dependent, obsessive–compulsive, antisocial, and histrionic personality disorders, were significantly reduced after the ImR intervention. Additionally, the Meta-emotional problem and difficulties in emotional regulation were also reduced. Moreover, negative self-compassion showed a significant decrease after ImR, but positive self-compassion remained unchanged. These findings suggest that group ImR delivered via telehealth can effectively reduce negative beliefs about oneself, negative emotions, and emotional dysregulation. However, it seems that this intervention does not increase a more benevolent attitude towards oneself, possibly due to the less direct intervention of the therapist in the group telehealth setting. The researchers discuss the implications of these findings for clinical practice in a group telehealth context.

Keywords Imagery rescripting · Personality beliefs · Meta-emotions · Emotional regulation · Self-compassion · Telehealth · Schema Therapy

Introduction

Imagery rescripting (ImR) is a technique often used in the treatment of various mental disorders. It has been found to be effective both as part of clinical protocols and as a stand-alone technique, with similar effectiveness to other established therapies such as EMDR, cognitive restructuring, and exposure therapy. Studies have shown that the effects of ImR can be sustained for up to 4–12 weeks after treatment (Arntz, 2012; Kip et al., 2023; Morina et al., 2017). The underlying mechanisms of change in ImR are currently being investigated. It has been found to improve the encoding and processing of traumatic memories (Spinhoven, 2012; Hagenaars & Arntz, 2012), as well as increase perceptions of mastery and self-efficacy (Kunze et al., 2019). One hypothesis that has not yet been tested is that ImR reduces negative emotional reactions to one's own negative emotions, known as the meta-emotional problem, and increases self-compassion, ultimately leading to a reduction in dysfunctional self-beliefs (Mancini & Mancini, 2018).According to cognitive accounts, when individuals judge their negative emotions as

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unacceptable, it can trigger a secondary emotional reaction, which in turn maintains the primary negative emotion. This secondary emotional reaction, or meta-emotional problem (Ellis, 1980, 2003) influences the attempts to regulate the emotions (Hofmann, 2020). Meta-emotions have a significant impact on psychological well-being as they are closely tied to emotional regulation. Therefore, the Meta-emotional problem is considered a maintenance factor in several mental disorders. In line with this view, experiencing guilt and shame for PTSD or feeling guilty about intrusive thoughts in Obsessive Compulsive Disorder are bad predictors of therapy outcomes (Gilbert & Andrews, 1998). In keeping, the reduction of the Meta-emotional problem also decreases the primary problem in specific phobias (Couyoumdjian et al., 2016) and the activation of the autonomic system during exposure to phobic stimuli in specific and social phobia (Morticcioli & Couyoumdjian, 2018). Moreover, a study showed that meta-emotional problem is a significant and robust predictor of the severity of depressive symptomatology (Visco Comandini et al., 2021). In contrast, it has been shown that imagining receiving a compassionate attitude from an external source led to an increase in the ability to console oneself in participants with high self-criticism (Hollis-Walker & Colosimo, 2011).

Meta-emotions have a significant impact on psychological well-being as they are closely tied to emotional regulation. The meta-emotional problem, characterized by non-acceptance and emotional avoidance, can have detrimental effects on well-being. On the other hand, positive meta-emotions promote acceptance of one's emotions and can have positive effects on well-being (Neff, 2003).

Research has consistently shown that maladaptive emotion regulation strategies, such as rumination, avoidance, and suppression, are associated with higher levels of psychopathology. In contrast, adaptive strategies like acceptance, reappraisal, and problem-solving are associated with lower levels of psychopathology (Neff, 2003). Notably, the concept of self-compassion, which involves accepting one's painful experiences in a non-judgmental way, is closely related to the acceptance of meta-emotions. Previous research has found that self-compassion plays an important role in imagery rescripting, leading to a decrease in negative affect (Hudd, 2018). Additionally, a study reported that after undergoing imagery rescripting, patients described experiencing improvements in emotional regulation (Schaich et al., 2020). However, despite the potential relevance of the meta-emotional problem in emotional regulation, no studies have specifically assessed the effectiveness of Imagery rescripting in reducing the meta-emotional problem.

The primary objective of this study was to assess whether group imagery rescripting (ImR) delivered via telehealth could reduce the Meta-emotional problem and increase self-compassion in a non-clinical community sample. Due to the COVID-19 pandemic and the increased utilization of telehealth for mental health treatment, the study was conducted entirely online.

Telehealth has become especially valuable for individuals who may face barriers to accessing traditional in-person treatments, such as those living in rural areas or abroad. It has been found that telehealth treatments for mental disorders can yield similar clinical outcomes compared to in-person care, although additional factors need to be considered (Sugarman & Busch, 2023).

ImR has been shown to be effective in telehealth settings, as indicated by previous research (Paulik et al., 2021). Recent studies have also explored the incorporation of ImR in group settings, both in-person and via telehealth, and have observed positive changes in emotional and cognitive states (Bachrach & Arntz, 2021; Tenore et al., 2022).

By conducting this study, the researchers aimed to contribute to the existing literature on the mechanisms underlying the effectiveness of ImR and provide insights into ImR delivered via telehealth.

Based on the existing literature, the researchers hypothesized that group imagery rescripting (ImR) delivered via telehealth would lead to the following reductions:

1. The strength of dysfunctional beliefs associated with personality disorders: Previous research has shown that ImR can be effective in reducing dysfunctional beliefs related to personality disorders. Therefore, it is hypothesized that group ImR delivered via telehealth would lead to a reduction in these dysfunctional beliefs.
2. The Meta-emotion problem: It is hypothesized that group ImR delivered via telehealth would decrease the Meta-emotion problem by improving self-compassion and reducing negative evaluation of one's inner affective state. Self-compassion has been found to be associated with greater acceptance and non-judgmental response to emotions. Additionally, ImR has the potential to help individuals reevaluate and reinterpret their emotional experiences, leading to a decrease in the negative evaluation of emotions.
3. Emotional regulation difficulties: The hypothesized reduction in the Meta-emotion problem is expected to be associated with improved emotional regulation abilities. By addressing the underlying issues contributing to emotional dysregulation, group ImR delivered via telehealth is expected to result in a decrease in emotional regulation difficulties.

Materials and methods

Participants

For this study, the authors recruited participants by sending out a newsletter, and participants volunteered to participate. Exclusion criteria were the presence of a bipolar disorder, psychosis, or substance abuse. Additionally, participants who had previously experienced imagery rescripting (ImR) were not included.

Initially, the sample consisted of 52 participants. However, seven participants were excluded from the analysis because they failed to participate in at least two out of three follow-up sessions. Therefore, the final sample size consisted of 45 participants, with 29 of them identifying as female.

The participants were from 10 different Italian regions, and their mean age was 30 with a standard deviation of 0 and a range of 27 to 60. Approximately 46.6% of the participants had a university degree, while 40% had a specialization or held a PhD. Only 2% of the participants had a high school diploma.

Among the entire sample, 11.11% reported having received a psychiatric diagnosis. The specific diagnoses reported were two cases of panic disorder, one case of anorexia nervosa, one case of cyclothymia, and one case of major depressive disorder. Additionally, 20% of the participants were currently in psychotherapy, and 2% were taking psychiatric medication. Participants did not receive any form of payment.

Procedure

All participants completed online questionnaires using the survey platform Question Pro (https://www.questionpro.com). The process involved multiple steps.

In the first online session, participants signed the informed consent form and completed the initial assessment. They were also instructed to choose and write down the statement (the negative self-belief) that caused them the most suffering from the 140 items in both the Young Schema Questionnaire-Short Form (YSQ-SF) (Young & Brown, 1988) and the Personality Belief Questionnaire-Short Form (PBQ-SF) (Butler et al., 2006).

A week after the first session, participants received three ImR sessions, with one session per week, following the protocol used in previous studies (Lee & Kwon, 2013; Tenore et al., 2020, 2022).

During the ImR sessions, participants were asked to close their eyes and imagine themselves in their designated safe place, as previously described. They were then prompted to recall a recent episode in which they experienced the negative self-belief they had chosen. They were instructed to focus on the emotional and somatic experiences connected to that belief.

During the ImR sessions, participants were guided through a process involving the bridge emotion technique (Watkins, 1971). They were asked to recall a memory from their childhood that evoked similar feelings and experiences to the present negative self-belief. Participants were instructed to relive this childhood memory from their perspective as children, and then to shift their perspective to observe the memory as their adult selves. This allowed them to enter the image as adults and address the emotional needs of their child selves, providing healing and resolution.

The ImR sessions were conducted in a group setting, and participants were asked to keep their cameras turned on while the conductor, who is the first author of the article, red the imagery rescripting script. The procedure followed in these sessions was similar to that used in a previous study conducted by the authors (Tenore et al., 2022).

In synthesis the script contained the following steps:
Instructions about the procedure.
Safe place imagery.
Visualization through imagery of a recent situation that activated the dysfunctional belief.
Focus on the emotion arise from the visualization.
Floating Back to a childhood memory.
Rescripting of the memory arise.
Safe place imagery.
Measures were collected at multiple time points: after one week, one month, two months, and three months from the completion of the third ImR session, as previous studies did (Tenore et al., 2020, 2022). This allowed for the assessment of the effects of the group ImR intervention over an extended period of time (Fig. 1).

Fig. 1 Procedure timeline

Measures

The young schema questionnaire short version (YSQ-S2)

The Young Schema Questionnaire short version (YSQ-S2) is a self-report inventory constituted by 75 items. The questionnaire assesses 15 Early Maladaptive Schemas (EMS) according to Young's Schema theory (Young & Brown, 1988). Each item represents a statement regarding a maladaptive belief to which respondents are requested to rate the degree of correspondence on a 6-point Likert scale (1–6). For each EMS, assessed by 5 items, a mean score is calculated, where high scores represent a more active EMS. The validation of the short version of the YSQ is not available in Italian, so the 75 items were selected from the English validation study (Welburn et al., 2002). In that study Cronbach's alpha coefficient was reporting ranging from 0.80-0.93.

The personality belief questionnaire short form (PBQ-SF)

The Personality Belief Questionnaire Short form (PBQ-SF—Butler et al., 2006) is a self-report inventory constituted by 65 items. The questionnaire has been developed to assess dysfunctional beliefs, typical of personality disorders, in according to the Diagnostic and Statistical Manual for Mental Disorders (Diagnostic and Statistical Manual of Dsm-5 Tm). The short form was derived by the original PBQ, constituted by 126 items (Beck & Beck, 1991). Since no Italian validation of this reduced version of the PBQ is available, we selected the 65 items on the basis of the English validation study (Flebus & Montano, 2006). The questionnaire assesses the specific beliefs, assumed to be associated to nine personality disorders, such as Avoidant, Dependent, Passive-aggressive, Obsessive–compulsive, Antisocial, Narcissism, Histrionic, Schizoid and Paranoid. Respondents rate the degree they agree with the statements from 0 ("*I don't believe it at all.*") to 4 ("*I believe it totally.*"). Cronbach's alpha coefficient for the total score of PBQ-SF was $\alpha = 0.97$ (Butler et al., 2006). The coefficients for the specific scales were: Avoidant ($\alpha = 0.84$), Dependent ($\alpha = 0.89$), Passive-Aggressive ($\alpha = 0.86$), Obsessive–Compulsive ($\alpha = 0.90$), Antisocial ($\alpha = 0.80$), Narcissistic ($\alpha = 0.83$), Histrionic ($\alpha = 0.89$), Schizoid ($\alpha = 0.79$), and Paranoid ($\alpha = 0.91$).

Meta-Emotion Scale (MES)

The Meta-Emotion scale (Mitmansgruber et al., 2009) is a self-report inventory constituted by 28 items. Eight subscales assess negative and positive meta-emotion experiences such as anger (i.e. "*I often think my emotional reaction is wrong*", compassionate care (i.e. "*When I am sad or anxious, I do myself something good to make things easier for myself*"), interest (i.e. "*I learn through my feelings*"), contempt/shame (i.e. "*I cannot forgive myself for a long time when I have done something wrong*"), thought control (i.e. "*When I am sad or anxious, I become demanding of myself*"), and suppression (i.e. "*I cannot come to grips with strong emotions*". Responses are given using 6-point Likert scales (from 1 = "is not at all true for me" to 6 = "is completely true for me"). MES considers also two indices of the general viewpoint about positive and negative emotional experiences. The sum of these indices shows the general viewpoint of the individual about different emotional experience. Parsaei and colleagues (Parsaei et al., 2019) reported the Cronbach's alpha coefficient of 0.75 for MES, while Sadati and colleagues of 0.81 (Sadati et al., 2022).

Self-Compassion Scale (SCS)

The Self-Compassion Scale is a 26-item self-report inventory (Neff, 2003), assessing self-compassion. It is constituted by six subscales, three positives (i.e., self-kindness, common humanity, and mindfulness), and three negatives (i.e., self-judgment, isolation, and over-identification). It includes items that measure how often people respond to feelings of inadequacy or suffering with self-kindness (e.g., "*I try to be loving toward myself when I'm feeling emotional pain*"), self-judgment (e.g., "*I'm disapproving and judgmental about my own flaws and inadequacies*"), common humanity (e.g., "*I try to see my failings as part of the human condition*"), isolation (e.g., "*When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world*"), mindfulness (e.g., "*When something painful happens I try to take a balanced view of the situation*"), and over-identification (e.g., "*When I'm feeling down I tend to obsess and fixate on everything that's wrong*"). Respondents are asked to express the degree to which they agree with the statements on a 5-point scale from "Almost Never" to "Almost Always." (Neff, 2003 p. 224). After reversing negative items, the six subscales mean scores are calculated. The internal consistency, for each scale, has been found to be $\alpha = 0.83$ for self-kindness; $\alpha = 0.85$ for self-judgment, $\alpha = 0.71$ for common humanity, $\alpha = 0.84$ for isolation, $\alpha = 0.73$ for mindfulness and $\alpha = 0.82$ for over-identification (Petrocchi et al., 2014).

The difficulties in emotion regulation strategies

The Difficulties in Emotion Regulation Strategies (DERS—Gratz & Roemer, 2004)) is a 36-item self-report questionnaire, that assesses difficulties the regulation of negative emotions.

Responses are given using 5-point Likert scales (1 = almost never, to 5 = almost always).

The sum of the single items constituted the total score, but also five subscales are yielded such as nonacceptance of emotional responses, difficulty in engaging in the goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Higher scores indicate higher emotion regulation difficulties. DERS showed good internal consistency (α = 0.90) and single scales have been found to have an overall good internal consistency, rated from 0.74 to 0.88 (Sighinolfi et al., 2010).

The beliefs about emotions questionnaire

The Beliefs about Emotions Questionnaire (BAEQ; (Manser et al., 2012)) is a 43-items self-report questionnaire aimed at assessing the beliefs about emotions. Responses are given on a five-point scale (1 = "strongly disagree" to 5 = "strongly agree"). Higher scores indicate higher strength of the belief. The questionnaire yields six subscales such as Overwhelming and Uncontrollable (α = 0.87); Shameful and Irrational (α = 0.91); Invalid and Meaningless (α = 0.42); Useless (α = 0.77); Damaging (α = 0.39); and Contagious (α = 0.08) (Manser et al., 2012).

Data analysis

Statistical analyses were computed by using the R software (R Core Team, 2021). To test the differences among pre-test scores and the following scores of each scale, linear mixed-effect models were used **(LMM)** In particular, an LMM was tested setting each scale as a response variable, time was administered as fixed factor and the participant as clustering variable and random factor (i.e., random intercept model). LMM were preferred over repeated measure ANOVA since can handle the fact that subject could randomly did not present a response across some time points. The baseline was set as reference level and each time point was compared to the baseline. LMM were tested by using the lme4 package (Bates et al., 2015). Additionally, Table 1 shows mean and standard deviations of baseline PBQ scores.

Results

Participants were not recruited within a clinical sample, however, their scores of dysfunctional personality belief resembled those of patients with PDs, rather than those of non-PD participants as reported in Table 1.

Results of the regressive models are reported in Tables 2, and 3. The tables show only the measures containing at least one significant difference. A complete overview of the results, including non-significant measures can be found in Table S1 of the Supplementary materials. Dysfunctional beliefs decreased significantly after ImR. Specifically, beliefs typically observed in Dependent personality disorder were significantly different between baseline and after 1-month (t = -2.7, $p = 0.007$), 2 months (t = -2.9, $p = 0.003$) and 3 months (t = -2.5, $p = 0.011$) from the three ImR sessions. Similarly, beliefs typically observed in Obsessive–Compulsive personality disorder were significantly different between baseline and 2 months (t = -2.82, $p = 0.02$) and 3 months (t = -3.1, $p = 0.002$) from the ImR sessions. Moreover, beliefs typically observed in Antisocial personality disorder were significantly different between baseline and 2 months (t = -2.6, $p = 0.008$) and 3 months (t = -3.1, $p = 0.002$) from the ImR sessions. Finally, beliefs typically observed in Histrionic personality disorder were significantly different between baseline and 1 week (t = -2.1, $p = 0.03$), one month (t = -2.9, $p = 0.003$), 2 months (t = -3.1, $p = 0.001$) and 3 months (t = -3.1, $p = 0.002$) from the ImR sessions. No significant differences were observed between baseline measures of avoidant, passive-aggressive, schizoid, paranoid and borderline scores dysfunctional beliefs scores. (All $ps > 0.05$).

Table 1 Criterion PD mean Z-scores are based on a sample of 756 psychiatric outpatients with mixed diagnoses (Beck et al., 2001; Butler et al., 2002). Mean Z-scores in our samples are particularly high for the Dependent, Obsessive–Compulsive, Antisocial, Narcisistic and Paranoid cognitive profile

PBQ	Mean Z Scores (our sample) at baseline	SD	Criterion Group Z-scores	No PD Z scores
Avoidant	0.46	0.6	0.63	-0.69
Dependent	0.79	0.7	0.83	-0.49
Passive Aggressive	1.004	0.7	No Data	-0.38
Obsessive–Compulsive	0.74	0.7	0.31	-0.51
Antisocial	2.0	0.9	0.31	-0.18
Narcisistic	1.9	0.8	1.10	0.38
Histrionic	1.2	0.8	No Data	-0.29
Schizoid	1.3	0.9	No Data	-0.14
Paranoid	0.6	0.6	0.51	-0.55

Table 2 The table shows statistical comparisons between the values of the dysfunctional beliefs typically found in the Dependent, Obsessive–Compulsive, Antisocial and Histrionic personality disorder, as measured by the PBQ before ImR and after 1 Week, and at 1,2,3 months follow up

PBQ Z-scores					
Dependent	**Estimate**	**St. Error**	**df**	**t**	***p***
Week1	-0.08399	0.07423	111.69	-1.132	0.26025
Month1	-0.22715	0.08412	112.59	-2.700	**0.00799 ****
Month2	-0.24557	0.08191	112.45	-2.998	**0.00334 ****
Month3	-0.23278	0.09087	112.83	-2.562	**0.01174 ***
Obsessive–Compulsive	**Estimate**	**St. Error**	**df**	**t**	***p***
Week1	-0.06539	0.08243	112.70	-793	0.42928
Month1	-0.13728	0.09338	113.76	-1.470	0.14427
Month2	-0.20498	0.09093	113.59	-2.254	**0.02609 ***
Month3	-0.31659	0.10087	114.05	-3.139	**0.00216 ****
Antisocial	**Estimate**	**St. Error**	**df**	**t**	***p***
Week1	-0.2424	0.1281	112.44	-1.893	0.06097
Month1	-0.2104	0.1448	114.35	-1.452	0.14911
Month2	-0.3793	0.1411	114.04	-2.688	**0.00826 ****
Month3	-0.4886	0.1564	114.92	-3.125	**0.00225 ****
Histrionic	**Estimate**	**St. Error**	**df**	**t**	***p***
Week1	-0.18576	0.08723	113.12	-2.129	**0.03538 ***
Month1	-0.29060	0.09881	114.21	-2.941	**0.00396 ****
Month2	-0.30763	0.09622	114.046	-3.197	**0.00180 ****
Month3	-0.33641	0.10673	114.513	-3.152	**0.00207 ****

Statistically significant differences are highlighted in bold. For each PD the table contains only the subscales in which statistically significant differences were observed. $*p < .05$; $**p < .01$; $***p > .001$

Beliefs about emotions decreased significantly after the three ImR sessions. Specifically, the belief that negative emotions are overwhelming and uncontrollable was significantly different between baseline and after one week (t = -2.7, $p < 0.01$), 1-month (t = -3.7, $p < 0.001$), 2 months (t = -3.3, $p < 0.001$) and 3 months (t = -3.5, $p < 0.001$) from the ImR. Similarly, the belief that negative emotions are shameful and irrational was significantly different between baseline and after one week (t = -2.8, $p < 0.01$), 1-month (t = -5.2, $p < 0.0001$), 2 months (t = -3.8, $P < 0.001$) and 3 months (t = -3.4, $p < 0.001$) from the ImR. Emotions about one's own emotional experience also decreased significantly from baseline. In particular, shame and contempt (i.e. "*When I am ashamed about my emotional reactions, I can hardly think of anything else*") were significantly different between baseline and 1-month (t = -3.8, $p < 0.001$), 2 months (t = -2.8, $p < 0.01$) and 3 months (t = -3.9, $p < 0.001$) after the ImR. No significant differences were observed between the MES shame and contempt subscale baseline scores and scores obtained after 1 week from the ImR ($p > 0.05$). The regression also revealed significant differences in the Thought Control subscale of the MES, measuring how much one becomes demanding towards one's own negative feelings (i.e. "*When I am sad or anxious, I become demanding of myself*"). Specifically, baseline scores of this subscale reduced significantly after 1 month (t = -2.6, $p < 0.001$) and 3 months (t = -3.5, $p < 0.001$) from the ImR. No significant differences were observed between the MES shame and contempt subscale baseline scores and scores obtained after 1 week and after 2 months from the ImR (all $Ps > 0.05$). No significant differences were found between baseline and post intervention measures in the other subscales (see S1 in Supplementary Materials).

Discussion

The aim of this study was to assess if group ImR delivered via telehealth reduces the strength of dysfunctional personality beliefs along with the Meta-emotional problem and emotional regulation. Additionally, we aimed at observing whether ImR improves self-compassion.

Dysfunctional personality beliefs were reduced, specifically for the cognitive profile typically observed in the dependent (e.g."*I am helpless when I'm left on my own*"), obsessive–compulsive (e.g. "*Any flaw or defect of performance may lead to a catastrophe*"), antisocial (e.g. "*People will get at me if I don't get them first*") and histrionic personality disorder (e.g. "*If I entertain people, they will not notice my weaknesses*"). Our sample, was not specifically recruited among a clinical population, however presented baseline dysfunctional beliefs z-scores resembling those of participants with mixed personality disorders, rather than those of participants with no PD. Importantly, in the last

Table 3 The table shows statistical comparisons between the values of the meta-emotional variables before ImR and after 1 Week, 1,2,3 months follow up. Meta Emotional Variables were assessed by means of the Belief about Emotions Questionnaires (BAEQ); the Meta Emotional Scale (MES); the Self-Compassion Scale (SCS) and the Difficulty in emotional regulation (DERS)

Meta Emotional Variables

BAEQ_Overwhelming and uncontrollable	Estimate	St. Error	df	t	p
1 Week	-1.7653	0.6456	113.6563	-2.734	**0.007252 ****
1Month	-2.7219	0.7303	115.3612	-3.727	**0.000302 *****
2Months	-2.3519	0.7113	115.0873	-3.306	**0.001261 ****
3Months	-2.8032	0.7885	115.8634	-3.555	**0.000548 *****
BAEQ_Shameful and Irrational	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-1.8109	0.6347	114.1944	-2.853	**0.005142 ****
1Month	-3.7483	0.7185	115.5543	-5.217	**< 0.001 *****
2Months	-2.6441	0.6998	115.3385	-3.779	**0.000251 *****
3Months	-2.7105	0.7760	115.9386	-3.493	**0.000677 *****
MES_Contempt Shame	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0.9874	0.6537	114.8073	-1.510	0.133668
1Month	-2.7917	0.7392	116.6555	-3.777	**0.000252 *****
2Months	-2.0101	0.7200	116.3570	-2.792	**0.006131 ****
3Months	-3.1777	0.7980	117.2110	-3.982	**0.000119 *****
MES_Thought Control	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0.6666	0.5202	113.4042	-1.281	0.202635
1Month	-1.5593	0.5894	114.3004	-2.645	**0.009308 ****
2Months	-0.7906	0.5740	114.1608	-1.377	0.171075
3Months	-2.2635	0.6368	114.5374	-3.555	**0.000551 *****
SCS Negative	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0. 26,437	0.09758	113.31201	-2.709	**0.007791 ****
1Month	-0.37780	0.11057	114.24102	-3.417	**0.000878 *****
2Months	-0.24721	0.10767	114.09610	-2.296	**0.023499 ***
3Months	-0.40254	0.11944	114.48779	-3.370	**0.001025 ****
DERS Limited access to emotion regulation strategies	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0.7868	0.4548	112.8942	-1.730	0.08635
1Month	-1.6671	0.5148	114.3433	-3.238	**0.00157 ****
2Months	-1.0406	0.5013	114.1127	-2.076	**0.04018 ***
3Months	-1.1859	0.5559	114.7562	-2.133	**0.03503 ***
DERS Impulse control difficulties	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0.9547	0.4435	111.8296	-2.153	**0.033495 ***
1Month	-1.0195	0.5017	113.5756	-2.032	**0.044466 ***
2Months	-1.3613	0.4886	113.2950	-2.786	**0.006259 ****
3Months	-2.0406	0.5417	114.0901	-3.767	**0.000263 *****
DERS Lack of emotional clarity	**Estimate**	**St. Error**	**df**	**t**	**p**
1 Week	-0.3990	0.3233	116.6382	-1.234	0.21966
1Month	-0.8670	0.3631	121.3153	-2.388	**0.01849 ***
2Months	-1.11761	0.3541	120.4961	-3.322	**0.00119 ****
3Months	-0. 9990	0.3910	123.1464	-2.555	**0.01185 ***

Statistically significant differences are highlighted in bold. For each questionnaire the table contains only the subscales in which statistically significant differences were observed. $*p < .05$; $**p < .01$; $***p > .001$. A complete version of the table is contained in the S1 supplementary materials

decade Schema Therapy has been shown its effectiveness in the treatment of personality disorders (Bamelis et al., 2014; Farrell et al., 2009, Giesen-Bloo et al., 2006, Nadort et al., 2009, Nordhal and Nysaeter 2005, Van Asselt et al., 2008), since ImR is a central part of ST for PD, it is plausible to hypothesise its involvement in such results. However, isolated effects of ImR on personality disorders or on personality disorder related beliefs has never been observed.

Furthermore, research has shown that ImR has the ability to modify the meaning individuals assign to adverse experiences. Specifically, it has been observed that ImR can significantly impact negative beliefs individuals hold about themselves (Hagenaars & Arntz, 2012). This is supported by multiple studies that have demonstrated the effectiveness of ImR in reducing dysfunctional self-beliefs (Cooper, 2011; Tenore et al., 2022).

For example, a study conducted with individuals suffering from social anxiety found that ImR resulted in positive restructuring of negative self-beliefs (Reimer & Moscovitch, 2015). These findings consistently suggest that ImR brings about a change in the way individuals perceive themselves. This change in self-representation is thought to contribute to the broad applications and effectiveness of ImR across different psychological disorders (transdiagnostic effectiveness). Furthermore, we found a reduction in the dysfunctional beliefs about emotions, as well as a reduction in the negative evaluation of the negative emotion itself. This is in line with the idea that negative meta-emotions may be representative of the non-acceptance of the emotional experience (Neff, 2003). This reduction, at the best of our knowledge, has not been already observed. It seems that after ImR individuals tend to experience less shame about their emotions and consider them as less irrational. This might reflect a reduction in the invalidation of those negative emotions that are experienced and incapsulated in painful childhood memories. Consistently, a previous study, showed that ImR produced a reduction in the shame state measures (Tenore et al., 2022). Specifically, here we found a reduction in those MES and BAEQ subscales which reflect the ideas that negative emotions should be controlled and are something to be ashamed about (i.e. the Overwhelming and Uncontrollable and the Shameful and Irrational BAEQ subscales; the Thought Control and Contempt Shame MES subscales and finally the Impulse Control Difficulties DERS subscale).

These findings support the hypothesis that ImR can effectively reduce the Meta-emotional problem (Mancini & Mancini, 2018). According to this perspective, ImR has the potential to redefine the meaning of suffering associated with childhood experiences, portraying it as valid, appropriate, and deserving of care. Consequently, this may help alleviate messages of invalidation regarding negative emotions that were received during crucial developmental stages and primary attachment relationships.

From a Meta-emotional standpoint, perceiving negative emotions as unacceptable and problematic can transform them into aversive events, thus intensifying emotional reactivity (Ellis, 1999; Greenberg, 2004; Greenberg & Safran, 1990; Hayes et al., 2006; Mennin & Farach, 2007). The Meta-emotional problem is thought to influence self-representation and contribute to the maintenance of

psychopathology (Gardner et al., 1988; Hofmann, 2013). It is worth noting that the Meta-emotional problem appears to be a transdiagnostic phenomenon, as it has been identified in various mental health conditions such as depression, social anxiety, post-traumatic stress disorder (PTSD), alcohol abuse, couple problems, and personality disorders (Leahy, 2001, 2002) and previous studies showed that judging emotions as irrational results in rumination and avoidance of such emotions (Trincas et al., 2016). Furthermore, our findings revealed a decrease in difficulties recognizing and regulating emotions, as measured by the "lack of emotional clarity" and "limited access to emotion regulation strategies" subscales of the Difficulties in Emotion Regulation Scale (DERS). This is significant because emotional regulation plays a crucial role in mental health and well-being (Gross & Muñoz, 1995). It is widely acknowledged that difficulties in emotion regulation are associated with various mental health issues (Aldao et al., 2010) and contribute to the development of maladaptive behaviors (Buckholdt et al., 2015; Ponzoni et al., 2021).

In our study, we found a decrease in the negative aspects of self-compassion, including self-judgment, isolation, and over-identification. However, contrary to our expectations, we did not observe an increase in positive self-compassion. Similarly, there was no increase in the sub-scale of the Meta-emotional problem that measures interest and compassionate care toward one's own emotions. Interestingly a meta-analysis from Murris and Petrocchi (Muris & Petrocchi, 2017) showed that negative indicators of self- compassion were positively related to psychopathology and positive indicators of self-compassion negative related to psychopathology. Authors suggested that positive self-compassion scales tap protective factors towards mental health problems, while negative self-compassion represent increased vulnerability to it. Moreover, Murris and Petrocchi 's work showed that negative self-compassion scale indicators were significantly stronger associated with mental health issues than the positive indicators.

Our findings suggest that while individuals' critical and judgmental attitude toward themselves may decrease after ImR, there may not be a simultaneous increase in a more benevolent and compassionate attitude. This result could be attributed to the limitations of the group procedure used in our study. The group setting may not have allowed for the introduction of modeling a positive attitude toward the child's negative emotions. The facilitator was unable to directly intervene in the mental imagery or provide advice or psychoeducation regarding children's emotional needs.

This limitation may have hindered the development of a more comprehensive and balanced sense of self-compassion among participants. Future studies could explore alternative intervention formats that allow for a more explicit focus on fostering positive self-compassion in addition to reducing

negative self-compassion. This study has several limitations that need to be acknowledged. Firstly, there is a lack of a control intervention, which limits our ability to establish a causal relationship between ImR and the observed changes.

Future studies should include a control condition to better understand the specific effects of ImR.

Secondly, the sample used in this study is limited and comprised of individuals with higher education levels. This may impact the generalizability of our findings to a more diverse population. Future research should aim to include a more heterogeneous sample to better understand the broader applicability of the results.

Despite these limitations, our preliminary findings suggest that group ImR delivered via Telehealth primarily targets dysfunctional messages present in painful childhood memories at both the emotional and cognitive levels, rather than directly increasing self-compassion. This has important implications for clinical practice, as it indicates that reducing internalized criticism does not necessarily lead to an improvement in self-compassion. It suggests that specific interventions targeting self-compassion may be needed in addition to ImR to foster a more compassionate and supportive attitude towards oneself.

"Raw data are not publicly available to preserve individuals' privacy under the European General Data Protection Regulation"

Ethics

Participants provided informed consent prior to start the procedure by accepting to proceed with the surveys and after having read the digital informed consent form. The study and the procedure were carried out in accordance with the principles of the Declaration of Helsinki and were approved by the Guglielmo Marconi University Ethical Committee (Protocol Date. 24–03-2020).

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