



Reappraising negative emotions reduces distress during the COVID-19 outbreak

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Accepted: 11 August 2022

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Abstract

In two studies, we examined the utility of intrinsic (i.e., self) versus extrinsic (i.e., other) reappraisal training for distress reduction during two consecutive COVID-19 lockdowns in Israel. In both Study 1 (n = 104) and Study 2 (n = 181), participants practiced the use of reappraisal for eight sessions across three weeks. Participants were trained to reappraise either a personal event (self-reappraisal group) or an incident presumably written by another participant (other-reappraisal group). Study 2 also included an untrained control group. Outcome measures were daily negative mood and psychological distress immediately at post-training and at a two-month follow-up. The results demonstrate a benefit for training compared to no training in lowering immediate post-training distress and daily negative emotions. However, this advantage disappeared at the two-month follow-up. In both studies, intrinsic reappraisal was associated with lower post-training distress than extrinsic reappraisal. Findings suggest reappraising negative experiences may lower distress at times of major contextual stress.

Keywords Social emotion regulation · Reappraisal · Training · Pandemic · COVID-19

Introduction

Studies on the psychological implications of the COVID-19 pandemic point to moderate to high levels of distress and an increase in the rates of anxiety and depression (Daly & Robinson, 2021; Qiu et al., 2020; Zhang et al., 2020). Emotion regulation (ER) is known to be a prominent protective factor against the development of anxiety and depression symptoms (Aldao et al., 2010). As yet, however, the ability of ER training to reduce distress under specific stressful circumstances such as a pandemic is understudied (Wang et

al., 2021), with no study examining the effects of different forms of ER training in real-life naturalistic settings.

The literature on ER describes multiple ways to cope adaptively with stress and negative emotions (Grommisch et al., 2019), primarily focusing on intrinsic regulation (McRae & Gross, 2020; Wang et al., 2021). A common intrinsic regulation strategy is reappraisal, defined as the reinterpretation of a negative event or situation in a more constructive and positive way to improve mood (Gross & John, 2003; Uusberg et al., 2019). The nature of the COVID-19 pandemic forced individuals to deal with ongoing threatening information and restrictive policies that dramatically changed their lives. As reappraisal entails processing one's thoughts and feelings about a situation, it may be a more adaptive strategy to deal with the pandemic than strategies such as distraction or avoidance.

Outside the context of the COVID-19 pandemic, numerous studies have shown that reappraising one's own events (i.e., self-reappraisal) is associated with multiple positive outcomes. For example, laboratory studies have found reappraising negative stimuli or situations can reduce negative mood (Aldao et al., 2010; Ochsner et al., 2012; Webb et al., 2012). Importantly, training individuals to employ reappraisal to regulate their own negative emotions was found to reduce negative emotional reactivity and perceived stress

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(Denny & Ochsner, 2014), as well as attenuated emotion-related brain activity (Cohen & Ochsner, 2018; Denny et al., 2015). In the context of the COVID-19 pandemic, one recent multi-country study tested the utility of brief reappraisal interventions to reduce distress in response to COVID-19 generic photographs from various media sources (showing, e.g., hospitalized patients, temperature checks in public places, empty streets in metropolitan areas during lockdowns). Results pointed to a distress-mitigating effect of reappraisal interventions compared to control conditions (Wang et al., 2021). It is noteworthy, however, that most of these studies used pictorial stimuli that were not personal or specific to participants, making it hard to draw conclusions on the implications of the training for real-life situations.

Recent pioneering research suggests that while regulating one's own emotions promotes well-being, so too does regulating other people's emotions (Cohen & Arbel, 2020; Inagaki & Orehek, 2017; Nozaki & Mikolajczak, 2020; Zaki & Williams, 2013). Accumulating evidence on what is commonly termed extrinsic emotion regulation (Nozaki & Mikolajczak, 2020) or interpersonal emotion regulation (Zaki & Williams, 2013) shows regulating the negative emotions of others with the aim of helping them feel better reduces the stress and improves the mood of the regulators (Cohen & Arbel, 2020; Martínez-Íñigo et al., 2013; Mongrain et al., 2018; Niven et al., 2012), possibly because of the rewarding nature of support provision (Hallam et al., 2014; Inagaki & Eisenberger, 2012). Specific to reappraisal, one dataset showed reappraising others' emotions over a three-week period was associated with reduced depression and perseverative thinking via an increase in habitual reappraisal (Doré et al., 2016; Morris et al., 2015).

Our study was the first to compare the relative contribution of intrinsic (self-focused) and extrinsic (other-focused) reappraisal training.¹ Both other- and self-reappraisal may have favorable effects on the regulator, depending on context (for further reading, see Doré et al., 2016; Cohen & Arbel, 2020). Yet it remains unclear which of these implementation strategies is more effective in the face of prolonged exposure to stress. Under the chronic stress of the COVID-19 pandemic, individuals may have benefited from reappraising their reality as more plausible and favorable to maintain hope and enhance feelings of control over the extreme circumstances (Wilson & Gilbert, 2008). In this sense, reappraising one's own negative daily events may promote adjustment under situations of prolonged ecological stress. That being said, studies show that when individuals feel intense negative emotions, they tend to use reappraisal to a lesser extent and prefer using other ER strategies, such as

distraction (Ford et al., 2017; Ford & Troy, 2019; Sheppes et al., 2014).

Extrinsic reappraisal may allow individuals to take a greater emotional distance when thinking about the negative content of a given event (Kross & Ayduk, 2011). This may enable them to practice reappraisal while feeling less overwhelmed. Indeed, studies show that gaining emotional distance from one's own problems helps reduce related distress (Kross & Ayduk, 2011). Furthermore, beyond the rewarding nature of helping someone else, reappraisal of another person's negative states may increase one's own feelings of social connectedness (Taylor, 2006).

It is currently unknown to what extent the findings from laboratory studies on the efficacy of self-reappraisal can be generalized to real-life situations, especially uncontrollable and prolonged ones such as the COVID-19 pandemic. To address this question, in two studies, we examined the efficacy of *intrinsic* (i.e., self-focused) vs. *extrinsic* (i.e., other-focused) ER training on distress reduction among regulators in everyday life. In Study 2, we also compared the two groups (other-focused, self-focused) to a control group. The training was performed during two consecutive COVID-19 lockdowns in Israel and included the regulation of real-life events related to the pandemic. Each procedure included eight sessions held every other weekday over a period of three weeks. To increase ecological validity, we asked participants to reappraise personal events. In the extrinsic procedure (other-reappraisal), participants were trained to reappraise other people's distressing events related to COVID-19. In the intrinsic procedure (self-reappraisal), participants were trained to reframe personally distressing events more positively. In both groups and in both studies, participants were asked to provide their reappraisal in writing, and we compared the utility of the two types of training for distress reduction on a daily basis and globally. At the daily level, before each of the eight sessions, participants reported their level of negative emotions that day. At the global level, we assessed distress level (a composite of depression, anxiety, and stress) at baseline, during the week after the last training session (i.e., post-training), and at a two-month follow-up. In Study 2, we expected both self- and other-reappraisal training would alleviate distress compared to no training. Given the pioneering nature of this study, we did not postulate a specific direction for the relative benefit of self- vs. other-reappraisal training.

¹ The study was not preregistered.

Study 1

Method

Participants

A power analysis using G*power (Faul et al., 2007) showed that to achieve a power > 80% with a priori alpha set at 0.05 to study within-between variable interactions with partial eta squared of 0.06 (medium effect size) in the ANOVAs, we needed 40 participants in each group. One hundred and forty-six participants completed the pre-training survey and were invited to participate in the training. Of this sample, 108 participated in the training. Four participants were removed from the analysis, as they completed fewer than five training sessions. (self-reappraisal group $n = 48$, mean age = 26.14 years, $SD = 4.31$, 73.55% female; other-reappraisal group $n = 56$, mean age = 27.02, $SD = 4.04$, 78.0% female). For demographic details, see Table S1 in the Supplemental Materials, available online. At the two-month follow-up, sample size included 34 participants in the self-reappraisal group (70.83%) and 44 participants in the other-reappraisal group (78.71%). Participants who did not complete the two-month follow-up survey did not differ from those who completed the survey in terms of pre-training distress, $t(102) = -0.64$, $p = 0.52$, Cohen's $d = 0.15$, trait reappraisal levels, $t(102) = -1.05$, $p = 0.30$, Cohen's $d = 0.24$, age, $t(102) = -1.04$, $p = 0.29$, Cohen's $d = 0.24$, number of completed training sessions, $t(102) = 0.48$, $p = 0.64$, Cohen's $d = 0.11$, or sex, $X^2(1) = 0.16$, $p = 0.69$.

Procedure

The study took place in Israel during the first few weeks of the COVID-19 outbreak. The pre-training survey was completed at the end of March 2020, and the training took place between April 5 and April 23, 2020. At the time, Israel was under an almost complete lockdown. People were restricted to remaining within 100m of their homes, and all schools and most indoor facilities and centers were closed. Participants were recruited through online advertisements. The study took place in four stages: pre-training assessment, training, post-training assessment a few days after the training, and a two-month follow-up. Participants who completed the pre-training questionnaire were randomly assigned to an other-reappraisal or a self-reappraisal group. Groups did not differ on key study constructs, including gender, $X^2(1) = 0.83$, $p = 0.36$, age, $F(1, 102) = 1.16$, $p = 0.28$, $\eta_p^2 = 0.01$, baseline levels of psychological distress, $F(1, 102) = 0.04$, $p = 0.84$, $\eta_p^2 = 0.00$, baseline levels of reappraisal $F(1, 102) = 0.47$, $p = 0.50$, $\eta_p^2 = 0.01$, and the number of completed training sessions, $F(1, 102) = 0.21$, $p = 0.66$, $\eta_p^2 = 0.00$. For both

groups, the training comprised eight sessions, each separated by two days, and spanning three weeks. Before completing the initial questionnaire, participants received a detailed explanation of the purpose of the study and signed an informed consent form. The study was approved by the ethics committee of the Faculty of Education, University of Haifa. All surveys were administered via Qualtrics. Participants received monetary compensation equal to \$25 in NIS, and those who completed all training sessions could participate in a lottery to win a tablet.

Training

During the three-week study period, participants in the two groups received an email which included a link to a Qualtrics survey on Sundays, Tuesdays, and Thursdays (with the exception of Tuesday, April 15, which was a holiday). Therefore, participants completed the training task eight times. The email was sent at 5:00 pm, and participants were asked to complete the survey by 10:00 pm. In each training session, participants first rated their mood and then completed a reappraisal task. Participants in the other-reappraisal group read a description of an incident presumably written by another participant and were asked to provide a reappraisal to help that participant feel better. Participants in the self-reappraisal group were asked to write about an incident during the past two days that had upset them. They were then asked to reappraise this incident in writing. After completing the reappraisal task, participants in both groups again rated their mood. 95% of the participants completed at least six training sessions.

Other-Reappraisal Procedure. For the other-reappraisal group, we created eight scenarios describing difficulties related to COVID-19. These scenarios focused on health, economics, social issues, and appearance, all of which are typical domains of worry among young adults (Arbel et al., 2018). The Supplemental Materials provide a full list of these scenarios. Participants received the following instructions.

Event Instructions. Please read a scenario describing an incident or a situation experienced by one of the other participants in this study over the past few days that caused them to feel regret or disappointment or made them feel bad about themselves.

Reappraisal Instructions. Now, please help the person who wrote about this incident evaluate it less negatively to make them feel better about themselves and feel less regret or disappointment. To do so, you can, for example, suggest that they focus on the positive aspects of the incident and/or on what they can learn from it. You can also help them think about the incident from a different perspective, for example, that of a bystander.

Self-Reappraisal Procedure. Participants in this group received the following instructions.

Event Instructions. Think of an incident or situation that took place during the last two days that caused you to feel regret or disappointment or made you feel bad about yourself. Please write about the incident and its circumstances. Describe what happened and what you felt and thought afterwards.

Reappraisal Instructions. Now, please think about the incident again in a way that will make you feel better about yourself and cause you to feel less regret or disappointment. To do so, for example, you can focus on the positive aspects of the incident and/or on what you learned from it. You can also think about the incident from a different perspective, for example, that of a bystander. Please describe how you reevaluated the incident.

Global measures

Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS is a self-report questionnaire containing 21 items measuring symptoms of depression, anxiety, and stress; higher levels mean more distress. Participants were asked to rate how often they experienced each item in the past two weeks, using a four-point scale, ranging from 0 ('did not apply to me at all') to 3 ('applied to me very much or most of the time'). In this study, we used a composite score of the three scales to reflect participants' global distress to match the groups on initial distress level. The Omega reliability index for DASS scores was =0.94.

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ consists of 10 statements assessing two emotion regulation strategies: reappraisal and suppression. Reappraisal is the ability to change the way one thinks about a situation, to change how one feels (e.g., 'I control my emotions by changing the way I think about the situation I am in'). Suppression is the ability to mask one's feelings and emotional expression (e.g., 'I control my emotions by not expressing them'). Participants are asked to rate whether they agree or disagree with each statement on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). The Omega reliability index was 0.82.

Daily measures

Negative Daily Mood. Participants rated the extent to which they were currently experiencing each of seven negative emotions; angry, frustrated, worried, helpless, afraid, sad, and lonely, based on the Brief Measures of Positive and Negative Affects (PANAS; Watson et al., 1988). Participants rated each emotion on a visual analogue scale, ranging from 0 (completely disagree) to 100 (completely agree). This was

done before and after the reappraisal assignment; however, for this study, we only used the pre-assignment ratings. The Omega reliability index was 0.83 for the within level (i.e., session level) and 0.97 for the between level (i.e., averaged across all days).

Analysis

Differences between groups in DASS levels were tested with linear regression models, and group differences in negative emotions were tested with mixed linear regression models, using lme4 package (Bates et al., 2014). We used sum to zero contrasts for categorical predictors (i.e., group, session number). To estimate effect size, we used effectsize R package (Ben-Shachar et al., 2020) and car R package (Fox & Weisberg, 2019). The emmeans package (Lenth et al., 2019) was used to contrast the analyses and to estimate and test conditional and marginal main effects and interactions. All models were adjusted for the number of the training sessions completed by the participants. Participants' age, sex, and pre-levels of using reappraisal were tested as covariates. Including these variables did not change the pattern of effects, and they were excluded from final analyses for parsimony. The syntax is publicly available on the OSF website.²

Results

Training-related changes in psychological distress (DASS scores)

We ran two one-way regression models, predicting DASS at post-training and at two-month follow-up separately. Group (self-reappraisal, other-reappraisal) served as the predictor, and the number of valid sessions was entered as a covariate. Table 1; Fig. 1 depict average DASS scores for each group at pre-training, post-training, and two-month follow-up.

In the first model, we tested group differences in DASS at post-training, adjusting for pre-training DASS levels and the number of sessions completed. The effect of group was small to moderate and did not reach significance, $F(1,100) = 3.74, p = 0.056, \eta_p^2 = 0.04$.

In the second model, we tested group differences in DASS at the two-month follow-up, adjusting for post-training DASS levels and the number of sessions completed. Group differences were of negligible size and not significant, $F(1,74) = 0.36, p = 0.55, \eta_p^2 = 0.00$.

² <https://osf.io/xh82w/>.

Table 1 Average of DASS Scores at each Time Point in Study 1

Variable	Pre-training	Post-training	2-month follow-up
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Self-reappraisal	(<i>n</i> = 48)	(<i>n</i> = 48)	(<i>n</i> = 34)
DASS - Total	22.15 (11.86)	18.79 (9.19)	21.97 (13.06)
Other-reappraisal	(<i>n</i> = 56)	(<i>n</i> = 56)	(<i>n</i> = 44)
DASS - Total	22.64 (13.25)	22.91(15.52)	19.72 (14.84)

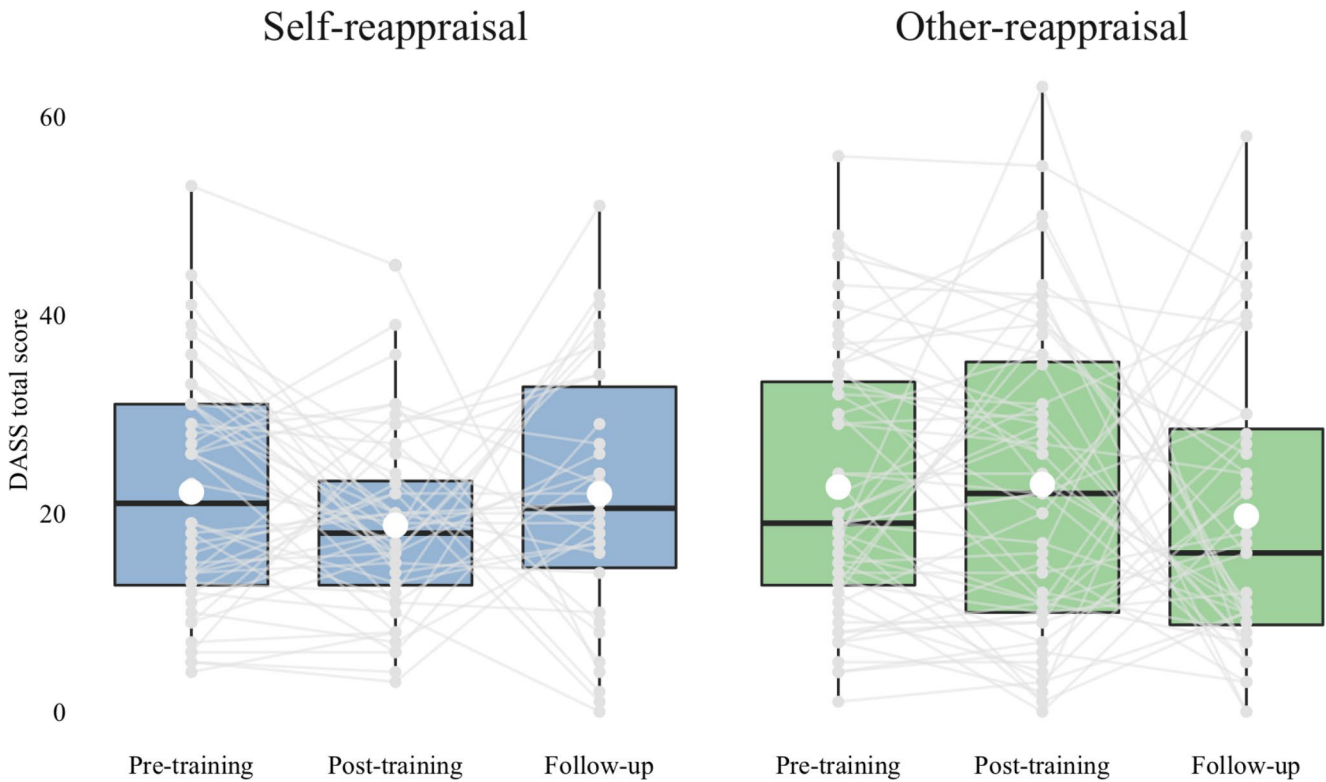


Fig. 1 Study 1: DASS Level for Each Group at Each Study Phase
 Note: Boxes represent the interquartile range (IQR). Horizontal black lines represent median levels. White circles represent mean levels. Upper lines represent the maximum observation below the upper fence (75th percentile + 1.5 * IQR). Lower lines represent the minimum observation below the lower fence (25th percentile - 1.5 * IQR). Dots represent actual DASS scores, and white lines represent the DASS scores of each participant across the three assessment points.

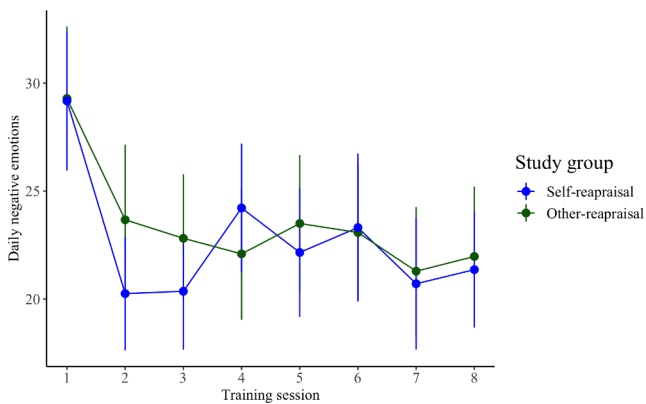


Fig. 2 Study 1: average level of negative Emotions across Training Sessions for each group
 Note: Lines represent SE.

Negative daily emotions

To test the effect of training on negative daily mood, we ran a mixed regression model with random intercept. Session number served as a within-subject factor and group (self-reappraisal, other-reappraisal) served as a between-subjects factor. There was no effect for group, $F(1, 105.10)=0.02, p=0.89, \eta_p^2=0.00$, but a significant effect emerged for session, $F(7, 708.64)=4.86, p < .0001, \eta_p^2=0.05$ (see Fig. 2). When we added the interaction group X session, the effects for group and session number remained largely the same, and the interaction effect was not significant, $F(7, 701.69)=0.46, p=0.86, \eta_p^2=0.00$.

Study 2

Method

Participants

Two hundred and twenty-nine participants completed the pre-training survey and were invited to participate in the training. Of this sample, 186 participated in the training. Two participants were removed from the analysis, as they completed fewer than five training sessions, and another three participants were removed from the control group for not following the training instructions (ratings in the daily mood measure were either 0 or 100 for all days and for all items) (self-reappraisal group $n=55$, mean age = 26.40 years, $SD=5.43$, 56% female; other-reappraisal group $n=65$, mean age = 27.39, $SD=4.43$, 59% female; control group $n=61$, mean age = 27.53, $SD=8.63$, 58% female). For demographic details, see Table S2 in the Supplemental Materials, available online. Seven participants did not complete the post training surveys. At the two-month follow-up, sample size included 34 participants in the self-reappraisal group (62% female), 43 participants in the other-reappraisal group (61% female), and 47 participants in the control group (61% female). Participants who did and did not complete the two-month follow-up survey did not significantly differ in terms of baseline levels of distress, $t(179)=1.54$, $p=0.13$, Cohen's $d=0.25$, reappraisal levels, $t(179)=1.18$, $p=0.24$, Cohen's $d=0.19$, age, $t(179)=0.10$, $p=0.92$, Cohen's $d=0.02$, or sex, $X^2(1)=1.21$, $p=0.27$. Participants who did and did not complete the follow-up surveys differed in the number of completed training sessions, $t(179)=-2.11$, $p=0.04$, but despite the statistical significance, this effect was small to medium, Cohen's $d=0.34$ [completed follow-up survey: $M=7.74$, $SD=0.55$; did not complete follow-up survey: $M=7.49$, $SD=1.04$].

Measures

We used the same measures as in Study 1. Psychological distress at pre-training, post-training, and 2-month follow-up was measured with the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The Omega reliability index for DASS scores was = 0.93. Overall pre-training reappraisal was measured with the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The Omega reliability index for pre-training reappraisal was 0.85. Negative daily mood was measured at each session using the same procedure as in Study 1. The Omega reliability index for negative mood was 0.80 for the within level (i.e., session level) and 0.94 for the between level (i.e., averaged across all days).

Procedure

The study took place in Israel during the second COVID-19 lockdown. The pre-training survey was completed in mid-September 2020, and the training took place between September 21 and October 8, 2020. The procedure was similar to Study 1, with a few changes. First, to ensure gender did not account for the observed effects of Study 1 (mostly female participants), we recruited an equal number of male and female participants for Study 2. Second, participants in the self-reappraisal group were asked to write about an upsetting event specifically related to the pandemic to match the topic for reappraisal across the two training groups. Third, we included a control group in which participants reported their mood but did not practice the reappraisal assignment. Participants were randomly assigned to the other-reappraisal group, the self-reappraisal group, or the control group. Groups did not differ on key study constructs, including gender, $X^2(2)=3.37$, $p=0.19$, age, $F(2, 178)=0.53$, $p=0.59$, $\eta_p^2=0.01$, baseline levels of psychological distress, $F(2, 178)=0.33$, $p=0.72$, $\eta_p^2=0.01$, baseline levels of reappraisal, $F(2, 178)=0.26$, $p=0.77$, $\eta_p^2=0.00$, and number of completed training sessions, $F(2, 178)=0.96$, $p=0.38$, $\eta_p^2=0.01$. Participants received monetary compensation equal to \$25 in NIS, and those who completed all training sessions could participate in a lottery to win a tablet.

Analysis

As in Study 1, we used regression models to test between-group differences (i.e., self-, other-, control) in DASS post-training and at a two-month follow-up. We used a mixed regression model to test between-group differences in average negative mood level during the training sessions.

Results

Training-related changes in psychological distress (DASS scores)

We ran two regression models, one predicting DASS post-training and the other predicting DASS at the two-month follow-up. Table 2; Fig. 3 depict average DASS scores for each of the three study groups at pre-training, post-training, and two-month follow-up.

In the first model, we tested group differences in DASS post-training, adjusting for levels of DASS pre-training and for the number of training sessions completed. Results pointed to a significant effect of group, $F(2, 169)=6.58$, $p=.002$, $\eta_p^2=0.07$. Post hoc comparison of the three groups indicated significantly lower DASS levels post-training in the

Table 2 Average of DASS Scores at Each Time Point in Study 2

Variable	Pre-training	Post-training	2 month follow-up
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Self-reappraisal	(<i>n</i> = 55)	(<i>n</i> = 53)	(<i>n</i> = 34)
DASS – Total	22.35 (14.14)	15.98(11.50)	18.12(13.51)
Other-reappraisal	(<i>n</i> = 65)	(<i>n</i> = 62)	(<i>n</i> = 43)
DASS - Total	20.68(13.06)	18.98(11.91)	15.88(12.38)
Control group	(<i>n</i> = 61)	(<i>n</i> = 59)	(<i>n</i> = 47)
DASS - Total	20.36(14.69)	20.71(13.23)	21.06(13.84)

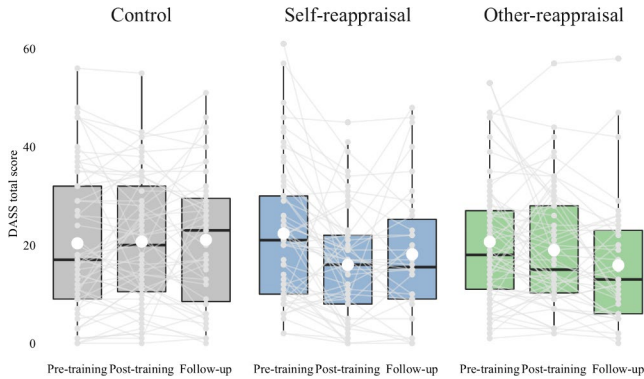


Fig. 3 Study 2: DASS Level for each group at each study phase
 Note: Boxes represent the interquartile range (IQR). Horizontal black lines represent median levels. White circles represent mean levels. Upper lines represent the maximum observation below the upper fence (75th percentile + 1.5 * IQR). Lower lines represent the minimum observation below the lower fence (25th percentile - 1.5 * IQR). Dots represent actual DASS scores, and white lines represent the DASS scores of each participant across the three assessment points.

two training groups than in the control group, $t(169) = -2.85, p = 0.01, \eta_p^2 = 0.05$. Next, we ran post hoc pairwise comparisons with FDR correction to test mean differences across the three groups. Results indicated a significantly lower DASS level post-training for the self-reappraisal group than for the other-reappraisal group, $t(169) = -2.38, p = 0.04, \eta_p^2 = 0.03$, and the control group, $t(169) = -3.59, p < 0.001, \eta_p^2 = 0.07$. The difference between the other-reappraisal and control groups was not significant, $t(169) = 1.30, p = 0.20, \eta_p^2 = 0.00$.

In a second model, we tested group differences in DASS at the two-month follow-up, adjusting for DASS levels post-training (i.e., the DASS levels at the prior assessment point) and for the number of sessions completed. The effect of group was not significant, $F(2, 119) = 1.92, p = 0.16, \eta_p^2 = 0.03$.

Negative daily emotions

To test whether the training reduced negative emotions across sessions, we ran a mixed regression model with random intercept, session number as a within-subject factor, and group (self-reappraisal, other-reappraisal, control) as a between-subjects factor. The effect of group was significant,

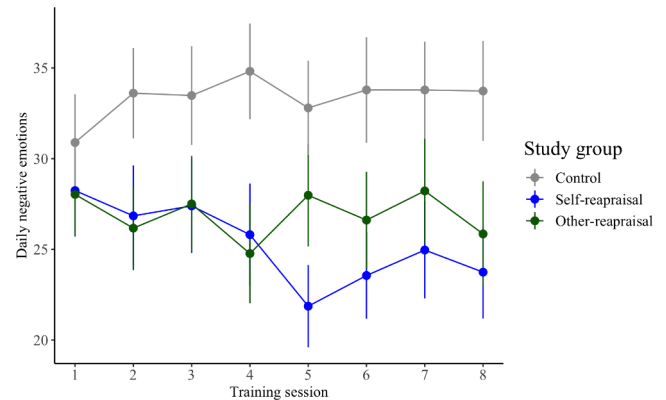


Fig. 4 Average level of negative Daily Emotions across Training Sessions for each Study Group
 Note: Lines represent SE.

$F(2, 175.37) = 3.40, p = 0.04, \eta_p^2 = 0.04$. There was no main effect for session, $F(7, 1147.94) = 0.52, p = 0.82, \eta_p^2 = 0.00$ (see Fig. 2). Post hoc comparison of the two training groups (self-reappraisal: $M = 25.31, SD = 19.08$; other-reappraisal: $M = 27.29, SD = 21.57$) and the control group ($M = 33.34, SD = 20.86$) indicated significantly lower levels of negative emotions, on average, in the two training groups than the control group, $t(175) = -2.53, p = 0.01, \eta_p^2 = 0.04$. Next, we ran post hoc pairwise comparisons with FDR correction to test mean differences across the three groups. Results showed significantly lower levels of negative emotions in the self-reappraisal group than the control group, $t(175) = 2.51, p = 0.04, \eta_p^2 = 0.03$. Comparisons of the other-reappraisal and control groups, $t(175) = 1.99, p = 0.09, \eta_p^2 = 0.02$, and self-reappraisal and control groups, $t(175) = -0.74, p = 0.46, \eta_p^2 = 0.00$, were not significant. Figure 4 illustrates mean levels of negative emotions for each group across the eight sessions. When we added the interaction group X session, the effects for group and time remained largely the same, and the interaction effect was not significant, $F(14, 1134.06) = 0., p = 0.69, \eta_p^2 = 0.00$.

General discussion

This research brought the investigation of reappraisal training into individuals' real lives during the first two COVID-19 lockdowns in Israel. It also examined the relative utility of intrinsic vs. extrinsic reappraisal training to better understand how to optimize the ability to cope under extreme and continued stress. Study 1 took place during the first COVID-19 lockdown and showed that self- and other-reappraisal training had similar effects on distress reduction, although there was a trend towards a greater reduction in distress in the self-reappraisal group in the post-training assessment. The two groups showed similar reductions in negative daily mood across the eight daily training sessions. Study 2 took place about five months after Study 1, during the second COVID-19 lockdown. Results demonstrated favorable effects for both types of reappraisal training compared to a control condition, with a stronger effect for the self-reappraisal training. Specifically, post-training distress was lower for the self-reappraisal group than for the other-reappraisal or control groups, with no advantage of other-reappraisal training over the control condition. Average negative daily mood did not differ across the eight training sessions for the two training groups, but the self-reappraisal group had significantly lower levels of negative daily mood, on average, than the control group. Importantly, at the two-month follow-up, the advantage of any reappraisal training over the control condition disappeared (Study 2). Arguably, the effect of reappraisal training on distress is short lived and requires continuous practice (Cohen & Ochsner, 2018), especially under major stressors, such as COVID-19.

Our finding of larger advantages for self- vs. other-reappraisal in Study 2 than in Study 1, may be related to natural changes in responding to the pandemic circumstances. Under prolonged stressors (e.g., Study 2 took place seven months after the pandemic onset while Study 1 took place after one month), engaging with one's own emotional difficulties (i.e., self-reappraisal) may become increasingly fundamental for survival, whereas engaging with others' difficulties may be less productive and diffuse one's mental resources. In fact, research on the benefits and costs of supporting others has often demonstrated the favorable effects of supporting others are short term (see Cohen & Arbel, 2020).

Alternatively, the relative utility of the self- versus other-reappraisal training may be related to differences in the potency of reappraising one's own events compared to reappraising events presumably experienced by a fellow participant. While event scenarios given to participants in the other-reappraisal group were relevant to the COVID-19 pandemic, they were probably less personally relevant than events mentioned by participants in the self-reappraisal

group. Furthermore, participants in the other-reappraisal group were asked to provide support to a fellow participant, not to a friend or a relative, and they did not receive any feedback for their support. All of these elements may have lowered the impact of the regulation training for participants in this group. Future assessments of extrinsic reappraisal training should compare different types of support recipients (e.g., close other, relative, distant other) and the role of feedback.

Limitations

A few limitations should be mentioned. First, Study 1 took place during the first COVID-19 outbreak and lockdown. This put a time pressure on data collection and limited our ability to recruit a larger sample to include a control group or to balance the sample for the sexes. The fact that our sample included mostly females may limit generalizability for males. Prior studies have found sex differences in the regulation of stress (Kelly et al., 2008), particularly in the tendency to affiliate and connect under stress (Taylor, 2006), and this might influence the effect of reappraising others on the regulator. The lack of a control group precludes inferences on the contributions of both types of reappraisal training to the reduction of distress. We accounted for these limitations in Study 2, which yielded a largely similar pattern of results for the efficacy of self- versus other-reappraisal training. Nevertheless, the control group in Study 2 did not have to share negative experiences, and future studies should consider including a condition in which individuals report on negative daily events to control for possible difficulties sharing negative experiences in groups.

Second, in both studies, we used convenience samples, and this poses a risk for the representativeness and generalizability of the results. Third, we focused on reappraisal, a central cognitive emotion regulation strategy (Ochsner & Gross, 2005), but individuals use multiple strategies to regulate emotions (Aldao et al., 2015), even for the same event. In fact, it is the richness and flexibility of emotion regulation that has been found to promote well-being (Birk & Bonanno, 2016; Bonanno & Burton, 2013; Ford & Troy, 2019; Sheppes et al., 2014). Future studies should examine more complex training protocols that explore the utility of various types of emotion regulation strategies and their combination.

Fourth, in the other-reappraisal group, we asked participants to regulate others' written negative events. There may have been inter-individual variability in the cognitive and emotional engagement these texts elicited in participants, and this could have increased the variability of the effect. In addition, written texts may not be robust enough to elicit an

emotional response or genuine caring. Texts may not accurately mimic real-life emotional support situations, which are usually interpersonal in nature. Future studies could examine the effect of other types of reappraisal training on the regulator using more ecologically valid stimuli (e.g., video clips).

Finally, it is possible that other-reappraisal was less effective because the specific nature of the COVID-19 pandemic limited the availability of social interactions. Participants were under lockdown during the training procedure and had fewer opportunities to practice other-reappraisal in real life, and this may have affected the utility of this ER strategy. Future studies should follow up on the extent to which participants apply the acquired ER strategy in their daily lives in a variety of stressful scenarios. This information would help to establish the efficacy of each training protocol.

Conclusion

Despite these limitations, our data provide solid evidence of the utility of reappraisal training in promoting mental health in the natural environment, particularly under extreme circumstances. In addition, we have given a fine-grained examination of the relative efficacy of intrinsic (i.e., self) versus extrinsic (i.e., other) reappraisal, providing support for a relative advantage of intrinsic emotion regulation. Importantly, however, other-reappraisal was also beneficial to providers, which should encourage future studies to further specify the conditions under which reappraising others may be especially beneficial.

A major strength of this research is that we trained individuals to use reappraisal in real life using context-sensitive information, thus answering previous calls in the literature (Aldao, 2013). Although this ecological design may have increased variability in the responding patterns compared to a more controlled design, it enabled us to capture distress and emotional regulation benefits as they unfolded in real life. Daily life is rife with stressors and regulatory efforts, so the fact that we were able to demonstrate the efficacy of training in two different samples points to its robustness. The results suggest reappraisal training is a promising approach for outreach strategies in the wake of disasters, especially given its high accessibility and affordability.

Given the pioneering nature of this research, its specific COVID-19 context, and aforementioned limitations, our results should be further examined and replicated. We encourage future studies in the field to continue exploring the specific parameters under which intrinsic and extrinsic emotion regulation are particularly effective across contexts, timeframes, and personal characteristics.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12144-022-03642-6>.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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