Motiv Emot (2016) 40:740–749
DOI 10.1007/s11031-016-9566-6

ORIGINAL PAPER

# Beliefs about emotion's malleability influence state emotion regulation

**Elizabeth T. Kneeland**[1] · **Susan Nolen-Hoeksema**[1] · **John F. Dovidio**[1] · **June Gruber**[2]

Published online: 25 May 2016


**Abstract** The current study examined how manipulating information about whether emotions are fixed or malleable influences the extent to which individuals engage in different emotion regulation strategies. We hypothesized that fixed, compared to malleable, emotion beliefs would produce less effort invested in emotion regulation. Participants were randomly assigned to experimental conditions emphasizing that emotions are malleable or fixed, and then completed an autobiographical negative emotion induction. Participants reported seven different emotion regulation strategies they used during the recall task. Participants in the fixed emotion condition, compared to those in the malleable emotion condition, reported engaging significantly less in self-blame and perspective-taking. They engaged somewhat, but not significantly, less in all of the other strategies, except acceptance. These results suggest that emotion malleability beliefs can be experimentally manipulated and systematically influence subsequent emotion regulatory behavior. Implications for affective science and mental health are discussed.

**Keywords** Emotion regulation · Emotion beliefs · Negative emotions · Psychopathology

## Introduction

The ability to navigate an emotion-laden life represents a key aspect of psychological health. Difficulty regulating emotions relates to a wide range of undesirable psychological outcomes, such as depression, chronic worry, and substance use (Gross 2013; Kring 2008). Despite the recent growth in research on emotion regulation (Gross 2013), it remains unclear why some individuals experience greater success in regulating their emotions and what determines the emotion regulation strategies individuals select and use in the moment.

One factor that may influence the ways people regulate their emotion is their personal beliefs regarding the malleability of emotion. Beliefs about whether a quality is fixed or malleable influence individuals' regulatory behavior and can impact individuals' perceptions and motivations (Dweck 2000; Dweck and Leggett 1988). Because fixed theorists believe that a specific attribute is static and outside personal control, they make fewer efforts at self-regulation, attribute potential failure in self-regulation to their intrinsic inability, and believe that a challenge cannot be overcome through additional, active effort (Dweck 2000; Dweck and Leggett 1988). By contrast, malleable theorists believe that a specific attribute is changeable, attribute potential setbacks to situational factors, and exhibit a more assertive and active pattern of coping (Dweck and Leggett 1988; Tamir et al. 2007). However, a limitation of the extant research examining the correlations between beliefs about emotion's malleability and affect and emotion regulation is that they cannot answer the question of causality. The present research investigated whether intervening experimentally to influence whether people believe that their emotions are fixed or

**Electronic supplementary material** The online version of this article (doi:10.1007/s11031-016-9566-6) contains supplementary material, which is available to authorized users.

✉ Elizabeth T. Kneeland
elizabeth.kneeland@yale.edu

[1] Department of Psychology, Yale University, P.O. Box 208205, New Haven, CT 06520, USA

[2] Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, USA

malleable influences the extent to which they engage in different emotion regulation strategies.

Beliefs about the malleability of emotions represent a viable means through which to examine individual differences in state emotion regulation and the overall role of emotion-related beliefs in how people respond to emotional experiences. Theorizing about this topic has considered beliefs about a construct's malleability to be trait-like and directly influencing the individual's attributions, motivation, and effort expended at self-regulation (as described above; see Burnette et al. 2013, for review). Empirical studies of interventions promoting more malleable theories in domains such as personality have found that promoting a more malleable view consistently facilitates more effective coping behavior, further substantiating the causality of malleability beliefs (Burnette and Finkel 2012; Dweck 2000; Yeager et al. 2013). Therefore, there is empirical support for the efficacy of a malleable belief intervention and justification for the development of such an intervention in the domain of beliefs about emotion's malleability.

Based on work regarding the influence of malleability beliefs about constructs such as intelligence, it is likely that holding a more fixed, entity view may limit direct efforts to self-regulate (Dweck 2000; Dweck and Leggett 1988), leading individuals to adopt a more passive coping style in the moment compared to more active, effortful forms of emotion regulation. Consistent with this reasoning, correlational work found that trait-level emotion theories related to how participants regulated their negative emotions and their emotional experiences. In correlational research, participants who believed that emotions were more fixed reported lower levels of positive emotions and higher levels of negative emotions, decreased psychological well-being, lower perceived emotion regulation self-efficacy, and higher levels of depression (Kappes and Schikowski 2013; Tamir et al. 2007). Self-reported malleable emotion theories also were correlated with the greater trait use of cognitive reappraisal (Tamir et al. 2007). Individuals who held the belief that anxiety is fixed reported less engagement in both cognitive reappraisal and suppression compared to individuals who believed that anxiety is malleable (Schroder et al. 2015). The present study extends this past work by directly manipulating beliefs about emotion's malleability and examining the effects on a range of emotion regulation strategies.

The goal of the current study was to examine the causal influence of beliefs about emotion's malleability by directly manipulating whether participants believed emotions were malleable versus fixed, and investigating the effect on the ways people regulate negative emotion. In the current study, individuals read a passage explaining that emotion is malleable or fixed, recalled an upsetting personal memory as a negative emotion induction, and reported on the specific state emotion regulation strategies they used.

Drawing on prior research on the impact of beliefs about malleability in other domains (Dweck 2000) and correlational findings about the relationship between beliefs about the malleability of emotions and emotion regulation (Schroder et al. 2015; Tamir et al. 2007), we predicted that participants in the fixed emotion condition, compared to individuals in the malleable emotion condition, would report engaging in less active emotion regulatory efforts overall and would be more likely to engage primarily in emotion regulation strategies that acted on the emotion once it was fully felt. We predicted that participants in the fixed emotion condition, compared to those in the malleable emotion condition, would report engaging in less reappraisal and positive refocus, that act on the emotion as it is unfolding, engaging instead primarily in regulation strategies that acted on the emotion once it was fully felt. We also predicted that malleable emotion theorists would engage in more perspective-taking (e.g., "I thought that other people go through much worse experiences") because work by Dweck and colleagues on intelligence malleability theories holds that incremental theorists are more likely to place a single, upsetting event within a framework of other life events occurring across time (Dweck 2000; Dweck and Leggett 1988). By contrast, we predicted that participants in the fixed experimental condition would report engaging in more passive acceptance (e.g., "I thought that I could not change anything about it"), because this emotion regulation strategy focusing on accepting the negative situation most directly mirrors the belief that emotions are also immutable.

We explored the effect of the manipulation of emotions as fixed or malleable on seven specific emotion regulation strategies that are often the focus of empirical research, have consistent ties to psychological health, and are especially relevant to the regulation of unwanted emotions associated with the recall of an upsetting personal memory. Reappraisal, acceptance, positive refocus (also called distraction) have been largely considered effective strategies in the extant emotion regulation literature (Aldao et al. 2010; Gross 2013). In addition, positive refocus is largely seen as an effective emotion regulation strategy through shifting an individual's attention away from aversive emotional stimuli in order to reduce negative emotions (Sheppes and Gross 2011). Perspective-taking, or meaning-making through placing the single event within a larger context, is also considered effective in coping with emotionally upsetting events (Park and Folkman 1997). Therefore, uncovering a potential cognitive factor, specifically the beliefs about emotion's malleability, is important for understanding factors that could promote psychological health.

Three of the emotion regulation strategies we studied typically are negatively associated with psychological health. Rumination is frequently viewed as miring the individual in emotional distress (Nolen-Hoeksema et al. 2008). Cognitive suppression, or pushing unwanted negative thoughts or emotions out of conscious awareness, is similarly viewed as ineffective in decreasing emotional upset and can lead to the ironic amplification of unwanted emotions and thoughts (Wegner and Zanakos 1994). Self-blame is also largely seen as ineffective in coping with unwanted negative emotions through increasing negative emotions (Garnefski et al. 2001). Because of theorizing by Gross and others (e.g., Gross 2008; Tamir et al. 2007) indicating that fixed emotion theorists would engage in more response-focused emotion regulation strategies, we predicted that individuals who were induced to believe that emotions are fixed would engage in more cognitive suppression (e.g., "there were thoughts that kept jumping into my mind") and rumination (e.g., "I was preoccupied with what I was thinking and feeling") because these emotion regulation strategies act on the emotion once it has fully unfolded. Based on work by Dweck and colleagues that found that individuals who held more fixed views of intelligence were more likely to blame themselves for negative events and failures, we similarly predicted that fixed emotion theorists would be more likely to engage in self-blame (e.g., "I felt that I was the one to blame for it") in response to the negative event (Dweck 2000). Therefore, the current study included a range of emotion regulation strategies to explore how emotion malleability beliefs might relate to specific forms of state emotion regulation.

## Method

### Participants

Participants completed the study using Amazon's Mechanical Turk (mTurk) (Buhrmester et al. 2011) and were compensated $0.75. Participants were drawn from the United States and there were no demographic restrictions. One hundred and seventy-two participants completed the current study. Three participants were excluded from analysis because their time (measured in minutes) to complete the study was greater than two standard deviations of the mean time ($M = 26.12$, $SD = 13.79$) to complete the study (Ratcliff 1993). The three participants who were excluded took between 52 and 124 min to complete the study. The final analyzed sample consisted of one hundred and sixty-nine individuals, 97 (57.4 %) of whom were women. The average age of the sample was 36.74 years ($SD = 11.94$, range 18–70 years). Self-reported ethnicities were: 131 (77.5 %) White, 15 (8.9 %) African American/Black, 8 (4.7 %) Asian or Pacific Islander, 8 (4.7 %) Latino/Hispanic and 7 (4.1 %) Multiracial. There were no group differences at baseline in terms of age, gender, or race ($p$'s $> .23$).

### Procedure

All participants were informed that the study's purpose was to determine how personality influences how individuals comprehend and present information. Participants were informed that this was the study purpose at the beginning of the study in order to justify the reading and writing portions of the emotion belief experimental induction and the writing of the negative personal memory that served as the negative emotion induction. Participants' baseline state affect was initially measured to assess changes in anxiety and general affect as a function of the negative emotion induction. Participants completed the six-item version of the state anxiety scale of the State-Trait Anxiety Inventory (STAI-S; Marteau and Bekker 1992). The scale had good internal consistency (Cronbach's $\alpha = .86$). Participants also completed the 20-item Positive and Negative Affect Scale (PANAS) that assessed their positive and negative affect "during the past week" to serve as a measure of baseline affect (Tellegen et al. 1988). Reliability for the PANAS Negative Affect subscale and Positive Affect subscale was excellent (Cronbach's $\alpha = .92$ for each subscale). Participants also completed the Implicit Theories of Emotion scale to assess their trait level beliefs about emotion's malleability before the emotion belief manipulation (Cronbach's $\alpha = .83$, Tamir et al. 2007). In counterbalanced order across participants, participants were presented with information designed to manipulate their beliefs about the malleability or stability of emotion and a negative emotion induction. Specifically, participants either received the emotion malleability manipulation first and then underwent the negative emotion induction, or underwent the negative emotion induction and then received the emotion malleability manipulation. In both study versions, all participants completed state affect and emotion regulation measures after receiving both the experimental manipulation and the negative emotion induction.

#### *Experimental manipulation of emotion beliefs*

Participants were randomly assigned to receive the "emotion is malleable" passage (the malleable condition; $n = 82$) or the "emotion is fixed" passage (the fixed condition; $n = 87$). The passages were each approximately one page single-spaced in length and presented fictitious data and quotations to convey the argument either that emotions are fixed or that emotions are malleable (The full

texts of both passages are included in the supplementary material.). This type of intervention has been used to promote malleability beliefs (Yeager et al. 2013). Participants then summarized their specific manipulation passage's argument. This process has been used successfully to aid in the internalization of subtle manipulations (Walton and Cohen 2011), and also took advantage of the "saying is believing" effect to enhance the internalization of the arguments presented in the specific manipulation passage (Echterhoff et al. 2005).

*Negative emotion induction*

Participants also completed a negative emotion induction in which they were prompted to recall a personally upsetting memory for 5 min. Personal memory recall has been used often in research on emotion regulation (Hatzenbuehler et al. 2009; Rusting and Nolen-Hoeksema 1998). Participants were instructed to type out a brief, open-ended description of the upsetting memory in order to enhance the internalization of the negative emotion induction used previously in memory recall emotion inductions (Rusting and Nolen-Hoeksema 1998). To assess whether the types of incidents recalled for the negative emotion induction task were comparable, two independent judges, unaware of participants' experimental condition, coded a subset (20 % of the sample) of the memories participants generated during the negative emotion induction using a categorical coding scheme used in Gruber et al. (2011). Three categorical content variables were coded: social, romantic interaction, and work. Kappas for all content categories were excellent (0.86–0.95).

Participants next completed the PANAS to assess their affect "during the sad memory recall." Internal consistency for this second administration of the PANAS was good for both the Negative Affect and Positive Affect scales (Cronbach's $\alpha = .90$ for each subscale). Participants again completed the STAI assessing their anxiety during the recall of the upsetting memory. Internal consistency for this administration was excellent (Cronbach's $\alpha = .88$).

*Assessment of emotion regulation strategies*

Participants then completed a state version of the Cognitive Emotion Regulation Questionnaire (CERQ), adapted from the 36-item trait version for the current study (Garnefski et al. 2001). The current study focused on the CERQ scales of self-blame (Cronbach's $\alpha = .92$), acceptance (Cronbach's $\alpha = .76$), rumination (Cronbach's $\alpha = .73$), reappraisal (Cronbach's $\alpha = .85$), positive refocus (distraction; Cronbach's $\alpha = .91$), and perspective-taking (Cronbach's $\alpha = .88$). The White Bear Suppression Inventory (WBSI; Cronbach's $\alpha = .93$) was adapted for this study to assess participants' state levels of thought suppression. Although the vast majority of self-report emotion regulation scales assess trait-level use of these strategies, there is precedent for utilizing adapted trait emotion regulation scales to assess state use of emotion regulation (e.g., Egloff et al. 2006). In addition, as demonstrated earlier, the state emotion regulation scales that represent our main dependent measures in the current study demonstrated strong internal reliability.

At the end of the study all participants were debriefed on the study's true purpose. In the present study we did not include a funnel debriefing procedure. However, in a separate study with a parallel design, we did include a comprehensive funnel debriefing procedure and found that only 5 % of participants accurately guessed the study's purpose in line with other behavioral research that uses subtle experimental manipulations (Bargh and Chartrand 2000; Kneeland et al. 2016).

## Results

### Manipulation checks

As described above, two independent judges coded the content of the memories (related to social, romantic interaction, and work domains; Gruber et al. 2011) that participants recalled during the negative emotion induction. There were no significant differences in the prevalence of these content categories between the two experimental conditions ($p$'s $> .16$).

We conducted a series of repeated measures Analysis of Variance (ANOVAs) to examine whether participants were experiencing the intended increase in anxiety and negative affect and decrease in positive affect as a function of the negative emotion induction. Supportive of the intended manipulation of negative emotion, negative affect (as assessed by the PANAS) increased from baseline ($M = 17.52$, $SD = 8.56$) to after the emotion induction ($M = 21.60$, $SD = 9.03$), $F(1,166) = 41.54$, $p < .001$, $\eta_p^2 = .20$. State anxiety increased from before the emotion induction ($M = 10.24$, $SD = 3.78$) to after the negative emotion induction ($M = 16.01$, $SD = 4.84$), $F(1,168) = 261.19$, $p < .001$, $\eta_p^2 = .61$. Positive affect decreased from baseline ($M = 32.41$, $SD = 8.56$ to $M = 21.59$, $SD = 9.00$), $F(1,167) = 276.33$, $p < .001$, $\eta_p^2 = .62$.

We next examined whether there were any group differences in changes in anxiety, and positive and negative affect as a function of the negative emotion induction. We conducted linear regressions with experimental condition, pre-induction affect or anxiety scores, gender, and the

interaction between gender and experimental condition as predictors, in separate analyses of post-speech anxiety, positive affect, and negative affect. There were no differences in post-speech anxiety [$F(1,167) = 2.36$, $p = .13$, $\eta_p^2 = .01$], positive affect [$F(1,166) = .12$ $p = .73$, $\eta_p^2 = .001$], or negative affect [$F(1,165) = 2.21$, $p = .14$, $\eta_p^2 = .01$] as a function the fixed versus malleable emotion manipulation. Thus, both the content and emotional responses to the emotion induction instructions were comparable for participants in the fixed emotion and malleable emotion conditions.

### Emotion regulation strategies

Preliminary analyses revealed no systematic effect of gender, or race on the use of the regulation strategies of interest. Age was negatively associated with cognitive suppression [$r(168) = -0.24$, $p = .002$], self-blame [$r(168) = -0.25$, $p = .001$], and rumination [$r(168) = -0.21$, $p = .006$]. Therefore the analyses for suppression, self-blame, and rumination were conducted with and without age in the model; the results remained the same, and thus the final results below do not include age in the analyses. If data was missing from a scale the participant's data were excluded from that analysis. Overall, for predictor and dependent variables, less than 1 % of the data was missing.

In the preliminary analyses focusing on participants' emotion regulation efforts, we conducted a series of regressions with experimental group (fixed versus malleable), the centered continuous variable of participants' emotion malleability beliefs before undergoing the emotion belief manipulation, the order in which materials were presented (counterbalanced across participants), the interaction term between participants' unmanipulated beliefs about emotion's malleability and experimental group, and the interaction between study version and experimental group as predictor variables. There were no systematic effects of either of the interaction terms, of the continuous emotion belief variable, or the study version on the use of the emotion regulation strategies of focus, and therefore these terms were trimmed from the model for main analyses.

To address the issue of Type I errors associated with conducting a number of separate univariate analyses of variance, as recommended (Hummel and Sligo 1971; Leary and Altmaier 1980), we conducted a multivariate analysis of variance (MANOVA) with the full set of emotion regulation strategies that we hypothesized could be affected by our fixed versus malleable emotion manipulation. This analysis revealed a significant multivariate effect for experimental group, $F(1,157) = 2.26$, $p = .018$, $\eta_p^2 = .10$. Then, as also recommended, we examined the effects for each emotion regulation strategy in a series of univariate analyses of variance.

For the main analyses, experimental group was the predictor variable in the univariate analyses with experimental condition as a fixed factor. As predicted, participants who believed that their emotions were malleable ($M = 15.94$, $SD = 6.55$) engaged in more perspective taking to regulate their unwanted emotions compared to those participants who were induced to view their emotions as fixed ($M = 13.71$, $SD = 6.79$), $F(1,168) = 4.69$, $p = .03$, $\eta_p^2 = .03$. However, contrary to our predictions, participants who were induced to view their emotions as malleable were more likely to engage in self-blame ($M = 13.56$, $SD = 7.72$) compared to those in the fixed emotion condition ($M = 11.17$, $SD = 6.86$), $F(1,167) = 4.49$, $p = .03$, $\eta_p^2 = .03$. Although participants in the malleable emotion condition engaged somewhat more than participants in the fixed emotion condition in positive refocus, cognitive reappraisal, cognitive suppression, and rumination emotion regulation strategies, none of these effects attained statistical significance (see Table 1).

The experimental manipulation also significantly influenced the use of acceptance in the expected direction. Specifically, participants who were induced to view emotions as fixed were *more* likely to engage in acceptance ($M = 21.80$, $SD = 3.79$) compared to participants who were induced to view emotions as malleable ($M = 19.99$, $SD = 5.35$), $F(1,166) = 6.39$, $p = .01$, $\eta_p^2 = .04$. We note, however, that acceptance was the emotion regulation strategy most directly related to beliefs about emotional fixedness.[1] As described earlier, the passive type of acceptance measured in the current study, using items such as "I thought that I have to learn to live with it", most closely parallels the belief that internal experiences are also fixed.[2]

[1] We also assessed the other scales of the CERQ (Planning, Catastrophizing, Blaming Others) as part of a larger study. In relation to the current study, there were no group differences in the state use of these emotion regulation strategies (all $p$'s $> .38$). We chose to focus on the selected seven subscales included in the main analyses in the current study in order to reduce participant burden, stay within time constraints, and because we believed the excluded emotion regulation strategies were the least applicable to regulating emotions in response to an upsetting personal memory.

[2] We also assessed participants' beliefs about the malleability of personality before undergoing the emotion belief manipulation. There were no systematic main effects or interactions between personality malleability beliefs and experimental condition on the dependent variables.

**Table 1** Emotion beliefs and emotion regulation strategies

| Emotion regulation strategy | *Mean* | *SD* | *F* | *p* value | $\eta_p^2$ |
|---|---|---|---|---|---|
| Self-blame | | | 4.49 | 0.03 | 0.03 |
| Malleable | 13.56 | 7.72 | | | |
| Fixed | 11.17 | 6.86 | | | |
| Perspective-taking | | | 4.69 | 0.03 | 0.03 |
| Malleable | 15.94 | 6.55 | | | |
| Fixed | 13.71 | 6.79 | | | |
| Acceptance | | | 6.39 | 0.01 | 0.04 |
| Malleable | 19.99 | 5.35 | | | |
| Fixed | 21.80 | 3.79 | | | |
| Rumination | | | 1.63 | 0.20 | 0.01 |
| Malleable | 18.08 | 5.25 | | | |
| Fixed | 17.06 | 5.18 | | | |
| Positive refocus | | | 0.19 | 0.66 | 0.01 |
| Malleable | 13.05 | 6.33 | | | |
| Fixed | 12.63 | 6.25 | | | |
| Reappraisal | | | 1.14 | 0.29 | 0.01 |
| Malleable | 15.62 | 5.95 | | | |
| Fixed | 14.59 | 6.53 | | | |
| Cognitive suppression (WBSI) | | | 0.53 | 0.47 | 0.01 |
| Malleable | 48.24 | 12.60 | | | |
| Fixed | 46.76 | 13.59 | | | |

Means and standard deviations (SD) are presented for the two experimental groups (malleable and fixed)

## Discussion

Identifying factors that account for individual differences in emotion regulation is important because difficulties modulating emotions have been linked to a wide array of undesirable health outcomes (Gross 2013). The current study extended past work on the influence of malleability beliefs of constructs, such as intelligence, by investigating how beliefs about emotion's malleability causally influence emotion regulatory behavior. The current study was theoretically guided by work on malleability theories in other domains in which individuals who viewed a construct as fixed were less likely to engage in self-regulation (Dweck and Leggett 1988; Schroder et al. 2015). As predicted, for two of the seven examined emotion regulation strategies (self-blame and perspective-taking), participants who were induced to view emotions as fixed were significantly less likely to engage in the emotion regulation compared strategy to the participants who were induced to view emotions as malleable. For positive refocus, cognitive reappraisal, cognitive suppression, and rumination, participants in the fixed emotion condition showed somewhat, but not significantly, less engagement than did participants in the malleable emotion condition. These findings are partially consistent with our main hypothesis.

By contrast, we found that individuals who were induced to view their emotions as fixed engaged more in acceptance compared to those for whom emotions were described as malleable. One explanation for this result is that acceptance in the CERQ is operationalized with items focusing on an external sense of control (e.g., "I think that I cannot change anything about it"), which may be more associated with a belief that emotion is fixed. It is possible, however, that if acceptance were operationalized in a more active way, it might also be used less by participants in the fixed emotion condition than in the malleable emotion condition. Future work could examine the effects of beliefs about emotion's malleability on the use different forms of acceptance.

Whereas the emotion belief manipulation influenced emotion regulation strategies, we found no effects for participants' trait emotion malleability beliefs, reported before undergoing the manipulation, on changes in affect and state emotion regulation. These findings may seem inconsistent with past work correlating beliefs about emotion's malleability to emotionality and general patterns of emotion regulation (e.g., Schroder et al. 2015; Tamir et al. 2007) and emotional avoidance in the moment (Kappes and Schikowski 2013). However, as Snyder and Ickes (1985) argued, "strong situations," often involving experimental manipulations (e.g., of the malleability of

emotions), tend to reduce the impact of individual difference variables on responses. Thus, we believe that our finding that a manipulation of whether emotions are malleable or fixed can affect emotion regulation supports and complements, rather than contradicts, previous findings that (in the absence of a direct manipulation of these beliefs) individual differences in beliefs about emotion's malleability relate to people's affective responses and emotion regulation.

An additional possibility to consider more fully in future research is that the fixed versus malleable manipulation may influence some *types* of emotion regulation strategies more than others. Theorizing by Gross and colleagues (Gross 2008; Tamir et al. 2007) suggests that individuals who believe that their emotions are more fixed may be particularly less likely to engage strategies to regulate their emotion actively as the emotion emerges, because they do not believe that emotion can be changed as it is unfolding. Instead, they may rely on later-stage, response-focused efforts, such as suppression and rumination, to cope with the emotion only once it has fully developed. Gross (2008) further posited that malleable emotion theorists would engage in more early-stage, also called "antecedent-focused," emotion regulation strategies, such as cognitive reappraisal, that involve direct efforts to change the unfolding emotion before the emotion has fully arisen (Gross 2008; Tamir et al. 2007). However, Gross's (2008) framework does not parsimoniously account for the pattern of variation we observed. In our study, there were no significant effects of our fixed versus malleable emotion manipulation in the use of rumination or cognitive suppression, which are response-focused strategies that we would have expected to show group differences under Gross's framework. In addition, participants in the fixed emotion condition engaged these strategies somewhat less (not more) than those in the malleable emotion condition.

The current study's results might not reflect Gross's (2008) argument because the emotion regulation strategies we investigated are complex and might not be easily classified through the early versus late stage categorization. In addition, solely relying on these categories to classify emotion regulation strategies could reflect an oversimplification because when a specific emotion regulatory strategy, such as reappraisal, exerts its influence on the unfolding emotion can differ based on factors such as context or emotional intensity (Sheppes and Gross 2011). Also, because the content of the different emotion regulation strategies differed, we could test whether participants in the malleable or fixed emotion condition engaged a particular strategy differently (a between-groups comparison), but could not meaningfully compare whether participants in either condition relied on one strategy more or less than another (a within-subjects comparison). One possibility for future research would be to provide participants with a choice of strategies, clearly identified as antecedent- or response-focused, and assess whether participants in the fixed versus malleable emotion condition systematically select different types of strategies.

The current study's results partially supports the claim that individuals who view their emotions as malleable engage in more active emotion regulation strategies. Specifically, individuals in the fixed emotion condition engaged in less perspective-taking (e.g., "I thought that I could learn something from the situation") than did participants in the malleable emotion condition. Greater levels of perspective-taking and seeking meaning following an upsetting event by placing the event within a larger perspective has been associated with lowered depression, and greater self-esteem, and can represent a key mechanism of change within a therapeutic interaction (Hayes et al. 2005).

However, we also found that individuals in the malleable emotion condition were *more* likely than those in the fixed emotion condition to engage in self-blame. Self-blame, as assessed in the current study, focuses on the individual blaming himself or herself for negative life experience and his or her negative emotions (Garnefski et al. 2001). Engaging in self-blame when coping with negative events, like the upsetting experiences recalled during the negative emotion induction, has been tied to depression, loneliness, and anxiety (Garnefski et al. 2001). However, there could be benefits to engaging in self-blame for individuals who also believe that emotions are constructs that can be changed. Specifically, it could be that if an individual both believes that they are personally responsible for an upsetting event, and that they can modify their emotional response, that this then feeds a greater sense of self-efficacy and a more active coping stance. There is some evidence supporting this claim from the literature on responses to trauma that holds that individuals who believe that they had agency over an upsetting event and believe that they have personal control over events in the future report better adjustment and decreased psychological distress following the upsetting event (Janoff-Bulman and Lang-Gunn 1988; Compas et al. 1991).

Future work could examine the mechanisms through which emotion beliefs relate to emotion reactivity and emotion regulation. For example, a possible explanation for the results of the current study could be that promoting a more malleable view of emotion inclines individuals to place themselves in a more central role in emotion regulation, which inclines them to engage in a different profile of emotion regulation. In the current study, self-blame and perspective-taking both involve the individual placing themselves in a central role in coping with the event through blaming themselves (in the case of self-blame) and

through placing the personal event within a larger life context (in the case of perspective-taking). A next step in future research in this domain could focus less on how individuals who view their emotions as fixed regulate less overall or regulate with response-focused strategies, but could adopt a more fine-grained approach to focus in on which conditions promoting a malleable view of emotion could promote a more active regulatory stance.

The results from the current study complement and extend empirical and theoretical work about implicit theories in other domains such as intelligence and personality that found that beliefs about malleability directly relate to self-regulation (see Burnette et al. 2013 for a comprehensive review). In the domain of beliefs about emotion, specifically, believing that emotion is malleable predicts positive outcomes such as lower depressive symptoms, decreased feelings of helplessness, and improved well-being in adolescents and adults (De Castella and Byrne 2015; Romero et al. 2014; Tamir et al. 2007). In addition, an intervention directly promoting a more malleable view of intelligence led to positive health outcomes, such as increased motivation to confront challenges (Blackwell et al. 2007). The current study extends past intervention work is the first to our knowledge to demonstrate that beliefs about emotion's malleability can be experimentally induced with a systematic impact on how individuals regulate their unwanted emotions in the moment.

Although the current study demonstrates that beliefs about emotion's malleability can causally influence which emotion regulation strategies individuals select and use, future work could examine the exact nature of the directionality of this relationship. Specifically, it could be that engaging in putatively more active or adaptive regulation strategies, such as reappraisal, could feed the sense that emotions are malleable. Specifically, future empirical work could include a task in which participants are given instructions on how to enact cognitive reappraisal (Ehring et al. 2010) to examine any changes as a result of learning a new, active emotion regulation strategy on participants' beliefs about emotion's malleability. In addition, longitudinal studies in which individuals' use of specific emotion regulation strategies are assessed naturalistically across time could also clarify whether a particular, more active coping stance could then increase the individual's sense that emotions can be changed.

In addition, it is possible that participants in the current study were aware of the goal of the experimental manipulation and responded based on demand characteristics rather than due to the emotion belief manipulation. However, as described above, only approximately 5 % of participants from separate study with parallel design ascertained the study's purpose (Kneeland et al. 2016). In addition, if participants were responding based on demand effects, we would expect that participants in the malleable experimental condition would endorse significantly greater engagement in all emotion regulation strategies, reflecting a general desire to report controlling their emotions after reading an informative passage about how emotions can be changed. However, the current study did not find this pattern of results; in fact, found that participants who were induced to view their emotions as malleable reported significantly less use of the emotion regulation strategy of acceptance than did those who were led to believe that their emotions were fixed.

Another avenue for future research is to take a more multi-modal approach to measuring emotional reactivity. Assessments of state emotions and emotion regulatory efforts in the current study relied on self-report measures. Measuring emotion is notoriously difficult, yet the extent to which self-reported emotions represent a valid measure of true emotional experience has been shown to vary depending on the type of self-report used (Robinson and Clore 2002). Future work could incorporate physiological measures of emotional arousal to clarify whether emotion malleability beliefs do not influence subjective self-reports of affect, but do influence more objective, physiological measures of emotion. In addition, we note that we did not include a control condition. It is important to match experimental groups to the control group on the cognitive demands of the experimental manipulation because some regulation strategies could require more effort than others. An avenue for future work could be to include a control condition that also involves participants reading about qualities, such as intelligence, that may be described as fixed or malleable but are largely irrelevant to emotion to clarify whether one of the emotion belief manipulations was more powerful in influencing emotion regulation.

Further clarifying and exploring the relationship between beliefs of emotion's malleability and emotion regulation processes holds implications not just for understanding how emotion regulation feeds psychopathology, but also for how to improve clinical interventions. The current study's results clarify to a potential causal factor in emotion regulation, but also speak to a potential limitation in promoting more malleable views of emotion without taking into account exactly which emotion regulation strategies are influenced. The current study's findings suggest that promoting a more malleable view of emotion could be integrated into existing cognitive therapies, yet more research is needed to clarify under which parameters a more malleable view of emotion would be beneficial. Examining the function of emotion malleability beliefs within more extreme emotion states could speak to the role of these beliefs in the etiology and maintenance of psychopathology.

**Compliance with ethical standards**

**Conflict of interest** The authors declare no conflicts of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

## References


Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237.

Bargh, J. A., & Chartrand, T. L. (2000). A practical guide to priming and automaticity research. In H. Reis, & C. Judd (Eds.), *Handbook of research methods in social psychology* (pp. 253–285). New York: Cambridge University Press.

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*(1), 246–263.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3–5.

Burnette, J. L., & Finkel, E. J. (2012). Buffering against weight gain following dieting setbacks: An implicit theory intervention. *Journal of Experimental Social Psychology, 48*(3), 721–725.

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and selfregulation. *Psychological Bulletin, 139*(3), 655–701.

Compas, B. E., Banez, G. A., Malcarne, V., & Worsham, N. (1991). Perceived control and coping with stress: A developmental perspective. *Journal of Social Issues, 47*(4), 23–34.

De Castella, K., & Byrne, D. (2015). My intelligence may be more malleable than yours: The revised implicit theories of intelligence (self-theory) scale is a better predictor of achievement, motivation, and student disengagement. *European Journal of Psychology of Education, 30*(3), 245–267.

Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development*. New York, NY: Psychology Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256–273.

Echterhoff, G., Higgins, E. T., & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology, 89*(3), 257–276.

Egloff, B., Schmukle, S. C., Burns, L. R., & Schwerdtfeger, A. (2006). Spontaneous emotion regulation during evaluated speaking tasks: Associations with negative affect, anxiety expression, memory, and physiological responding. *Emotion, 6*(3), 356–365.

Ehring, T., Tuschen-Caffier, B., Schnülle, J., Fischer, S., & Gross, J. J. (2010). Emotion regulation and vulnerability to depression: Spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion, 10*(4), 563–572.

Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences, 30*(8), 1311–1327.

Gross, J. J. (2008). Emotion regulation. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (3rd ed., pp. 497–512). New York, NY: The Guilford Press.

Gross, J. J. (2013). Emotion regulation: Taking stock and moving forward. *Emotion, 13*(3), 359.

Gruber, J., Dutra, S., Eidelman, P., Johnson, S. L., & Harvey, A. G. (2011). Emotional and physiological responses to normative and idiographic positive stimuli in bipolar disorder. *Journal of Affective Disorders, 133*(3), 437–442.

Hatzenbuehler, M. L., Nolen-Hoeksema, S., & Dovidio, J. (2009). How does stigma "get under the skin"? The mediating role of emotion regulation. *Psychological Science, 20*(10), 1282–1289.

Hayes, A. M., Beevers, C. G., Feldman, G. C., Laurenceau, J. P., & Perlman, C. (2005). Avoidance and processing as predictors of symptom change and positive growth in an integrative therapy for depression. *International Journal of Behavioral Medicine, 12*(2), 111–122.

Hummel, T. J., & Sligo, J. R. (1971). Empirical comparison of univariate and multivariate analysis of variance procedures. *Psychological Bulletin, 76*(1), 49–57.

Janoff-Bulman, R., & Lang-Gunn, L. (1988). Coping with disease, crime, and accidents: The role of self-blame attributions. In L. Abramson (Ed.), *Social cognition and clinical psychology: A synthesis* (pp. 116–147). New York, NY: Guilford Press.

Kappes, A., & Schikowski, A. (2013). Implicit theories of emotion shape regulation of negative affect. *Cognition and Emotion, 27*(3), 1–9.

Kneeland, E. T., Nolen-Hoeksema, S., Dovidio, J. F., & Gruber, J. (2016). Emotion malleability beliefs influence the spontaneous regulation of social anxiety. *Cognitive Therapy and Research,* 1–14. doi:10.1007/s10608-016-9765-1.

Kring, A. M. (2008). Emotion disturbances as transdiagnostic processes in psychopathology. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotion* (pp. 691–705). New York, NY: The Guilford Press.

Leary, M. R., & Altmaier, E. M. (1980). Type I error in counseling research: A plea for multivariate analyses. *Journal of Counseling Psychology, 27*, 611–615.

Marteau, T. M., & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State—Trait Anxiety Inventory (STAI). *British Journal of Clinical Psychology, 31*(3), 301–306.

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400–424.

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of General Psychology, 1*(2), 115–144.

Ratcliff, R. (1993). Methods for dealing with reaction time outliers. *Psychological Bulletin, 114*, 510–532.

Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin, 128*(6), 934–960.

Romero, C., Master, A., Paunesku, D., Dweck, C. S., & Gross, J. J. (2014). Academic and emotional functioning in middle school: The role of implicit theories. *Emotion, 14*(2), 227–234.

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*, 790–803.

Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2015). The role of implicit theories in mental health symptoms, emotion regulation, and hypothetical treatment choices in college students. *Cognitive Therapy and Research, 39*(2), 120–139.

Sheppes, G., & Gross, J. J. (2011). Is timing everything? Temporal considerations in emotion regulation. *Personality and Social Psychology Review, 15*(4), 319–331.

Snyder, M., & Ickes, W. (1985). Personality and social behavior. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (3rd ed., Vol. 2, pp. 883–947). New York, NY: Random House.

Tamir, M., John, O. P., Srivastava, S., & Gross, J. J. (2007). Implicit theories of emotion: Affective and social outcomes across a major life transition. *Journal of Personality and Social Psychology, 92*(4), 731–744.

Tellegen, A., Watson, D., & Clark, L. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070.

Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science, 331*(6023), 1447–1451.

Wegner, D. M., & Zanakos, S. (1994). Chronic thought suppression. *Journal of Personality, 62*(4), 615–640.

Yeager, D. S., Trzesniewski, K. H., & Dweck, C. S. (2013). An implicit theories of personality intervention reduces adolescent aggression in response to victimization and exclusion. *Child Development, 84*(3), 970–988.