In press at: Emotion (date of acceptance: March 12, 2015)

BRIEF REPORT

Distract or Reappraise? Age-Related Differences in Emotion-Regulation Choice

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Gal Sheppes is supported by the Israel Science Foundation (Grant No. 1393/12).

We thank Katharina Kuba, Friederike Doerwald, and Jan Pletzer for their valuable assistance in data collection.

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Abstract

Does aging impact strategy choice with regard to regulating negative emotions? Based on the assumption that older adults are highly motivated to quickly defuse negative states, we predicted that older adults, relative to young adults, would show an increased preference for distraction (a cognitive disengagement strategy) over reappraisal (a cognitive engagement strategy) in face of negative material. A stronger preference for distraction, in turn, should be associated with higher affective well-being at older ages as it helps to avoid high physiological arousal. Young (19-28 years, $n = 38$) and older (65-75 years, $n = 39$) adults completed a laboratory task of emotion-regulation choice in which they viewed negative pictures of high and low intensity and chose between distraction and reappraisal to regulate their emotional response. Confirming predictions, age was associated with an increased preference to choose distraction over reappraisal. Among older but not young adults, the relative preference for distraction-over-reappraisal predicted higher state affective well-being. Additionally, across age groups, the preference for distraction-over-reappraisal was positively predicted by stimulus intensity and negatively by cognitive resources. Findings support the notion of an age-related shift towards disengagement strategies to regulate negative emotions, which maps onto older adults' pro-hedonic orientation and holds affective benefits.

Key words: Emotion-regulation choice, reappraisal, distraction, aging

Older adults are assumed to be more strongly motivated than young adults to maximize current affective well-being (Carstensen, 2006). Emotion regulation strategies aimed at down-regulating negative emotions may help to reach this goal. Recent research has done much to illuminate how effectively older compared to young adults are able to implement emotion regulation strategies in laboratory settings (Opitz, Rauch, Terry, & Urry, 2012; Phillips, Henry, Hosie, & Milne, 2008; Shiota & Levenson, 2009). Yet, because in these prior studies the specific strategies were assigned as part of the experimental design, an important motivational aspect of age differences in emotion regulation has remained virtually unexplored. Namely, it remains open which regulatory options young and older adults would spontaneously choose to down-regulate negative emotions when facing threats to well-being.

One central class of emotion regulation strategies are cognitive strategies (Parkinson & Totterdell, 1999). These can be distinguished according to whether the incoming emotional information is modulated early or late in cognitive processing (Sheppes & Gross, 2011). Individuals can either disengage attention from emotional information at an early stage, for example by using *distraction* (the refocusing of attention from emotional information towards unrelated thoughts), or they can engage with the emotional information and change its meaning in a later stage, for example by using *reappraisal* (the reinterpretation of emotional information to alter its emotional meaning). Prior research suggests that employing distraction provides more effective short-term relief (Paul, et al., 2013; Thiruchselvam, et al., 2011), whereas reappraisal helps making sense of emotional events and thereby facilitates long-term adaptation (Wilson & Gilbert, 2008). Given these differential outcomes, the choice between distraction, a prototypical disengagement strategy, and reappraisal, a prototypical engagement strategy, is partly driven by emotional goals: When given the goal to obtain quick relief, young adults were found to choose

distraction over reappraisal more often than when given the goal to aim for longer-term adaptation (Sheppes, Scheibe, et al., 2014).

According to socioemotional selectivity theory, emotional goals shift with age (Carstensen, 2006). A more limited time horizon at higher ages leads older adults to prioritize immediate well-being, whereas young adults are motivated to optimize future outcomes, regardless of the immediate affective consequences. Similarly, strength and vulnerability integration theory predicts that older adults are highly motivated to down-regulate negative emotions quickly in order to avoid physiological arousal, which is difficult to regulate at higher age (Charles, 2010). Based on these theories, we reasoned that when given the choice between distraction and reappraisal to down-regulate negative emotions, older adults should show a relative preference for disengagement distraction, which provides quick, effective relief from threats to well-being. In contrast, young adults should more strongly favor engagement reappraisal, which fosters learning and long-term adaptation. Initial evidence, based on self-report and gaze patterns, indirectly supports this assumption. When confronted with interpersonal emotion-laden problems, older adults report using disengagement, passive strategies (withdrawal, denial) more, and engagement, active strategies (direct confrontation, reflection on emotions) less than young adults (Birditt, Fingerman, & Almeida, 2005; Blanchard-Fields, 2007). After negative mood induction, older adults tend to look away from negative stimuli, whereas young adults look towards the same stimuli; these differential looking patterns have been interpreted as indirect evidence that older adults use distraction and young adults use reappraisal to down-regulate negative emotions (Noh, Lohani, & Isaacowitz, 2011).

In addition to emotional goals, emotion-regulation choice is shaped by other contextual factors including *stimulus intensity* and *cognitive resources* (Sheppes, Scheibe, et al., 2014). Reappraisal has been found to lose effectiveness when stimulus intensity increases, as it is more

difficult to override the incoming information with an alternative interpretation to the extent that it is stronger (Sheppes & Gross, 2011). Accordingly, in prior studies, young adults preferred reappraisal over distraction when facing low-intensity negative situations, but shifted preferences for high-intensity negative situations (Sheppes, Scheibe, Suri, & Gross, 2011). Stimulus intensity likely affects emotion-regulation choice in older adults in similar ways.

Additionally, implementing distraction in many instances is cognitively less effortful than reappraisal: In distraction, relative to reappraisal, incoming emotional information is blocked early before it gathers force and there is less semantic conflict between the appraisals of affective stimuli and the regulatory alternative thoughts (Sheppes, Brady, & Samson, 2014). Cognitive resources normatively decline with age, yet, the rate of decline differs widely among persons (Verhaeghen, 2011). Because limited cognitive resources likely create the need to use cognitively less effortful strategies (Urry & Gross, 2010), older adults with lower levels of cognitive resources should show an enhanced preference for distraction-over-reappraisal relative to their peers with higher levels of cognitive resources. In contrast, cognition should be less influential for emotion-regulation choice in young adults who can generally draw on high levels of cognitive resources (Baltes, Lindenberger, & Staudinger, 2006).

The affective outcomes of emotion-regulation choice may also differ by age. Using disengagement strategies to regulate negative emotions may contribute to older adults' enhanced affective well-being while this may not necessarily apply for young adults (Morgan & Scheibe, 2014; Staudinger, 2000). According to strength and vulnerability integration theory, reduced physiological flexibility with age makes it increasingly difficult to down-regulate negative arousal once it occurs, prolonging recovery (Charles, 2010). Consequently, older adults' affective well-being may depend on their use of strategies that have an early, quick influence on emotional responses. Older adults who use disengagement strategies to regulate negative emotions more

often should therefore enjoy better affect than their peers who use these strategies less often. Indeed, when instructed to regulate their feelings while viewing negative images, older (but not young) adults were found to have affective benefits from avoiding to look at the most negative aspects of the images (signifying disengagement; Noh et al., 2011).

In this study, we tested four hypotheses regarding age differences in emotion-regulation choice upon exposure to negative material. We predicted that (1) older adults show stronger preferences than young adults for distraction, a cognitive disengagement strategy that provides quick relief from negative encounters, over reappraisal, a cognitive engagement strategy that allows processing and long-term adaptation. We further predicted that (2) stimulus intensity enhances distraction-over-reappraisal preferences for both age groups, and that (3) low cognitive resources enhance distraction-over-reappraisal preferences more strongly for older than young adults. Finally, we predicted that (4) older but not young adults would benefit affectively from a preference for distraction-over-reappraisal to down-regulate negative emotions.

Method

Participants and Procedure

Young (*n*=38, 19-28 years; 61% female; 87% students) and older adults (*n*=43, 65-75 years; 55% female; 95% retired) were recruited from a mid-size German city to participate in a study of personality and well-being. Four older participants failed to follow instructions or discontinued the study midway and were excluded. After reporting momentary affect, participants performed an emotion-regulation choice task, and then rated their momentary affect again. They next completed a cognitive task and a measure of trait affect. Participants received €15 ($20) as compensation.

Measures

Emotion regulation choice task. A computer-based task designed by Sheppes et al. (2011) was used to assess participants' choice between distraction and reappraisal when facing negatively valenced pictures from the International Affective Picture System (Lang, Bradley, & Cuthbert, 2008). To reduce the likelihood of age differences in emotion generation we selected 38 pictures (half low-intensity, half high-intensity) that in prior research were rated comparably on valence by young and older adults of the same nationality and age as the current sample (Grühn & Scheibe, 2008). According to normative ratings, the mean valence (1 = *highly unpleasant*, 9 = *highly pleasant*) was 3.23 (range 2.73 to 3.84) for low-intensity pictures and 2.18 (range 1.67 to 2.63) for high-intensity pictures; $t(36) = 10.13$; $p = .001$.

During training, the two strategies were explained (order counterbalanced) and practiced with 8 pictures. Participants were probed after each practice trial how they implemented their chosen strategy and corrected when necessary. During the actual task, participants saw 15 low-intensity and 15 high-intensity pictures in random order and were instructed to choose between distraction and reappraisal[1], based on which strategy would help them most to feel less negative about the picture. Each trial consisted of a brief (1000ms) preview of the picture, followed by a choice screen (left key: reappraise, right key: distract, key order counterbalanced), a prepare screen, a long (15000ms) presentation of the picture when the chosen strategy was implemented, and a negativity rating screen ("How negatively does this picture make you feel?", 1= *not negative at all;* 9 = *very negative*). During training, it was emphasized that participants should always rate their current affect as honestly as possible, independent of whether or not the chosen strategy had worked for them. For each trial, we logged participants' choice (coded 1 for distraction and 0 for reappraisal).

Cognitive resources. We measured executive control with the Flanker task (for details, see Voelcker-Rehage, Godde, & Staudinger, 2011), which requires participants to identify the color of circles surrounded by congruent, neutral, or incongruent distractor circles. Participants who performed below 70% accuracy across trials (3 young, 2 older) and whose flanker data were lost due to technical errors (1 young, 1 old) were excluded from analyses involving the flanker task. We subtracted average RT in congruent trials from average RT in incongruent trials (M = 33.58 ± 17.89; range -13.04 to 70.31); higher scores thus indicate impaired executive control. The index was unrelated to age ($t(68) = 0.20$; $p = .85$).

Affect. We measured *momentary affect* with a short version of a validated German emotion checklist (Kessler & Staudinger, 2009). Emotions (*serene, relaxed, delighted, excited, lethargic, sluggish, annoyed, nervous)* represented the full affect space and were rated on a scale from 0 (*not at all*) to 4 (*very much*). We used the full 16-item version to measure *trait affect*, which served as control variable. Because we were interested in the effect of emotion-regulation choice on people's general affect, we created one affect score by subtracting average negative from average positive emotions.

Results

To test age differences in emotion-regulation choice, taking into account stimulus intensity and cognitive resources, we analyzed the proportion of distraction-over-reappraisal choices with a Mixed-Model Analysis; stimulus intensity (low, high) served as within-subjects factor and age group (young, older) and cognitive performance (continuous) as between-subjects factors. Replicating prior studies, stimulus intensity strongly influenced choice (Table 1). Participants generally preferred reappraisal (67%) over distraction (33%) for low-intensity pictures, but preferred distraction (57%) over reappraisal (43%) for high-intensity pictures. Additionally, we found the expected main effect of age: Older adults choose more distraction

than young adults across both low-intensity (38% vs. 27%) and high-intensity stimuli (59% vs. 54%). Cognitive resources also predicted strategy choice: Participants with reduced executive control chose overall more distraction than those with higher executive control; the simple correlation was r=.33, p=.006. However, executive control did not moderate age differences; thus, cognitive differences predicted strategy choice equally across age groups.

To link strategy choice with affective outcomes, we created an affect change score by regressing post-task affect on pre-task affect, saving the standardized residual. Positive (negative) residual scores indicate that affect was enhanced (diminished) after the task, relative to expected levels given pre-task affect. We regressed these scores on the proportion of distraction-over-reappraisal choices across all trials, age, and their interaction, adjusting for trait affect.[2] The interaction between age and strategy choice was significant (Table 2). Simple slope analysis revealed that choosing relatively more distraction (less reappraisal) was associated with better affect in older adults (β=.450, p=.007), but not in young adults (β=-0.050, p=.774). An additional region-of-significance analysis indicated that age group differences in affect change were only significant outside the possible range of choice scores (below -.08 and above 1.08). Thus, strategy choice is associated with differential affect change within the group of older adults, but not within the group of younger adults, nor between age groups.[3]

Discussion

Results confirm our core prediction of age-related differences in strategy choice when facing negative material. Older relative to young adults showed a stronger preference for distraction (a prototypical disengagement strategy that provides immediate relief) over reappraisal (a prototypical engagement strategy that allows processing and long-term adaptation) to regulate negative emotions. This finding is consistent with motivational differences, proposed by socioemotional selectivity theory and strength and vulnerability integration theory, that older

adults strive to selectively disengage from negative information and defuse unpleasant feelings quickly. Young adults, in contrast, presumably strive to engage with all aspects of their environment, including negative information, to obtain instrumental, future-oriented goals.

This finding was qualified, however, by the demonstrated influence of two contextual factors, stimulus intensity and cognitive resources. The strong effect of stimulus intensity replicates earlier findings in young adults (Sheppes et al., 2011; Sheppes, Scheibe, et al., 2014) and indicates maintained flexibility of strategy choice at older ages. Older persons were found to be sensitive to external context factors and adapt their strategy choices accordingly; they used engagement strategies for some negative contexts. The main effect of cognitive resources only partially confirms predictions. It supports the notion that in old age strategy choice matches the available cognitive resources (Schindler & Staudinger, 2005; Urry & Gross, 2010), such that older adults choose the less effortful strategy of distraction more often when cognitive resources are limited and the more effortful strategy of reappraisal more often when cognitive resources are abundant. Unexpectedly, however, cognitive differences modulated strategy choice equally in young adults who enjoy comparably high levels of cognitive resources (Baltes et al., 2006). And indeed prior research has shown that executive control, our indicator of cognitive resources, is associated with the use of reappraisal in young adults (Cohen, Henik, & Moyal, 2012). The current finding thus suggests that executive control may be important to strategy choice across adulthood.

As expected, disengagement preferences held affective benefits for older adults. A preference for distraction-over-reappraisal was associated with better momentary affect after completing the emotion-regulation task, among older but not young adults. These findings dovetail with Noh et al.'s (2011) findings that older adults who looked away from negative aspects during an image-viewing task had better affective outcomes than their age peers with

different gaze preferences. Arguing from strength and vulnerability integration theory, choosing early disengagement allows older adults to quickly reduce physiological arousal which, once elevated, is difficult to down-regulate given physiological slowing (Charles, 2010).

One strength of the present study is the examination of repeated strategy choices in a controlled laboratory task, with the stimulus material pre-calibrated to be age-invariant in perceived valence and to vary systematically in intensity. However, we did not collect valence ratings from the present sample; hence, we cannot fully rule out that older adults' increased preference for distraction was (partially) driven by their stronger reactivity to the images. Another limitation is external validity: Strategy choice in the laboratory context may only partially resemble strategy choice in real life, where people can select among many more strategies. Moreover, older adults may have reacted to the laboratory context differently than young adults. Nevertheless, given that distraction and reappraisal represent prominent regulatory options this study is an important first step towards understanding age differences in emotion-regulation choice.

A potential concern is that participants may not have used their chosen strategy. Given our validation work (Sheppes, Scheibe, et al., 2014) and the elaborate practice before the task we assume that participants likely tried to implement their chosen strategy, but we cannot know how successful they were in doing so. It remains open to what extent age differences in strategy choice are based on differential ability to execute the strategies. Existing studies on ability differences are inconclusive, partly because studies differ in the targeted subtypes of distraction and reappraisal. Although older adults were found more successful than young adults in implementing different variants of distraction (Lohani & Isaacowitz, 2014; Phillips et al., 2008), earlier studies did not include neutral distractors as used here. Positive age differences were found in the ability to implement positive reappraisal (Lohani & Isaacowitz, 2014; Shiota &

Levenson, 2009); but negative age differences were found in the ability to implement unspecified cognitive reappraisal (Opitz et al., 2012; Tucker, et al., 2012). In future research instructed regulation may be added to the choice task to examine the role of ability differences in choosing strategies.

Concluding, the present findings support the common assumption in the emotional aging literature that older adults' maintenance of affective well-being hinges on shifts in strategy use (Blanchard-Fields, 2007; Charles, 2010; Isaacowitz & Noh, 2011; Morgan & Scheibe, 2014). Age-associated changes in goals and cognitive resources provide important internal context factors for choosing between available strategies to regulate negative emotions. When strategy choices match life-phase specific goals, resources, as well as external context factors, affective benefits may result.

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Footnotes

[1] See supplemental materials for specific instructions of the strategies.

[2] Results were robust when not adjusting for trait affect.

[3] We present further analyses predicting trial-level negativity ratings as supplemental materials.

Table 1.

Results of a General Linear Model Analysis Predicting Emotion-Regulation Choice as a Function of Stimulus Intensity, Age Group, and Executive Control

Variable	$F(1, 66)$	p	η^2
Main effects			
Stimulus intensity (SI)	72.78***	.001	.524
Age group	12.02***	.001	.154
Executive control	8.55**	.005	.115
Interaction effects			
SI x Age group	1.01	.320	.015
SI x Executive control	0.86	.357	.013
Age group x Executive control	0.22	.640	.003
SI x Age group x Executive control	0.03	.861	.000

Note. $N = 70$. Emotion-regulation choice is operationalized as the proportion of distraction-over-reappraisal choices across 30 trials, and executive control as difference in reaction time between congruent and incongruent trials on the flanker task.

**$p < .01$. ***$p < .001$.

Table 2.

Results of a Multiple Regression Analysis Predicting Change in State Affect Pre-to-Post Task

Predictors	*B*	SE_B	β	*p*
Age group	-0.022	0.234	-.011	.926
Strategy choice	-0.049	0.172	-.050	.774
Age x Strategy choice	0.496	0.237	.351*	.039
Trait affect	0.135	0.085	.176	.118

Note. $N = 77$. Strategy choice denotes the proportion of distraction-over-reappraisal choices across all trials. Affect is computed as average of positive emotions minus average of negative emotions. State affect change is operationalized as standardized residual of post-task affect regressed on pre-task affect. Age group is coded 0 for young and 1 for old.

* $p < .05$.

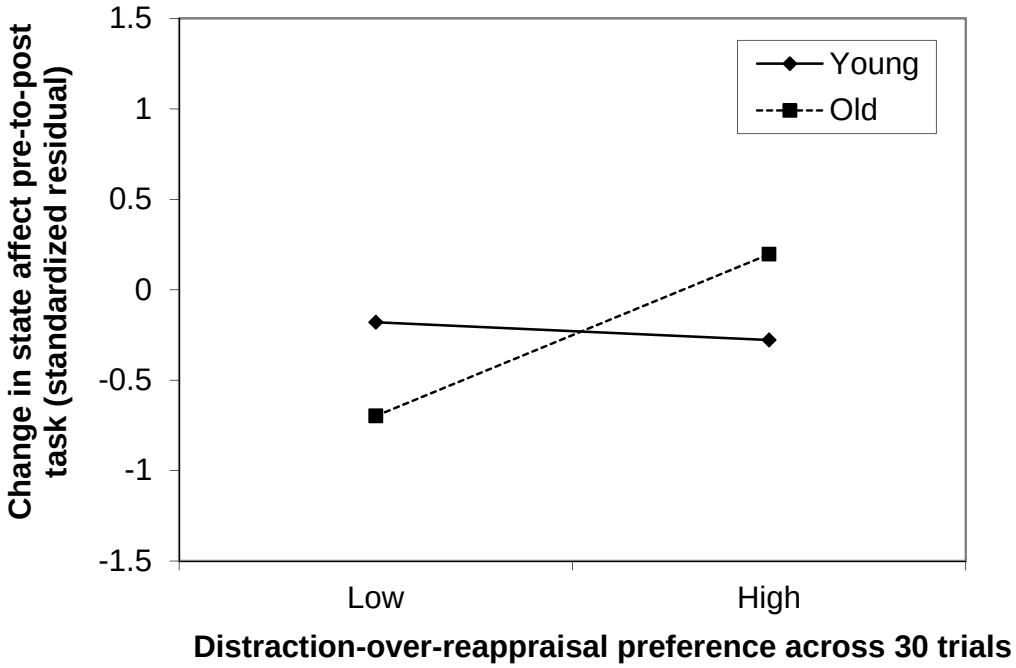

Figure 1. Moderating effect of age group on the association between strategy choice (distraction-over-reappraisal preference across 30 trials) and change in momentary affect. The graph plots the standardized residual of post-task affect regressed on pre-task affect. Low and high distraction-over-reappraisal preference refer to 1SD below or above the mean, respectively. Trait affect was included as covariate.

Supplemental Materials

Instructions for Distraction and Reappraisal

Distraction: This strategy entails that you try to feel less negative about a picture by distracting yourself. Please think about something that is completely unrelated to the situation shown in the picture and emotionally neutral. Thus, neither positive nor negative. There are two ways to do this: The first possibility is that you think about a familiar street or your neighborhood when you see the picture. For instance, if you see a negative picture of a woman who has been burnt, you could think of walking around your neighborhood and the different buildings and nature around you. The second possibility is to think of everyday activities. For instance, when you are looking at a negative picture you could think about making coffee in the morning or doing groceries. … Furthermore, it is important that you keep your eyes on the picture and not look away."

Reappraisal: "This strategy entails that you pay attention to the situation shown in the picture but try to change the meaning of it. This means that you tell yourself something positive about the picture. The positive thought is supposed to help you feeling less negative. For example, when you see a picture you could tell yourself that whatever is going on will soon be resolved and that help is on the way. It is very important that you stay focused on the picture and that you don't think of unrelated things that distract you and therefore make you feel better. The idea of this strategy is to reappraise the meaning of the situation."

Multilevel Analyses of Trial-Level Negativity Ratings

As part of the emotion-regulation choice task, negativity ratings were obtained after each trial to enhance for study participants the salience of instructions to base their strategy choice on its potency to reduce experienced negativity (see also Sheppes, Scheibe, et al., 2014). At first sight, it may be tempting to infer from these trail-level negativity ratings the effectiveness of strategies depending on age. Unfortunately, the ratings are ill-suited to draw conclusions about strategy effectiveness, due to an inherent interpretation problem. Below, we nevertheless report results regarding trial-level negativity ratings, discuss the challenges in interpreting them, and suggest future research directions to address these challenges.

Specifically, we conducted multilevel modeling using the linear MIXED MODELS function in SPSS to test the interactive effect of age group and strategy choice on trial-level negativity ratings. We predicted negativity ratings by strategy choice (coded 0 for reappraisal and 1 for distraction) at Level 1 and age group (coded 0 for young and 1 for older) at Level 2, as well as their cross-level interaction. We further adjusted for normative valence ratings (centered) as the best available proxy for stimulus intensity at Level 1. The intercept of the negativity ratings was 2.80 (*SE* = 0.17; *t* = 15.99, *p* = .001). Negativity ratings were predicted by normative valence (ß = -1.17, *SE* = 0.56; *t* = -20.94, *p* = .001), strategy choice (ß = 0.97, *SE* = 0.20; *t* = 4.95, *p* = .001), and age group (ß = 0.80, *SE* = 0.24; *t* = 3.31, *p* = .001), indicating that negativity ratings were higher for stimuli with lower (i.e. more negative) normative valence ratings, after choosing distraction as compared to reappraisal, and among older as compared to young adults. The cross-level interaction between strategy choice and age group was non-significant (ß = 0.33, *SE* = 0.27; *t* = 1.22, *p* = .22).

As noted, these results are difficult to interpret. Consider the main effect of strategy choice, indicating that negativity ratings were significantly higher after distraction choices than

after reappraisal choices. One potential interpretation may be that distraction is less effective in down-regulating negativity than reappraisal. However, given our other finding that people choose distraction over reappraisal more often at higher negative stimulus intensity, an equally viable interpretation is that distraction-chosen stimuli were more difficult to regulate than reappraisal-chosen stimuli, which led to higher post-picture ratings. In the current emotion-regulation choice task, the two explanations of the strategy choice main effect cannot be disentangled. The same interpretation problem applies to the (non-significant) interaction effect between strategy choice and age group.

More generally, inferences about strategy effectiveness require equating the intensity of stimuli across distracted and reappraised pictures. This is made possible in paradigms that involve instructing participants which strategy to use in each trial in order to experimentally assign stimuli of equal intensity to each regulatory condition. By contrast, our emotion regulation choice paradigm allows participants to freely choose strategies. Importantly, we have repeatedly shown in the past (Hay, Sheppes, Gross, & Gruber, 2014; Sheppes et al., 2011; Sheppes, Scheibe, et al., 2014) as well as in the present study that increased negative stimulus intensity leads to an increased preference to choose distraction over reappraisal. This means that on average, distracted pictures are of higher negative intensity relative to reappraised pictures. This finding is illustrated in Figure S.1, which shows the percentage of participants choosing distraction-over-reappraisal as a function of stimulus intensity (operationalized by normative valence ratings). As can be seen, stimulus intensity and strategy choices are strongly related. For example, some of the high-intensity pictures (shown in the left part of the graph) were distracted by more than 80% of participants. We thus do not have a reliable estimate of how negative people would have felt would they have reappraised these same pictures, which is a basic requirement for comparing strategies' effectiveness.

A potential solution is to combine our strategy choice paradigm (which cannot assess strategy effectiveness) with a standard strategy effectiveness paradigm (which cannot assess strategy choice). Parallel stimulus sets may be created and counterbalanced between the choice and effectiveness parts. Combining choice and effectiveness paradigms would allow statistically adjusting for strategy effectiveness when linking strategy choice with affective outcomes in different age groups.

Reference Cited Only in the Supplementary Materials

Hay, A. C., Sheppes, G., Gross, J. J., & Gruber, J. (2014). Choosing how to feel: Emotion regulation choice in bipolar disorder. *Emotion*. Advance online publication. http://dx.doi.org/10.1037/emo0000024

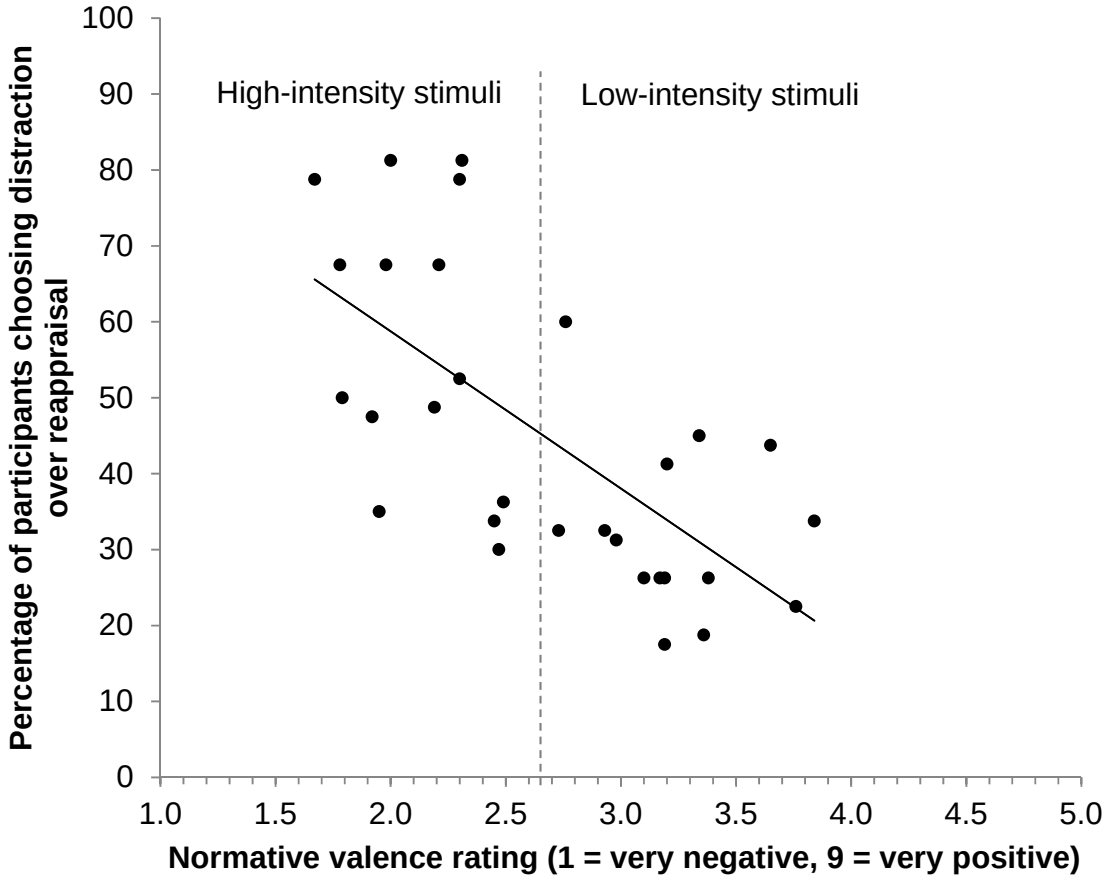

Figure S.1. Strategy choice per picture as a function of stimulus intensity, operationalized as normative valence ratings. Each dot represents one of the 30 pictures from the stimulus set used during the emotion-regulation choice task (the 8 pictures used during practice are not shown). Note that with Lang et al.'s (2008) normative valence ratings, lower scores indicate higher negative intensity. The dashed line indicates the break point for the low and high stimulus intensity categories.