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BRIEF REPORT

Psychological Distance and Emotional Experience: What You See Is What You Get

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Recent research suggests that perceiving negative emotion-eliciting scenes approaching intensifies the associated felt emotion, while perceiving emotion-eliciting scenes receding weakens the associated felt emotion (Muhlberger, Neumann, Wieser, & Pauli, 2008). In the present studies, we sought to extend these findings by examining the effects of *imagining* rather than *perceiving* such changes to negative emotion-eliciting scenes. Across three studies, we found that negative scenes generally elicited less negative responses and lower levels of arousal when imagined moving away from participants and shrinking, and more negative responses and higher levels of arousal when imagined moving toward participants and growing, as compared to the responses elicited by negative scenes when imagined unchanged. Patterns in responses to neutral scenes undergoing the same imagined transformations were similar on ratings of emotional arousal, but differed on valence—generally eliciting greater positivity when imagined moving toward participants and growing, and less positivity when imagined moving away from participants and shrinking. Moreover, for these effects to emerge, participants reported it necessary to explicitly imagine scenes moving closer or farther. These findings have implications for emotion regulation, and suggest that imagined spatial distance plays a role in mental representations of emotionally salient events.

Keywords: emotional experience, psychological distance, mental imagery, mental representation, emotion regulation

Many years ago, the telephone company, AT&T, ran a famous and successful advertising campaign with the slogan "Reach out and touch someone." This tag line suggested to consumers that the company's telephone connections could decrease the experience of distance between them and their loved ones. Imagined psychological distance, such as in this example, shows up frequently in lay speech about emotional connections, as when lovers talk about growing close or growing distant. This raises the possibility that associations between imagined psychological distance and emotional experience do not simply reflect ways of speech or common cultural constructs, but also reflect an aspect of the mental representation of these emotions. If so, mentally manipulating the distance of an emotional scene, "in the mind's eye," might be able to change emotional experience in response to that emotional scene.

The process model of emotion regulation (Gross, 1998) suggests how this might work. According to this model, the effects of any given emotion regulation strategy can be understood in terms of where it impacts an emotion generation sequence that includes stages for perception, attention, appraisal, and response. For example, reappraisal, which involves cognitively changing one's interpretation of the meaning of a stimulus, targets the appraisal stage, and thereby has the potential to influence all aspects of emotional response to it.

Another way to change one's emotional response is by changing the initial perceptual inputs to the emotion generative sequence. One strategy for doing this is known as situation modification, which involves changing some aspect of an emotion-eliciting stimulus or context so as to alter its emotion-eliciting power. For example, if seated next to an annoying individual at a party, one could simply get up and move to a seat further away. Recent research supports and extends this idea by suggesting that the perceived, if not actual, physical distance from an emotional stimulus also influences one's emotional response to it. Muhlberger and colleagues showed participants emotional or neutral scenes on a

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computer screen, and then made the scenes appear to either recede into the distance or move toward participants, by shrinking or growing on the screen (Muhlberger, Neumann, Wieser, & Pauli 2008). When negative scenes appeared to move toward participants they elicited more negativity and stronger emotional arousal than when they either remained static or appeared to move away. Interestingly, neutral and positive stimuli did not significantly change in valence as a result of the manipulations, but likely contributed to overall main effects of increased arousal when moving toward participants.

Converging evidence suggests similar emotional effects for other manipulations that influence perceptions of distance. De Cesarei and Codispoti (2008) found that smaller sized and lower resolution scenes both elicited weaker emotional experiences than larger or higher resolution perceived scenes of the same content. And Williams and Bargh (2008) demonstrated that simply priming the idea of greater spatial distance can make emotional responses to negative stimuli weaker. In one study, priming with greater perceived distances was associated with more liking for an embarrassing story. In another, priming with greater perceived distances led to weaker negative emotional experience in response to a strongly negative story.

The latter study is important because it suggests that changing one's mental representation of the distance between the self and an emotionally charged stimulus—and not just seeing that change in distance take place—can change one's emotional response to it. Here we aimed to take this idea a step further by testing the hypothesis that using visual imagery to move a mental representation of a stimulus closer or further away—as seen in the mind's eye—would be sufficient to change one's emotional response to that stimulus. If imagining distance changes has analogous effects on emotional experience as perceiving them does, this would suggest a new type of situation modification strategy that involves imagined rather than real modifications to the proximity of an emotional event. In three studies, we examined how and whether imagining changes to the spatial distance at which an emotional stimulus appears in the mind's eye would change the emotional impact of that stimulus. Study 1 compared imagination to perception, Study 2 considered whether explicit changes to imagined distance were essential for the effects to emerge, and Study 3 explored the role of experimental demand and mental imagery facility in predicting the effects of imagined changes to distance. All studies included both neutral and negative events to test whether the prior finding that the effects of perceptual changes in apparent distance are found only for negative events also holds for imagined changes in distance.

Study 1: Imagination Versus Perception

Study 1 compared perceived versus imagined changes to spatial distance. Similar to the methods of Muhlberger et al. (2008), participants perceived and imagined either emotionally negative or neutral stimuli moving closer, further away, or not moving relative to the viewer. Stimuli were selected from the IAPS database of emotional photographs (Lang, Bradley, & Cuthbert, 1997).

Method

Participants. Nineteen participants from the Columbia University community took part, in exchange for either pay at a rate of $12/hour or credit toward an introductory psychology course. Data for one participant was unusable due to equipment malfunction. Of the remaining 18 ($M = 19.5$ years, $SD = 1.6$ years),[1] 10 were female and eight male.

Stimuli. Normative valence (positivity-negativity) and arousal ratings from the IAPS (scale 1 to 9, with 1 the most negative, and 9 the most positive; 1 the least arousing, and 9 the most arousing), were used to select scenes. Emotionally negative scenes (Mean valence, arousal = 2.2, 6.2) included mangled body parts, dead animals, threatening weapons, and the like. Emotionally neutral scenes (Mean valence, arousal = 5.2, 3.5) consisted of still life, animals or people, nature scenes, and the like. There were 12 conditions in the study (as described in the procedures below), requiring 12 sets of scenes, including six neutral and six negative sets, with 10 scenes per set. Scenes were matched for valence, arousal, and content across negative sets and across neutral sets. Assignment of image sets to experimental conditions was counterbalanced across participants. Scenes (approximately $4 \times 6''$) were presented on a $17''$ computer monitor. Participants sat approximately $18''$ from the monitor.

Procedures. Prior to the experimental trials, participants were instructed that they would see a series of scenes in photographs, and that they would be asked to perform each of three different tasks, labeled *away, no change,* and *toward.* They were told that in the *away* case they should imagine the scene they saw receding until it was the size of a postage stamp. In the *no change* case they were to imagine the scene remaining as they had seen it. In the *toward* case they were to imagine it coming close enough that it grew to the size of a standard $17''$ monitor screen. They were informed they would have four seconds during which to imagine the changes. Participants then practiced making the changes in their mind's eye, in the allotted 4 s window, with reference to neutral scenes. They were encouraged to ask questions and continue with practice until competent with the manipulations. Participants were informed that in some trials they would be asked to imagine these changes and in other trials they would be asked to watch them occur on the screen.

Experimental trials. Each trial began with a scene centered on the screen for six seconds. During the last two of these seconds, the instruction (Away, No Change, or Toward) appeared below the scene. In imagery conditions, the image and instruction disappeared, leaving the screen blank for four seconds, during which participants imagined the scene shrinking and moving away, remaining as it was, or growing and coming toward them. In perception conditions, when the instruction disappeared, videos depicted the scene moving away, remaining the same, or moving closer. Trial order was randomized. After the four seconds provided during which to imagine a transformation in the mind's eye, or watch one, participants were prompted to rate their emotional experience in response to the transformed scene. Ratings were made on two dimensions: valence—positivity or negativity, from *very negative* at −4 to *very positive* at 4—and emotional arousal, from *calm* at 0 to *excited/aroused* at 6.

[1] Due to a clerical error, age data were not available for nine participants. All were undergraduates of comparable age to those for whom age data were available.

Results and Discussion

Emotional experience: Valence. We conducted a 2-scene valence (negative vs. neutral) by 3-change (away, no change, toward) by 2-stimulus type (imagined vs. perceived) repeated measures ANOVA on ratings of emotional valence. There were main effects of change, $F(2, 34) = 4.21$ $p = .023$, as well as of scene valence, $F(1, 17) = 455.70$, $p < .001$. The predicted interaction of scene valence by change was significant, $F(2, 34) = 20.47$, $p < .001$. As predicted, there was no three-way interaction, $p > .9$. Collapsing across perception and imagery, for negative stimuli the *away* case was significantly less negative than the *no change*, $F(1, 34) = 23.44$, $p < .001$, and *toward* cases, $F(1, 34) = 38.92$, $p < .001$. For neutral stimuli, the *away* case produced significantly less positive responses than did the *toward* case, $F(1, 34) = 6.54$, $p = .015$. (See Table 1 and Figure 1.)

Emotional experience: Arousal. Using a similarly structured ANOVA, we examined the effects of scene valence and change on ratings of emotional arousal. There were main effects of change, $F(2, 34) = 21.84$, $p < .001$, and of scene valence, $F(1, 17) = 141.89$, $p < .001$. The analysis produced a significant scene valence by change interaction, $F(2, 34) = 4.74$, $p = .015$. Again, as predicted, there was no three-way interaction, $p > .5$. For negative stimuli, the *away* case was significantly less arousing than the *no change*, $F(1, 34) = 33.92$, $p < .001$, and *toward* cases, $F(1, 34) = 75.97$, $p < .001$. The *no change* case was also significantly less arousing than the *toward* case, $F(1, 34) = 8.37$, $p = .007$. For neutral stimuli, the *toward* case produced higher arousal then the *no change*, $F(1, 34) = 17.73$, $p < .001$, and *away* cases, $F(1, 34) = 33.23$, $p < .001$.

In summary, whether stimuli were imagined or perceived, participants in Study 1 experienced more negativity when negative stimuli approached, and less negativity when these stimuli moved away. By contrast, neutral stimuli became more positive when approaching and less positive when receding. However, arousal increased in response to both neutral and negative stimuli when approaching, and decreased when receding.

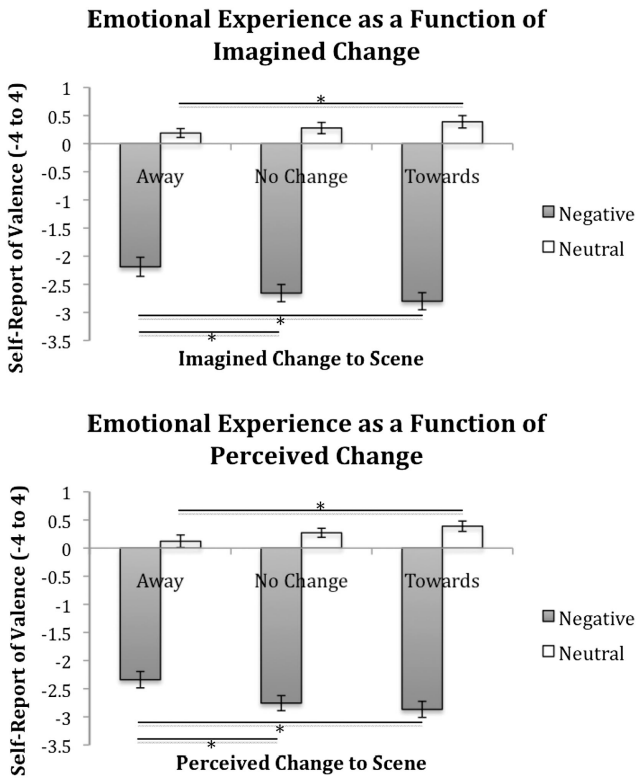

Figure 1. Study 1: Self-report of emotional experience in response to *imagined* and *perceived* changes to negative and neutral scenes. Reports are of valence, as rated on a 9-point Likert scale from *very negative* at −4 to *very positive* at 4.
* $p \leq .05$.

Study 2: Implicit Changes to Spatial Distance

In Study 1, participants were asked to explicitly change imagined stimulus proximity. With Study 2, we considered whether

Table 1
Mean Self-Report Ratings, and (Standard Deviations)

	Negative			Neutral		
	Away	No change	Toward	Away	No change	Toward
			Study 1, Imagined			
Valence	−2.189 (0.723)$_a$	−2.656 (0.649)$_b$	−2.8 (0.645)$_b$	0.189 (0.334)$_d$	0.278 (0.424)$_{d,e}$	0.389 (0.468)$_e$
Arousal	3.094 (1.025)$_a$	3.7 (1.195)$_b$	3.894 (1.232)$_b$	0.794 (0.458)$_d$	1.006 (0.633)$_e$	1.406 (0.64)$_f$
			Study 1, Perceived			
Valence	−2.339 (0.621)$_a$	−2.756 (0.568)$_b$	−2.867 (0.608)$_b$	0.122 (0.472)$_d$	0.272 (0.341)$_{d,e}$	0.389 (0.391)$_e$
Arousal	3.133 (0.972)$_a$	3.711 (0.981)$_b$	4.106 (1.153)$_c$	0.978 (0.674)$_d$	1.083 (0.678)$_d$	1.539 (1.014)$_e$
			Study 2			
Valence	−1 (1.816)$_a$	−2.444 (1.756)$_b$	−3.667 (0.768)$_c$	0.167 (0.513)$_d$	0.111 (0.322)$_d$	0.444 (0.615)$_d$
Arousal	2.667 (1.68)$_a$	3.833 (1.506)$_b$	5.056 (1.307)$_c$	0.389 (0.98)$_d$	0.5 (1.044)$_d$	1.667 (1.748)$_e$
			Study 3			
Valence		−2.342 (0.595)$_a$	−2.624 (0.695)$_b$		0.292 (0.51)$_d$	0.458 (0.55)$_e$
Arousal	3.03 (1.225)$_a$	3.076 (1.14)$_a$	3.458 (1.305)$_b$	1.288 (0.76)$_d$	1.202 (0.755)$_d$	1.57 (0.935)$_e$

Note. Means in a given row with different subscripts differ significantly at $p = .05$ or less, two-tailed.

their explicit goal to change imagined spatial distance was essential to the effect on emotion. Thus, we created conditions with which to examine whether participants would spontaneously imagine changes to distance. Participants engaged in a single trial only for each condition (e.g., away-negative, away-neutral, etc.), in which they reported how they would hypothetically feel were they to imagine such changes. Critically, after collecting participant responses, we asked whether or not they imagined a scene moving toward or away from them in order to know how they would feel under those circumstances. Additionally, in Study 1, experimental demand was a possible influence on participant reports. In particular, negative scenes might have been expected to become more negative and more arousing with greater proximity, and no changes in valence or arousal would be expected for emotionally neutral scenes. Study 2 also addressed the potential of demand by examining the individual difference of social desirability via the Marlowe-Crowne Social Desirability scale (MCSD)—a construct which indexes a person's tendency to try to please others and comply with their expectations (Crowne & Marlowe, 1960).

Method

Participants. Eighteen participants from the Columbia University community (M = 28.2 years, *SD* = 13.1 year) took part in exchange for pay at a rate of $12/hour. Eight were female and 10 male.

Procedures. Participants were trained as in Study 1. They were then shown example negative scenes. Following the example scenes, for each condition participants were asked to rate how they thought they would feel after imagining negative or neutral scenes moving away and shrinking, not changing, or coming toward them and growing. Questions pertaining to each condition were, for example—in the negative-away case—to "Click on the number that most closely represents how you think you would feel in response to negative scenes after imagining them far away and small," on both the valence and arousal scales. Following the last rating, participants were asked "Did you imagine moving a scene in your mind's eye (e.g., seeing it move away and get small, or move toward you and grow large) in order to help you answer these questions?" Finally, participants completed the MCSD.

Results and Discussion

Emotional experience: Valence. We conducted a 2-scene valence (negative vs. neutral) by 3 imagined change (*away, no change, toward*) repeated measures ANOVA on ratings of valence. There was a main effect of scene valence, $F(1, 17) = 101.77$, $p < .001$, and of imagined change, $F(2, 34) = 18.78$, $p < .001$. There was also a significant scene valence by imagined change interaction: $F(2, 34) = 17.65$, $p < .001$. Within the negative scenes, the *toward* case was significantly more negative than the *no change*, $F(1, 34) = 12.17$, $p = .001$, and *away* cases, $F(1, 34) = 57.88$, $p < .001$. *No change* was also significantly more negative than *away*, $F(1, 34) = 16.97$, $p < .001$. There were no significant differences between the levels of imagined change for the neutral stimuli. MCSD scores did not correlate significantly with valence ratings, ps $> .33$, in all but one condition—MCSD correlated with neutral *away* scores, $r = .51$, $p = .032$. One might argue that demand would be most relevant to a change score from *no change* to *away* or *toward* for each participant. MCSD scores also did not correlate with such change scores, ps $> .50$, except in one case, at a trend level. MCSD was marginally correlated with the change from *no change* to *away* for neutral cases, $r = .45$, $p = .060$. Both instances in which MCSD correlated, significantly or marginally, with either scores or change scores may be spurious as only two data points drove them, with 16 of 18 participants showing a zero for valence or change in valence in those neutral conditions. Even if they were not spurious, more positive estimates in the neutral away case do not fit with an explanation based on demand characteristics.

Emotional experience: Arousal. Using a similarly structured ANOVA, we examined the effects of scene valence and imagined change on ratings of emotional arousal. There was a main effect of scene valence, $F(1, 17) = 88.52$, $p < .001$, and of imagined change, $F(2, 34) = 34.21$, $p < .001$. There was also a significant scene valence by imagined change interaction, $F(2, 34) = 4.24$, $p = .023$. Within the negative scenes, the *toward* case was significantly more arousing than the *no change*, $F(1, 34) = 16.18$, $p < .001$, and *away* cases, $F(1, 34) = 61.74$, $p < .001$. *No change* was also significantly more arousing than *away*, $F(1, 34) = 14.71$, $p = .001$. Within the neutral scenes, the *toward* case was significantly more arousing than the *no change*, $F(1, 34) = 14.73$, $p = .001$, and *away* cases, $F(1, 34) = 17.67$, $p < .001$. MCSD scores did not correlate significantly with arousal ratings, ps $\geq .30$, nor with change scores from *no change* to *away* nor *toward*, ps $> .34$.

In Study 2, negative scenes were deemed more negative with greater proximity, whereas proximity did not affect the valence of neutral scenes. However, greater proximity elicited increased arousal in response to both negative and neutral scenes. MCSD did not predict those findings. Critically, participants were not able to assess how they thought they would feel without explicitly imagining negative and neutral scenes approaching or receding. Indeed, 100% of participants reported that they imagined moving scenes in their mind's eye (i.e., imagining them move away and get small; remain the same; move toward and get large) in order to answer the rating questions.

Study 3: The Role of Demand and Mental Imagery Facility

Studies 1 and 2 illustrated that manipulating the distance at which an emotional image appeared in the mind's eye influenced its emotional impact, and that imagining such changes—whether from an explicit goal to do so, or spontaneously—appeared to be centrally important in that connection. The data suggest that experimental demand does not account for the findings, as a) it is hard to explain why neutral images should be expected to increase in arousal with proximity without actually seeing the change in the mind's eye, b) MCSD scores were not relevant in predicting the general pattern of findings in Study 2, and c) participants in Study 2 spontaneously imagined the changes in order to know how to respond. However, additional evidence regarding whether experimental demand played a role was warranted. Thus, Study 3 examined two pertinent individual differences while replicating the mental imagery trials from Study1. These individual difference measures were a) the MCSD and b) mental imagery facility—one's ability to move mental images in the mind's eye (Cohen et al., 1996). If mental imagery facility were correlated with emo-

tional responses, that would provide converging evidence that participants did indeed make use of mental imagery, as they reported.

Method

Participants. Twenty-nine participants from the Columbia University community took part in exchange for either introductory psychology course credit or pay at a rate of $12/hour. Due to a computer error, data were not available for four participants. Of the remaining 25 (M = 25.2 years, *SD* = 5.5 years), 15 were female and 10 male.

Procedures. Procedures were identical to Study 1, except as noted. Only mental imagery trials were conducted, using all stimuli. Following the mental imagery trials, participants completed the MCSD scale (Crowne & Marlowe, 1960) to assess their tendencies to comply with experimenter expectations, and a measure of facility generating and using visual mental imagery. The mental imagery measure was a replication of Shepard and Metzler's mental rotation task (Cohen et al., 1996; Shepard & Metzler, 1971). Participants were presented images of two similar objects on a computer screen. They then had to rotate one in their mind's eye in order to be able to know whether it was the same or different as the other object depicted on the screen. D prime scores for accuracy were then computed for each participant.

Results and Discussion

Emotional experience: Valence. Due to a computer error, data for the *away* case were not available for the valence measure. We conducted a 2 scene valence (negative vs. neutral) by 2 imagined change (*no change, toward*) repeated measures ANOVA on ratings of valence. There was a main effect of scene valence, $F(1, 24) = 265.10$, $p < .001$, and a significant scene valence by imagined change interaction: $F(1, 24) = 15.00$, $p = .001$. The *toward* case was significantly more negative than the *no change* case, $F(1, 24) = 11.83$, $p = .002$, for the negative stimuli, and marginally significantly more positive than the *no change* case, $F(1, 24) = 4.10$, $p = .054$, for the neutral stimuli. MCSD scores did not correlate significantly with valence ratings, ps $> .24$, in any of the conditions. One might argue that demand would be most relevant to a change score from *no change* to *toward* for each participant. MCSD scores also did not correlate with such change scores, ps $> .5$. Mental imagery facility (*d* prime), however, did correlate with valence ratings for negative stimuli for the *toward* case, $r = .49$, $p = .013$, and with the change score from *no change* to *toward*, $r = .43$, $p = .031$.

Emotional experience: Arousal. A 2 scene valence (negative vs. neutral) by 3 imagined change (*away, no change, toward*) repeated measures ANOVA on ratings of arousal revealed a main effect of scene valence, $F(1, 24) = 76.48$, $p < .001$, and of imagined change, $F(2, 48) = 12.30$, $p < .001$. For the negative stimuli, the *toward* case was significantly more arousing than both the *no change*, $F(1, 48) = 42.42$, $p < .001$, and *away* cases, $F(1, 48) = 53.25$, $p < .001$. For the neutral stimuli, the *toward* case was also significantly more arousing than both the *no change*, $F(1, 48) = 39.37$, $p < .001$, and *away* cases, $F(1, 48) = 23.12$, $p < .001$. The only correlations between arousal scores and MCSD scores that approached significance were a correlation with the negative *away*, $r = .38$, $p = .060$, and the negative *no change* cases, $r = .34$, $p = .097$. People who were more likely to succumb to demand characteristics reported greater arousal to the negative *away* and *no change* cases—which patterns, moreover, would not be expected were demand characteristics to be able to account for the data. MCSD scores also did not correlate with change scores from *no change* to *away* nor *no change* to *toward*, ps $> .21$. Mental imagery facility was uncorrelated with arousal scores, and with arousal change scores from *no change* to *away* or *no change* to *toward,* ps $> .10$.

In summary, one's tendency to be susceptible to demand—as measured with the MCSD scale—had no bearing on one's likelihood to report emotion levels that fit with the overall expected findings. By contrast, one's facility with visual mental imagery manipulation—as measured with *d* prime accuracy scores on a mental rotation task—did influence emotional experience. Those who had greater mental imagery facility reported less extreme responses. That result may be less intuitive than the result that greater mental imagery facility would intensify valence. However, we suggest that it nonetheless provides converging evidence of mental imagery's important role in this paradigm. One interpretation is that those with greater facility were more able to control emotional mental images so as to lessen the impact.

General Discussion

The concept of psychological distance often is associated with emotional intensity in ordinary language. From AT&T's "Reach out and touch someone" to common phrases, such as "we've grown so close," and "some distance will help you feel better," there are references to this connection. In three studies, we considered whether and how psychological distance in the mind's eye connects to emotional experience. In each study, negative scenes tended to be less negative and less emotionally arousing when imagined moving away, and the opposite when imagined moving toward the observer. Importantly, Study 1 additionally showed that perceived and imagined changes to spatial distance produce the same effects. Study 2 results build on Study 1 to suggest that seeing changes to spatial distance in the mind's eye—whether via an explicit goal to do so, or spontaneously—is critical for the effects to emerge. And Studies 2 and 3 suggest that demand was not the cause of the present findings. Rather, the alternative hypothesis, that changes to mental imagery were central to the process, is better supported.

These findings fit with prior work in which perceived changes to spatial distance were manipulated (Muhlberger et al., 2008) or primed (Williams & Bargh, 2008), and extend them to imagined changes. The latter have potential for emotion regulation that prior findings do not, as changes to imagined distance are within the emotion regulators control.

Data on the emotional effects of changes to spatial distance also imply that an important moderator—context—may be valuable to discuss more extensively in connection with the literature relating approach and avoidance to positivity and negativity (e.g., Cacioppo, Priester, & Bernston, 1993; Chen & Bargh, 1999; Neumann & Strack, 2000), as has been recently suggested (Centerbar & Clore, 2006; Markman & Brendl, 2005). Specifically, we propose that the valence of the object and the nature of the interaction with it should be among those variables considered. In

the current work, imagining a scene approaching oneself appeared to heighten the emotional response tendency already present.

The present findings also suggest an important mechanism by which emotion regulation techniques involving first- to third-person perspective shifts may function (e.g., Ayduk & Kross, 2008; Kross, Ayduk, & Mischel, 2005). In addition to a change in content, a third-person perspective likely—although not necessarily—includes an increase in imagined spatial distance relative to a first-person perspective.

These findings also complement the work by Trope, Liberman, Fujita and colleagues on psychological distance and construal level (e.g., Fujita, Eyal, Chaiken, Trope, & Liberman, 2008; for review see Liberman & Trope, 2008). Trope and colleagues have refined the concept of psychological distance to pertain to at least four subtypes: social distance, spatial distance, temporal distance, and hypotheticality—more hypothetical associated with greater distance. At their core, these different forms of psychological distance all share the feature that near is more concrete, and far is more abstract. In the case of emotion, one might expect that a more concrete stimulus would bring about a stronger response than an abstract one. Consider that it is the self-appointed role of makers of such movies as *Saving Private Ryan* (Spielberg, Levinsohn, Gordon, & Bryce, 1998) to try to make the atrocities of war and oppression more concrete, and thus more emotional. However, we are aware of no prior research on Trope and colleagues' theory that pertains to whether and how imagined psychological distance might relate to emotional experience. Seen through the lens of that theory, we are testing an implication of their model that has not previously been tested directly, and adding a twist by showing that imagined, and not actual, physical distance is all that is needed to influence emotional experience.

Finally, these data also suggest that imagined spatial distance plays a role in mental representations of emotionally salient events. Building on the idea that mental representations can involve visual mental imagery (Barsalou, 1999; Kosslyn, Thompson, & Ganis, 2006), these results suggest a specific role for spatial distance in the mind's eye in the mental representations of emotional events.

Limitations and Future Directions

Although these data suggest an influence of imagined changes to spatial distance on emotional experience, there are limitations to the present work pertaining to mediating mechanisms and generalizability. Our Study 1 and 3 instructions guided participants to move scenes away or toward them in their mind's eye, and in Study 2 participants did this spontaneously. This manipulation involves a change in imagined distance, which is accompanied by—and therefore may in part be mediated by—changes in motion, size, resolution, or, perhaps, range of focus within the mind's eye. Existing research pertaining to perceived changes to stimulus size and resolution suggest they each might play a role (De Cesarei & Codispoti, 2008). Future research should examine the independent effects of these potential mediators. Additionally, it may be useful to consider the generalizability of this work to specific emotions, both positive and negative (e.g., anger vs. disgust vs. joy).

One also wonders about the potential role of experimental demand. It is an unlikely alternative explanation for four reasons. 1) 100% of participants in Study 2 reported that they needed to imagine moving emotional or neutral scenes away or toward them in order to know what they expected to happen as a result. 2) The unexpected finding that spatial distance influenced emotional responses, especially arousal, to neutral scenes is hard to explain as a result of experimental demand. If anything, experimental demand should have led to no changes to the emotionally neutral scenes as a function of distance. 3) In Studies 2 and 3, one's tendency to be susceptible to demand was uncorrelated with the finding that greater proximity increased the intensity of emotion. 4) Greater facility with mental imagery, in Study 3, did relate to the intensity of emotional reports in the most intensely emotional condition.

While demand is unlikely, a related consideration is whether participants held folk theories about how distance relates to emotion. Points 1, 2, and 4 above suggest that folk theories are also an unlikely alternative explanation. However, future research can build on this work by exploring the degree to which folk theories moderate or mediate the influence of imagined distance on emotional experience.

Although the general pattern held across studies—for example, negative stimuli more negative with imagined proximity and less so with greater imagined distance—there are subtle differences across studies. For example, in Study 1 the valence effect is carried more by the *away* condition than *toward,* while in Study 2 it is more evenly a function of both *away* and *toward*. We suggest that there may be individual differences in how people react to specific stimuli chosen by the experimenters that introduce noise (e.g., Study 1). When participants spontaneously produce their own example stimuli (e.g., Study 2), it may be both more personally relevant and easier to manipulate in the mind's eye, thus leading to a more evident effect in each condition.

Finally, there is the potential that changes to imagined distance were by themselves not the only critical variable in regulating emotion. For example, it is possible that seeing a scene at a greater distance caused participants to appraise (i.e., reappraise) the scene differently. A scene of a car accident, for instance, close up may have been hard to separate from oneself; whereas the same scene at a great distance may have been easier to construe as fake, as pertaining to strangers, and so on. In line with this prediction, Kross and colleagues have shown that reanalysis of a painful emotional memory is more effective in changing how one feels when one sees oneself in the recall of the memory from a third-person perspective than when recalling from a first-person perspective (Ayduk & Kross, 2008; Kross et al., 2005). Whether different imagined distances afford differences in other forms of emotion regulation merits exploration in future research. Such mechanisms would not detract from imagined distance-based techniques in emotion regulation, but may lead to more optimal combined forms of emotion regulation.

Conclusions

If there are many routes toward adaptive emotion regulation (Gross, 1998; Ochsner & Gross, 2005), here we provide evidence for a new twist on one type of route: mental imagery may be used to change emotional responses to imagined events, without reference to the content of the emotional experience or any explicit goal to change emotion. This highlights that the emotion generation process may be impacted at its earliest perceptual stage not just by

changing the world via situation modification, but by changing one's mental representation of it via imagined modifications.

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