Research Article

EFFECTS OF FEAR AND ANGER ON PERCEIVED RISKS OF TERRORISM:
A National Field Experiment

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Abstract—*The aftermath of September 11th highlights the need to understand how emotion affects citizens' responses to risk. It also provides an opportunity to test current theories of such effects. On the basis of appraisal-tendency theory, we predicted opposite effects for anger and fear on risk judgments and policy preferences. In a nationally representative sample of Americans (N = 973, ages 13–88), fear increased risk estimates and plans for precautionary measures; anger did the opposite. These patterns emerged with both experimentally induced emotions and naturally occurring ones. Males had less pessimistic risk estimates than did females, emotion differences explaining 60 to 80% of the gender difference. Emotions also predicted diverging public policy preferences. Discussion focuses on theoretical, methodological, and policy implications.*

Terrorist attacks on the United States intensely affected many individuals and institutions, well beyond those directly harmed. Financial markets dropped, consumer spending declined, air travel plummeted, and public opinion toward government shifted. These responses reflected intense thought—and emotion. The attacks—and prospect of sustained conflict with a diffuse, unfamiliar enemy—created anger, fear, and sadness.

A growing literature considers the interplay of emotions and risk perceptions (see Holtgrave & Weber, 1993; Loewenstein & Lerner, 2002; Loewenstein, Weber, Hsee, & Welch, 2001; Mellers, Schwartz, & Ritov, 1999; Schwarz & Clore, 1996; Slovic, Finucane, Peters, & MacGregor, 2002). Its theories can both illuminate current events and be tested by them.

Early research found that positive emotions trigger more optimistic risk assessments and negative emotions trigger more pessimistic ones, even if the source of the emotion has no relation to the target risks (Johnson & Tversky, 1983). Recent research replicates carryover effects of emotion, but demonstrates the importance of examining specific emotions rather than global (positive-negative) feelings (DeSteno, Petty, Wegener, & Rucker, 2000; Keltner, Ellsworth, & Edwards, 1993; Lerner & Keltner, 2000, 2001; Tiedens & Linton, 2001). Experiments guided by appraisal-tendency theory (Lerner & Keltner, 2000, 2001) have demonstrated that some negative emotions trigger optimism.

Appraisal-tendency theory assumes that emotions not only arise from (Smith & Ellsworth, 1985), but also elicit (Keltner et al., 1993; Lerner & Keltner, 2000, 2001; Tiedens & Linton, 2001) specific cognitive appraisals. Such appraisals, although tailored to help the individual respond to the event that evoked the emotion, persist beyond the eliciting situation—becoming an implicit perceptual lens for interpreting subsequent situations. For example, fear arises from (Smith & Ellsworth, 1985) and evokes appraisals of uncertainty and situational control (Lerner & Keltner, 2001), two central determinants of risk judgments (Slovic, 1987), whereas anger is associated with appraisals of certainty and individual control (Lerner & Keltner, 2001; Smith & Ellsworth, 1985). Consistent with appraisal-tendency theory, laboratory studies have found that anger triggered in one situation evokes more optimistic risk estimates and risk-seeking choices in unrelated situations. Fear does the opposite, evoking pessimistic estimates and risk-averse choices (Lerner & Keltner, 2000, 2001). Appraisals of certainty and control moderate and (in the case of control) mediate these effects (Lerner & Keltner, 2001).

If these findings generalize to the risks of terrorism, then an angry country could endorse different policies than a fearful one. The existing evidence, however, comes almost exclusively from experiments with controlled conditions and college-student samples. The present study tested whether these patterns would hold with a nationally representative sample that received emotion inductions and answered questions at home. No previous emotion experiment has used a national sample; few have used a topic so inherently salient that respondents already have strongly held beliefs. To further test generality, the study measured risk perceptions with different response modes (verbal, numeric), while considering both naturally occurring and experimentally induced emotions.

Members of a nationally representative sample vary in many ways. Our analyses focus on age and gender. Compared with women, men generally report lower risk estimates (Slovic, 1999). Given the many factors that covary with gender in a national sample (e.g., income, longevity, social status), a gender difference in risk estimates may be multiply determined. One intriguing (but previously untested) explanation implied by appraisal-tendency theory is that gender differences in emotional experience will account for differences in risk estimates. Drawing on the demonstrated effects of fear and anger on risk perception (Lerner & Keltner, 2001) and men's tendency to report experiencing less fear and more anger than women (Biaggio, 1980; Grossman & Wood, 1993), we predicted that women would perceive greater risks than men and that differences in experienced fear and anger would mediate this result.

Conventional wisdom holds that adolescents have a sense of invulnerability that encourages risky behaviors. However, studies have found similar risk perceptions for adolescents and adults (Quadrel, Fischhoff, & Davis, 1993). A recent study of a nationally representative adolescent sample measured predications of life events (e.g., pregnancy, school completion, violent crime) and found accurate to optimistic predictions, except for exaggerated estimates of premature mortality (Fischhoff et al., 2000). We oversampled adolescents, in order to have the statistical power to detect age differences.

The tragic terrorist attacks provide a unique opportunity for testing psychological theories and laboratory findings, using experimental methods with a nationally representative sample and considering issues of intense interest. In addition, the results may help citizens and policymakers understand the complex emotions and cognitions evoked by the attacks.

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METHOD[1]

Overview

Our two-part field experiment drew a random sample from Knowledge Networks' nationally representative panel, originally recruited through random-digit dialing. Individuals agreeing to participate in this panel receive a WebTV and free interactive Internet access, in return for completing occasional surveys. Characteristics of the 75,000 households in the panel closely match the U.S. Census (for details on the Knowledge Networks panel, see http://www.knowledgenetworks.com/ganp/index.html).

For the present study, respondents received an e-mail message announcing the survey's availability. Respondents agreeing to participate received the survey and provided informed consent. Survey alerts were sent on two dates: September 20 and November 10, 2001. Each time, respondents had approximately 14 days to respond.

September 20th Procedure (Time 1)

A random sample of 1,786 Knowledge Networks panel members (ages 13–88) answered questions about the attacks and completed several psychosocial scales, two of which are relevant here: (a) the five-item Anxiety Subscale from the Stanford Acute Stress Reaction Questionnaire (Cardeña, Koopman, Classen, Waelde, & Spiegel, 2000; $\alpha = .78$) and (b) a four-item face-valid Desire for Vengeance Scale (Skitka, 2001; $\alpha = .69$). We performed a principal-components factor analysis on each question set (no rotation), then used regression scores from the factor in subsequent data analyses.

November 10th Procedure (Time 2)

The same 1,786 panel members received a message describing the second study and inviting those who could spend 20 uninterrupted minutes alone to participate. The survey was opened by 1,030 people. The study sample included the 973 who completed almost all the survey questions.

Sample

Preliminary analyses separated adolescents ($n = 143$) and adults ($n = 830$). Demographics for each subsample roughly matched Census figures.[2] Both were 49% male. The mean ages were 45.9 ($SD = 16.8$, range: 18–88) and 15.3 ($SD = 1.15$, range: 13–17). Across the sample, self-reported ethnic-group membership was as follows: 12% African American, non-Hispanic; 12% Hispanic; 8% other, non-Hispanic; and 68% White, non-Hispanic.[3] Among the adults, 14% reported not completing high school, 31% said they had graduated high school or received a general equivalence diploma, 23% reported having

some college education but no degree, 23% said they graduated from a 2- or 4-year college, and 9% had advanced degrees.

Experimental manipulation

As respondents opened the second survey, a computer algorithm randomly assigned them to one of three emotion conditions. Respondents answered questions about their mood, then received a two-part emotion induction. The first part presented text like the following, followed by a box for typing a response:

The terrorist attacks evoked a lot of emotion in Americans. We are particularly interested in what makes you most ANGRY about the attacks. Please describe in detail the one thing that makes you most ANGRY about the attacks. Write as detailed a description of that thing as possible. If you can, write your description so that someone reading it might even get ANGRY from learning about the situation.

• What aspect of the terrorist attacks makes you the most ANGRY?
• Why does it make you so ANGRY?

The other two conditions replaced "ANGRY" with "SAD" or "AFRAID."

Respondents in each condition then saw a picture and heard an audio clip about terrorism that had, in pretests, evoked the target emotion more than the other two emotions. (We focus in this report on fear and anger; the sadness manipulation will be reported elsewhere.) In order to evaluate the effects of actual media portrayals, all stimuli came from major media outlets, primarily CNN and the *New York Times*. The anger text and picture involved celebrations of the attacks by people in Arab countries. The fear text warned of anthrax and bioterrorism; the picture showed postal workers wearing flimsy masks.

Measures of risk perception

not too far off for 9/11

Each respondent judged risks in three ways, differing in response mode, focal event, and risk target. For the first set of questions, respondents judged the likelihood of future events for the United States, on a verbal response scale anchored at 0 (*extremely unlikely*) and 8 (*extremely likely*). Typical items were, "Safety in airline travel will improve dramatically as a result of the terrorist attack," "Another major terrorist attack will occur within the next 12 months" (reverse-scored), and "The United States will be able to capture Osama bin Laden." Analyses of this *Risk of Future Events for the United States* scale used mean responses to the nine items ($\alpha = .73$).

It is possible that placing greater analytic demands on respondents might diminish emotion effects. In order to test this possibility, we included two other risk scales that asked respondents to generate precise probabilities. First, the *Risky Events and Precautionary Actions for Self* scale asked respondents to indicate the probabilities that they themselves might experience eight risky events and precautionary actions within the next 12 months. Then, the *Risky Events and Precautionary Actions for Average American* scale asked respondents to indicate the probabilities that the average American might experience the same eight events and actions within the next 12 months.[4] The anchors for these scales were 0% (*the event is impossible*) and 100% (*the event is certain to happen*). Five items concerned terrorism; three concerned routine risks ($\alpha = .74$ for Self,

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1. Given space constraints, methodological details could not be included in this report. This information is available on-line (http://computing.hss.cmu.edu/lernerlab/appendixFinal.pdf) or by request from the authors.

2. Weights adjusted for variable number of telephone lines per household and oversampling of some geographical areas. They included a nonresponse adjustment and poststratification weighting to demographic benchmarks from the Current Population Survey. For sampling details, see http://www.knowledgenetworks.com/ganp/index.html.

3. When an adolescent did not identify his or her race, we inferred it from parental race. When parental race was missing, race was randomly assigned according to the proportions in the cases for which race was known.

4. Judgments may be subject to a self-enhancement bias wherein respondents believe that they face less risk than the "average American" (Taylor & Brown, 1988; Weinstein, 1980). We examined whether this bias persists despite the sense of vulnerability potentially instilled by the terrorist attacks.

α = .85 for Average American). Item-level responses were negatively skewed (toward low probabilities). Averaging items on each scale produced more normal distributions.

Policy preferences

Finally, respondents evaluated four "possible government policies" on a 4-point Likert scale anchored at 1 (*strongly opposed*) to 4 (*strongly support*).

Manipulation checks

At the end of the survey, respondents reported how they felt while writing about their feelings, viewing the picture, and hearing the audio clip. They rated five-item scales for each focal emotion (fear: α = .94, anger: α = .94). Response scales ranged from 0 (*do not feel the emotion the slightest bit*) to 8 (*feel the emotion even more strongly than ever before*). We averaged responses on each scale for subsequent analyses.

RESULTS[5]

Are Teens Different From Adults?

The data for teens and adults were consistent with recent findings (Fischhoff et al., 2000) in that the teen and adult samples revealed the same patterns on all analyses. Therefore, we collapsed the samples, weighting teens proportional to their representation in the U.S. Census data.

Self-Reported Emotions

Across the fear and anger conditions, the mean self-report for anger was 5.06. The mean for fear was 3.46. Analyses of variance (ANOVAs) indicated that the emotion primes significantly increased the target emotion. Respondents reported more anger in the anger condition (M = 5.39) than in the fear condition (M = 4.73), $F(1, 649)$ = 13.55, p < .001. They reported more fear in the fear condition (M = 3.72) than in the anger condition (M = 3.22), $F(1, 649)$ = 9.18, p < .01. As anticipated, females reported less anger than men, $F(1, 645)$ = 6.16, p < .05 (Ms = 4.84 vs. 5.29) and greater fear, $F(1, 645)$ = 21.43, p < .001 (Ms = 3.84 vs. 3.08). There was no interaction between emotion condition and gender. Thus, the emotion primes increased the target emotions, for males and females. Nonetheless, anger was the dominant emotion across conditions.[6]

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5. Although doing so weakened the experimental effects, we included every respondent for whom we had data, regardless of whether the respondent followed instructions to (a) be completely alone during the survey (75.6% complied), (b) write feelings corresponding to the emotion prime (81.4% complied), and (c) complete the survey in one sitting (87% completed within the same day). Comprehensive statistics on response and completion rates are available from the authors.

6. It may have been socially undesirable to admit feeling fear while the United States president called for courageous and retaliatory responses. In pilot tests with the same stimuli conducted 4 weeks before Time 2, reported fear was higher.

Risk Perceptions

Do experimentally primed emotions affect risk perceptions?

We predicted opposite effects on risk perceptions for fear and anger. In order to test for generality, we elicited judgments of 25 risks, over three scales, with two response modes. The Risk of Future Events for the United States scale was a nine-item Likert scale, with verbal response options. The two eight-item Risky Events and Precautionary Actions scales (Self and Average American) used a numerical probability scale.

As expected, each risk scale showed more optimistic (i.e., lower) estimates in the anger condition than in the fear condition (see Fig. 1). For the Risk of Future Events for the United States scale, the mean response was 3.38 in the anger condition and 3.62 in the fear condition, $F(1, 644)$ = 7.93, p < .01. Similarly, on the Risky Events and Precautionary Actions for Self scale, the mean estimated probability was 30.5% in the anger condition and 35.2% in the fear condition, $F(1, 644)$ = 8.25, p < .01. The highest mean was for fear-condition females (37.7%), and the lowest was for anger-condition males (27.3%). The same pattern emerged with the Risky Events and Precautionary Actions for Average American scale (M_{anger} = 48.1%, M_{fear} = 52.0%), $F(1, 644)$ = 4.55, p < .05. Thus, experimentally priming emotions triggered global effects on risk perceptions, well beyond the specific foci of the stimuli and even with the more analytic probability response scale.

Gender differences

As predicted, males were more optimistic than females, an effect that did not interact with emotion-condition effects (see Fig. 1). Females' risk estimates were higher than males' for risks to the United States (M_{female} = 3.65, M_{male} = 3.34), $F(1, 640)$ = 18.28. Similar patterns appeared for risks to the self (M_{female} = 35.92%, M_{male} = 29.61%), $F(1, 640)$ = 18.04, and for risks to the average American (M_{female} = 53.29%, M_{male} = 46.51%), $F(1, 640)$ = 15.97, all ps < .001. On the latter two scales, the difference in mean probability judgments ranged from 1.0% to 14.9% across the 16 items, with an overall mean difference of 6.4%.

Mediators

The foregoing results are consistent with emotion manipulations having causal effects on risk judgments. However, the condition differences might also reflect aspects of the manipulations other than the emotions they evoked. We evaluated the possibility with two analyses.

Why do the fear prime and anger prime have opposite effects on risk estimates? A multivariate analysis of covariance (MANCOVA) tested whether controlling for respondents' self-reported emotions would diminish the relationship between emotion condition and risk perception.[7] The MANCOVA included the three risk scales as dependent measures, the self-report scales for fear and anger (respectively) as covariates, and emotion condition (anger, fear) as the independent variable. Results supported the hypothesis. Significant associations appeared between the fear covariate and higher risk perceptions, $F(3, 640)$ = 48.08, Wilks's λ = .82 (η^2 = .19), as well as between the anger covariate and lower risk perceptions, $F(3, 640)$ = 11.35, Wilks's λ = .95

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7. A multivariate analysis was warranted (rather than nine ANOVAs), given the similar patterns for the three scales. In addition, this analysis reduced the chance of Type 1 error.
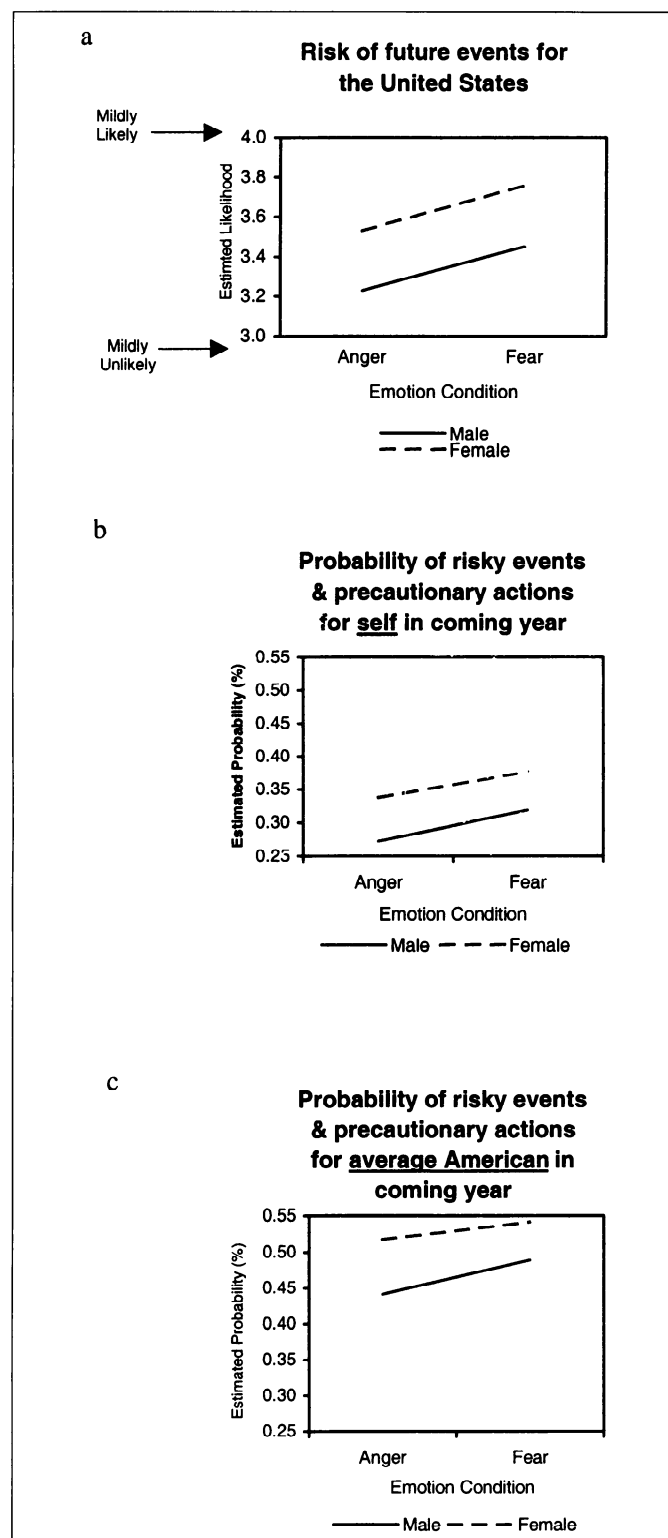
a

Risk of future events for the United States

b

Probability of risky events & precautionary actions for self in coming year

c

Probability of risky events & precautionary actions for average American in coming year

Fig. 1. Mean perception of risk as a function of emotion condition, separately for males and females. Results are shown for the three scales, which measured (a) perceived risk to the United States (nine items), (b) probability of risky events and precautionary actions for oneself (eight items), and (c) probability of risky events and precautionary actions for the average American (eight items).

Table 1. *Partial correlations between naturally occurring anxiety and desire for vengeance (measured soon after September 11th) and risk perceptions (measured 6–10 weeks later)*

Risk perception	Anxiety	Desire for vengeance
Risk of Future Events for the United States	.10*	−.16**
Risky Events and Precautionary Actions for Self	.24**	−.07[†]
Risky Events and Precautionary Actions for Average American	.13**	−.07[†]

Note. These correlations control for the nonfocal emotion (anxiety or vengeance, respectively), preexisting anxiety disorders, and political ideology. $N = 973$.
[†]$p \le .08$. *$p \le .05$. **$p \le .001$. All p values are two-tailed.

($\eta^2 = .05$), both $ps < .001$. When these covariates were considered, the once-significant effect of emotion condition, $F(3, 640) = 5.30$, $p = .001$, Wilks's $\lambda = .98$ ($\eta^2 = .02$), no longer predicted risk perceptions, $F(3, 640) = 1.86$, $p = .14$, Wilks's $\lambda = .99$ ($\eta^2 = .01$).

Do emotions experienced shortly after September 11th predict risk estimates 6 to 10 weeks later? The second analysis examined whether naturally occurring fear and anger showed the same patterns as experimentally primed fear and anger. At Time 1, 9 to 23 days after September 11th, respondents completed the Desire for Vengeance Scale and the Anxiety Subscale of the Stanford Acute Stress Reaction Questionnaire. If emotion has lasting effects on risk perceptions, respondents who were more anxious shortly after the attacks should have made more pessimistic risk estimates at Time 2, 6 to 10 weeks later, compared with respondents who were less anxious; similarly, respondents who were initially more angry (as measured by their desire for vengeance) should have made lower risk estimates at Time 2 than respondents who were less angry. We tested these predictions by calculating partial correlations between Time 1 self-reported emotions and Time 2 scores on the three risk measures, controlling for the nonfocal emotion.[8] Table 1 displays the results. As predicted, naturally occurring emotions shortly after the attacks reliably predicted risk estimates for diverse events 6 to 10 weeks later; this was true for both of the response scales (verbal, probability). Moreover, although both anxiety and vengeance are negative feelings, they had opposite correlations with risk perceptions. Greater anxiety predicted higher risk estimates; greater desire for vengeance predicted lower risk estimates.[9] The results in Table 1 and the experimental effects provide convergent evidence for fear and anger having significant and distinct effects on risk perceptions.

8. In previous research, desire for vengeance correlated positively with conservative attitudes (Skitka & Tetlock, 1993). Therefore, we controlled for political ideology in all our analyses involving vengeance.

9. Two of the correlations for vengeance fell just short of significance with a two-tailed test, but achieved significance with a one-tailed test. The lower reliability of these results may reflect imperfect measurement of the underlying concept of anger. The scale alpha was only .69, and item content did not address anger exclusively.

Table 2. *Relationships between gender and risk estimates*

Risk perception	r^2	sr^2	% variance explained by emotion
Risk of Future Events for the United States	.018	.007	.611
Risky Events and Precautionary Actions for Self	.037	.007	.811
Risky Events and Precautionary Actions for Average American	.018	.007	.611

Note. The semipartial correlations control for respondents' self-reported experience of fear and anger.

didn't answer

Why do men and women view risks differently? A MANCOVA tested the hypothesis that self-reported emotional experience mediates the gender difference in risk estimates. Consistent with the hypothesis, the data showed significant associations between the fear covariate and higher risk perceptions, $F(3, 635) = 45.45$, Wilks's $\lambda = .82$ ($\eta^2 = .18$), as well as between the anger covariate and lower risk perceptions, $F(3, 635) = 11.06$, Wilks's $\lambda = .95$ ($\eta^2 = .05$), both $ps < .001$. The original gender difference, $F(3, 637) = 10.10$, $p < .001$, Wilks's $\lambda = .96$ ($\eta^2 = .05$), was weaker, but still significant, when these covariates were taken into account, $F(3, 635) = 4.14$, $p < .01$, Wilks's $\lambda = .98$ ($\eta^2 = .02$). In order to determine how much emotions mediated the gender difference in each outcome, we calculated the semipartial correlations between gender and risk outcomes, controlling for self-reported emotion during the study. We then calculated the squared semipartial correlations, which represent percentage of variance explained (see Table 2). The results were consistent with the MANCOVA. Controlling for self-reported emotions did not fully explain the gender difference in risk perception, but self-reported fear and anger explained 81% of the variance in risk estimates on the Risky Events and Precautionary Actions for Self scale and 61% of the variance on the other two scales.

How realistic are lay risk perceptions? As in previous research, respondents assigned each negative event a lower probability of occurring to them than to the average American (see Table 3). For example, they saw a mean 20.5% personal chance of being hurt in a terrorist attack within the next year, but a 47.8% chance for the average American to be hurt.

Because respondents estimated the chance that each event would occur within the next year, it is now possible to evaluate the accuracy of their predictions, and we are undertaking a study to do this. In the meantime, a few aspects of the data merit note. If probability judgments are interpreted literally, then the mean probability judgments should equal the relative frequency of the associated events occurring. In this light, the flu-risk judgments would be accurate if, in the ensuing year, about 50% of the respondents had a disease that they considered the flu. Compared with the historical flu rates, this mean judgment is moderately elevated, for both the Risky Events and Precautionary Actions for Self and Risky Events and Precautionary Actions for Average American scales (Adams & Marano, 1995). The average estimated personal probability of being a victim of violent crime (other than a crime of terror) also agrees with historical statistics (RAND, 1998), if one uses the median to represent the skewed distribution. However, the 43% estimated probability for the average American to be the victim of violent crime (other than a crime of terror) is much higher

than official estimates, as is the mean for dying from any cause. These high estimates could reflect an availability bias, with media reports exaggerating other people's apparent vulnerability (Kahneman, Slovic, & Tversky, 1982). They could also reflect sporadic problems with translating beliefs into probability judgments, especially regarding risks for average Americans.[10] Nonetheless, the judgments in Table 3 suggest that respondents perceived unrealistically high rates of risks for themselves and even more elevated risks for the average American.

Does emotion affect policy preferences beyond risk perceptions? Finally, we expected that responses to two of our "possible government policies" would show effects of fear and anger. Table 4 displays the items and results. Compared with fear-condition respondents, anger-condition respondents supported the (vengeful) deporting policy more strongly and the (conciliatory) contact policy less strongly. Self-reported emotions from Time 1 (vengeance) and Time 2 (fear, anger) showed a similar pattern. Regardless of emotion, respondents supported providing Americans with honest, accurate information. Unexpectedly, an emotion difference emerged for investing in general capabilities over specific solutions; fearful respondents showed modestly more support for this policy than angry respondents did. In sum, emotion primes significantly shifted views on terrorism policies; naturally occurring emotions showed corresponding patterns.

nationalism

CONCLUSIONS

A field experiment, using a nationally representative sample and a multimethod approach, found that fear and anger altered beliefs and attitudes regarding matters of national interest. Experiencing more anger triggered more optimistic beliefs; experiencing more fear triggered greater pessimism. These effects held across a range of risks (terror and non-terror related) and with both a verbal response scale and a more analytical probability response scale. Thus, two negative emotions had consistently divergent effects on risk estimates, providing additional evidence for the importance of examining specific emotions, rather than just global moods.

Across all risks, males expressed less pessimism than did females. Differences in reported emotion explained 60% to 80% of the variance in these effects.

As has been found previously, respondents saw themselves as less vulnerable to risks than the average American, and less likely to take precautionary measures. However, these judgments of relative risk did not reflect unrealistic optimism, in an absolute sense. Some risk estimates (e.g., for the average American being a victim of violent crime) reflected pronounced pessimism, considering historical risk rates. Other risk judgments (e.g., being injured in a terror attack) can be

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10. One difficulty with open-ended probability response modes is that respondents may use "50" to express uncertainty (i.e., "fifty-fifty"), rather than a numerical probability (Bruine de Bruin, Fischbeck, Stiber, & Fischhoff, 2002; Fischhoff & Bruine de Bruin, 1999). Saying "50" when one cannot resolve one's beliefs inflates summary statistics for risks typically assigned much lower probabilities. Such a "50 blip" occurred for the estimates of personal risk for two events: being injured in a terror attack and taking antibiotics against anthrax. Removing all "50%" responses for the former event reduces the mean probability estimate from 21% to 12% and the median from 10% to 5%. Removing all "50%" responses for the latter event reduces the mean probability estimate from 22% to 17% and the median from 5% to 3%.

Table 3. *Respondents' probability estimates that within the next 12 months they and the average American would experience risky events and take precautionary actions*

Event or action	Scale	*M*	*SD*	Median
Being hurt in a terror attack	Self	20.5	22.5	10.0
	Average American	47.8	35.7	50.0
Having trouble sleeping because	Self	23.5	29.5	10.0
of the situation with terror	Average American	44.0	27.6	45.0
Traveling less than usual	Self	34.0	36.2	20.0
	Average American	53.9	25.3	50.0
Screening mail carefully for	Self	53.6	38.8	50.0
suspicious items	Average American	60.0	29.6	60.0
Taking antibiotics against anthrax	Self	22.1	30.3	5.0
	Average American	39.3	30.2	35.0
Getting the flu	Self	46.8	31.3	50.0
	Average American	59.5	29.2	50.0
Being the victim of violent crime	Self	22.0	22.9	10.0
(other than terror)	Average American	43.0	30.1	40.0
Dying from any cause	Self	35.0	34.3	25.0
(crime, illness, accident)	Average American	52.6	35.2	50.0
Average of all items	Self	32.3	18.7	30.4
	Average American	50.1	21.3	50.0

Note. $N = 973$. All *t* values for paired comparisons were significant, $p < .001$. The distributions of the individual items (excluding the average of all the items) were negatively skewed. A Wilcoxon sign-rank test was therefore performed, and the results were equivalent to the parametric results.

Table 4. *Emotion and policy preferences*

Policy	Partial correlation with self-reported affect at Time 1[a]		Partial correlation with self-reported emotion at Time 2[b]		Mean response at Time 2		Test for mean difference between fear and anger at Time 2
	Anxiety	Vengeance	Fear condition	Anger condition	Fear condition	Anger condition	*t* (*df*)
General							
Provide Americans with honest, accurate information about the situation, even if the information worries people	.02	.02	−.01	.09*	3.47	3.43	−0.68 (634)
Invest in general capabilities, like stronger public health, more than a specific solution like smallpox vaccinations	.05	−.02	.09*	.02	3.58	3.47	−2.19* (635)
Emotionally responsive							
Deport foreigners in the U.S. who lack valid visas	−.06	.28**	−.12**	.26**	3.48	3.63	2.52* (634)
Strengthen ties with countries in the Moslem world	−.02	−.13*	−.02	−.09*	3.23	3.08	−2.17* (631)

Note. Policy response scales ranged from 1 (*strongly opposed*) to 4 (*strongly support*). $N = 973$.
[a] Time 1 emotions represent individual differences shortly after September 11th. Partial correlations between Time 1 emotions and policy questions control for the nonfocal Time 1 emotion (anxiety or vengeance, respectively), preexisting anxiety disorders, and political ideology.
[b] Time 2 emotions represent self-reported feelings in response to the emotion manipulations. Partial correlations between Time 2 emotions and policy questions control for the nonfocal emotion (fear or anger, respectively).
*$p \leq .05$. **$p \leq .001$. All *p* values are two-tailed.

Effects of Emotion on Perceived Risks of Terrorism

evaluated only now, when the actual risk is known because a year has passed since completing the survey. Given the events (or lack thereof) in the year since the survey, respondents appear to have been deeply pessimistic when estimating a 20% chance of being hurt in a terror attack for themselves and a 48% chance for the average American.

Although our comparisons between fear and anger focused on risk estimates, emotions also influenced public policy preferences. As expected, experimentally primed anger activated more punitive preferences, and fear enhanced preferences for conciliatory policies and investment in broadly applicable precautionary measures.

Extrapolating results from an experiment to a real-world setting requires matching conditions between the two. Our study used television (WebTV) to focus respondents on an all-too-familiar topic for 15 to 20 min. The manipulation involved activities that one might encounter in everyday life. Specifically, respondents were asked to dwell briefly on a common emotion, then experience a related picture and text from the news media. Thus, the effects we observed might resemble those evoked by comparable news reports and periods of reflection. A more sustained focus (e.g., a crisis, intense political debate, memorial period) could be expected to increase the effects. Similar emotional manipulations (by experimenters, politicians, etc.) should have similar effects, proportional to their emotional power. Citizens need to understand these processes in order to apply their hearts and minds to what might be a protracted struggle with the risks of terror.

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