

Affect and Risk Perception in the Context of Terrorism:  
Towards an Understanding of its Psychosocial Aspects

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*Keywords:* Affect, fear, anger, risk perception, resilience, terrorism

Citation:

Mandel, D.R. (in press). Affect and risk perception in the context of terrorism: Towards an understanding of its psychosocial aspects. In A. Speckhard (Ed.) *Psychosocial, Organizational, and Cultural Aspects of Terrorism: Final Report to NATO HFM140/RTO*. Brussels: NATO.

## Introduction

The immediate consequences of terrorism are evident in the graphic news images of mayhem that quickly follow such events. But terrorism is like a stone tossed into a still pond. It triggers waves of consequence that ripple out over multiple timescales from the micro-level of the individual to the macro-level of international relations. The socio-political dynamics that terrorism triggers are undoubtedly complex and still not well understood (Burns & Slovic, 2007). Nor can the rippling effects of terrorism be attributed to the sheer magnitude of threat posed. As Mueller (2007) points out, the statistical risk of terrorism in the U.S. is comparable to that of being killed by lightning or an allergic reaction to peanuts. Thus concern about terrorism as a form of threat, both by government officials and members of the public, reflects much about its psychosocial nature. The threat of terrorism, unlike the threat of lightning, seems to stem in large measure from the signal it sends, and from our own ability to imagine terrorists increasing the frequency and magnitude of their mayhem unless counter-terrorism measures are taken to stop them. As Slovic (1987) proposed some time ago, the perception of risk would seem to have much to do with its signal value—what a particular type of threat portends for the future—and terrorism is a good example of risk as signal.

In some sense, terrorists use the signal value of a terrorist act to initiate a longer-term game that holds nations as captive players. Governments that do not respond aggressively enough to terrorist attacks may be perceived as weak and ineffective by their attackers and citizens alike. Conversely, too vigorous a response may strain a nation's economic resources, undermining its long-term military power and capabilities to achieve other objectives. When the response is military in nature, it can embroil a nation in deadly conflicts that may have waning public support, particularly if casualties mount without clear signs of movement towards victory. Moreover, when the counter-terrorism measures that are invoked limit human rights and freedoms or violate international laws based on ethical principles, terrorists can gain a strategic advantage by undermining their opponents' moral authority and diplomatic influence on the world stage. All games that involve strategy have a psychosocial dimension. The terrorism game, particularly when played out on an interconnected world stage, as is common today, is an extreme and high-stakes example of this. For this reason, the game metaphor may be particularly apt for the terrorism-counterterrorism cycle and should be considered alongside and contrasted with the four popular metaphors of counterterrorism—war, law enforcement, social epidemic, and prejudice reduction (namely, overcoming inter-group prejudices that, according to this metaphor, are thought to underlie terrorism)—recently discussed by Kruglanski, Crenshaw, Post, and Victoroff (2008).

In the present chapter, I examine some recent research that examines one aspect of the psychosocial dimension: the role of affect or emotion in shaping risk perceptions concerning terrorist attacks and anticipated resilience in the face of such attacks. The public's perception of risk can have important implications for the effectiveness of government plans to respond to disasters, including terrorist attacks. For

instance, in one study that I conducted in collaboration with a group of Carnegie Mellon University researchers (see Bruine de Bruin et al., 2006, Project 2), Canadian participants were presented with a scenario of a nuclear blast in their region (all cities in the province of Ontario) caused by a terrorist attack. Participants were asked to decide how long it would take them to relocate back to their home after a mandatory period of relocation away from their home had ended and to rate the importance of factors that might influence their decision. Risk of cancer was rated very highly but, even more importantly, the importance of cancer risk to participants was the strongest predictor of the time they would take to return home ( $\beta = .42, p < .01$ ). Indeed, the only other factor that significantly predicted time to return home was the importance they placed on missing their home ( $\beta = .29, p < .01$ )—itself an affectively-laden assessment. The study clearly indicates that risk perceptions in times of real crisis, such as during a terrorist attack, are likely to be an important determinant of personal decision-making.

### **Affect and Risk Perception**

It has long been known that perceptions of risk or threat among the general public are influenced by a multidimensional array of psychosocial factors that, among others, include feelings of dread and outrage (e.g., Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978; Sandman, 1989; Slovic, 1987). Leaders of terrorist organizations are acutely aware of the psychological bases of risk perception and attempt to use those bases to their strategic advantage, seeking to prompt fear and perceived risk that is disproportionate to the statistical risk yet highly representative of the iconic images of terror that acts of terrorism so easily evoke (Slovic, 2004). Sunstein (2003) refers to this process as *probability neglect*, where individuals attend to the *possibility* of catastrophic harm caused by terrorism while ignoring the fact that the probability of such harm based historical evidence is low. Mueller (2007) describes the process as akin to a reverse lottery in which one's chance of losing (namely, being a victim of terrorism) is extremely low, yet just as good as for anyone else by virtue of the unpredictable, uncontrollable, and seemingly random nature of their infrequent occurrences. Most theorists acknowledge the importance of emotions such as fear, worry, and dread play an important role in keeping the threat of terrorism highly salient, and how terrorists, unscrupulous politicians, and profiteers in the terrorism industry may attempt to exploit such emotions for their own advantage (e.g., Lustick, 2006; Mueller, 2006).

Much research on the effect of affect on risk perceptions has emphasized the importance of an individual's affective state at the time of judgment (e.g., see Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2002). According to these "affective valence" theories, one's current affective state is used as a cue to gauge the level of threat associated with various types of events or scenarios. For this reason, Schwarz & Clore (1996) refer to "feelings as information," and Slovic et al. (2002) refer to this process of using feelings as information in order to arrive at judgments (including those about threat) as the "affect heuristic."

Support for affective valence theories comes from a number of different sources. For instance, Johnson and Tversky (1983) demonstrated that participants who were experimentally put in a positive mood tended to be more optimistic about risks than their counterparts who were put in a negative mood, even when the risks assessed were semantically unrelated to the mood stimuli. Other examples of support come from studies indicating that the inverse relationship observed between perceived risks and perceived benefits is mediated by affective assessments (Finucane, Alhakami, Slovic, & Johnson, 2000; Slovic, MacGregor, Malmfors, & Purchase, 1999). In the terrorism domain, Shiloh, Güvenç, and Önköl (2007) found that negativity of affect was directly related to perceived costs of terrorism and inversely related to perceived control in both Turkish and Israeli samples. Moreover, in the Turkish (but not the Israeli) sample, there was a significant positive correlation between negative affect and perceived vulnerability to terrorism—a composite measure comprised mainly of perceived risk items.

Whereas affective valence theories stress the effect of the “good-bad” quality of one’s affective state on judgment, emotion-specific theories have proposed that different emotions that share the same valence may nevertheless lead to different, even opposing, effects on judgment. The basis for this claim is that different emotions are not only the consequence of distinct cognitive appraisals (Smith & Ellsworth, 1985), but that they also give rise to distinct appraisals that form an important part of the basis for emotion’s influence on judgment (e.g., Keltner, Ellsworth, & Edwards, 1993; Lerner & Keltner, 2000; Mandel, 2003; Tiedens & Linton, 2001). Moreover, according to this view, the appraisal tendencies generated by specific emotions can persist, spilling over to influence judgments even when the target of judgment differs from the emotion-eliciting stimulus (Gasper & Clore, 1998; Goldberg, Lerner, & Tetlock, 1999).

In terms of risk perception, two emotions that have received research attention are fear and anger. Although both are negative emotions, fear arises from and gives rise to appraisals of uncertainty and situational control, whereas anger is associated with appraisals of certainty and personal control (Lerner & Keltner, 2001; Smith & Ellsworth, 1985). Given that perceived risk is inversely related to perceived certainty and personal control (McDaniels, Axelrod, Cavanagh, & Slovic, 1997; Slovic, 1987) and stimulus familiarity (Song & Schwarz, in press), there is reason to hypothesize that perceived risk or threat might be amplified by feelings of fear and attenuated by feelings of anger. This is precisely what some experimental research has found (e.g., Lerner & Keltner, 2000; 2001; Lerner & Tiedens, 2006).

Of particular relevance to the present context, Lerner, Gonzalez, Small, and Fischhoff (2003) examined the effect of fear and anger on terrorism risk perceptions in a representative U.S. sample drawn in 2001. In the fear condition, participants were asked to write about what aspects of 9/11 made them the most afraid and then saw a picture and heard an audio clip about terrorism that had in pretests been shown to induce fear. In the anger condition, participants were asked to write about what

aspects of 9/11 made them the angriest and then saw a picture and heard an audio clip about terrorism that had in pretests been shown to induce anger. Compared to anger-induced participants, fear-induced participants perceived greater risk of terrorism-related threats to the U.S. as well as greater risk of terrorism-related and terrorism-unrelated events to both self and average others. Moreover, when current fear and anger were controlled, the manipulated effect of emotion was no longer significant, demonstrating that the causal effect of the emotion manipulation was mediated by experienced emotion. When a sub-sample was examined a year later, not only did a new experimental induction of fear and anger once again have the predicted effects on perceived terrorism risk for the future (namely, replicating the effects just described), it also influenced retrospective assessments of risk perceived a year earlier in the predicted direction (Fischhoff, Gonzalez, Lerner, & Small, 2005).

### **A Recent Investigation in the Canada-US Context**

More recently, the predictive effect of fear and anger on risk perceptions was examined in a study commissioned by Defence R&D Canada – Toronto. I along with a Carnegie Mellon University research team comprised of Wandu Bruine de Bruin, Keith Florig, Baruch Fischhoff, Julie Downs, and Eric Stone (see Bruine de Bruin et al., 2006, Project 1) collected data from slightly over 200 members of the public in the Toronto and Pittsburgh regions. Participants provided baseline measures of their trait and state emotions prior to being presented with the first of two disaster scenarios. One scenario presented a risk communication about an ongoing avian flu pandemic that had affected the participant's region and provided risk-mitigating advice that focused on the use of N-95 surgical masks as a barrier method. The other scenario (see Box 1) presented a risk communication about a dirty bomb attack that had affected the participant's region and provided risk-mitigating advice that focused on sheltering at home or work until radiation levels decreased.

The order of scenario presentation was counterbalanced across participants. After reading the first scenario, participants were asked about a number of their anticipated behavioural and psychological responses to the information they had received. Among these measures, we examined their perceived mortality and morbidity risk. For example, one item asked participants "What is the chance that you would be hurt in the explosion and die from your wounds?" and they were asked to respond on a 0 = *no chance* to 100 = *certainty* 101-point scale. We also elicited assessments of participants' anticipated physical and psychological resilience. For example, one item asked participants "How hard or easy would it be for you to cope *psychologically* with the consequences of this dirty bomb attack?" and they were asked to respond on a 1 = *very hard* to 7 = *very easy* 7-point scale. Before we presented participants with the second scenario, we re-assessed their emotional state. After reading the second scenario, we once again asked participants about perceived risk, anticipated resilience, and re-assessed their emotional state.

Based on the earlier findings by Lerner et al. (2003) and Fischhoff et al. (2005), we hypothesized that participants' fear linked to a given disaster scenario would be a

direct predictor of their risk perceptions regarding that scenario and an inverse predictor of their anticipated resilience. First, as shown in Figure 1, we observed that compared to baseline, reading the dirty bomb scenario caused an increase in reported fear ( $F[1, 204] = 6.58, p < .05$ ), while the bird flu scenario showed a marginally significant increase ( $F[1, 198] = 3.24, p = .07$ ). Similarly, compared to baseline, anger increased after participants read the dirty bomb scenario ( $F[1, 204] = 6.34, p < .05$ ) and the bird flu scenario ( $F[1, 198] = 4.05, p < .05$ ). Thus, the scenarios, hypothetical as they were, nevertheless produced an increase in both fear and anger. Fear and anger were significantly positively correlated in both the avian flu pandemic scenario ( $r = .75, p < .001$ ) and the dirty bomb scenario ( $r = .81, p < .001$ ).

### Box 1. *Dirty Bomb Scenario*

Imagine that, about one hour ago, a truck bomb exploded in your area. It is suspected to be an act of terrorism. At least a dozen people have been reported dead and more than thirty others have already been taken to hospitals to be treated for injuries.

The truck bomb was a “dirty bomb” meaning it was laced with radioactive materials that were dispersed by the blast. The explosion created a cloud of radioactive dust that rose hundreds of feet into the air and was carried downwind in an easterly direction. Radioactive dust within this cloud can expose people to radiation, both while they are in the air and after the dust has fallen back to the ground. By now, one hour after the blast, most of this radioactive dust has settled onto the ground. Although the greatest concentration of radioactivity is found within a block or two of the point of the explosion, hazardous levels of contamination may occur as far as 5 kilometers (or 3 miles) downwind.

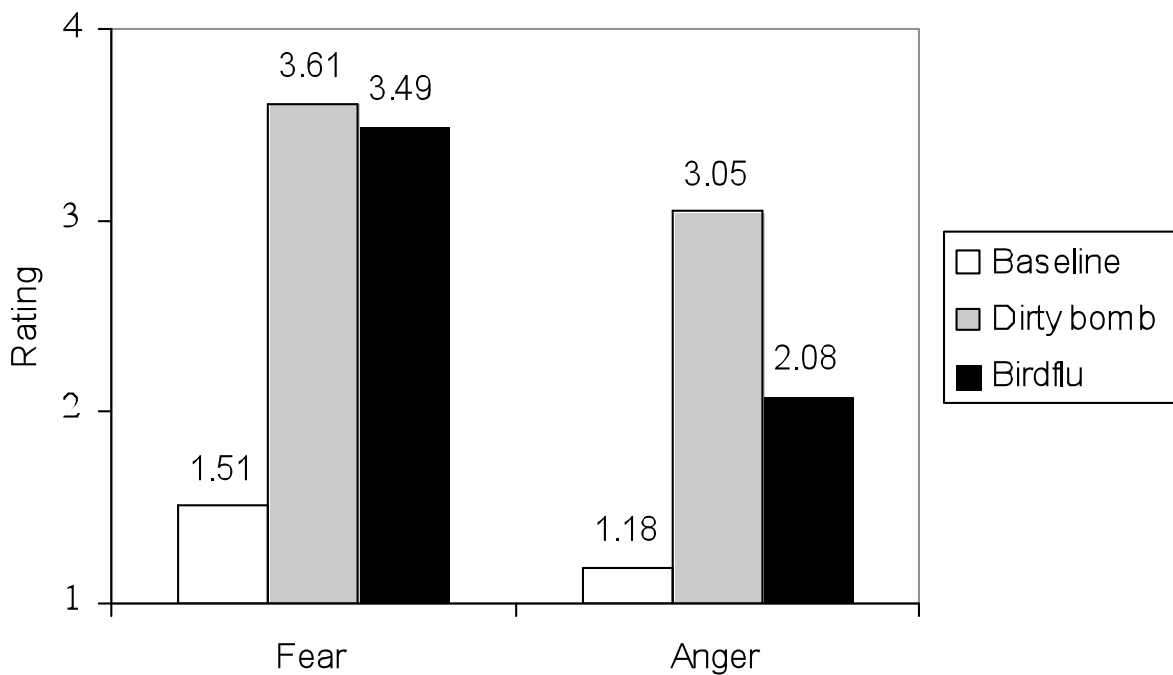
Health officials do not expect levels of radiological contamination to be high enough to cause radiation sickness, except perhaps among people who were within a few hundred meters (or yards) of the explosion location. Beyond that distance, the main health effect of exposure to the radioactive dust spread by this explosion is an increased risk of cancer. Exposure to the radioactive dust can occur in three ways. First, radiation can come from dust that is lying on the ground or on other surfaces. Second, radiation exposure can come from dust that settles on peoples’ skin, hair, or clothing. Finally, if radioactive dust is inhaled, they can lodge in the lungs and expose lung tissue to radiation. Cancer risk can be reduced by reducing all three types of radiation exposure.

Until authorities are able to identify where the areas of significant radiation are located, citizens within 5 kilometers (or 3 miles) of the explosion are advised by government health officials to go indoors and remain indoors. The walls of buildings will shield people from radiation emitted by radioactive dust on the ground. You are advised that if you have spent any time out of doors since the time of the explosion, you should remove your outer layer of clothing because it might be contaminated with radioactive dust. In addition, those who were outdoors should wash hair and exposed skin to flush away any radioactive dust that might have settled on them.

Imagine that you are within 5 kilometers (or 3 miles) of the explosion. You are advised by the officials to immediately seek shelter in the safest room in the building, whether you are at home or at your place of work. The safest room is the one that is best protected from radiation coming in from outside. This would be against an earth-backed basement wall or, if in a tall building, anywhere on the upper floors, but not on the three top floors.

You are also advised to make sure that it is hard for radiation dust to get into your “safest room” by closing doors and windows, and by shutting off air conditioning and closing vents. When you go into the “safest room,” you should bring food, water and other necessities with you. Once you are in your “safest room,” you are advised to stay there as much as is possible to minimize your radiation exposure. You will be notified through broadcast announcements when it is safe to leave your shelter area. Citizens are strongly advised not to attempt to flee the area because this is likely to result in even greater radiation exposure than remaining indoors. You will be given more information as soon as it becomes available.

Figure 1. Mean Fear and Anger (from Bruine de Bruin et al., 2006)



As emotion-specific accounts would predict, we found that when trait emotions and scenario-related anger were statistically controlled, participants' scenario-related fear was directly predictive of perceived risk in the avian flu pandemic scenario ( $\beta = 0.33, p < .01$ ) and in the dirty bomb scenario ( $\beta = .35, p < .01$ ). Moreover, as hypothesized, fear was an inverse predictor of anticipated resilience in dealing with the dirty bomb scenario ( $\beta = -.38, p < .01$ ), however the coefficient did not reach the level of statistical significance in the avian flu pandemic scenario ( $\beta = -.17, p > .10$ ). In other words, increases in reported fear were associated with increases in perceived risk and (in the dirty bomb scenario only) decreases in anticipated resilience.

We also conducted a comparable analysis of the predictive effect of anger on perceived risk and anticipated resilience. In this case, however, contrary to the prediction of emotion-specific accounts that anger would attenuate perceived risk, scenario-related anger was unrelated to either perceived risk or anticipated resilience in both scenarios (all  $ps > .10$ ). Thus, overall, we found only partial support for the predictions of emotion-specific accounts. That is, we replicated the predictive effect of fear on perceived risk and extended that to anticipated resilience. However, we found no support in this study for the idea that anger either reduces perceived risk or augments anticipated resilience.

It is noteworthy that the predictive effects of fear on perceived risk and anticipated resilience were not restricted to state measures linked to the relevant scenario. We also found that trait fear was a direct predictor of perceived risk ( $\beta = .20, p < .01$ ) and an inverse predictor of anticipated resilience ( $\beta = -.28, p < .001$ ). Once again, though, the analyses we conducted using a trait measure of anger showed no significant predictive effects. Thus, the findings of the current research lend further support to the idea that fear can amplify perceptions of risk, although the study's findings also call into question the robustness of earlier findings (e.g., Fischhoff et al., 2005; Lerner et al., 2003) which indicate that anger, conversely, attenuates perceived risk.

### **Affect and Risk Perceptions about Agents in the Terrorism Game**

A recent study by Oshin Vartanian and I (Mandel & Vartanian, 2009) examined whether the target of evaluation—either al Qaeda leader Osama Bin Laden (OBL) or former U.S. president George W. Bush (GWB)—moderated the relationship between individuals' state emotion and the level of threat they perceived the target to pose. In contrast to other studies examining the effect of emotion on risk perception (e.g., Bruine de Bruin, 2006; Lerner et al., 2003; Lerner & Keltner, 2001), the threat measures we used pertained not to specific types of event, such as dying in a terrorist attack, but to two broad categories of consequence attributable to the actions of either OBL or GWB—namely, dangers to national security and dangers to individual rights. These categories of threat reflect a central value tradeoff that underlies most terrorism games and certainly 9/11. In part, we were interested in examining how participants perceived the threats to national security posed by OBL and GWB. Moreover, we asked participants to evaluate these threats in both the Canadian and global contexts, anticipating that they would perceive greater threat overall in the international domain.

A 2006 EKOS poll (Harper, 2006) conducted at about the same time as the present research found that Canadians regarded former U.S. president George W. Bush as the third greatest danger to the world after Osama Bin Laden and North Korean leader Kim Jong-il, but ahead of Iranian President Mahmoud Ahmadinejad or Hezbollah leader Hassan Nasrallah. This is a remarkable finding given that the U.S. is Canada's closest ally. GWB antipathy, therefore, unlike OBL antipathy, is highly

counter-normative. Stated differently, while it normal for terrorist leaders to threaten our security, it is abnormal for leaders of our closest allied democratic states to do so.

We anticipated that this key difference would have an impact on the relationship between emotion and threat perception. Specifically, we hypothesized that participants' state emotion would be more influential on perceived threat among those participants evaluating GWB than among those evaluating OBL. By asking 120 participants (namely, University of Toronto undergraduates) to rate their emotions toward the relevant agent, we were also able to test a moderated mediation hypothesis in which the predictive effect of state emotion on threat perception would be mediated by emotion toward the threat agent when that agent was GWB but not when the agent was OBL. Given the measures we collected, we were able to test both emotion-specific and valence-based variants of this hypothesis.

Participants were randomly assigned to one of six experimental conditions in a 3 (Emotion: anger, neutral, fear)  $\times$  2 (Target: Bin Laden, Bush) factorial design. Fear, anger, and neutral emotions were elicited using brief (2-5 min) film segments following Gross and Levenson's (1995) procedure. Participants completed an emotion manipulation check once the film segment had elapsed. The manipulation check instructed subjects to rate the extent to which they felt 18 different emotions (amusement, embarrassment, love, anger, fear, pride, anxiety, guilt, sadness, confusion, happiness, shame, contempt, interest, surprise, disgust, joy, and unhappiness) while watching the movie on a 9-point scale (0 = *none at all*, 8 = *extremely*). These measures were also used to construct positive and negative state measures of emotion for subsequent analyses.

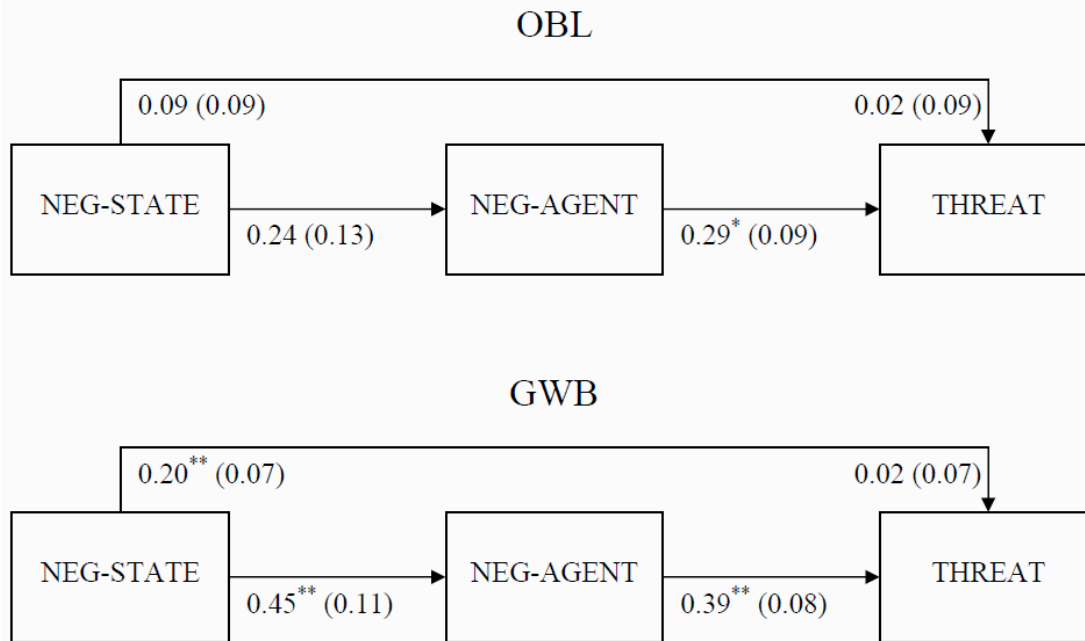
After completing the first phase of the study, participants were instructed to begin "a second study." Participants were presented with a color image of either GWB or OBL and were asked to indicate the extent to which the target made them feel the emotions of anger, anxiety, contempt, disgust, embarrassment, fear, moral outrage, sadness, amusement, calm, happiness, interest, pride, and surprise using 9-point scales (0 = *none at all*, 8 = *extremely*). These items were similarly collapsed into positive and negative emotion scales of agent-related emotion. Finally, participants were instructed to assess how much of a threat they thought the target posed to Canada's national security, the security of nations worldwide, the rights and freedoms of Canadian citizens, and the rights and freedoms of citizens worldwide using 7-point scales (1 = *none at all*, 7 = *extremely*).

Our manipulation of emotion was effective. Participants in the anger condition reported feeling significantly angrier than participants in either the neutral or fear condition, and participants in the fear condition reported feeling significantly more fearful than participants in either the neutral or anger condition. We began our analysis of perceived threat by subjecting participants' responses to the four threat items (excluding the world peace item, which did not fit into this design) to a 2

(Region: Canada, international) × 2 (Threat Type: national security, individual rights) × 2 (Agent: GWB, OBL) × 3 (Emotion: anger, neutral, fear) mixed analysis of variance (ANOVA). A significant main effect of region was found such that participants perceived greater threat posed by our target agents in the international context than in the Canadian context. A significant main effect of threat type was also observed such that participants perceived greater threat to national security than to individual rights. None of the other main or interaction effects were statistically significant. Thus, we did not find any significant effect of manipulated emotion on threat perceptions, contrary to the predictions of Lerner and Keltner's (2000) emotion-specific account. And, echoing the earlier EKOS poll, the null effect of agent indicates that participants in our sample regarded OBL and GWB as posing threats of roughly the same magnitude—a finding whose strategic implications for “winning hearts and minds” (even of citizens of closely allied states) is likely not to be lost on the present readership.

Although our manipulation of specific emotions did not influence perceived threat, we did find that a composite measure of threat was predicted by agent-related negative affect for both GWB and OBL. That is, the more negative the participant felt toward the evaluated agent (namely, OBL or GWB), the more he or she perceived the agent to pose a threat to national security and personal freedoms. Moreover, as the top half of Figure 2 shows, there was no predictive effect of negative state emotion on threat for participants who evaluated OBL. Hence, there could be no mediation either. In contrast, as the bottom half of Figure 2 shows, negative state emotion did significantly predict threat for participants evaluating GWB, and this effect was fully mediated by negative emotion evoked by the threat agent (Sobel  $z = 3.13, p < .01$ ). These findings of moderated mediation directly support our hypothesis that people's current (state) emotion plays a more significant role in threat perception when the situation or actor is counter-normative.

Figure 2. *Model of Moderated Mediation* (Note: from Mandel and Vartanian (2009). Values are unstandardized regression weights with standard errors in parentheses.)



\*  $p < .01$ , \*\*  $p < .001$ .

Specifically, we propose that, in the present study, the observed moderation by threat agent was the result of the differing normative frames for the two actors. Terrorists are expected to do harm, and assessments of the extent to which they are likely to do so, we suspect, may be based on one's personal beliefs about a threat agent's intentions, capabilities, limitations, and opportunities as well as the potential victim's vulnerabilities to attack—much like a systematic threat assessment would (e.g., see Tusikov & Fallman, 2009). In contrast, leaders of closely allied states, such as U.S. presidents, are not only *not* expected to cause harm, but are indeed expected *not* to cause harm, making the standard criteria for assessment more opaque in terms of their relevance. In this counter-normative evaluative context, experienced (negative) emotion, we believe, will be brought to the forefront as a proxy for belief-based assessments. Stated differently, we propose that use of the affect heuristic will be particularly pronounced in norm-violating contexts. Of course, the present findings are merely indicative and invite future research aimed at directly testing this theoretical proposition.

Finally, the findings of this study point to the strategic importance of being able to manipulate people's emotions, particularly their negative emotion, in terrorism games. There is widespread agreement that strategic success in terrorism games requires winning over public opinion—or, to use a hackneyed phrase, people's

hearts and minds. The present findings indicate that the link between the heart and the mind is a strong one, at least when it comes to evaluations of the threat posed by iconic actors in terrorism games. Regardless of whether participants evaluated Bush or Bin Laden as a potential source of threat, we found that the degree of negative emotion evoked in participants by the threat agent was predictive of the degree of threat that they perceived the agent to pose. In other words, the more negative Bush or Bin Laden made participants feel, the more threatening they appeared. For participants evaluating Bush, moreover, the negativity they felt about him, in turn, was a reflection of how negatively they felt prior to being asked to evaluate him. Of course, it is important to bear in mind the correlational nature of these findings. One might argue that it was participants' levels of threat perception about the relevant target of evaluation that influenced their emotions toward that target. However, that causal direction would not explain the predictive effect of individuals' overall negative states at the start of the study on their levels of perceived threat toward the target of evaluation.

These findings are particularly relevant in the terrorism context because terrorists often try to get the leaders of victimized states to respond in ways that compromise their moral and ethical values. Doing so often triggers moral outrage in public constituencies, resulting in a pool of negative emotion directed at the victim whose transgressions, unlike the terrorists, are likely to be perceived as counter-normative. The consequence of this process is that the victimized state may end up being seen as the aggressor, especially if that state is also perceived to be a powerful entity (the U.S. and Israel offer good examples). These socio-cognitive factors are of strategic importance in terrorism games and need to be better understood. The research summarized in this chapter contributes to fulfilling that requirement, but is of course only one small step. One hardly needs to state that more is sorely needed.

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