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Perceptions of Terrorism and Disease Risks: A Cross-national Comparison

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Threats seem to abound. In just the last weeks of 2003 and the first week of 2004, a cow slaughtered in Washington state was found to have BSE (bovine spongiform encephalitis), and fears of mad cow disease brought United States beef exports practically to a halt. A third and fourth new case of SARS were reported in China, reviving the anxieties of the previous year, when the hitherto unknown illness caused hundreds of deaths around the world. Meanwhile, the Department of Homeland Security ratcheted up the terrorist threat level to orange, indicating a "high" risk of terrorist attacks.

What makes people feel more threatened by some risks than others? To what extent are their perceptions of risk influenced by quantitative data on the likelihood and severity of the risk, and to what extent by their emotional responses to the risk? What are the relationships, if any, between people's risk perceptions and their risk-related attitudes and behaviors, including their willingness to take personal action and/or support governmental action to address the perceived risk? Understanding why people evaluate health and safety risks as they do is essential for public decision makers to be able to communicate effectively with the public regarding those risks. It will also help them anticipate with reasonable accuracy the public's reactions both to the risks and to the measures the decision makers may recommend or order in response.[1] The social, political, and economic consequences of poor risk communication and/or other disjunctions between government policy and public response may be momentous.

Research on risk perception and related topics has addressed many aspects of these and similar questions. In contrast to experts, whose assessments of risk are supposed to be grounded (although not necessarily exclusively) in the objective probability of relevant adverse events (e.g., death or serious illness), laypeople's perceptions of and attitudes toward risks to health and safety have been shown to be influenced by many other factors, including

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1. Baruch Fischhoff, *Assessing and Communicating the Risks of Terrorism, in* SCIENCE AND TECHNOLOGY IN A VULNERABLE WORLD: SUPPLEMENT TO AAAS SCIENCE AND TECHNOLOGY POLICY YEARBOOK 51, 51-52 (Albert H. Teich et al. eds., 2002).

how "dreaded" and/or "unknown" the risk is (the *psychometric* model);[2] whether the risk as a whole is imbued with positive or negative affect (the *affect heuristic*);[3] the *availability* of the risk due, for example, to its salience in the mass media;[4] whether risk-creating action is presented as a loss or gain relative to the status quo (*decision framing* or *prospect theory*);[5] an inability to appreciate very small probabilities and hence a tendency to overestimate low-probability risks and/or to make other statistically anomalous judgments;[6] a tendency to believe that similarly situated others are more likely than oneself to suffer bad outcomes (the *optimism bias*);[7] the perceiver's transient mood;[8] and the perceiver's emotional response to the risk itself (*appraisal tendency*).[9]

Less is known about national differences in risk perception and related judgments. Research has shown, for instance, that Americans are less worried about genetically engineered food but more worried about nuclear power than

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2. Baruch Fischhoff et al., *How Safe is Safe Enough? A Psychometric Study of Attitudes Toward Technological Risks and Benefits*, *in* THE PERCEPTION OF RISK 80 (Paul Slovic ed., 2000); Paul Slovic, *Perception of Risk*, 236 SCIENCE 280 (1987).

3. Paul Slovic et al., *The Affect Heuristic*, *in* HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT 397 (Thomas Gilovich et al. eds., 2002).

4. Paul Slovic et al., *Facts Versus Fears: Understanding Perceived Risk*, *in* JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 463, 465 (Daniel Kahneman et al. eds., 1982).

5. Daniel Kahneman & Amos Tvèrsky, *Choices, Values, and Frames*, 39 AM. PSYCHOLOGIST 341 (1984).

6. GERD GIGERENZER, CALCULATED RISKS: HOW TO KNOW WHEN NUMBERS DECEIVE YOU (2002); HOWARD MARGOLIS, DEALING WITH RISK: WHY THE PUBLIC AND THE EXPERTS DISAGREE ON ENVIRONMENTAL ISSUES (1996).

7. Neil D. Weinstein, *Unrealistic Optimism About Susceptibility to Health Problems: Conclusions from a Community-wide Sample*, 10 J. BEHAV. MED. 481 (1987); Neil D. Weinstein & William M. Klein, *Unrealistic Optimism: Present and Future*, 15 J. SOC. & CLINICAL PSYCHOL. 1 (1996).

8. Eric J. Johnson & Amos Tversky, *Affect, Generalization, and the Perception of Risk*, 45 J. PERSONALITY & SOC. PSYCHOL. 20 (1983).

9. Jennifer S. Lerner & Dacher Keltner, *Beyond Valence: Toward a Model of Emotion-specific Influences on Judgment and Choice*, 14 COGNITION & EMOTION 473 (2000) [hereinafter Lerner & Keltner, *Beyond Valence*]; Jennifer S. Lerner et al., *Effects of Fear and Anger on Perceived Risks of Terrorism: A National Field Experiment*, 14 PSYCHOL. SCI. 144 (2003); Jennifer S. Lerner & Dacher Keltner, *Fear, Anger, and Risk*, 81 J. PERSONALITY & SOC. PSYCHOL. 146 (2001) [hereinafter Lerner & Keltner, *Fear, Anger, and Risk*]. Expert risk perceptions, and more importantly, regulatory actions taken on the basis of such analyses, may be subject to other kinds of distortion relative to the norm of rational cost-benefit analysis. *See, e.g.*, STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 10-29 (1993); CASS R. SUNSTEIN, RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT 55-77 (2002). A discussion of this topic is beyond the scope of the present paper.

western Europeans are;[10] that the Japanese share Americans' dread concerning nuclear power but consider it to be a more familiar and known risk;[11] and that Canadians and Swedes have similar perceptions of the risks and benefits of prescription drugs.[12] Studies have identified both similarities and differences in cross-national or cross-cultural risk perceptions using the psychometric paradigm,[13] a linear combinatorial model of expected outcomes (known as *conjoint expected risk*),[14] cultural worldviews analysis,[15] or some combination of these approaches.[16] National differences in risk perception and risk-related policy making have also been attributed to the different availability of the risks[17] and to differences in the political and decision making structures in the respective countries.[18]

This farrago of findings and theories suggests at the very least that there is much more worth knowing about national differences in risk perception. First, if more or less the same health threat provokes different reactions in different countries, researchers can direct their attention to the psychological and other factors that may underlie such differences, which in turn could shed light on how risk communicators might better bridge gaps between expert and lay perceptions. Second, disease risks like SARS do not respect national boundaries. They are international threats to health. Even if threats like terrorism may be more precisely targeted at the citizens of one country than another, responding effectively to terrorism (and to SARS) is likely to require international cooperation. If perceptions of the risks of terrorism (and hence the benefits of combating it) differ between countries, achieving that cooperation or consensus may be that much more difficult. Thus, discovering evidence of national differences in risk perception and related judgments could

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10. Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 712, 745-46 (1999).

11. Randall R. Kleinhesselink, & Eugene A. Rosa, *Cognitive Representation of Risk Perceptions: A Comparison of Japan and the United States*, 22 J. CROSS-CULTURAL PSYCHOL. 11, 20-23 (1991).

12. Paul Slovic et al., *Risk Perception of Prescription Drugs: Report on a Survey in Canada*, 82 CANADIAN J. PUB. HEALTH S15, S19 (1991).

13. *E.g.*, George W. Hinman et al., *Perceptions of Nuclear and Other Risks in Japan and the United States*, 13 RISK ANALYSIS 449 (1993); Klienhesselink & Rosa, *supra* note 11.

14. David R. Holtgrave & Elke U. Weber, *Dimensions of Risk Perception for Financial and Health Risks*, 13 RISK ANALYSIS 553 (1993).

15. MARY DOUGLAS & AARON WILDAVSKY, RISK AND CULTURE (1982).

16. *E.g.*, Holtgrave & Weber, *supra* note 14; Christina G.S. Palmer, *Risk Perception: An Empirical Study of the Relationship Between Worldview and the Risk Construct*, 16 RISK ANALYSIS 717 (1996); for a review, see Elke U. Weber & Christopher K. Hsee, *Culture and Individual Judgment and Decision Making*, 49 APPLIED PSYCHOL.: AN INT'L REV. 32 (2000).

17. Kuran & Sunstein, *supra* note 10, at 712-13.

18. Sheila Jasanoff, *American Exceptionalism and the Political Acknowledgment of Risk*, *in* RISK 61 (Edward J. Burger, Jr. ed., 1993).

have important practical ramifications in addition to augmenting basic psychological knowledge about the determinants of risk perception.

To address these questions in the context of currently salient risks, we conducted a survey of Americans' and Canadians' perceptions of and attitudes toward the risks of terrorism and SARS. We chose these risks because we believed (based on anecdotal evidence) that people in each country might perceive one of these risks but not the other to be especially salient, and thus somehow "nationally distinctive"—that Canadians, due to the spring 2003 outbreak of SARS cases in Toronto, would be more likely to think of SARS as "our risk," as a peculiarly Canadian threat; and that Americans, due to the terrorist attacks of September 11, 2001, and the subsequent American military response, would think the same thing about terrorism. We also sought to ascertain respondents' perceptions of and attitudes toward West Nile Virus, reasoning that that disease had affected the United States and Canada similarly and could therefore be characterized as "nondistinctive." We hypothesized that respondents in each country would perceive the distinctive risk for their country as more serious than the other country's distinctive risk or the nondistinctive risk. That is, we predicted that Canadians would perceive SARS to be a bigger threat than terrorism or West Nile disease; Americans would perceive terrorism to be a bigger threat than SARS or West Nile disease.

In addition, we suspected that respondents' risk perceptions and related judgments would be affected not only by their country of residence, but also by the extent to which they identified themselves with their country. Collective self-esteem (CSE) is a psychological construct that has been used to measure the importance of a person's social or collective identity to that person's self-concept.[19] CSE is predicted to affect people's responses to threats to collective identity[20] and has been associated with psychological adjustment, including the ability to cope with threats to health.[21] If particular risks, such as SARS and terrorism, do come "tagged" with a national identity, as suggested above, then persons who more strongly identify themselves with the nation in which they reside might be even more inclined to differentiate among risks on this basis. We hypothesized, therefore, that higher levels of self-identification with and attachment to their country would heighten respondents' characteristic reactions to their respective nationally distinctive risks.

We also sought to examine other issues relating to risk perceptions and related judgments. In particular, we wanted to learn more about the factors

19. Riia Luhtanen & Jennifer Crocker, *A Collective Self-esteem Scale: Self-evaluation of One's Social Identity*, 18 PERSONALITY & SOC. PSYCHOL. BULL. 302 (1992).

20. *Id.* at 314-16.

21. Daniel S. Bailis & Judith G. Chipperfield, *Compensating for Losses in Perceived Personal Control over Health: A Role for Collective Self-esteem in Healthy Aging*, 57B J. GERONTOLOGY: PSYCHOL. SCI. P531 (2002).

influencing people's willingness to take personal precautions and/or to support public (governmental) actions to reduce perceived risks. For example, we attempted to ascertain the relative importance of people's emotional and cognitive responses to SARS, terrorism, and West Nile Virus as predictors of their expressed support for precautionary behavior.

Our findings largely confirmed our first hypothesis. Canadian respondents perceived SARS to be a significantly greater risk, to themselves and others, than terrorism. Canadians also perceived SARS to be a significantly greater risk than Americans did. (Canadians did not, however, perceive SARS to be a greater risk than West Nile Virus.) Americans, by contrast, perceived terrorism to be a significantly greater threat than SARS, and, by some measures, a significantly greater threat than Canadians did. (Americans did not also perceive themselves to be at greater risk of terrorism than West Nile Virus.) In addition, Canadians responded with significantly more negative affect to the threat of SARS than Americans did; Americans responded with significantly more of the negative emotions of anger, contempt, and disgust to the threat of terrorism than Canadians did.

The association of nationality-based collective self-esteem with risk perceptions and related judgments also differed according to respondents' nationality and the distinctive risk for that country, but the effects were not quite what we predicted. Most strikingly, the more highly Canadian respondents thought of themselves as Canadian citizens, the less risk they perceived to themselves and others from SARS. For American respondents, high overall CSE was correlated with greater support for government action to control terrorism. And for respondents in both countries, strength of national affiliation was a better predictor of their support (or lack thereof) for public action to reduce these risks than were their perceptions of the magnitude of the risks.

In the remainder of this paper, we briefly describe the methodology of our risk perception study and report our major findings.[22] We then suggest possible explanations for these findings, discussing them in terms of basic principles and processes identified elsewhere in risk perception research.[23] We conclude by outlining some of the implications of our findings for risk communication and public policy.[24]

I. RISK PERCEPTIONS SURVEY

On July 15-24, 2003, 118 undergraduate students at the University of Manitoba in Winnipeg, Manitoba, and forty-three law students at Quinnipiac University in Hamden, Connecticut, participated in a survey in which they read brief descriptions of three different threats to health and safety—SARS, terrorism, and West Nile Virus—and answered questions about those threats.

22. *See infra* notes 25-35 and accompanying text.
23. *See infra* notes 36-77 and accompanying text.
24. *See infra* notes 78-90 and accompanying text.

The sample as a whole was 59.7 percent White, 63.5 percent female, and averaged 26.8 years of age. There was no significant difference in gender distribution between the two groups (female: 63.8 percent vs. 62.8 percent), although the Canadian sample was significantly younger than the American sample (24.7 years of age vs. 32.5).

The threat descriptions in the survey were similar in length and detail; the terrorism threat described a possible bioterrorism attack, to make the health threat as comparable as possible to that posed by the other, natural disease threats. The order of threat presentation was counterbalanced. Dependent measures included measures of perceived risk to self and others; emotional responses to risk; support for various specified personal and public actions to reduce the risk; psychometric features of perceived risk, such as the extent to which the risk is known, controllable, dreaded, and equitably distributed;[25] whether respondents believed that individuals or public officials have the greater ability and/or responsibility to control the risk; self-reported media exposure to risk information; the CSE scale, adapted to gauge national self-identification; a dispositional optimism scale; and various demographic items.

II. MAJOR RESULTS

A. National Differences in Risk Perception and Related Emotions

Responses to risk depended on both the nature of the risk and the respondents' nationality. Persons in each country perceived their nationally distinctive risk to be significantly greater than the other country's distinctive risk and responded to it with more negative affect, confirming our first hypothesis. That is to say, we found threat-by-country interactions on risk perceptions and related emotions.

The predicted distinctive risk effects were found for perceptions of risk to both self and others. Canadians estimated the percentage chance that they would become seriously ill or die from SARS within the next year as 7.43 percent, and the percentage chance that they would suffer a similar outcome from terrorism as 6.04 percent, a significant difference.[26] By contrast, Americans estimated the percentage chance that they would become seriously ill or die from SARS within the next year as 2.18 percent, and the percentage chance that they would suffer a similar outcome from terrorism as 8.27 percent, also a significant difference.[27]

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25. The authors would like to thank Paul Slovic for generously making available his dependent measures, which we adapted for our purposes.

26. Daniel S. Bailis et al., A Cross-national Comparison of Perceived Risks from Terrorism and Disease (2004) (unpublished manuscript, on file with authors).

27. *Id.*

Estimates of likelihood of harm to others displayed the same pattern. Canadians estimated the percentage chance that others of their age and geographic region would become seriously ill or die from SARS within the next year as 8.94 percent, and the percentage chance that others would suffer a similar outcome from terrorism as 7.13 percent; Americans estimated the percentage chance that others of their age and geographic region would become seriously ill or die from SARS within the next year as 3.31 percent, and the percentage chance that others would suffer a similar outcome from terrorism as 9.36 percent.[28]

We found similar effects regarding respondents' emotional reactions to these threats. On a 1-7 scale, Canadians reported significantly more negative affect when thinking about the threat of SARS than Americans did (2.19 vs. 1.56).[29] With regard to the threat of terrorism, there was no significant difference between the national groups in reported negative affect generally (Americans: 2.69 vs. Canadians: 2.48), but Americans did feel significantly more anger (4.07 vs. 3.09), contempt (2.74 vs. 2.14), and disgust (4.31 vs. 3.27) about the threat of terrorism than Canadians did.[30]

B. Collective Self-esteem and Responses to Risk

Certain responses to risk were also significantly correlated with participants' reported degree of identification or affiliation with their nation of residence (CSE), and these CSE effects pertained almost exclusively to respondents' nationally distinctive risks. For Canadians, however, contrary to our hypothesis that higher levels of self-identification with and attachment to their country would heighten respondents' characteristic reactions to their nationally distinctive risk, higher overall CSE was *inversely* correlated with negative affect (r = -.20), sadness (r = -.19), anger (r = -.24), and contempt (r = -.21) when thinking about SARS (see Table 1).[31]

For Americans, by contrast, CSE affected mainly reactions to the threat of terrorism. The greater their sense of self-identification with America (overall CSE), the likelier they were to support both personal action (r = .32) and, even more so, governmental action (r = .45) to reduce the risk of terrorism, and the likelier they were to believe that the risk of terrorism fatalities could be controlled (r = .48).[32] There were no significant correlations be-

28. *Id.*
29. *Id.*
30. *Id.*
31. *Id.* In addition, the more highly Canadians thought of themselves as cooperative and contributing members of Canadian society (the "membership" subscale of CSE), the less of a risk they perceived SARS to present to themselves (r = -.21) and others (r = -.24). *Id.*
32. *Id.*

tween American respondents' overall CSE and their reactions to the threat of SARS (see Table 1).[33]

Table 1. Correlations between collective self-esteem and responses to perceived risk, by nation of residence:

	Canada		United States	
	SARS	Terrorism	SARS	Terrorism
Risk to self	-.08	-.06	-.03	.16
Negative affect	**-.20***	-.14	-.18	-.02
Sadness	**-.19***	-.12	.11	.05
Anger	**-.24***	.00	.22	.10
Contempt	**-.21***	-.06	-.16	.02
Personal action	-.16	-.08	.06	**.32***
Public action	-.04	-.15	.30	**.45****
Fatalities controllable	-.02	-.07	-.24	**.48****

All values for *r*, * = correlation significant at $p < .05$; ** = correlation significant at $p < .01$.

C. Risk Perceptions, Emotions, and Support for Risk-related Action

Across the entire sample of respondents and all three threats, risk perceptions were positively and significantly correlated with both negative affect and expressions of willingness to take personal action to reduce the threat. As with negative affect in general, the specific emotions of anger and fear were also both positively correlated with risk perceptions (a finding we discuss below in light of Jennifer Lerner and her colleagues' work on appraisal tendency theory). We further examined whether perceived risk (i.e., largely cognitive response) or negative affect (i.e., largely emotional response) was a stronger predictor of support for personal action to reduce risk. Regression analyses showed that for Canadians, negative affect, but not perceived risk to self, significantly predicted support for personal action to reduce all risks (SARS: negative affect, $\beta = .32$; risk to self, $\beta = .18$; terrorism: negative affect, $\beta = .35$; risk to self, $\beta = .03$; West Nile Virus: negative affect, $\beta = .25$; risk to self, $\beta = .16$).[34] Similarly, Americans' negative affect, but not their risk perceptions, significantly predicted their support for personal action to reduce the two disease risks (SARS: negative affect, $\beta = .39$; risk to self, $\beta = -.19$; West Nile Virus: negative affect, $\beta = .43$; risk to self, $\beta = .11$).[35]

33. *Id.*

34. *Id.*

35. *Id.* With regard to the risk of terrorism, neither Americans' perceived risk to self nor their negative affect was a significant predictor of support for personal action.

III. DISCUSSION

A. National Differences in Risk Perception and Related Emotions

Why did Canadians consider the threat of SARS to be more serious than that of terrorism and more serious than Americans considered it, and why did Americans consider the threat of terrorism to be more serious than that of SARS? The first possibility is that these national differences in perceived risk correlate with differences in objective risk data. It might seem, for instance, that because Canadians but not Americans died from SARS in 2003, Canadians would be more justified than Americans in perceiving themselves to be at non-negligible risk of becoming seriously ill or dying from SARS. Similarly, because the September 11th attacks struck the United States rather than Canada and the United States remains a more logical target for the same terrorist organizations, Americans would be justified in perceiving greater risks from terrorism than Canadians did.

The objective risk data, however, do not support these divergences in perceived risk. According to the World Health Organization, there were a total of 284 cases of SARS in Canada (251) and the United States (33) through early August 2003, with forty-one fatalities, all in Canada. [36] Even if the relevant risk data for our Canadian respondents were based on the Canadian figures alone, their probability of contracting SARS would seem to have been less than .0008 percent, and the probability of dying from it, less than .0002 percent. Now, even if one assumes that Canadians' risk of becoming seriously ill or dying in a terrorist attack was zero, the minuscule difference between zero and the estimated likelihood of suffering such an adverse outcome from SARS does not justify Canadians' significantly greater perception of their distinctive risk. Similarly, even if one assumes that the objective risk posed by SARS to Americans was zero (an unlikely assumption because the SARS virus is capable of crossing borders, and some Americans did contract the disease), the difference between the objective risk posed by SARS to Canadians and Americans, respectively, does not justify the significant difference in perceived risk between the two groups.

The same is true with respect to the risk of terrorism. Although it is notoriously difficult to obtain reliable, objective risk estimates on such low probability events,[37] if one were to assume one or more terrorist attacks against the United States each year with an aggregate mortality equivalent to that of the September 11th attacks and a random distribution of the threat across the country, the odds of an American dying from terrorism within the

36. World Health Organization, Summary Table of SARS Cases by Country, 1 November 2002 – 7 August 2003 (Aug. 15, 2003), *available at* http://www.who.int/csr/sars/country/2003_08_15/en/.

37. W. Kip Viscusi & Richard J. Zeckhauser, *Sacrificing Civil Liberties to Reduce Terrorism Risks*, 26 J. RISK & UNCERTAINTY 99 (2003).

year would be about .001 percent. The difference between .001 percent and zero (on the dubious assumption, again, that Americans were not at risk of becoming seriously ill or dying from SARS) would not appear to justify the distinction our American respondents drew between the likelihood that they would be victimized by terrorism as opposed to SARS within the year.[38]

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38. We might also observe that across our entire sample, the mean perceived risks for all threats measured were considerably inflated in comparison to the best estimates of objective risk. For instance, the mean responses to the question, "What is the percentage chance that you will become seriously ill or die from [threat] within the next year?" were as follows: SARS, 6.0 percent; terrorism, 6.6 percent; West Nile Virus, 9.3 percent. Bailis et al., *supra* note 26. With regard to SARS, given the epidemiological data above, the probability of a randomly chosen American or Canadian (total population approximately 320 million) contracting SARS would be less than one in one million, or .0001 percent. So our respondents overestimated the risk of SARS by four orders of magnitude. Their overestimation of the risks of terrorism was nearly as great. The rather speculative odds of an American being killed in a terrorist attack (noted above) were .001 percent; even in Israel, where there are, unfortunately, more reliable data on the risk of terrorism fatalities, the odds of an Israeli dying from a terrorist attack in a given year are now about .004 percent. This figure is based on a total of 800 Israeli fatalities from September 27, 2000 (the beginning of the second intifada) through August 12, 2003, Middleastern Conflict Statistics Project, Statistical Report Summary (2003), and an Israeli population of about 6.1 million. So our respondents overestimated this risk by (at least) three orders of magnitude. Respondents similarly overestimated the risk of becoming seriously ill or dying from West Nile Virus. Assuming (generously) about 4,000 "serious" cases per year out of a combined U.S. and Canadian population of about 320 million, the probability that any one person would contract a serious case of West Nile Virus within the year would be about 1 in 80,000, or 0.00125 percent. (In 2002, the Centers for Disease Control and Prevention reported 4,156 cases and 284 fatalities in the U.S., Centers for Disease Control and Prevention, West Nile Virus: 2002 Case Count (2003), *available at* http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount02.htm; Health Canada reported 466 confirmed cases, with ten deaths in Canada in 2003, Health Canada, West Nile Virus: Canada—Human Surveillance: Results of 2003 Program (Dec. 18, 2003), *available at* http://hc-sc.gc.ca/pphb-dgspsp/wnv-vwn/pdf_sr-rs/2003/surveillance_table_121803_hm.pdf; it was not reported how many of the non-fatal cases were serious). To be sure, some of the magnitude of the overestimation may be an artifact of the scale used to measure participants' risk perceptions, on which the minimum value was 0.1%; even so, participants' mean responses to the target threats were arguably 16-19 times greater than the objective risk data. These results confirm other studies indicating that people are not very good at estimating low probability risks, Fischhoff, *supra* note 1, at 52-53; for instance, people tend to treat very low likelihoods as either equal to zero or very substantial, MARGOLIS, *supra* note 6, at 85. Our data are also consistent with those of Lerner and her colleagues, who recently reported perceptions, in the wake of the September 11th attacks, of the likelihood of being victimized by terrorism that were extravagant in comparison to any plausible objective risk data. Lerner et al., *supra* note 9, at 148-50.

It also does not appear that the psychometric model[39] of lay risk perceptions helps to explain our finding of nationally distinctive risks. According to this model, people consider risks more serious the more those risks are dreaded (i.e., certain to be fatal, affect large numbers of people) and unknown (i.e., new, involuntary, uncontrollable).[40] Intuitively, it would seem that SARS and bioterrorism would be roughly equally dreaded (or not) or unknown (or not) in both Canada and the United States. We conducted a factor analysis of responses to several survey items that we included to elicit the psychometric features of our respondents' risk perceptions. The analysis resulted in a data space defined by the extent to which respondents believed themselves not to have much choice about whether to face the risk (corresponding in part to the psychometric model's "unknown" dimension) and the extent to which they believed themselves to be highly exposed to the risk (corresponding rather less well to the "dread" dimension[41]). With the exception of Americans' reactions to the threat of terrorism, responses to all three risks from both Canadians and Americans tended to cluster in roughly the middle of the data space, reflecting similar reactions in terms of the indicated risk perception features.[42]

A more promising explanation for why residents of Canada and the United States perceived the risks of SARS and terrorism so differently is that the two groups of respondents may have been exposed to systematically different media coverage of those risks, making those risks differently available to them when we solicited their perceptions. We did not directly test for media exposure effects, but a comparison of our findings with a rather crude content analysis of media risk coverage in the two countries in the months preceding the survey is suggestive. This sampling of national and local print coverage of SARS and terrorism indicates that Canadian media sources devoted about 40 percent more articles to SARS than American media sources did, while more than fourteen times as many articles about terrorism appeared in American as opposed to Canadian print media.[43] These threat-by-country

39. *See supra* note 2 and accompanying text.

40. *Supra* note 2.

41. Our high exposure dimension corresponds better to a third, "catastrophic" dimension identified in some psychometric studies, which refers to the absolute number of lives exposed to the risk. Baruch Fischhoff et al., *Risk Perception and Communication*, *in* OXFORD TEXTBOOK OF PUBLIC HEALTH 1105 (Roger Detels et al. eds., 4th ed. 2002).

42. Bailis et al., *supra* note 26.

43. *Id.* We conducted NEXIS and Factiva searches of articles containing at least two mentions of the respective target terms (SARS, terrorism, West Nile), during the period January 1, 2003, to July 20, 2003, in one newspaper with national reputation if not also readership, one local newspaper or set of newspapers, and one national newsmagazine (Canada: *The Globe and Mail*, the *Winnipeg Sun*, and *MacLeans*; United States: The *New York Times*, the NEXIS "All Connecticut news sources" file, and *Newsweek*).

interactions roughly parallel the national patterns of respondents' perceptions of SARS and terrorism risks.[44]

Recall that we found that across the entire sample and all risks, respondents' emotional and cognitive risk perceptions were correlated.[45] These correlations seem at least consistent with the operation of the affect heuristic.[46] Paul Slovic and his colleagues argue that people have quick, intuitive affective responses to risky activities, and that their evaluation of the risks and benefits of those activities tends to be guided by those global affective responses.[47] For instance, studies have shown that people perceive the risks and benefits of an activity to be negatively correlated (whereas in principle they should be positively correlated or independent[48]), that people's risk/benefit judgments are impervious to new risk/benefit information, and that the perceived inverse relationship between risks and benefits is enhanced when people do not have time for analytic deliberation, all of which tends to show that a rapid, affective response is driving risk-related judgments.[49] Our study design, however, did not permit us to test directly for the affect heuristic because we cannot prove whether respondents' emotional responses to threats caused their quantitative risk estimates, vice versa, or neither. Moreover, the nature of our inquiry did not allow us to examine respondents' perceptions of benefits as well as risks, an integral part of much affect heuristic research.

Our finding that respondents' anger as well as their fear was positively correlated with the magnitude of the risk they perceived (anger: and personal risk, $r = .21$; and risk to others, $r = .21$; fear: and personal risk, $r = .33$; and risk to others, $r = .36$)[50] appears to be inconsistent with predictions derived

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44. This content analysis is, of course, oversimplified in several important respects. For instance, it is almost certainly not the case that Canadians are exposed only to Canadian news sources; they may be exposed to quite a lot of American electronic news coverage (*e.g.*, television). How this would affect Canadians' perceptions of the target risks, however, remains unclear: Increased exposure to American media coverage of terrorism, say, might have increased Canadians' sense of vulnerability to that risk; or the content of that coverage, insofar as it explicitly or implicitly labeled terrorism as a distinctively American risk, might actually have reduced Canadians' sense of vulnerability (a kind of contrast effect). Our findings regarding nationality-based CSE also cast doubt on any simple inference from national differences in availability of risk information to the national differences in risk perception that we found; *i.e.*, personality variables (CSE) as well as situational ones (availability) seem to play a role in these risk perception phenomena (although it could also be the case that differential media coverage influenced people's expressions of nationality-based CSE).

45. *See supra* text accompanying notes 26-30.

46. *See* Slovic et al., *supra* note 3.

47. *Id.*

48. *Id.* at 410; *cf.* MARGOLIS, *supra* note 6.

49. *See* Slovic et al., *supra* note 3, at 411-12.

50. Bailis et al., *supra* note 26.

from the appraisal tendency theory.[51] Jennifer Lerner and her colleagues have found that fearful people are more likely to think that bad things will happen to them (i.e., to make pessimistic risk estimates), whereas angry people are more optimistic, less likely to believe that bad things will happen to them.[52] Angry people make more optimistic risk estimates because the appraisal tendency or implicit cognitive structure of anger is associated with greater certainty and control, which tend to reduce or negate those qualities of risks that (according to the psychometric approach) make people concerned about them—the extent to which those risks are dreaded and unknown.[53] The appraisal tendency of fear, by contrast, is associated with precisely those qualities that lead to increased concern about risks.[54] Indeed, Lerner and her colleagues found that, a few months after the September 11th attacks, people experimentally induced to feel angry about the attacks were more optimistic about their chances of avoiding harm from future terrorism than were people induced to feel fearful about the attacks.[55] In contrast, we found that both fear and anger were correlated with increased perceptions of risk to both self and others.[56] One possible explanation for the difference is that, unlike Lerner and her colleagues, we did not manipulate participants' emotions as an independent variable.[57]

B. Strength of National Self-identification and Responses to Risk

Our findings regarding the relationships between respondents' self-identification with their national group and their reactions to risk are consistent with what is known about collective self-esteem (CSE), but also extend

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51. Lerner & Keltner, *Beyond Valence*, *supra* note 9; Lerner & Keltner, *Fear, Anger, and Risk*, *supra* note 9.

52. Lerner & Keltner, *Beyond Valence*, *supra* note 9, at 484-85; Lerner & Keltner, *Fear, Anger, and Risk*, *supra* note 9, at 154-55.

53. Lerner & Keltner, *Beyond Valence*, *supra* note 9, at 480; Lerner & Keltner, *Fear, Anger, and Risk*, *supra* note 9, at 147.

54. Lerner & Keltner, *Beyond Valence*, *supra* note 9, at 480; Lerner & Keltner, *Fear, Anger, and Risk*, *supra* note 9, at 147.

55. Lerner et al., *supra* note 9.

56. Bailis et al., *supra* note 26. The correlations between fear and anger and risk perceptions for each national group showed a largely consistent pattern. For Canadians and SARS, anger as well as fear was positively correlated with perceptions of risk to self and others; for other threats, Canadians' correlations between anger and risk perceptions were positive but insignificant. Only for Americans and the two disease risks was anger negatively correlated with perceived risk (as Lerner & Keltner, *supra* note 9, and Lerner et al., *supra* note 9, would predict), but again, none of these correlations was significant.

57. Note also that in the present study, anger and fear were significantly intercorrelated ($r = .50$), Bailis et al., *supra* note 26, so to some extent the inconsistency with Lerner et al. may be that the emotions reported in response to our different survey items were not as distinct as might have been desired.

that knowledge. The inverse correlations between CSE and Canadians' perceptions of the risk of SARS and their negative affect when thinking about SARS, for instance, are consistent with other studies showing CSE to be a generally adaptive trait[58] and thus similar to other measures of general self-esteem. Like self-esteem generally, CSE appears to give people more optimism, putting them more at ease in the face of risk. Yet, we found no significant correlation between respondents' dispositional optimism and their risk perceptions.[59] Thus, CSE seems to be doing something other than simply allowing people to bask in a warm glow of optimism. Moreover, to the extent that CSE is performing an adaptive function, that function is threat-specific. For example, Canadians' membership CSE (how highly they thought of themselves as cooperative and contributing members of Canadian society) was significantly and inversely correlated with their perceptions of risk from SARS but not from terrorism; Americans' overall CSE was significantly and positively correlated with their perceptions of the controllability of terrorism fatalities and their support for action to reduce terrorism risks, but not with any responses to the threat of SARS.[60] So whatever CSE is doing, it does not seem reducible to a generalized self-esteem-driven optimism.

One possibility, suggested by the brief mention of differential media risk coverage above, is that CSE capitalizes on availability: Its adaptive function responds to whatever threat is most salient. If the threat of SARS was more available to Canadians but the threat of terrorism was more available to Americans, then it might be expected that CSE would be deployed toward the threat that seemed to demand psychological adjustment the most. This explanation, however, does not take us very far into the mechanisms by which CSE may have affected respondents' perceptions of and attitudes toward their respective nationally distinctive risks.

The data are partly consistent with research showing that CSE offers a source of compensatory secondary control over health threats.[61] That is, persons who feel that they lack primary control over health outcomes may cope with those threats by adjusting themselves to that lack, reinterpreting themselves or their situation so that they do not feel overwhelmed by those threats. High CSE helps them make those adjustments, e.g., by using social comparisons to enhance rather than diminish their sense of self.[62] In the present context, high CSE would be predicted to help people cope with their nationally distinctive risk by enhancing their sense of well-being in the face of that risk despite their perceived lack of primary control over the risk. For our Canadian respondents, this seems to be the case. Despite the lack of any significant correlation between overall CSE or any CSE subscale and a belief that SARS

58. Bailis & Chipperfield, *supra* note 21.
59. Bailis et al., *supra* note 26.
60. *See supra* text accompanying notes 31-33.
61. *See* Bailis & Chipperfield, *supra* note 21.
62. *See id.* at P532.

fatalities can be controlled, and despite a significant negative correlation between membership and private CSE and support for personal action to reduce the risk of SARS,[63] Canadians with a strong sense of national identity felt less negative affect about the threat of SARS. Canadians who thought highly of themselves as Canadian citizens (membership CSE) also perceived less risk from SARS to themselves and others.[64] This indicates that CSE was associated with both cognitive and emotional coping with the nationally distinctive threat. This explanation, however, does not account well for the role of CSE in Americans' responses to terrorism because Americans who were higher in overall CSE were likelier to believe that terrorism fatalities could be controlled; however, they did not perceive a lesser risk from terrorism to themselves or others, nor did they experience less negative affect about the risk of terrorism.[65] That is, CSE for Americans seems to be associated with primary, not secondary, control of the perceived threat to health and safety.

Let us look more closely at how CSE functioned for American respondents. As noted, high CSE may have helped Americans to compensate for the perceived threat of terrorism by increasing their belief that the number of fatalities posed by this risk could be controlled. In addition, the stronger Americans' CSE, the more likely they were to support personal (r = .32) and especially public or governmental (r = .45) actions to reduce the risk of terrorism; scores on all of their CSE subscales except membership were positively correlated with increased support for public action to reduce terrorism risks (private CSE, r = .31; public CSE, r = .38; importance CSE, r = .39); and their private CSE was significantly correlated with their belief that government had both the responsibility (r = .35) and ability (r = .38) to control the spread of terrorism.[66] Note further that Americans' CSE helps to explain their support for government measures to control terrorism in a way that their emotional responses do not. Although both Americans and Canadians got angrier about terrorism than they did about SARS,[67] Americans' anger was

63. Bailis et al., *supra* note 26. This may imply a belief in the inefficacy of such personal action, although the positive correlation between Canadians' overall CSE and a belief that the government had the greater responsibility to control the spread of the disease casts some doubt on that speculation.

64. *Id.* This would appear to be consistent with the finding that people engage in social comparisons (of which membership CSE is one kind) as a way of maintaining (unrealistic) optimism in the face of health risks. *See* William M. Klein, *Maintaining Self-Serving Social Comparisons: Attenuating the Perceived Significance of Risk-Increasing Behaviors*, 15 J. SOC. & CLINICAL PSYCHOL. 120 (1996).

65. Bailis et al., *supra* note 26.

66. *Id.*

67. *Id.* This makes sense in terms of leading cognitive theories of emotion. *See, e.g.*, ANDREW ORTONY ET AL., THE COGNITIVE STRUCTURE OF EMOTIONS (1988). Terrorism is the product of one or more human agents who could plausibly be the target of anger, whereas SARS is most likely conceptualized in terms of the disease rather than humans responsible for its spread.

not significantly correlated with their support for these measures, nor was Americans' CSE significantly correlated with their anger (or any other emotional response) toward terrorism.[68]

To recap, attitudes toward salient health and safety risks depended on the particular threat and country. In addition, CSE performed a somewhat different function for the respondents in each country, depending in part on the particular aspect of CSE (as indicated by the various CSE subscales) in question. For Canadians, higher values on the membership subscale alone were significantly and inversely correlated with perceptions of risk from SARS (and West Nile Virus).[69] For Americans, only higher values on the private subscale were significantly and positively correlated with the belief that government has the ability and responsibility to control terrorism.[70] Both the membership and private subscales involve social comparisons, but of different sorts. The membership subscale involves a comparison between the respondent and other members of the same social group (in this case, other citizens of the country): "I am a worthy member of Canadian society." The private subscale involves a comparison between the target group (one's country of residence) and other groups, from the respondent's perspective: "I feel good about being American." In the face of their nationally distinctive risk, Canadians who felt more strongly that they were cooperative and contributing members of Canadian society (membership CSE) derived from that aspect of their self-identity a degree of reassurance in the face of the SARS threat. Membership CSE seems to have helped Canadians to respond to the perceived group threat in part by keeping it in perspective.

By contrast, in the face of *their* nationally distinctive risk, Americans who were prouder to be American (private CSE), quite apart from whether they considered themselves to be contributing members of American society or whether they believed that others thought well of America, were likelier to believe that it is government's job to combat terrorism. And feeling good in this way about being American was associated with increased support for such coercive measures as "subject[ing] certain kinds of people, such as . . . Arab individuals, to special tests or restrictions," because this group has been connected with the spread of terrorism and even "prevent[ing] private citizens from speaking freely in a public forum against the government's handling of [terrorism]."[71] This suggests a kind of chauvinistic support for government action in response to a perceived group threat.[72]

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68. Bailis et al., *supra* note 26. Our findings thus fail to confirm those of Lerner et al., who found that anger was significantly correlated with support for punitive responses to terrorism risks. *See* Lerner et al., *supra* note 9.

69. Bailis et al., *supra* note 26.

70. *Id.*

71. *Id.*

72. *See* Jennifer Crocker & Riia Luhtanen, *Collective Self-esteem and Ingroup Bias*, 58 J. PERSONALITY & SOC. PSYCHOL. 60 (1990). The contrast with Canadians' CSE and their attitudes toward terrorism risks is instructive. The more highly Canadi-

C. Risk Perceptions, Emotions, and Support for Risk-related Action

As noted earlier, participants' emotional responses to the various risks were stronger predictors of their support for personal action than were their risk perceptions.[73] Thus, people's emotional reactions to risk seem to have been more important than their quantitative risk estimates in shaping at least one important measure of their response to risk—their expressed willingness to take personal action to reduce the risk. This can be seen as generally consistent with the psychometric model,[74] the affect heuristic,[75] and other theories and findings indicating the primacy of emotional as opposed to purely cognitive appraisals in lay risk perception and related judgments.

The degree of participants' affiliation with their respective countries also seems to have had more to do with their support for risk-related action than did their perceptions of the magnitude of the risk. Even where risk perceptions were significantly correlated with support for personal action—for Canadians—CSE appeared to moderate this relationship: The worthier Canadians felt as citizens, the less SARS risk they perceived and the less they indicated an inclination to take action to reduce that risk.[76]

Moreover, only CSE and not perceived risk significantly predicted either group's support for public (governmental) action. Canadians' membership CSE was inversely correlated with their support for action against terrorism, while for Americans, all CSE subscales except membership were strongly and positively correlated with support for public action against terrorism.[77] Thus, nationality-based CSE appears to have played an important role, hitherto unnoticed in risk perception research, in people's responses to salient health and safety threats, and in particular, in their inclination to support action to address those risks.

IV. PUBLIC POLICY IMPLICATIONS

The success of much policy making in the field of public health and safety depends ultimately on individuals' good will and cooperation.[78] Al-

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ans thought of themselves as Canadians (membership CSE), the *less* their support for personal or public measures to reduce the risk of terrorism (personal, $r = -.21$; public, $r = -.21$). Bailis et al., *supra* note 26. It seems reasonable to suppose that these findings may reflect Canadian respondents' political opposition to what they may have perceived to be aggressive, unilateral American governmental measures ostensibly aimed at terrorism.

73. *See supra* notes 34-35 and accompanying text.

74. *See supra* note 2 and accompanying text.

75. *See supra* note 3 and accompanying text.

76. Bailis et al., *supra* note 26.

77. *Id.*

78. George J. Annas, *Blinded by Bioterrorism: Public Health and Liberty in the 21st Century*, 13 HEALTH MATRIX 33 (2003).

though risk regulation, at least to the extent that government has a hand in it, should be grounded in technocratic expertise[79]—including cost-benefit analysis, broadly conceived[80]—individuals will not support or comply with even a sound public policy if the expert basis of risk assessment reflected in the policy is sharply at odds with the naive basis in public opinion. It thus becomes critical, especially in a democratic society in which policy making must be at least somewhat responsive to the public will, to learn as much as possible about how laypeople perceive health and safety risks, how they are likely to react to information about those risks, and how they are likely to react to governmental measures adopted to address the risks.[81]

Our findings that both national residence and strength of national identity may motivate risk perceptions and related emotions and attitudes have potentially important implications for public policy. Canadian respondents thought that SARS was a more serious threat than terrorism; American respondents thought the opposite. These differences between Canadians' and Americans' perceptions—of the relative threats posed by SARS and terrorism, and of the actions that it would be appropriate to take in response to those threats—may be attributable in part to relatively straightforward cognitive factors (such as differences in the relative availability of news concerning those threats), and/or they may be symptomatic of deeper and growing cultural disagreements between two countries.[82]

Whatever the cause, the apparent identification of SARS and terrorism as "nationally distinctive" risks by Canadians and Americans, respectively, seems out of kilter with the real operation of these threats to health and safety. The SARS virus plainly does not respect national boundaries,[83] and Canadians as well as Americans could be the targets of anti-Western terror. Equally important is the fact that effective action to reduce the threats posed by SARS and terrorism requires international cooperation, which may be the more difficult to achieve the more that the perceived urgency of these threats differs significantly from one potentially affected country to another.

Evidence that people's strength of attachment to their country of residence, as measured by their nationality-based collective self-esteem may also affect their perceptions of and attitudes toward health and safety risks underscores these concerns but also sends more ambivalent messages. Perhaps it was to be expected that asking Canadians and Americans about SARS and terrorism would trigger reactions based in part on their senses of national

79. Cass R. Sunstein, *The Laws of Fear*, 115 HARV. L. REV. 1119 (2002) (reviewing PAUL SLOVIC, THE PERCEPTION OF RISK (2000)).

80. SUNSTEIN, *supra* note 9.

81. *See* Bernd Rohrmann & Ortwin Renn, *Risk Perception Research: An Introduction*, *in* CROSS-CULTURAL RISK PERCEPTION: A SURVEY OF EMPIRICAL STUDIES 11, 42-43 (Ortwin Renn & Bernd Rohrmann eds., 2000).

82. *See* Clifford Krauss, *Canada's View on Social Issues Is Opening Rifts with the U.S.*, N.Y. TIMES, Dec. 2, 2003, at A1.

83. *See, e.g.*, World Health Organization, *supra* note 36.

affiliation: Canadians tend to view their health care system as an important symbol of national identity and something that differentiates them from Americans,[84] while the military actions taken by the United States government since September 11th have become a focal point for many Americans' patriotic impulses, including an awareness that many people in other countries (including Canada) disagree about the appropriateness of these measures ostensibly taken to combat terrorism. Nationality-based CSE can be a good thing, helping people to cope with the anxiety that nationally distinctive threats to their health and safety would otherwise pose—as we have seen in the case of our Canadian respondents' reactions to the threat of SARS. But nationality-based CSE may not always be beneficial. In the case of American respondents, strength of self-identification with their country was correlated, as we have seen, with a kind of chauvinistic endorsement of sometimes coercive and even arguably unconstitutional governmental action to reduce the threat of terrorism. Our findings suggest that a democratic government that encourages at least some forms of self-identification with the country (i.e., that measured by the private CSE subscale) may foster greater popular support for, and thus obtain wider latitude to pursue, courses of action whose costs may outweigh their purported justification of reducing the threat that terrorism poses to public safety.

Nationality-based CSE is also associated with greater divergence between the perceptions of objectively similar risks by residents of different countries, potentially exacerbating the difficulty of achieving international cooperation in addressing these risks. It may even increase international competition related to such risks: The more strongly people identify themselves with their country, the more they may believe that their country is stigmatized and thus disadvantaged (relative to other countries) by a risk perceived to be distinctive to that country. Consequently, they may be more inclined to devote attention and resources to combating the risk and removing the relative disadvantage that the risk appears to be causing—even at the cost of diverting scarce resources from other, objectively more serious problems.

Our findings also raise important questions for risk communication. Providing the public with adequate information to enable them to perceive risks more accurately would likely be a part of any effective risk communication program. Citizens who believe that their mortality risk from SARS or terrorism is hundreds or thousands of times greater than it probably is may make unwise judgments regarding appropriate precautions, possibly forgoing beneficial and relatively safe activities or diverting scarce resources from other, objectively greater health and safety threats. Public information regard-

84. Robert G. Evans, *Two Systems in Restraint: Contrasting Experiences with Cost Control in the 1990s*, *in* CANADA AND THE UNITED STATES: DIFFERENCES THAT COUNT 21 (David M. Thomas ed., 2d ed. 2000).

ing risks like SARS and terrorism should also include comparative risk data[85] that would allow people to put those threats in perspective. For instance, governments might create public service announcements that compare the magnitude of the nationally distinctive risk to that of other, nondistinctive risks. It is reasonable to assume that people would be better able to correct any misperceptions of relative risk than they would mistakes in absolute estimates of the magnitude of a single risk, given people's widespread difficulties in grasping probabilistic information.[86]

As many scholars have observed, however, good risk communication involves much more than merely disseminating accurate quantitative risk data.[87] Another implication of our study concerns the content of the messages most likely to induce others to take precautions to reduce health and safety threats like the ones we examined. If personal action is driven by perceptions of the magnitude of the threat, messages presumably should be information-based. If personal action is driven by people's emotional reactions to the threat, effective messages should be emotion-based. We found significant positive correlations between people's risk perceptions and their negative affect toward those risks; that is to say, their emotional and non-emotional responses went hand in hand. Perhaps more importantly, we found that people's emotional responses to risks were much stronger predictors of their willingness to take personal action to address those risks than were their perceptions of the magnitude of the risks. It seems reasonable to infer, therefore, that effective risk communication must appeal to the public's likely emotional reactions to threats like SARS and terrorism as well as to their capacities to estimate the risks and benefits of precautions non-emotionally.

We find it especially intriguing that the strength of people's self-identification with their country had more to do with their support (or lack thereof) for public action to address those risks than it did with their perceptions of the magnitude of SARS or terrorism risks. Indeed, *only* the extent of

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85. Vincent T. Covello, *Risk Comparisons and Risk Communication: Issues and Problems in Comparing Health and Environmental Risks*, *in* COMMUNICATING RISKS TO THE PUBLIC: INTERNATIONAL PERSPECTIVES 79 (Roger E. Kasperson & Pieter Jan M. Stallen eds., 1991).

86. For instance, given the assumptions in the text about the likelihood and severity of future terrorist attacks (which almost certainly overstate the risk), a typical American is about 14 times as likely to die in a vehicle accident as to be killed in a terrorist attack. "[T]he terrorist attack on September 11, 2001, cost the lives of some 3,000 people. The subsequent decision of millions to drive rather than fly may have cost the lives of many more." GIGERENZER, *supra* note 6, at 31. What degrees of concern are appropriate to these relative risks is another matter, but at the least people's attention and other scarce resources should be deployed with such comparative data in mind.

87. DOUGLAS POWELL & WILLIAM LEISS, MAD COWS AND MOTHER'S MILK: THE PERILS OF POOR RISK COMMUNICATION (1997); Fischhoff et al., *supra* note 41; Peter M. Sandman, *Smallpox Vaccination: Some Risk Communication Linchpins* (Dec. 30, 2002), *available at* http://www.psandman.com/col/smallpox.htm.

participants' affiliation with their country of residence—and not the amount of risk they perceived—significantly predicted their attitudes toward public action: Canadians' membership CSE was inversely correlated with their support for action against terrorism, while for Americans, all CSE subscales except membership were strongly and positively correlated with support for public action against terrorism. This suggests that public information campaigns regarding risks such as those studied here should convey not only relatively uncontextualized risk information (such as the objective risk data discussed above) but also country-specific messages targeted at those aspects of nationality-based CSE most prominent in the audience. In addition, we note that because people's nationality-based CSE may be a largely intuitive and deeply rooted aspect of people's self-concepts, it may exert a particularly stubborn influence on people's receptivity to risk information campaigns, making it all the more important for communicators to take their audience's personalities into account. Not to do so, especially considering that nationality-based CSE seems to affect risk perceptions and judgments differently in different national groups, may make it even more difficult for the leaders of democratic countries (to the extent that they are responsive to their electorates) to foster the common ground that would facilitate concerted action to reduce such truly international risks as SARS, terrorism, and West Nile Virus.

Our findings and the implications we have drawn from them necessarily remain tentative, given the exploratory and limited nature of the present study. A broader and more demographically representative sampling of the respective national groups would be desirable to confirm and extend our findings. For instance, to disentangle the possible effects of nationality and geographic proximity to perceived threat source,[88] Americans residing closer to Toronto (for SARS) and Canadians residing closer to New York City (for terrorism) could be surveyed.[89] Another way to examine the effects of nationality apart from those of geographic proximity and other possible confounds could be to employ an experimental manipulation in which some participants' national identity would be cognitively primed (e.g., by display of the national flag and/or other symbols of national identity) before assessing their risk perceptions. In addition, to distinguish the possible effects of citizenship as opposed to country of residence, Canadian citizens residing in the United States and United States citizens residing in Canada could be surveyed.[90] In any

88. Baruch Fischhoff et al., *Judged Terror Risk and Proximity to the World Trade Center*, 26 J. RISK & UNCERTAINTY 137 (2003).

89. The fact that we obtained threat-by-country interactions on perceptions of risk to others as well as to self somewhat diminishes the force of the criticism that we did not control for proximity to perceived threat source or include it as an independent variable.

90. We also note the time-sensitive nature of any such survey. In mid-July, 2003, by comparison with the months immediately preceding, it was our impression that news of SARS was declining in major media sources, news of West Nile Virus beginning an upswing, and news of terrorism more or less unchanged. The availability to

event, the possibility that people's risk perceptions and related judgments may be shaped by their national residence and strength of national identity, as well as by the various cognitive and emotional influences that have been studied in the past, is well worth further examination by those interested in risk perception, risk communication, and the implications of both for public health and public policy.

respondents of media coverage of these or other risks could well be different at any given future date.