



INSTITUTE FOR HOMELAND SECURITY



**Sam Houston
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INCORPORATING FEAR INTO SECURITY RISK ASSESSMENTS

**Institute for Homeland Security
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This white paper presents a foundation for research to examine overlooked aspects of homeland security risk. While estimating psychological or behavioral consequences can be difficult, overlooking them lead to substantially misguided policy choices. Later papers will draw on this foundation to consider specific consequences of events or security measures to inform better policy.

Managing security activities is a particularly challenging pursuit. While the field shares with the field of criminal justice the challenges of hidden actors, evolving tactics, and uncertain policy measures, it has additional challenges in the extreme nature of the events, being both excessively large and excessively rare. Risks that driven by rare, high consequence events in the tails of a distribution are hard to estimate. Still, understanding the threat of terrorism is an important first step to adopting appropriate security measures.

There is disagreement and debate as to how bad homeland security risks are. While homeland security events are thankfully rare, the risk is driven by the extremely rare but high consequence events in the fat-tails of the distribution. ¹ Estimating risk from these rare events is challenging and analyses of terrorism risk vary significantly as a result. The public and political leaders certainly rate terrorism as a high priority. ² Some experts even describe terrorism as an existential threat, focusing on the potential for a massively disruptive attack with a weapon of mass destruction. ³ But many others find terrorism a smaller concern. ⁴ For advanced economies such as the United States, terrorism kills relatively few people per year on average and has little economic damage compared to more commonplace risks. ⁵ (Beall 2006, Peleg et al. 2011, Meierrieks and Gries 2013, Stewart and Mueller 2013, Gaibullov et al. 2014, Mueller and Stewart 2018, Arce 2019)

¹ Clauset and Woodard, "Estimating the Historical and Future Probabilities of Large Terrorist Events"; Clauset, Young, and Gleditsch, "On the Frequency of Severe Terrorist Events"; Becerra et al., "Natural Disasters, Casualties and Power Laws: A Comparative Analysis with Armed Conflict."

² Lugar, The Lugar Survey on Proliferation Threats and Responses; DHS and U. S. Department of Homeland Security, The Strategic National Risk Assessment in Support of PPD 8: A Comprehensive Risk-Based Approach toward a Secure and Resilient Nation; DHS and Department of Homeland Security, Quadrennial Homeland Security Review; Mueller and Stewart, "Trends in Public Opinion on Terrorism"; Pew Research Center, "15 Years After 9/11, a Sharp Partisan Divide on Ability of Terrorists to Strike U.S."; Pew Research Center, "Globally, People Point to ISIS and Climate Change as Leading Security Threats"; Mueller and Stewart, "Public Opinion and Counterterrorism Policy."

³ Ignatieff, *The Lesser Evil: Political Ethics in an Age of Terror*; Allison, *Nuclear Terrorism: The Ultimate Preventable Catastrophe*; Partnership for a Secure America, "WMD Report Card"; Torres, "Who Would Destroy the World? Omnicidal Agents and Related Phenomena."

⁴ Willis, "Guiding Resource Allocations Based on Terrorism Risk"; Mueller and Stewart, *Terror, Security, and Money: Balancing the Risks, Benefits, and Costs of Homeland Security*; Mueller and Stewart, "The Terrorism Delusion: America's Overwrought Response to September 11"; Weiss, "On Fear and Nuclear Terrorism"; Sageman, *Misunderstanding Terrorism*.

⁵ Beall, "Cities, Terrorism and Development"; Peleg et al., "The Normalisation of Terror: The Response of Israel's Stock Market to Long Periods of Terrorism"; Meierrieks and Gries, "Causality between Terrorism and Economic Growth"; Stewart and Mueller, "Aviation Security, Risk Assessment, and Risk Aversion for Public Decisionmaking"; Gaibullov, Sandler, and Sul, "Dynamic Panel Analysis under Cross-Sectional Dependence"; Mueller and Stewart, "Terrorism and Bathtubs: Comparing and Assessing the Risks"; Arce, "On the Human Consequences of Terrorism."

This disconnect could be because people are wrong. There are a range of perceptual biases associated with rare, high consequence risks. The availability heuristic, for example, describes how people overestimate recent risks⁶ and there have been multiple studies on how people overestimate rare risks.⁷ But it is also possible that people are right and risk analysts are wrong, omitting an important aspect of consequence from security risk assessments. It is known that experts consider risk differently from the lay public, focusing on objective measures of risk and omitting more subjective concerns.⁸ The missing aspect could be emotion. The psychological harms associated with death and destruction of security events can be significant. This can relate to syndrome-level psychiatric disorders such as PTSD, Acute Stress Disorder, severe depression, and others. But psychiatric illnesses are not the extent of harms, as distress and behavioral changes are even more widespread. These harms can be realized by those directly exposed to the violence as well as those who were indirectly exposed through relations to victims or through the media.

And to some extent, it does not matter whether people are right or wrong in their perceptions of risk insofar as people make choices based on their perceptions. Following September 11th, people avoided flying, tourism, and New York City. In fact, sometimes the risk avoidance behaviors actually increased risk; for instance, due to fear of flying after the terrorist attacks of September 11th, 2001, people switched from flying to the inherently more dangerous driving.⁹ Even if fear is irrational, so are people, and they feel real psychological pain and make real decisions accordingly.

As the National Academies note, most security risk assessments consider lives lost or economic damage but omit psychological or societal damage.¹⁰ Lives lost is discrete and easy to count and physical economic damage is only a little harder to estimate. Psychological and behavioral consequences, however, are hard to estimate—victims have to be sought out and assessed with severity on a continuous distribution along a number of different dimensions of harm.¹¹ Even for well-studied, singular events (such as September 11th) there have been numerous and varied estimates of psychological harms depending on the population being examined, the harm being studied, and the instrument to study it. Extrapolating from these events has also proven hard.

One useful framework from Dolan and Peasgood considered the economic and social costs of crime.¹² Their framework identified costs of the crime distinguishing between direct and indirect costs and between harms realized by the victims and those realized by others. A similar approach could be applied to security risks. Applying this framework to security concerns acknowledges that one key feature of terrorism is the victim-target duality. Terrorism is a political act, propaganda served to an audience or audiences, and those audiences are among the living not the dead. By using violence against the victims

⁶ Tversky and Kahneman, "Availability: A Heuristic for Judging Frequency and Probability."

⁷ Camerer and Kunreuther, "Decision Processes for Low Probability Events"; Magat, Kip Viscusi, and Huber, "Paired Comparison and Contingent Valuation Approaches to Morbidity Risk Valuation."

⁸ Fischhoff, Slovic, and Lichtenstein, "Lay Foibles and Expert Fables in Judgments about Risk"; Lazo, Kinnell, and Fisher, "Expert and Layperson Perceptions of Ecosystem Risk"; Sjöberg, "The Allegedly Simple Structure of Experts' Risk Perception: An Urban Legend in Risk Research."

⁹ Gaissmaier and Gigerenzer, "9/11, Act II."

¹⁰ Committee to Review the DHS's Approach to Risk Analysis and National Research Council of the National Academies, Review of the Department of Homeland Security's Approach to Risk Analysis.

¹¹ Butler, Panzer, and Goldfrank, *Preparing for the Psychological Consequences of Terrorism: A Public Health Strategy*.

¹² Dolan and Peasgood, "Estimating the Economic and Social Costs of the Fear of Crime."

of the attack, the public audience will also have the physical, societal, and psychological disruption, particularly if the targeted audience identifies with the victims. Accordingly, terrorists seek to amplify the harm realized by non-victim others in a way that most criminals do not. Table 1 shows some harms in that framework drawn from the literature.¹³

Table 1- Types of Costs of Security Events and Fear of Security Events

	Realized by victim	Realized by others
Tangible	Cost of treatment Lost wages Property damage	Economic losses Market losses Cost of security measures Cost of insurance administration
Intangible	Health-related physical Health-related psychological	Health-related physical Health-related psychological Mission disruption Changes in behavior Changed view of society Environmental damage Historic/symbolic damage

Additional research needs to be done on areas of psychological and perceptual harms related to security issues. There are inherent challenges in this—security events are represented by a fat-tailed distribution sometimes described as similar to a power law.¹⁴ In events of this kind, the overwhelming majority of events are low level (events with no deaths, for example) but it is the few, extremely rare high consequence events that influence the entire distribution. The rareness of these events, however, makes it hard to assess what is typical of these events. However, approaches that consider risk under minimal or no data (such as expert elicitation, scenario generation, reverse CBA, etc.) may still provide insight even if accurate point estimates cannot be made.¹⁵

¹³ Lundberg, “A Multiattribute Approach to Describe Homeland Security Risks.”

¹⁴ Clauset and Woodard, “Estimating the Historical and Future Probabilities of Large Terrorist Events”; Clauset, Young, and Gleditsch, “On the Frequency of Severe Terrorist Events.”

¹⁵ March, Sproull, and Tamuz, “Learning from Samples of One or Fewer”; Committee to Review the DHS’s Approach to Risk Analysis and National Research Council of the National Academies, Review of the Department of Homeland Security’s Approach to Risk Analysis.



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Lundberg, R. (2022). **Incorporating Fear into Security Risk Assessments** (Report No. IHS/CR-2022-2029).
The Sam Houston State University Institute for Homeland Security.
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