

Estimating Likelihood of Terrorist Attacks by Modeling Terrorist Beliefs and Motivations

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Abstract

Terrorism risk analysis requires estimation of both the likelihood of attack and the magnitude of the consequences of an attack. Current methods focus on target vulnerability, terrorist capability, and attack consequence. These methods ignore the motivational aspect, a key component to any analysis of terrorism risk. Analogous to PRA methods applied to estimate both natural and technological hazard probabilities, we extend PRA methods to estimate the likelihood of terrorist attack by modeling the attractiveness of competing attack alternatives from the view of a terrorist organization. We focus on both the beliefs and motivations of leaders of terrorist organizations who must choose among alternative attack possibilities, including decisions about location, timing, and mode of attack. We propose psychological models of terrorist objectives and values that substitute for more traditional physical, chemical, and biological models common in PRA of natural disasters (e.g., earthquakes) and technological hazards (e.g., nuclear power plants). We illustrate methods to construct terrorist value structures, including an objectives hierarchy and a multi-attribute utility model of terrorist values. These value models include terrorist uncertainties about the outcome of the attack, and uncertainties in our knowledge of the terrorist value functions, including parameters representing terrorists' attitude toward risk and trade-offs among conflicting objectives. Relative likelihood of terrorist attacks are functionally related to the terrorists' utility of attack. We suggest practical applications of this methodology for setting counter-terrorism policy, including allocation of funds for counter-terrorism. A number of challenges to modeling terrorist beliefs and values are discussed, including: (1) Difficulty in identifying geographically distributed terrorist group leadership, (2) evolving terrorist group leadership with short tenure, (3) changing terrorist beliefs about the likelihood of attack success in rapidly changing environment of counter-measures, (4) shifting terrorist motivations and values due to changing political events shaped by a worldwide media, and (5) growing attack option set growth due to growing terrorist capabilities.