

STRATEGIC OPTIONS FOR TERRORIST NETWORK DISRUPTION:
UNDERSTANDING THE STRUCTURE AND COMPLEXITY

by

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Abstract

Governments spend billions of dollars every year fighting terrorism, but still terrorism remains a major national security risk. The question still remains as to what are the key strategies or combination of strategies to combat terrorism, particularly as terrorist networks constantly evolve. The need to understand the internal dynamics of terrorist organizations has been well documented since the September 11th attacks, particularly the use of social network analysis (SNA) as it provides valuable insight into covert organizations. Due to the nature of covert organizations, complete network data is impossible, but extensive research has been done on the networks, individual terrorist attributes, and the overall strategies and goals of terrorist organizations. While much work has been done to collect information and analyze the network structure and terrorist attributes, much less attention has been paid to the implementation of successful strategies to disrupt the network and particularly how implemented strategies influence networks to evolve. As terrorist networks constantly change, approaches to disrupt them must constantly adapt. It is important to build onto the network and attribute data collected to understand how particular strategies influence network structure and more importantly what strategies achieve the goals they set out to accomplish. Only by tying together the terrorist organization attributes, network structure, and how strategies influence network changes will those implementing strategy make decisions that eventually weaken terrorist influence and power. To address the issue of incomplete network data, particularly missing links, this paper

utilizes several methods of machine learning to train the network to predict hidden links. Agent-based modeling is a tool that can utilize network and attribute data to enable the analysis of the effects of disruption strategies on a terrorist network. This paper presents an agent-based model to evaluate the network structural changes as disruption strategies are implemented. The focus of the model is the implementation of both kinetic and non-kinetic disruption strategies on a learned 271 al-Qaeda member network that is allowed to have varying levels of morale. The model enables the exploration of how key strategies may impact terrorist network metrics such as density, diameter, centrality, path length, the number of terrorists, and the ties between terrorists. This model is based on the al-Qaeda Attack Network available in the John Jay & ARTIS Transnational Terrorism Database