Modeling of Organizational Violence
Violent Intent Modeling and Simulation (VIMS)

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VIMS Background
VIMS: Background

- R&D sponsored by Human Factors Division at DHS S&T
- Initial work conducted by DoE laboratories
- Transitioned to IHSS in 2008

- Objectives of VIMS 2.0:
  - Incorporate social science theories into intelligence analysis
  - Design a system that follows the intelligence analyst (IA) workflow
  - Build a system architecture that is ready for the analyst desktop
  - Generate models to interpret motivations of violent groups and identify key predictors of violence escalation
Potential Utility of VIMS for IA Decision Support

Level of Violence

- What is the likelihood the group will become violent?
- Will the group’s level of violence escalate?
- What data would most reduce uncertainty?
- What is the expected severity of an attack?
- Will it be against a US target?
- How will groups react to the current environment, especially U.S. actions?
- What is the likelihood the group will attack in the short-term?
- Will the group’s level of violence de-escalate?
- Is the group likely no longer a threat?
- What data would most reduce uncertainty?
VIMS Modeling
Modeling Challenges

1. Produce models that will help analysts assess risks group and organizational violence
   - Use social science theories to assist analysis in understanding potential scenarios

2. Produce models that would help analysts to forecast future violence outcomes
   - Violence against humans
   - Violence escalation/de-escalation
   - Violence initiation/cessation
Four Types of Models

– Measurement models
  • How do we measure certain constructs from available data?
    – Variable passports and text analytic tools

– Exploratory models
  • What does the data show us?
    – data reduction, descriptive analyses, and correlation analysis

– Criteria-based models
  • Based on Social Theories what is a set of criteria that is associated with violence? How to interpret them?

– Predictive models
  • Can we predict (and if yes how well) violence outcomes such as attack timing, targets and fatality?
Data has been provided by START center at the University of Maryland

- Minorities at Risk Organizational Behavior (MAROB)
- Global Terrorism Database (GTD)
- The Big Allied And Dangerous (BAAD)
- Terrorism in Western Europe: Events Data (TWEED)
Criteria-based Models

- Objectives
  - Identify the best set of variables (criteria) associated with violence
  - **Outcome:** violence against people

- Data
  - MAROB (113 minority organizations in Middle East and North Africa)

- Variable selection process
  - Theory-based bivariate associations
  - Variable crosswalk
  - Multivariate associations
  - Tiers 1 and 2
Criteria-based Models

- Between-group comparison
  - Which of the groups show most threat?

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- Within the group comparison
  - Is a group moving towards violence or away from it?

- Finding similar groups
  - Which groups in the past are similar to the one of interest?
Example
Example Objective and Approach

• Objective: Group 37 is violent in 1999, what are the expected trajectories over the next 5 years?
• Approach: Identify similar groups in earlier years (e.g., 1993) and examine what happened to them in the ext several years.
## Finding Similar Groups

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### Finding Similar Groups
(Red=Violent, Green=Non-violent)

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Summary

• We examined 7 groups in 1993 that would be similar to group 37 in 1999.
• Most of the groups have ceased violence in 5 years. Their characteristics have also changed in time.
• The pattern of their characteristic change crudely corresponds to the pattern of violence.
• In the period 1999-2003 group 37 ceased being violent in 3 years, about the average time for the similar set of groups in 1993.
Thank you

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