

Explanation-Based Decision Making

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MITRE Sponsored Research



Problem

- **Analytic judgment is hard intellectual work.**
- **Sources of evidence are often incomplete, ambiguous, uncertain, unreliable, and misleading.**
- **Both novices and experts make predictable mistakes.**
- **Tools and techniques intended to improve analytic judgment are poorly understood, infrequently used, and almost never tested.**

Background

**A typical analyst's observation
about the analytic process**



“I’m working right now with some of our [analysts] on trying to capture how they take all of the raw information from messages/articles, come up with hypotheses, support those hypotheses with evidence from the messages, and then arrive at their conclusions. **As far as I can tell right now, it is a completely manual process that people accomplish in their brains. I’m wondering if there are any analyst workbenches out there that may support collating this information and making sense out of it.”**

— T. Hay, personal communication, 3/9/2005

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Objective

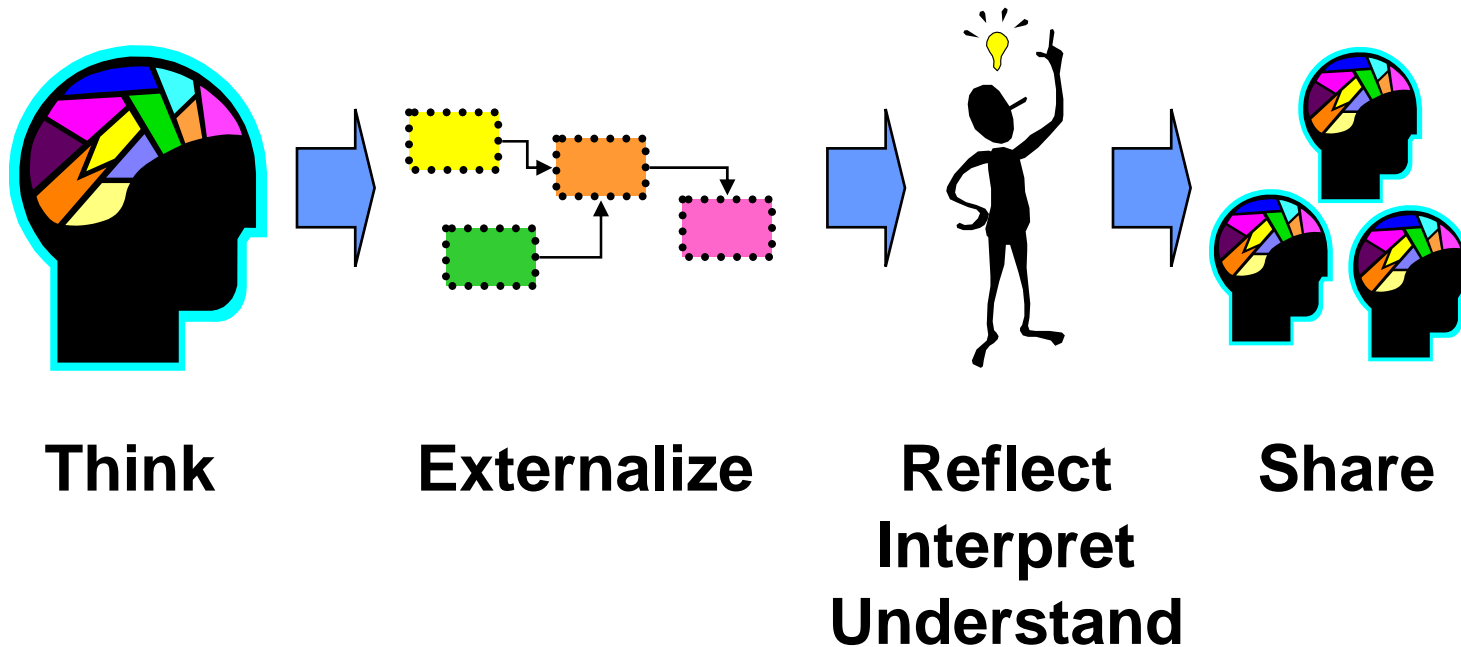
- **Make intelligence analysis processes and products more transparent**
 - Give consumers greater insight into the underlying evidence and reasoning
- **Develop new methods and tools that help detect and mitigate analyst bias**
 - Leverage analytic transparency to improve the effectiveness of peer review

Activities

- **Collected and reviewed a verbal protocol of an Analysis of Competing Hypotheses**
- **Surveyed literature on cognitive models of analytic reasoning, evidence marshaling, and related government programs**
- **Collected and evaluated analysis training scenarios to support experimentation**
- **Designing an Evidence Management & Marshaling Workbench**

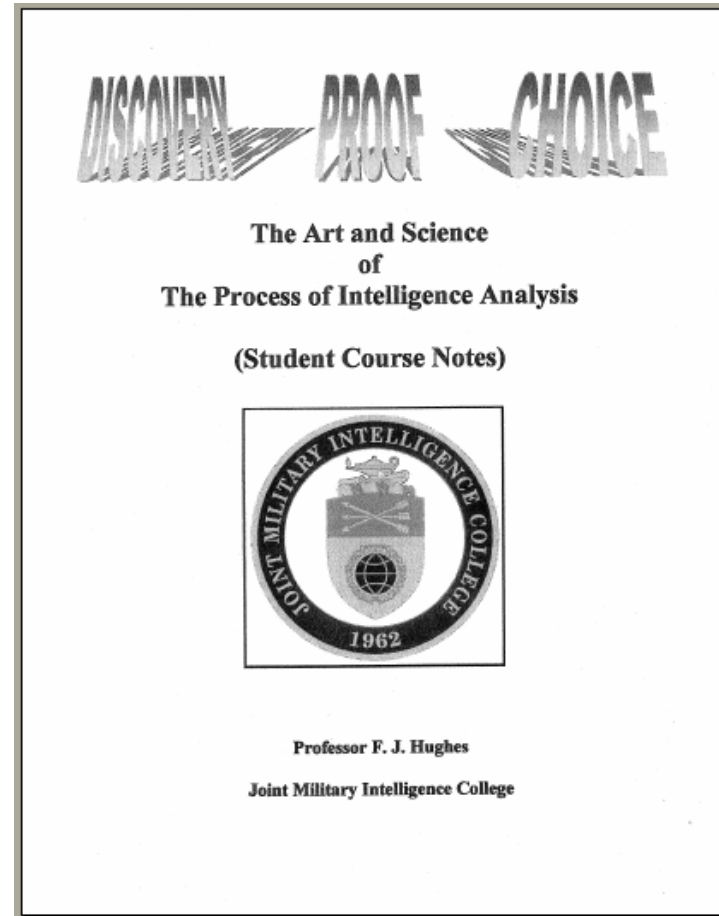
Highlight

Enable decision makers to construct and manipulate external representations of decision problems



Highlight

- **The “Discovery, Proof, Choice” Framework:**
 - **Evidence marshaling techniques**
 - **Construction of defensible and persuasive arguments**

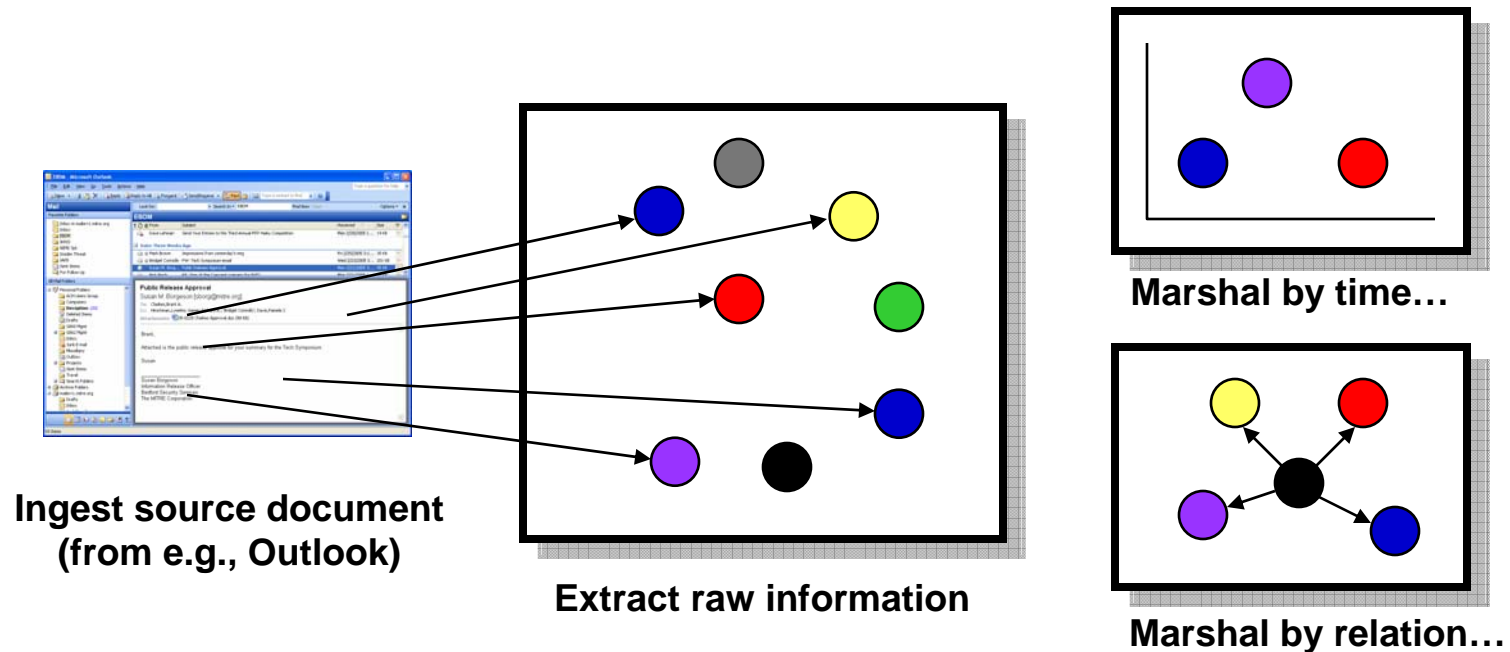


Impacts

- Collaborative partnership with BAE Systems to evaluate and improve the POLESTAR system
- Technical advice to DOD Intelligence Community Battlelab
- Technical support to ARDA Exploratory Program, Novel Intelligence from Massive Data program

Future Plans

Develop a “Discovery-Proof-Choice Workbench”



Test whether explicit evidence marshaling has a significant impact on hypothesis generation