

# Structured Argumentation

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MITRE Sponsored Research

The logo for the MITRE Technology Program, featuring a stylized graphic of stacked, colorful blocks (yellow, orange, and blue) to the left of the text.

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The MITRE logo, consisting of the word "MITRE" in a bold, black, sans-serif font.

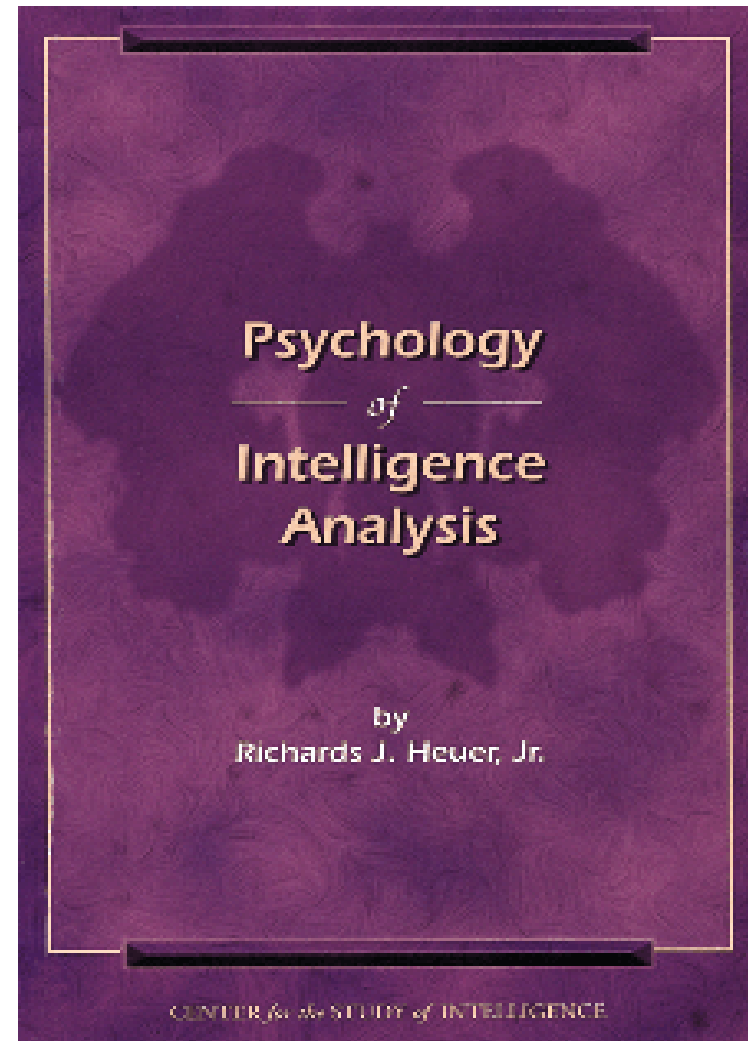
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# Problem

- **Structured Argumentation** is a set of working methods for analytic judgment characterized by explicit and detailed conclusions and their supporting lines of reasoning.
- Advocates claim Structured Argumentation and Structured Reasoning will promote better intelligence analysis, but there is little hard evidence that this is true.

# Background

“Tools and techniques that gear the analyst's mind to apply higher levels of critical thinking can substantively improve analysis on complex issues on which information is incomplete, ambiguous, and often deliberately distorted. Key examples of such intellectual devices include techniques **for structuring information, challenging assumptions, and exploring alternative interpretations.**”



# Objective

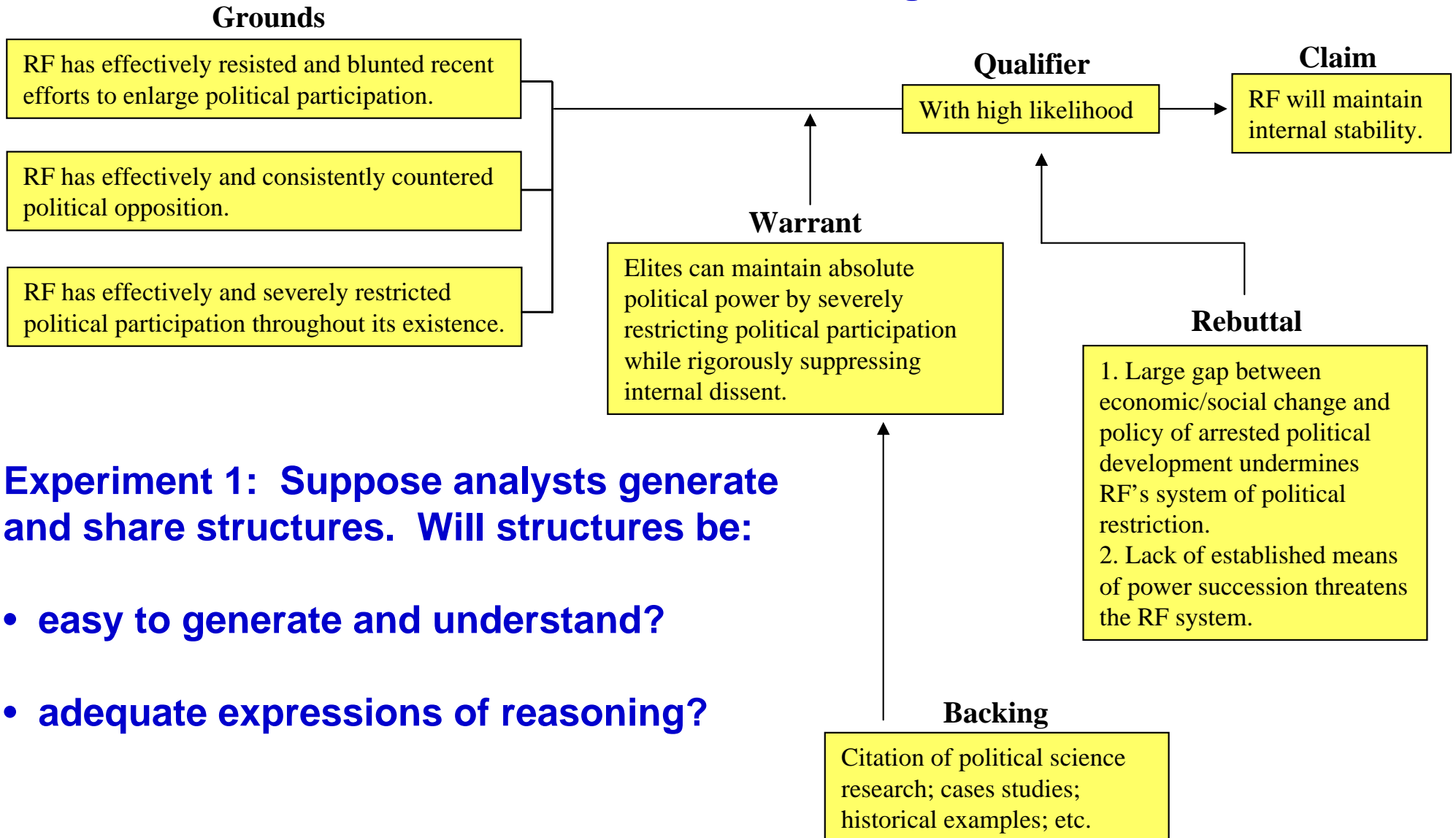
- **Test the hypothesis:** Does Structured Reasoning promote better intelligence analysis?
- **Evaluate** emerging and commercial information technology applications that support Structured Reasoning
- **Conduct experiments** to evaluate the impact of Structured Reasoning on analysis products and processes

# Activities

- **Experimental evaluation of structured argumentation techniques**
  - **Can structured arguments be intelligence products?**
  - **Does Analysis of Competing Hypotheses reduce the confirmation bias?**
- **Evaluation of commercial technology (e.g., SEAS, CIM)**

# Highlight

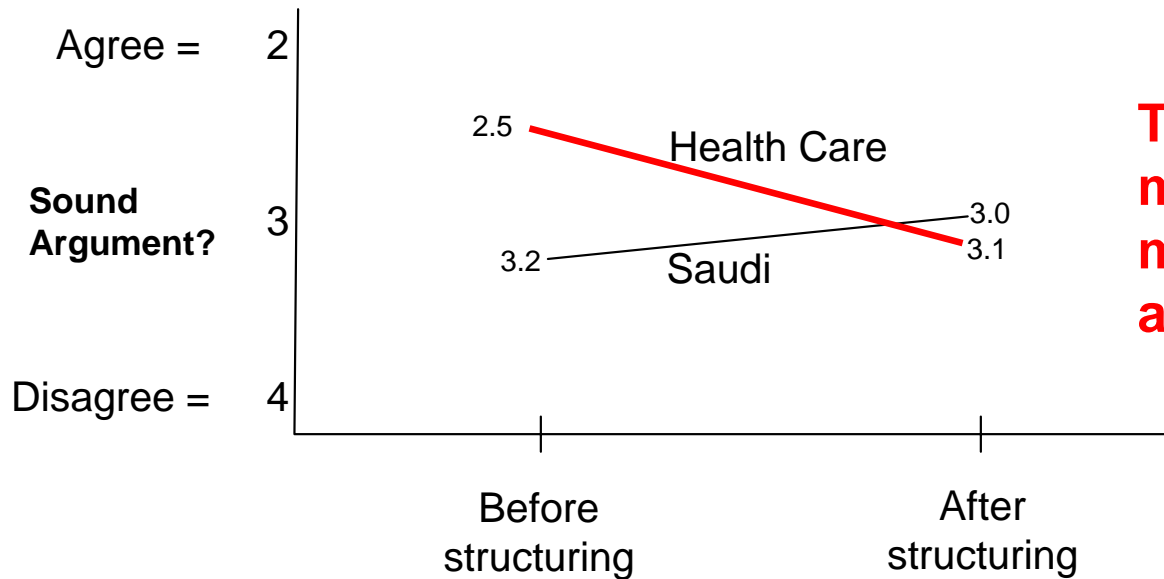
## Toulmin Argument Structure



**Experiment 1: Suppose analysts generate and share structures. Will structures be:**

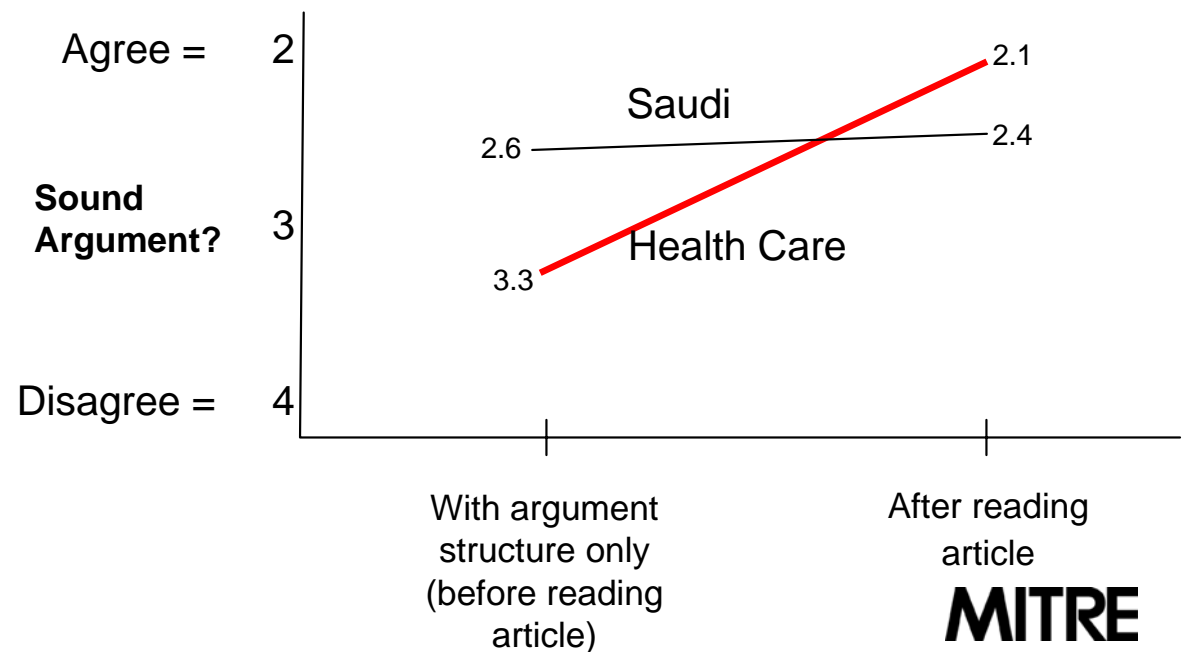
- **easy to generate and understand?**
- **adequate expressions of reasoning?**

# Highlight



**Toulmin structuring can make people significantly more critical of ill-formed arguments.**

**However, Toulmin structures can be hard to understand, so they can't be stand-alone products.**



# Impacts

- **Completed SEAS pilot with MITRE analysis group**
  - **Conclusion: SEAS has potential, but needs to be tailored to work environment**
  - **MITRE Technical Report available**
- **Advised sponsors on potential application of commercial argumentation technologies**
- **Completed government study investigating techniques for improving analytic tradecraft**

# Future Plans

		H2: No attack was intended, "chattered" about bogus plans to see our response			
		Estimate the <u>likelihood</u> that this <u>event</u> would <u>occur</u> ?	Assume the event occurred, estimate the likelihood that your sources would provide this evidence?	Assume the event did <u>not</u> occur, estimate the likelihood that your sources would provide this evidence?	
6					
7					
8					
9	CURRENT EVIDENCE	POSSIBLE EVENT			
13	Evid3: Everyone detained was innocuous	Event 3: Detained persons of real interest, based on the chatter (e.g., on specific flights)	very unlikely	unlikely	likely
14	Evid4: Reports of specific names, flights and targets uncovered from chatter	Event 4: Specific targets, methods, times mention in chatter	definite yes	likely	not relevant
15	Evid5: No reports of quiet time, just reports of increased chatter	Event 5: "Quiet" time days before the intended attack - no chatter about intended attack.	50/50	likely	likely
16	Evid6: No reports of abrupt movement of personnel of interest	Event 6: Abrupt movement of personnel of interest	unlikely	50/50	very likely
17	Evid 7: No reports of major fund transfers shortly before the "intended" attack	Event 7: Major fund transfers shortly before the intended attack	unlikely	50/50	very likely

**Tailored Structured Analysis:** Use research results to define new analysis tools

**Evidence Management:** Explore tools and methods for marshalling evidence against analytic models