Problem Description

• When working on difficult intelligence issues
  – Which is the correct explanation?
  – Which is the most likely outcomes?

Analysis of Competing Hypotheses

• Used to
  – Aid judgment on important issues
  – Minimize cognitive limitations

• Basic insights from
  – Cognitive Psychology
  – Decision analysis
  – Scientific method

Eight-Step of ACH

1. Identify hypothesis
2. List evidence
3. Prepare matrix
4. Refine matrix
5. Draw conclusions
6. Analyze conclusions
7. Report conclusions
8. Identify milestones

Step 1: Identify Hypothesis

• Hypothesis generation vs. hypothesis evaluation
  – Generation: bring together all possibilities
  – Evaluation: focus on

• Disproved vs. unproven
  – For a disproved hypothesis there is positive evidence that it is wrong
  – For an unproven hypothesis, there is no evidence that it is correct
Step 2: List Evidence

- Don’t limit to the evidences current available
- For each hypothesis, list support and contradict factors
- Absence and presence of evidence
  - E.x. If the dog barked in the night? no. nobody heard it barked (absence)

Step 3: Prepare Matrix

<table>
<thead>
<tr>
<th>Evidence</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. Saddam public statement of intent not to retaliate.</td>
<td>+</td>
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<td>E2. Absence of terrorist offensive during the 1991 Gulf War.</td>
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<td>E5. Iraqi embassies instructed to take increased security precautions.</td>
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<td>+</td>
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<tr>
<td>E6. Assumption that failure to retaliate would be unacceptable loss of face for Saddam.</td>
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<td>+</td>
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Question: will Iraq Retaliate for US Bombing?

- H1: Iraq will not retaliate
- H2: It will sponsor some minor terrorist actions.
- H3: Iraq is planning a major terrorist attack, perhaps against one or more CIA installations

Step 4: Refine Matrix

- Diagnostic value – likeliness of hypothesis
  - High-temp indicate sickness, but can’t determine which illness
- Reconsider the hypotheses
  - Add, or need finer distinction
  - Combine
- Reconsider the evidences
  - Put in missing factors
  - Delete evidence that have no diagnostic value
Step 5: Draw Conclusions

- Work down the matrix, looking at each hypothesis
- Proceed by trying to disprove the hypotheses rather than prove them

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Step 6: Analyze Conclusions

- Analyze how sensitive your conclusion is to a few critical items of evidence
  - The consequences if the evidence were wrong
  - Check the original source

Step 7: Report Conclusions

- Decision-maker need to make decisions on the basis of a full set of alternative possibilities
- The importance is eliminating not confirming
- Discuss the relative likelihood of all the hypotheses

Step 8: Identify Milestones

- Analytical conclusion should always be regarded as tentative
- Specify in advance things will change possibly
Summary and Conclusion

- Key differences b/t competing hypotheses from conventional intuitive analysis

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<th>conventional</th>
</tr>
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<tbody>
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<td>Num of possibilities</td>
<td>Full set</td>
</tr>
<tr>
<td>Diagnostic value</td>
<td>Greatest</td>
</tr>
<tr>
<td>Use of evidence</td>
<td>Refute</td>
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Things to Remember

- ACH's Way to analyze
  - Not by satisfying strategy
  - But by simultaneous evaluation

- Note the important difference b/t
  - Disproof and no proof