

# Hypothesis Testing




**Marilyn B. Peterson**  
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**University of New Mexico**

# Objectives

- ▶ Enumerate Heuer's eight steps of Analysis of Competing Hypotheses
- ▶ Apply Analysis of Competing Hypotheses to a set of intelligence data

# Heuer's Eight Steps

1. Determine Hypotheses
  2. Make list of evidence
  3. Prepare matrix; analyze 'diagnosticity'
  4. Refine matrix
  5. Draw tentative conclusions – disprove
  6. Assess sensitivity to critical evidence
  7. Report to management
  8. Assemble milestones for future observation
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# Modification of Heuer

- ▶ **Before you start:**
  - Develop a question to be asked – not ‘yes’ or ‘no’
  - Define terms
- ▶ **When gathering evidence**
  - Evaluate sources
  - Decide if you want to use assumptions or previous assessments

# Steps

- ▶ Step 1: Hypothesis generation
- ▶ Step 2: List All Evidence
- ▶ Step 3: Evidence, more evidence, and more evidence

# Step 4: Create a Matrix

<b>Evidence</b>	<b>H1</b>	<b>H2</b>	<b>H3</b>	<b>H4</b>	<b>H5</b>
<b>E1:</b>					
<b>E2:</b>					
<b>E3:</b>					
<b>E4:</b>					
<b>E5:</b>					
<b>E 6:</b>					
<b>E 7:</b>					

# Step 5: Refine the Matrix

- ▶ **Reconsider the hypotheses**
- ▶ **Eliminate the evidence with no diagnostic value**
- ▶ **Diagnostics Check**
- ▶ **Key evidence check**

# Step 6: Choose Least Inconsistent Hypothesis

**Work to disprove rather than prove**



# Look at Critical Evidence

- ▶ Review diagnostics assessments
- ▶ What would you consider critical in this example?

# Report Conclusions

- ▶ Do not ignore any hypotheses
- ▶ Include in report (appendix?)
- ▶ Indicate why not chosen

**Audit Trail**

# ID Future Milestones

- ▶ **What will it look like if indicators change?**
- ▶ **Will the hypotheses also change?**



# Pros and Cons of Hypothesis Testing

- ▶ Full set of alternative possibilities vs most likely alternative
  - ▶ Each hypothesis receives equal treatment
  - ▶ Identifies key evidence & assumptions.
  - ▶ Mitigates satisficing
  - ▶ Seeking evidence to refute hypotheses—use of the scientific method
- **Static**
  - **Can be time consuming**

# Hypothesis Testing

- ▶ How might you use this?
- ▶ When is the time to use it?
- ▶ What does ACH promote?
- ▶ What does ACH overcome?
- ▶ How does this fit in with the ODNI Standards?