A New Perspective on Use of the Critical Decision Method with Intelligence Analysts

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Background: Intelligence Analysis

- Sort through vast amounts of information to construct an accurate depiction of a situation
  - Products of information foraging and analysis are used by senior decisionmakers to make high-stakes decisions
- Complex process of assessing reliability of information from wide variety of sources and combining seemingly unrelated events
  - Involves data mining, data correlation, human judgment
- CTA – capture data to provide input to support development of a computational model of the IA’s processes, biases, analytic strategies
  - New method needed: scenarios do not fit typical pattern of making decisions and taking actions
  - Many CTA techniques have goal: elicit information on actions taken and decisions leading up to those actions
  - Greater emphasis on deductive reasoning, looking for patterns of activity, and making judgment about the level of risk present
- Needed to take different tack during interviews to capture essence IA’s job
  - Participants were asked to describe an example of a strategic analysis problem
Cognitive Task Analysis Methodology

- Participants: 10 military officer-students enrolled in NPS graduate school program
  - 6 Intelligence Information Management; 4 National Security Affairs
  - Average 10 years experience as intelligence analysts
- Phase One: Semi-structured interviews - Knowledge Audit (ACTA)
  - Identify challenging aspects of their jobs, cues and strategies
  - Needed broader set of probes to uncover bigger picture
- Phase Two: Draws from a variety of CTA methods
  - Tailored to Intelligence Analysts
  - Interview probes developed to focus on a critical assignment where analyst had to collect, analyze and produce report of strategic nature
    - Types of information used, how information was obtained
We are interested in the collection, analysis, and reporting of intelligence of strategic importance (as opposed to tactical or operational intelligence). Examples of such strategic analysis problems might include assessments of the capabilities of nations or terrorist groups to obtain or produce weapons of mass destruction, terrorism, strategic surprise, political policy, military policy etc.

Please try to recall a recent significant assignment in which you had to collect, analyze, and report on an intelligence problem of a strategic nature (for example, a class assignment that resulted in a paper, talk, briefing, etc.).

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<th>When was it?</th>
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<table>
<thead>
<tr>
<th>Where (in what course) was it?</th>
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<tr>
<th>What was the specific assignment?</th>
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<tr>
<th>What was the final product, product length, and product audience?</th>
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<tr>
<th>How much time was devoted to this task?</th>
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<th>Over what period of time?</th>
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<tr>
<th>What specific training or experience did you have that was particularly relevant to accomplishing this assignment?</th>
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<tr>
<th>What did you do step by step? (use as much space as needed to construct timeline)</th>
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| Information                                      | What information were you seeking, or what questions were you asking?  
|                                                | Why did you need this information?  
|                                                | How did you get that information? What was the information source?  
|                                                | Are there any difficulties in getting the information you needed from that source?  
|                                                | What was the volume of information that you had to deal with?  
|                                                | What did you do with this information?  
|                                                | Would some other information been helpful? |
| Mental models/Schemas                           | As you went through the process of analysis and understanding did you build a conceptual model?  
|                                                | Did you try to imagine important events over time?  
|                                                | Did you try to understand important actors and their relationships?  
|                                                | Did you make a spatial picture in your head?  
|                                                | Can you draw me an example of what it looks like? |
| Hypotheses                                      | Did you formulate any hypotheses?  
|                                                | Did you consider alternatives to those hypotheses?  
|                                                | Did the hypotheses revise your plans for collecting and marshalling more information? If so, how? |
| Intermediate products                          | Did you write any intermediate notes or sketches? |
In the last interview, you provided us with an interesting example of an analysis that you had performed. In today's interview we would like to go through that analysis again to verify and elaborate our understanding of that example analysis.

<table>
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<tr>
<th>Probe Topic</th>
<th>Probes</th>
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<tbody>
<tr>
<td>Goals</td>
<td>What were your specific goals at the time?</td>
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<tr>
<td>Standard Scenarios</td>
<td>Does this case fit a standard or typical scenario?</td>
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<td></td>
<td>Does it fit a scenario you were trained to deal with?</td>
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<tr>
<td>Analogues</td>
<td>Did this case remind you of any previous case or experience?</td>
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<tr>
<td>Hypotheses &amp; questions</td>
<td>What hypotheses did you have?</td>
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<tr>
<td></td>
<td>What questions were raised by that hypothesis?</td>
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<td></td>
<td>What alternative hypotheses did you consider?</td>
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<td></td>
<td>What questions were raised by that alternative hypothesis?</td>
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<tr>
<td>Methods</td>
<td>Were you following a method you had learned or developed in the past and, if so, can you describe it?</td>
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<tr>
<td>Information cues for hypotheses and questions</td>
<td>As you collected and read information, what things triggered questions or hypotheses that you later followed up?</td>
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<tr>
<td>Information tools</td>
<td>What sort of tools, such as computer applications, did you use?</td>
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<tr>
<td></td>
<td>What information source did you use?</td>
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<td></td>
<td>What difficulties did you have?</td>
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We are interested in performing more detailed observations of analysts as they solve some tasks. Our general idea is to develop a set of tasks and related materials that we could present to analysts to solve. We would then record how they solved the task. We would like the task to involve the collection of open source information, some analysis, and some product such as a briefing or paper. We would like to see if there is some version of the case you just recalled that could be used in our studies.

Is there some version of your case that could be done by an analyst in one day to a week?

What materials would be needed?
Cognitive Demands for Intelligence Analysts

- **Noticing Data**
  - Time critical data difficult to obtain
  - Two analysts looking at same picture/image can see different things
    - Need background knowledge, expertise working with each type of data e.g., trends of country, etc. influence interpretation
  - Classify data: Relevant/irrelevant
  - Distilling the relevance: “5 gems” from 100 reports

- **Synthesizing Data**
  - Need to assimilate, verify, and disseminate in short time window
  - Combine seemingly unrelated events and see the relevance
  - Avoid cognitive biases
    - Tunnel vision: So focused on one thing, miss key piece of puzzle
    - Confirmation bias: Discount/ignore data don’t understand, emphasize type of data most experienced with
  - Prior knowledge used to assess validity, reliability
  - Domain expertise needed to analyze each class of data
Cognitive Demands for Intelligence Analysts

• **High Cognitive Workload**: GOAL: Predict complex, dynamic events
  – Timeline compression coupled with organizational constraints ➔ “channels thinking down a specific path”
  – High cognitive complexity entailed to assess reliability and synthesize info from wide variety of sources: Is it possible? Plausible? Other sources corroborate?
  – Difficult judgments dealing with ambiguous data
    • All types of data can include spurious signals, inaccurate information
    • How to filter and how much weight to give to each specific piece?
    • Domain expertise needed to analyze each type (SIGINT, HUMINT, ELINT, IMAGERY, MASINT, Open Source)
      • Which pieces tie together? Can I trust this info?
  – Overwhelmed with massive amounts of data
    • Need to resolve discrepancies across systems, databases, etc.
    • Need to interpret data in context
  – Time pressure becoming increasingly stressful requirement
    • “Incredible time crunch:” Pressure to give more info, and faster, to the customer
  – Sheer volume makes it difficult to process; yet no technology available to effectively help synthesize different types of info

• **Cumbersome Databases**
  – Poor correlation algorithms
  – System presents results users do not trust: “tracks out of whack”
  – Analysts processes data manually ➔ Adds to cognitive load
Cognitive Demands for Intelligence Analysts

• **Decisions regarding Information Requirements**
  – Decide whether additional data is required
    • Who to go to for specific information?
    • What system is best to get particular types of information?
    • Re-task an asset? (expensive, involves trade-offs)
    • How to be efficient with limited assets, yet many requirements?

• **Disseminate**
  – Need to understand customer, context, big picture
    • Don’t overload “customer”/ but don’t starve, i.e., don’t decide for them when they need to know something
    • Customer doesn’t articulate need/ provide reasons for needing info
      – Avoid Groupthink, “Boy who Cried Wolf”

• **Cultural Issues**
  – Credibility: Operational guys “rarely understand analysis”
    • Attitude: “Why do I need you?”
<table>
<thead>
<tr>
<th>COGNITIVE DEMANDS</th>
<th>SCHEDULE: S#2</th>
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<tbody>
<tr>
<td>Syntheticizing data</td>
<td>Lack of technical familiarity with different types of data. Domain expertise is needed to analyze each class of data (HUMINT, SIGINT, IMAGERY, etc.).</td>
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<tr>
<td>Syntheticizing data</td>
<td>No database exists that can correlate across systems. No database can synthesize all various inputs from many different analysts to form one coherent picture.</td>
</tr>
<tr>
<td>Syntheticizing data</td>
<td>Different platforms. Users don't always understand information the system presents.</td>
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<tr>
<td>Syntheticizing data</td>
<td>Data bases are cumbersome to use.</td>
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<tr>
<td>Noticing data</td>
<td>Time-critical information is difficult to obtain.</td>
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<tr>
<td>Noticing data</td>
<td>Two analysts looking different things.</td>
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Naval Intelligence Analyst NPS2-2

• Task:
  – Will Estrada be deposed from presidency of Philippine Islands? Will there be a coup?

• Deadline:
  – 6 weeks

• Time worked on task:
  – Student estimate 72 h/week x 6 weeks
  – Our estimate 300~400 h.
NPS2-2: Will Estrada be Overthrown in a Military Coup?
INFORMATION FORAGING: Dual Problem Space Space

(1) Source space

AEmbassy
- JICPAC materials
- Cables
- Travel books
- Histories
- Cultural ethnography
- Far Eastern Ec. Rev
- East West Center
- DIA/DHS
- Asia Pacific Center
- CIA
- AEmbassy

General

Experts

Press

Websites

US War College Records

(2) Question space

Past gov transformations?

Key People

Questions

Chief of Staff
- Military
- Air Force

Political
- Senators
- Prev coup plotters
- Organized crime

Key People

Pro Estrada
- Anti Estrada

Previous plotters now senator
Schemas

- **KEY PLAYERS**
  - MILITARY
    - ARMY
  - REGION 1
    - <Commander>
  - FAMILIES
    - <Assistants>
    - REGION 2
      - <Commander>
      - <Assistants>
      - ... LOGISTICS
      - INTEL
      - PERSONNEL
      - AIR FORCE
      - ...
  - MILITARY
  - POLITICAL
    - SENATORS
    - CLERGY
    - PREV COUP PLOTTERS
    - POLITICAL PARTIES
    - POLITICAL ACTION GRPS
    - POLITICAL FRONT ORGS
  - OTHERS
    - ORGANIZED CRIME
    - PRESS
    - PROMINENT
    - INVOLVED SOME WAY

- **CLIQUE ASSOCIATIONS**
  - SAME UNIT
  - SAME REGION OF ORIGIN
  - CLASSMATES
  - FAMILY RELATIONSHIP
  - PAST CO-PLOTTER
  - BOARD CO-MEMBERSHIP
  - BUSINESS TIES

- **SOURCES**
  - GENERAL LIT
  - JICPAC
  - CABLES
  - WEBSITES
  - EXPERTS

- **ATTITUDES**
  - PRO-AQUINO
  - ANTI-AQUINO
Example

Week 1
• Consult old material
• Background research
• Consult open source intelligence

Week 2
• Collections planning

Week 3
• Liaison with Intel community

Week 4
• Build brief/paper

Week 5

Week 6
• Deliver paper/brief
Just-in-Time Capsule Briefings

Support post-graduate education in intelligence analysis

JITC Briefing toolkit
- Quickly gather info, organize, analyze, and communicate an intel briefing
  - E.g., Observed Chinese naval maneuvers vs stated doctrine
  - E.g., Immediate likelihood of unfriendly military coup in the Philippines

Build on
- Psychological studies of intelligence process
- Exemplary human-information interaction technology
Web Behavior Graphs (WBGs)
Summary: Critical Decision Method

• CTA was conducted to support development of a model of the intelligence analyst’s processes, biases, and analytic strategies
  – Goal: Provide input to build a computational model of analysis process
• Needed to uncover a different kind of domain knowledge
  – Critical Decision Method was tailored to focus on analysis
  – How an Intelligence Analyst goes about the task of analyzing a complex issue of strategic concern
• Analysis of a complex cognitive task, such the intelligence analyst's job, often requires the use of multiple techniques.
  – When results from several techniques converge, confidence is increased regarding the accuracy of the CTA model.
  – Method is still evolving
  – Next steps: Additional interviews and observe analysts perform task using open-source information on www