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Use of Analytic Tools and Techniques in the Homeland Security Classroom

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Monterey, California. Naval Postgraduate School

4th Annual Homeland Defense and Security Education Summit. Washington, D.C.
February 24-25, 2010
<https://hdl.handle.net/10945/25000>

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Instilling rigor and imagination in analysis

USE OF ANALYTIC TOOLS & TECHNIQUES IN THE HOMELAND SECURITY CLASSROOM

Presentation to: HSDECA
25 February 2010

Agenda

1. Five Classic Analytic Traps
2. Key Analytic Techniques
3. DC Sniper Case
4. How Can We Help You?

Five Classic Analytic Traps

- If we don't have a category for something, we usually ignore it.
- We discount facts that do not support our analysis.
- We overstate conclusions when a little data is consistent.
- We do not change our analysis despite mounting contradictions.
- We assume the present is like the past.

Key Analytic Techniques

- Challenge your assumptions.
- Generate multiple hypotheses.
- Search for inconsistent data.
- Check the reliability of the key evidence.
- Develop indicators.

Key Assumptions Check

Definition: An explicit exercise to list the linchpin assumptions that underlie the analysis.

The Method:

- List your working assumptions.
- Assess whether each is solid, requires some caveats, or is unsupported.
- If unsupported, assess how this would affect the analysis and key decisions.
- Refine the assumptions as necessary.

Multiple Hypothesis Generator

- Crisply define the lead hypothesis.
- Identify the key components
(*e.g., who, what, when, why, and how*).
- Generate plausible alternatives for each component.
- Compile all possible permutations.
- Discard illogical permutations.
- Select hypotheses most deserving of attention.

Analysis of Competing Hypotheses

The identification of a **complete** set of alternative hypotheses.

The systematic evaluation of data that is consistent and **inconsistent** with each hypotheses.

The **rejection** of hypotheses that contain too much inconsistent data.

ACH Software Tool

ACH 1.1.9 [C:\J-M Data 2005\Pherson Associates\ACH Data\Luna Example.achz]

File Edit Matrix Options Learning Aids Help

Enter Hypothesis Enter Evidence Sort Evidence By: Order Added Type of Calculation: Weighted Inconsistency Score Matrix Columns Tutorial

Classification:		H: 1	H: 2	H: 3	H: 4	
		Suicide	Internet Contact	Extramarital relationship	Professional hit man	Random Attack
Project Title:		Weighted Inconsistency Score				
Available Matric...		Enter Evidence				
Main	E10 Repeat trip	I	I	C	I	I
	E9 Missing money from evidence room	C	I	C	C	I
	E8 Roundabout route	I	C	C	C	I
	E7 Blood on toll ticket	I	C	C	C	C
	E6 Toll booth ticket (not needed)	I	C	C	C	C
	E5 Money, credit cards in car	C	N	C	C	I
	E4 No defensive wounds	C	I	I	I	I
	E3 Money from ATM	I	C	C	C	C
	E2 Car washed w/ own pen knife	I	C	C	I	C
	E1 Cell phone, keys in car before trip	C	I	I	C	I

Enter multiple hypotheses

Indicate consistency w/ hypothesis (I, N, NA, C)

Enter evidence items

ACH Software Tool

File Edit Matrix Options Learning Aids Help

Enter Hypothesis Enter Evidence Sort Evidence By: **Diagnosticity** Type of Calculation: **Weighted Inconsistency Score**

Classification:		H: 3	H: 4	H: 2	H: 1	
		Extramarital relationship	Professional hit man	Internet Contact	Suicide	Random Attack
Project Title:		Weighted Inconsistency Score	-2.0	-3.0	-4.0	-6.0
Available Matrix...		Enter Evidence				
Main		E10 Repeat trip	C	I	I	I
		E4 No defensive wounds	I	I	I	C
		E1 Left cell phone, glasses before trip	I	C	I	C
E10 Evidence N...		E9 Missing money from evidence room	C	C	I	C
		E8 Roundabout route	C	C	C	I
		E2 Killed w/ own pen knife	C	I	C	I
		E7 Blood on toll ticket	C	C	C	I
		E6 Toll booth ticket (not needed)	C	C	C	I
		E5 Money, credit cards in car	C	C	N	C
		E3 Money from ATM	C	C	C	I

Reorders hypotheses; can provide weighted inconsistency scores.

Moves most discriminating evidence to the top of the table.



Instilling rigor and imagination in analysis

THE DC SNIPER: AN ACH CASE STUDY

The Saga Begins

2 October 2002

- Bullet goes through window of Michael's craft store.

3 October 2002

- White male (55) shot at Shoppers Warehouse.
- Landscaper (39) shot mowing grass at car dealers.
- Indian immigrant (54) shot at Mobil next to Michael's.
- Latina housekeeper (34) shot seated at bus stop.
- White nanny (25) shot vacuuming minivan at Shell station.

A Perplexing Case

Common Characteristics:

- One shot, one victim.
- Other potential targets in the vicinity.
- Apparently high velocity rifle used.
- Witnesses heard a loud boom and then the victim fell; no one saw a shooter.

Hypothesis Generation

Analysis-based:

- Foreign terrorists.
- Domestic terrorists (White Supremacists).
- Serial killer (lone, white & male).

Evidence-based:

- A disgruntled Michael's store employee.
- A disgruntled Shoppers Warehouse employee.
- Etc.

Key Assumptions Check

Serial Killer Profile

White

Male

Single

Military Experience

Empirical Data

80 percent

99 percent

99.9 percent

Often the case,
but a necessary
requirement?

Loading the Evidence

Evidence		H1	H2	H3	H4
		Michael's	ForTer	SerKiller	DomTer
1	Shot fired at Michaels Store	CC	C	C	C
2	Blue car with two black men	CC	I	II	II
3	Killing at Shoppers Warehouse	I	C	C	I
4	Killing at Mobil near Michael's	CC	C	C	C
5	White van w/2 at Ramos killing	I	C	I	C
6	High Powered rifle used	C	C	C	C
7	White nanny shot at Shell station	I	C	C	I
8	Loud noise but no shooter	I	C	I	C

Key Assumptions Check

The White Van: A Public Preoccupation?

Description:

- White panel van with no writing
- Small white box truck
- White Chevy Astro
- White van with ladder rack on top
- White panel van with lettering on side

Loading the Evidence

Evidence		H1	H2	H3	H4
		Michael's	ForTer	SerKiller	DomTer
1	Haitian shot on DC street	I	C	C	C
2	Suspicious Caprice	C	I	II	II
3	TV profilers (white, male, lone, mil)	C	I	C	C
4	White female shot loading car at Michael's in Spotsylvania	CC	C	C	II
5	Dark car w/tinted windows	C	C	C	C
6	Black teenager in car	I	I	I	I

Check the Diagnosticity

Most Critical Evidence		H1	H2	H3	H4
		Michael's	ForTer	SerKiller	DomTer
1	Suspicious old car/Caprice	C	I	II	II
2	Blue car with two black men leaving Michael's store	C	I	II	II
3	Black teenager in Spotsylv. car	I	I	I	I
4	White nanny at Shell Station	I	C	C	C
5	White van w/2 at Ramos killing	I	C	I	I
6	Killing at Shoppers Warehouse	I	C	C	I

The Diagnosticity “Score” (or count up all the **I**s)

	<i>H2</i> ForTer	<i>H3</i> SerKiller	<i>H4</i> DomTer	<i>H1</i> Michael's
Number of Inconsistents	5	7	8	9
Weighted Score	4.1	5.8	8.7	10.2

What have we learned so far?

- H1 and H4 (Disgruntled Michael's Employee and Domestic Terrorist) are the most unlikely.
- H2 and H3 (Foreign Terrorist Serial Killer) are more probable, but they have a lot of **Inconsistents**.
- Need to add a new hypothesis for a Black Serial Killer.
- Reports of dark blue Caprice at least as important as White van/white box truck.

Loading More Evidence

Evidence		H1	H2	H3	H4	H5
		Michael's	ForTer	W Ser	DomTer	B Ser
1	Boy shot in school yard	I	C	C	C	C
2	Tarot card: "Call me God"	N	II	C	I	C
3	"For you Mr. Police"	I	I	C	I	C
4	Myers killed at Sunoco	I	C	C	I	C
5	Bridges shot at Spots. Exxon	I	C	C	I	C
6	Franklin killed at Home Depot	I	C	C	I	C
7	Sniper calls dispatcher and uses phrase "we"	II	C	II	C	I
8	Sniper cites AL killing (which involved 2 suspects)	II	II	II	II	I

Reassessing Diagnosticity

Most Critical Evidence		H1	H2	H3	H4	H5
		Michael's	ForTer	W Ser	DomTer	B Ser
1	Sniper cites AL killing (which involved 2 suspects)					
2	Blue car with 2 black men	C				
3	Sniper calls dispatcher and uses the phrase "we"			C		C
4	Suspicious Caprice	C				C
5	Black teenager in car					C
6	Tarot card: Call me God	N		C		C
7	T card: For you Mr. Police			C		C

The Diagnosticity “Score” (or count up all the **I**s)

	H5	H3	H2	H4	H1
	B Ser	W Ser	ForTer	DomTer	Michael's
Number of Inconsistents	7	11	11	12	18
Weighted Score	6.4	12.6	11.5	14.3	22.9

Loading More Evidence

Evidence		H1	H2	H3	H4	H5	H6	H7
		Michael's	ForTer	W Ser	DomTer	B Ser	2 Wh	2 Bl
1	Hooper shot at Ponderosa	I	C	C	C	C	C	C
2	Ziploc bag (demands/we)	II	II	II	II	II	C	C
3	Tacoma Credit Card/Ala	I	I	I	I	C	I	CC
4	Sniper calls Pastor (AL, "we")	I	I	I	I	I	C	C
5	Hispanic accent	C	I	I	I	I	I	I
6	Catalog dropped at AL site	II	II	II	II	I	II	C
7	Jamaican accent	C	I	I	I	C	I	C
8	Ride-on-Bus shooting	I	C	C	C	C	C	C

The Diagnosticity “Score”

(or count up all the **I**s)

	H7	H6	H5	H3	H2	H4	H1
	2 BI	2 Wh	B Ser	W Ser	ForTer	DomTer	Michael's
Number of Inconsistents	3	10	13	20	21	22	27
Weighted Score	2.1	10.4	13.7	22	24.5	26.2	34.8

Reevaluating Inconsistents in the Lead Hypothesis

Evidence		H1	H2	H3	H4	H5	H6	H7
		Michael's	ForTer	W Ser	DomTer	B Ser	2 Wh	2 BI
1	Hispanic accent	C	I	I	I	I	I	I
2	FBI Profile (white, male, likes guns, adult, angry)	C	I	C	C	I	I	I
3	TV profilers (white, male, lone, military background)	C	I	C	C	I	I	I

The Value of ACH

ACH instilled more rigor into the analysis by:

- Forcing you to generate multiple hypotheses.
- Helping you avoid premature closure.
- Allowing you capture all the data and add new hypotheses as you go along.
- Preventing you from dismissing data that may not be useful in the beginning.
- Focusing your attention on the most discriminating data.

The Value of ACH for the DC Sniper Case

Bottom Line: Sniper investigation was done very well.

If ACH had been used, however, it could have stimulated investigators to:

- Consider a broader range of perpetrators at the start.
- Dismiss the white van sooner as a key lead.
- Consider earlier on that the killer might be African American; might be 2 people.
- Shift the focus from conclusions to what the evidence is telling us.

ACH Software Tool

- Download for free.
- Easy to use.
- Has been adopted by analysts across the law enforcement and intelligence communities and even overseas.
- And now being taught at Fusion Centers around the country.

URL: www.pherson.org/ach.html

How Can We Help You?

Richards J. Heuer Jr. & Randolph Pherson *Structured Analytic Techniques in Intelligence Analysis* (February, 2010)

Sarah M. Beebe & Randolph Pherson. *Analysis in Action: Case Studies in Structured Analytic Techniques* (forthcoming).

Richards Heuer's *Psychology of Intelligence Analysis*
(available from Amazon.com or from www.pherson.org)

Free ACH software at www.pherson.org

Analytic Technique Checklists (available on request for KAC, ACH, and Indicators)

Handbook of Analytic Tools and Techniques
(available from www.pherson.org)