The Egmont Group
of Financial Intelligence Units

Egmont Strategic Analysis Course

Session 8

Advanced critical thinking

Participant Manual

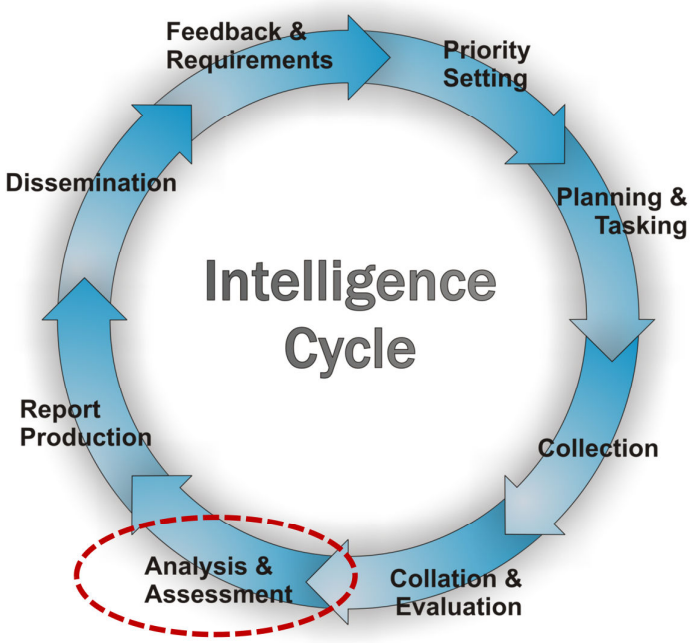
Version 25 October 2012

1. Introduction

In this session we cover the process of analysis but first of all we will deal with the process leading to generating hypotheses and making judgements.

As we'll see, given the nature of human decision-making, it is important to be aware of systematic problems with how we perceive information, how we evaluate it and how we make judgments. Given this awareness, we'll talk later about techniques that help to provide more valid analysis and its intelligence products.

While this session does not get into the applications of strategic intelligence, it **is** about the thinking required to create it and is therefore critical in providing valuable strategic financial intelligence that supports decision makers and reflects the responsibility we all have for doing it right.

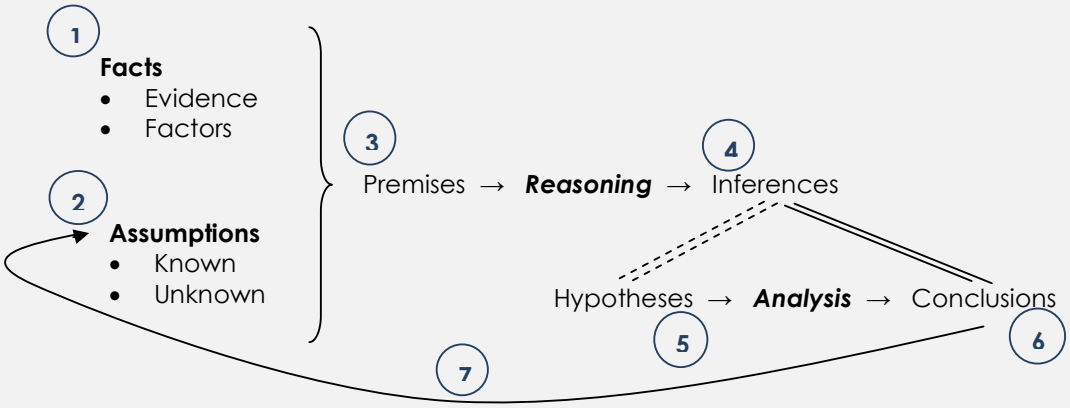


2. Strategic intelligence assessment

Analysis done in a laboratory is done in a controlled environment, in which specific procedures are used with clearly specified data parameters to achieve or test specific results.

Strategic analysis is not done in a laboratory and there is no predetermined formula for conducting strategic analysis.

In other words, while there are many tools and techniques available to the analyst, there are no generally-applicable sets of "how to" instructions for conducting strategic analysis. However, there are some fundamentals you must keep in mind in order to get the best results you can.



The analytical process

1. ***Facts*** *are our basic inputs, and can be identified by various terms, such as "evidence" or "factors".*
2. ***Assumptions*** *provide the contexts for the facts. They can be either known or unknown; stated or unstated, although, as we'll discuss shortly, unknown or unstated premises can be very dangerous. Note that facts and assumptions are not equivalent, but they both contribute to what we call "premises."*
3. ***Premises*** *are statements about the facts, in the context of our assumptions, whether known or unknown.*
4. ***Inferences*** *are the products of our reasoning to sort out the premises and derive what they collectively mean.*
5. ***Hypotheses*** *are our collection of plausible inferences, supported by our initial reasoning.*
6. ***Conclusions*** *are the hypotheses that survive, following our analysis. The conclusions are thus the products of our reasoning and our analysis.*
7. *Finally, we can draw a line back from our conclusions to reflect the cyclical or self-feeding nature of the process. Our conclusions in one round become some of our assumptions for the next one.*

a) Definitions and how they fit.

In the most basic characterization, "facts" are pieces of information and "premises" are statements about facts.

The premises we set out about those facts address what the facts tell us in relation to their relevance to one or more particular intelligence questions. Our "assumptions" provide the context within which the facts occur. In some respects, they can be understood as being the "glue" that binds the facts and other information. However, all too often, our assumptions actually obscure our facts and lead us to misunderstand them. So, when constructing our premises, we must keep in mind that we do so about facts either together with or in the context of our assumptions.

Inferences are the hypotheses or conclusions that are based on premises, and thus on our facts and assumptions. An hypothesis is a statement of cause and effect or some other relationship among a set of premises. It is arrived at through reasoning, through a logical synthesis.

A conclusion is also a statement of cause and effect or some other relationship among a set of premises, arrived at through a combination of reasoning and analysis. A hypothesis becomes a conclusion only after it has survived sufficiently the rigorous analysis that we perform.

b) Facts

A fact is what has actually happened; what is true. It can be verifiable by empirical means and can be distinguished from interpretation, inference, judgment, or conclusion. Facts are the raw data.

There are distinct senses of the word "factual": "True" (as opposed to "claimed to be true"); and "empirical" (as opposed to conceptual or evaluative). You may make many "factual claims" in one sense, that is, claims which can be verified or disproven by observation or empirical study, but I must evaluate those claims to determine if they are true.

People often confuse these two senses, even to the point of accepting as true, statements which merely "seem factual".

Alleged facts should be assessed for their accuracy, completeness, and relevance to the issue. Sources of alleged facts should be assessed for their qualifications, track records, and impartiality.

Occasionally, you will see, hear or use words like "evidence" or "factors" when talking about facts. These have similar, but slightly different meanings.

c) Premises

A premise is the starting point for a reasoning process. It is based on fact or an accepted assumption, or a combination of the two.

Premises are statements that form the basis for an argument or inference, and are used to identify facts or pieces of information that go together.

Premises are considered objective and accurate, and should have been previously assessed to determine their validity. The assumptions that provide the context for the premises must also have been assessed.

By the time we start the process of generating inferences (hypotheses), there should be minimal or no question about the data (the facts) and the validity of the assumptions.

Example

Facts:

- *Julie lives at 45 Main street.*
- *Julie lives alone.*
- *The phone number for 45 Main street is 999-6633.*
- *Julie does not own a cell phone.*

Premise

Julie's home phone number is 999-6633, and she lives at 45 Main Street.

Example

Fact:

- *John drives a cab for a living.*
- *John's tax information indicates that he made $37,000 last year.*
- *John takes frequent trips abroad.*
- *John owns a house valued at $550 000 that he owns outright.*

Premise

John has a source of income not identified in the above information.

Activity 8.1 – Developing premises

You have been given five (5) pieces of information about two neighbouring countries, Gergovan and Caprica. You'll first need to group the factual pieces together in sets of one or two and then develop premises, for example one premise for each set.

Do this as a group, using quick brainstorming. Remember the brainstorming rules, especially:

- No interpretation
- No criticisms
- Every idea is valuable, including contradictory ideas
- Generate quickly
-

Information

1. *Gergovan national news reports that drug cartels have been increasing their hold on territories throughout the country.*
2. *Gergovan military reporting states that ex-members of their special forces are employed by the Gergovan drug cartels for protecting their drug shipments and security.*
3. *Caprican police report that Gergovan citizens have been arrested in Caprica for drug trafficking.*
4. *Caprican classified reporting indicates that Gergovan drug cartels have set up a distribution center in Caprica's capital city.*
5. *The Caprican FIU received several suspicious transaction reports from banks about Gergovans making large cash deposits into the same bank account, 34577982.*

d) Inference

An inference is a step of the mind, an intellectual act by which one hypothesizes or concludes that something is true in light of something else's being true, or seeming to be true.

The **inference is the explanation** of what information (the facts, in the context of the assumptions, as stated in the premises) means. The inference initially succinctly describes a hypothesis or theory of what is going on and can take the form of a conclusion, prediction or estimation. It is, by definition, the result of a logical process, although one must be careful to ensure that it actually is.Inferences are derived through critical reasoning.

Inferences (hypotheses and conclusions) are claims that the analyst is trying to prove. They often begin with terms, such as: "so", "therefore", "thus", "hence". They are usually found at the first or last sentence of a logical argument. Building blocks can often be confused for hypotheses or even conclusions. This might occur, for example, because information from other intelligence sources, which we use as building blocks, often has the same flavour as inferences.

e) Inference development

The process of inference development is more than just re-iterating information – it's about extracting meaning from data or information, and developing a theory or theories about what the data mean.

It is important to remember that any set of information will have alternative explanations, so it is important not to jump to any conclusions. To prevent this, we can use a cyclical approach which includes collection, organization and evaluation of the data, followed by the identification and challenge of the assumptions, which leads onto the development of premises. Inferences can then be developed from those premises.

This cycle can then be repeated as a logical process. The key benefit of using inference development is that it slows down your thinking, prevents jumping to conclusions, and forces you to process all the information in a systematic way.

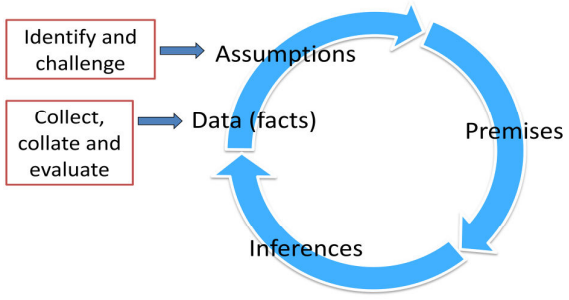


Figure 8.2 – *Inference development*

3. Critical reasoning

There are different types of critical reasoning:

Simple

- Inference must necessarily follow from the information provided
- This moves from information to a self-evident inference (logical conclusion)

> ***For example***
> *If A > B, and B > C, then A must > C*
>
> *All humans are mortal (evidence), I am human (evidence), therefore, I am mortal (conclusion)*

Medium level of complexity

- Conclusion is generalized from the observed evidence
- Move from specific facts to a general rule, involves assumptions

> ***For example***
> *Scientific research and some strategic intelligence*

Complex

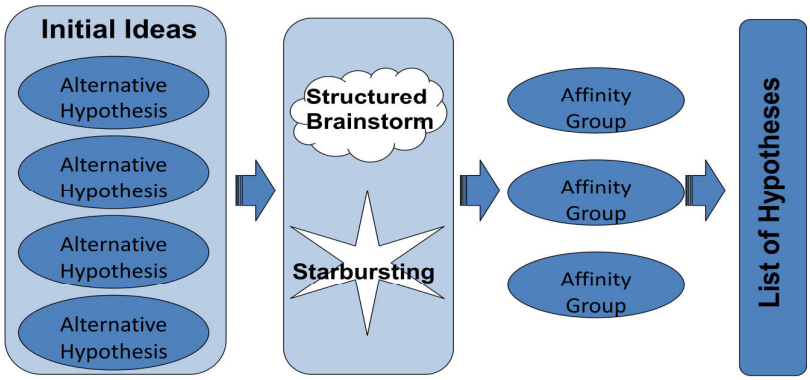
- Conclusion is considered probably true because it is the most plausible explanation
- Move from information to the best explanation, largely assumptions

> **For example**
> Strategic intelligence

a) Simple Hypothesis generation

At the beginning of a project it is important to establish at some hypotheses to be tested. It (or they) acts as the goal when performing the analysis:

- A systematic analysis of alternatives is required because of the sheer importance of the subject matter
- A large number of variables are included, and therefore need to be explored/tested in the analysis
- The outcome is uncertain (the hypothesis provides focus)
- There are competing views amongst analysts and/or decision makers.



Activity 8.2 – From premise to hypotheses

Using the premises that we developed for the Gergovans and Capricans case, develop **one or more inferences** using the technique called "Simple Hypothesis Generation". You have 5 minutes to complete this task.

Steps in simple hypothesis generation:

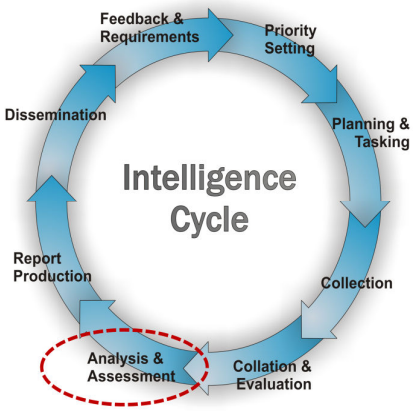
1. Each team member to write up to three alternative explanations (hypotheses) on a post-it note
2. Put the post-its on the flip chart (duplicates together)
3. Brainstorm to identify key factors and drivers
4. Aggregate the hypotheses into affinity groups and label groups
5. Ask if opposites could be true to develop new ideas and update the set
6. Clarify each hypothesis by asking who, what, when, where, why and how
7. Select the most promising hypotheses for analysis.

Premises

1. *Reporting indicates that drug cartels are active in Gergovia and have employed ex-special forces as security.*
2. *Gergovan citizens are setting up a distribution network for drug trafficking.*
3. *Gergovans are making several cash deposits into a common bank account in Caprica.*

4. Analysis

We have been discussing, at a high level, the essential process by which we start with the various bits and pieces of information and turn them into our various products. Now we come to the heart of that process. Interestingly enough, it's called "analysis."



So, fundamentally, analysis is:

- The separation of something complex into its constituent parts for individual study.
- The study of such constituent parts and their interrelationships in making up a whole.
- Comparison between two or more facts.
- Formally testing facts against one another to determine their causal and other relationships and how they relate to the whole.

In intelligence usage, analysis is a step in the processing phase of the intelligence cycle in which information is subjected to review in order to identify significant facts for subsequent interpretation.
By definition, then, "analysis" is the opposite of "synthesis," the process we use to make inferences.

Strategic financial intelligence analysis is best when it employs and effective combination of **qualitative** and **quantitative** analysis.

a) Quantitative analysis

Quantitative analysis is an attempt to objectively describe and understand behaviour by using sometimes complex mathematical, statistical and logical modeling, measurement and research techniques. By assigning numerical values to variables, quantitative analysts try to replicate reality mathematically.

Quantitative analysis can be done for a number of purposes, such as simple description and measurement, or to look across and make sense of large volumes of data, to detect and identify patterns and anomalies. It can also be used to identify trends, key event relationships, etc., and thereby help us to predict future events.

Quantitative analysis therefore answers the "what" in our analysis – what has happened, what has changed, what is going to happen?

In our terms, quantitative analysis includes the use of such things as complex data-mining, pattern recognition and social network analysis algorithms.

Examples of quantitative analysis include everything from simple ratios, such as reporting volumes per time period, to something as complicated as identifying and highlighting the geographic and temporal variations in money flows between two or more countries involved in terrorist financing activities.

Most quantitative research follows a linear path. Quantitative analysis emphasizes precisely measuring variables in testing hypotheses that are linked to general causal explanations.

Although quantitative analysis is a powerful tool for strategic analysis, it rarely tells a complete story without the help of its opposite - qualitative analysis.

b) Qualitative analysis

Qualitative analysis considers identifiable attributes, features, qualities, etc., to make judgements about, for example, the nature of something or its relationships, against specified or unspecified (not good!) criteria.

Qualitative analysis emphasizes developing insights, generalizations and, ultimately, interpretations from the data. It often follows a non-linear approach. It is not as straightforward as quantitative analysis.

Qualitative analysis usually relies on s*oft data,* non-quantifiable information, in the form of impressions, words, sentences, photos, symbols, and so forth, which dictate different research strategies, data collection and analytical techniques, for example, identity or link analysis.

Qualitative analysis is usually most effective in answering the "why?" question. Sometimes qualitative analysis can be, or appear to be, subjective. It is important to avoid this by using clearly-defined, rules-based processes and techniques.

This type of analysis technique is different from quantitative analysis, which focuses on numbers. The two techniques, however, will often be used in a mutually-complementary fashion. They often both capitalize on each other to mutually support and refine the results of the analysis.

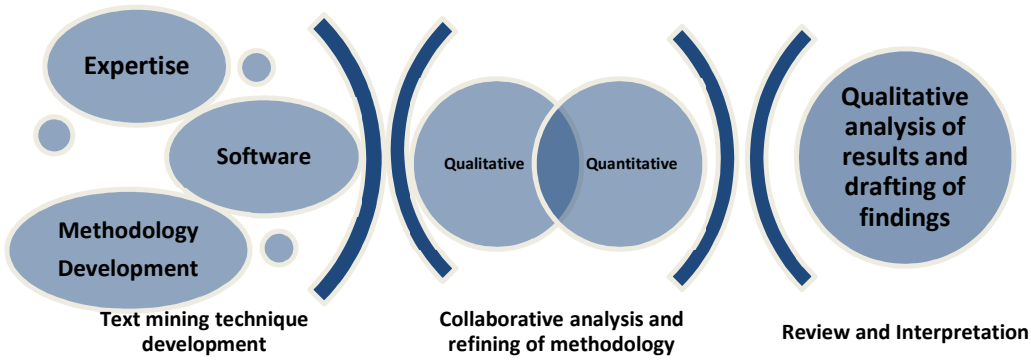


Figure 8.3 - *Qualitative & Quantitative Analysis Symbiosis*

c) Testing hypotheses

The objective when testing your hypotheses is to reduce your initial set of hypotheses to reduce its number …

- ➔ After generating hypotheses (i.e., inferences)
- ➔ Conducting the analysis and interpret the results
- ➔ Eliminating those hypotheses that don't "survive" the analysis
- ➔ Leaving those we now call conclusions.

d) Conclusions

The hypotheses, i.e., the inferences that withstand effective testing become your conclusions, which, when assembled and formally stated, constitute your assessments against the intelligence question.

Your conclusions and assessments are therefore the results of both reasoning (otherwise known as "synthesis") and analysis. Both of these are required and they interact with each other to achieve good, defensible conclusions.

However, we are not doing this analysis in the highly controlled environment of a laboratory and there are almost always more relevant things going on than we can include in our analysis. It is therefore not always the case that one can reach a categorical conclusion; sometimes the result is that there is insufficient information or that the information is not sufficiently consistent to reach a conclusion.

e) Making assessments

Our assessments are almost always made in the face of some continuing ambiguity or absent information. Assessments are therefore matters of considerable judgement.

At the point making our assessments under such circumstances, we must ask ourselves the following questions:

- Is the remaining ambiguity sufficient to forestall any assessment?
- If so, is there a possibility of obtaining more information to support a firm assessment in the time available?

If the answer to these is "no", then one's primary assessment must be that there is insufficient information, at the time, to provide a definitive answer to the intelligence question. As an alternative, it may be possible to provide a conditional assessment – one that provides users with useable indicators of whether or not it is valid?

In the end, one of the best devices to supplement an assessment is a clear statement of the level of confidence the analyst places on that assessment. Doing so is not a mechanism for avoiding one's responsibility for the assessment, but providing additional information to the recipient to help him or her decide how much to rely on it. This can prove a great advantage to the recipient.

Diagnostic reasoning

Diagnostic reasoning, which is discussed on page 15 of your SAT Toolkit, is used to evaluate a single, usually new piece of information. It is used instead of making a snap, often erroneous judgement on the meaning of the information in relation to a favoured or alternative hypotheses/ conclusions.

Diagnostic reasoning helps balance one's natural tendency to interpret new information as favourable to his or her existing understanding (mental model) of what is happening. It reduces the element of surprise.

The diagnostic process is to try to use then new piece of information to try to refute alternative judgments, rather than to confirm the existing one. It is a building block of analysis of competing hypotheses, which is a more complex process, dealing with multiple pieces of information. Diagnostic reasoning is used extensively for some time by the medical profession to solve diagnostic problems.

Strategic Analysis Course

Session 8

Advanced critical thinking

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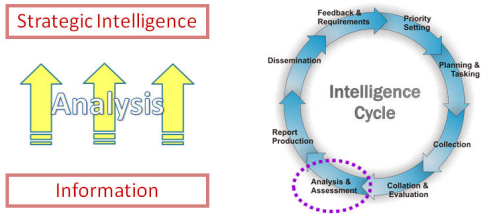
From Information to Strategic Intelligence



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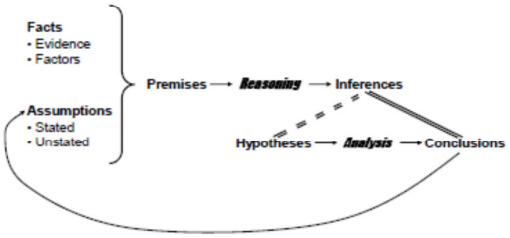
Strategic Intelligence Assessment

3

Analysis Logic Flow



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Facts

What has actually happened..... what is true

- Data
  - facts collected and organized for analysis
- Evidence
  - data on which a judgment or conclusion might be based or by which proof or probability might be established
- Factors
  - in logic or mathematics, the elements contributing to a particular result

5

Premises

Statements that form the basis of an inference

- Premises are considered true and based on facts or assumptions

What premises look like

- Include "because," "since," "for," "given that"
- Answers the question: "What proof does the writer provide to support that view?"

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From Facts to Premises

Examples

Facts

- Julie lives at 45 Main Street.
- Julie lives alone.
- The phone number for 45 Main street is 999-6633.
- Julie does not own a cell phone.

Premise

- Julie's home phone number is 999-6633, and she lives at 45 Main Street.

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From Facts to Premises

Examples

Facts

- John drives a cab for a living.
- John's tax information indicates that he made $37,000 last year.
- John takes frequent trips abroad.
- John has a house valued at $550, 000 that he owns outright.

Premise

- John has a source of income not identified in the above information.

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Activity

8.1 Developing premises

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Activity: Information pieces

1. Gergovan national news reports that drug cartels have been increasing their hold on territories throughout the country.
2. Gergovan military reporting states that ex-members of their special forces are employed by the Gergovan drug cartels for protecting their drug shipments and security.
3. Caprican police report that Gergovan citizens have been arrested in Caprica for drug trafficking.
4. Caprican classified reporting indicates that Gergovan drug cartels have set up a distribution center in Caprica's capital city.
5. The Caprican FIU received several suspicious transaction reports from banks about Gergovans making large cash deposits into the same bank account, 34577982.

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Activity: Premise 1

1. Gergovan national news reports that drug cartels have been increasing their hold on territories throughout the country.
2. Gergovan military reporting states that ex-members of their special forces are employed by the Gergovan drug cartels for protecting their drug shipments and security.

Premise:
Reporting indicates that drug cartels are active in Gergovia and have employed ex-special forces as security.

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Exercise: Premise 2

3. Caprican police report that Gergovan citizens have been arrested in Caprica for drug trafficking.
4. Caprican classified reporting indicates that Gergovan drug cartels have set up a distribution center in Caprica's capital city.

Premise:
Gergovan citizens are setting up a distribution network for drug trafficking.

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Exercise: Premise 5

5. The Caprican FIU received several suspicious transaction reports from banks about Gergovans making large cash deposits into the same bank account, 34577982.

Premise:
Gergovans are making cash deposits into a common bank account.

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Inference

- An intellectual act by which one hypothesizes or concludes that something is true in light of something else's being true, or seeming to be true.
- The result of a logical process.
- A claim that the analyst is trying to prove
  - "So", "therefore", "thus", "hence"
  - Usually, the last (or first) statement of the argument

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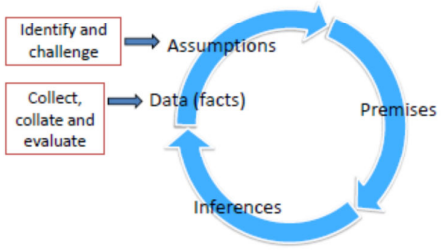
Inference Development



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Inferences Made through Critical Reasoning

Different types of critical reasoning:

- Simple
  Information → self-evident inference
- Medium Complexity
  Specific facts → general rule
- Complex
  Information → best explanation

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Simple hypothesis generation

When to generate hypotheses

- A systematic analysis of alternatives is required because of the sheer importance of the subject matter
- A large number of variables are included, and therefore need to be explored/tested in the analysis
- The outcome is uncertain
- There are competing views amongst analysts and/or decision makers.

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Activity

8.2 Hypothesis generation

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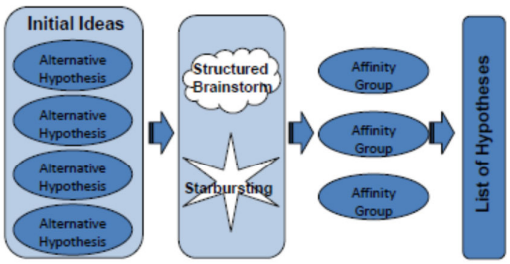
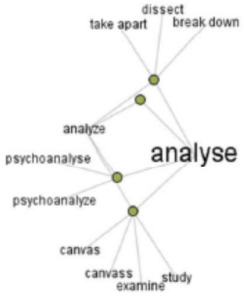
Simple Hypothesis Generation



Analysis



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Analysis

- The resolution of something complex into its constituent parts
- A comparison between two or more of something

Quantitative analysis

Qualitative analysis

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Quantitative analysis

- Uses mathematical, statistical and logical modeling, measurement and research techniques
- From simple description and measurement, to detecting and identify patterns and anomalies in large volumes of data
- Can involve complex algorithms for data-mining, pattern recognition or social network analysis

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Qualitative Analysis

- Considers identifiable attributes, features, qualities, etc., to make judgements against criteria
- Emphasizes developing insights from the data
- Often follows a non-linear approach
- Answers the "why?"

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Qualitative & Quantitative Analysis Symbiosis

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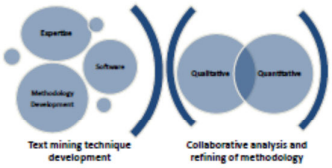
Qualitative & Quantitative Analysis Symbiosis



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Qualitative & Quantitative Analysis Symbiosis

26

Simple?

Straightforward?

NOT!

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Testing Hypotheses

After generating hypotheses (i.e., inferences)

↓

Conduct the analysis and interpret the results

↓

Eliminate those hypotheses that don't "survive" the analysis

↓

Leaving those we now call …

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Conclusions!

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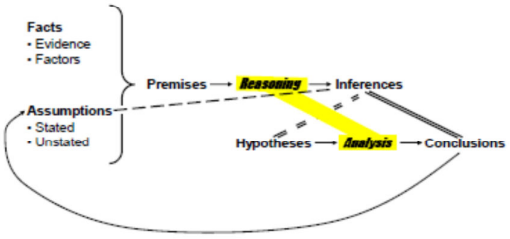
Analysis Logic Flow



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Conclusions?

- The hypotheses that withstand effective testing (analysis) become your conclusions.

…but it is not always the case that one can reach a categorical conclusion.

  - Sometimes the information is insufficient or contradictory.

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Making Assessments

- Assessment in the face of continuing ambiguity or absent information is a matter of considerable judgement:
  - Is the remaining ambiguity sufficient to forestall any assessment?
  - Is there a possibility of obtaining more information to support a firm assessment in the time available?
  - Is it possible to provide a conditional assessment – one that provides users with useable indicators of whether or not it is valid?

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Making Assessments

- In the end, one of the best devices to supplement an assessment is a clear statement of the level of confidence the analyst places on that assessment.
  - Doing so is not a mechanism for avoiding one's responsibility for the assessment, but providing additional information to the recipient to help him or her decide how much to rely on it

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The Analyst's Task:

"If it is a fact, it ain't intelligence."

Former CIA Director, Michael Hayden

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Questions

?