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Critical Thinking

**Structured Decision Analysis
and Problem Solving**

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Before We Begin, What Do You Know?

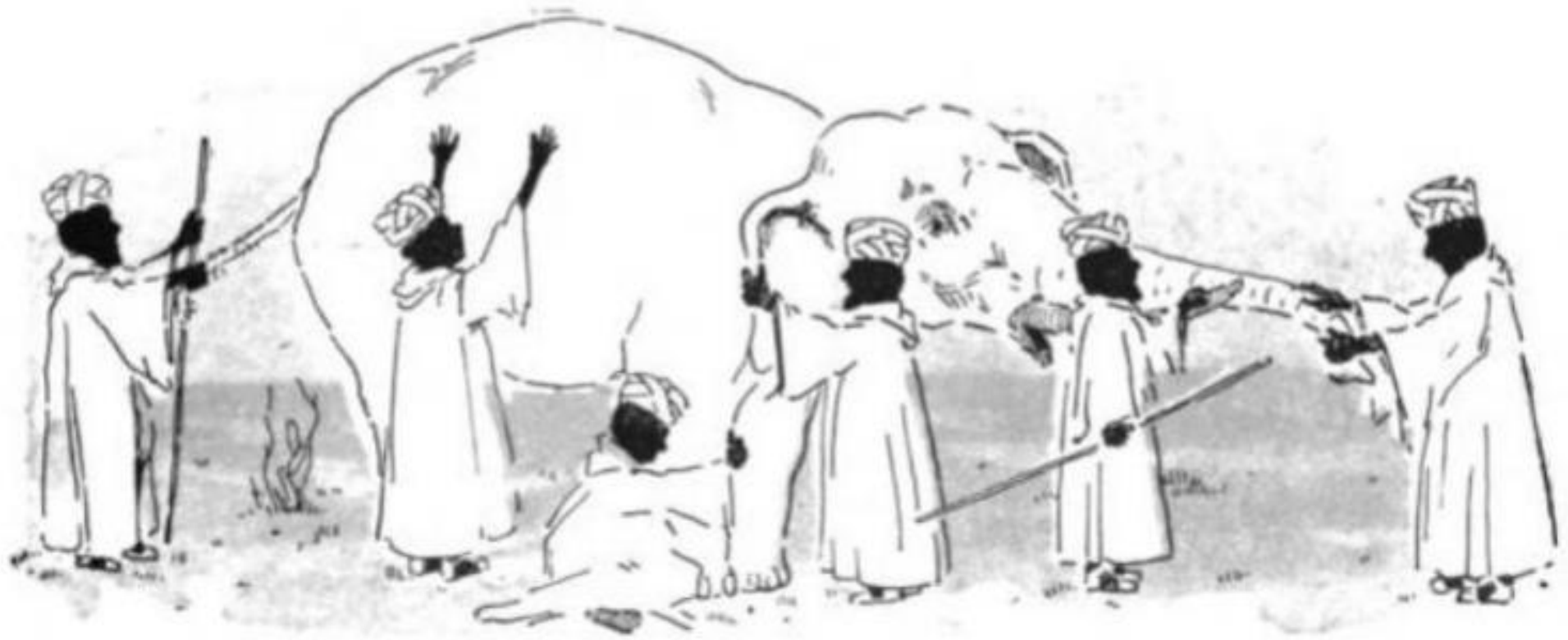
It's not what we don't know that hurts us.

It's what we know that isn't so.

- *Mark Twain*



The Blind Men and the Elephant



By Illustrator unknown - From Charles Maurice Stebbins & Mary H. Coolidge, Golden Treasury Readers: Primer, American Book Co. (New York), p. 89., Public Domain, <https://commons.wikimedia.org/w/index.php?curid=4581171>



Agenda

- What is critical thinking?
- Can it be measured, quantified or analyzed?
- The role of critical thinking in underwriting and problem solving
- Structured analysis and tools
- Obstacles
- Ignorance is no excuse

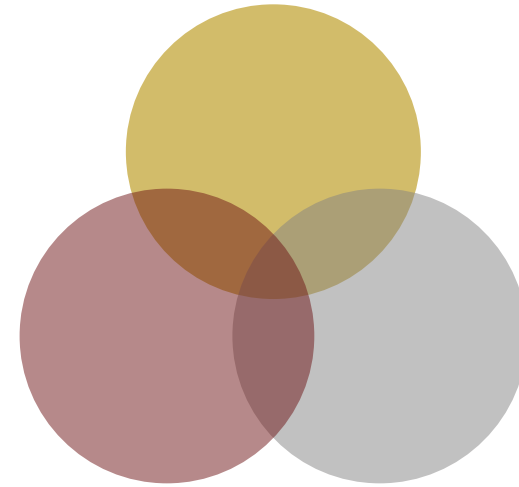
What Is Critical Thinking?

- Critical thinking
 - The ability to think clearly and rationally
 - Understand the *logical* connections between ideas
 - Identify, construct and evaluate arguments
 - Detect inconsistencies and common mistakes in reasoning
 - Solve problems systematically
 - Identify the relevance and importance of ideas
 - Reflect on the justification of one's own beliefs and values
- Compare this to creativity
 - A matter of coming up with new and useful possibilities



Critical vs. Creative Thinking

- Convergent thinking
 - Narrowing the focus
 - Cutting through alternatives
- Divergent thinking
 - Widening the view
 - Looking for alternatives and options
- Consider the forest and the trees
- How good is the zoom on your camera?
- Divergent thinking can be inherently uncomfortable for us
 - Yet those points of view are important to critical and creative thinking processes
- Creative thinking and developing divergent skills are a necessary part of critical thinking, but some of the creative thinking specific tools we'll hold for another day





So the Questions Are

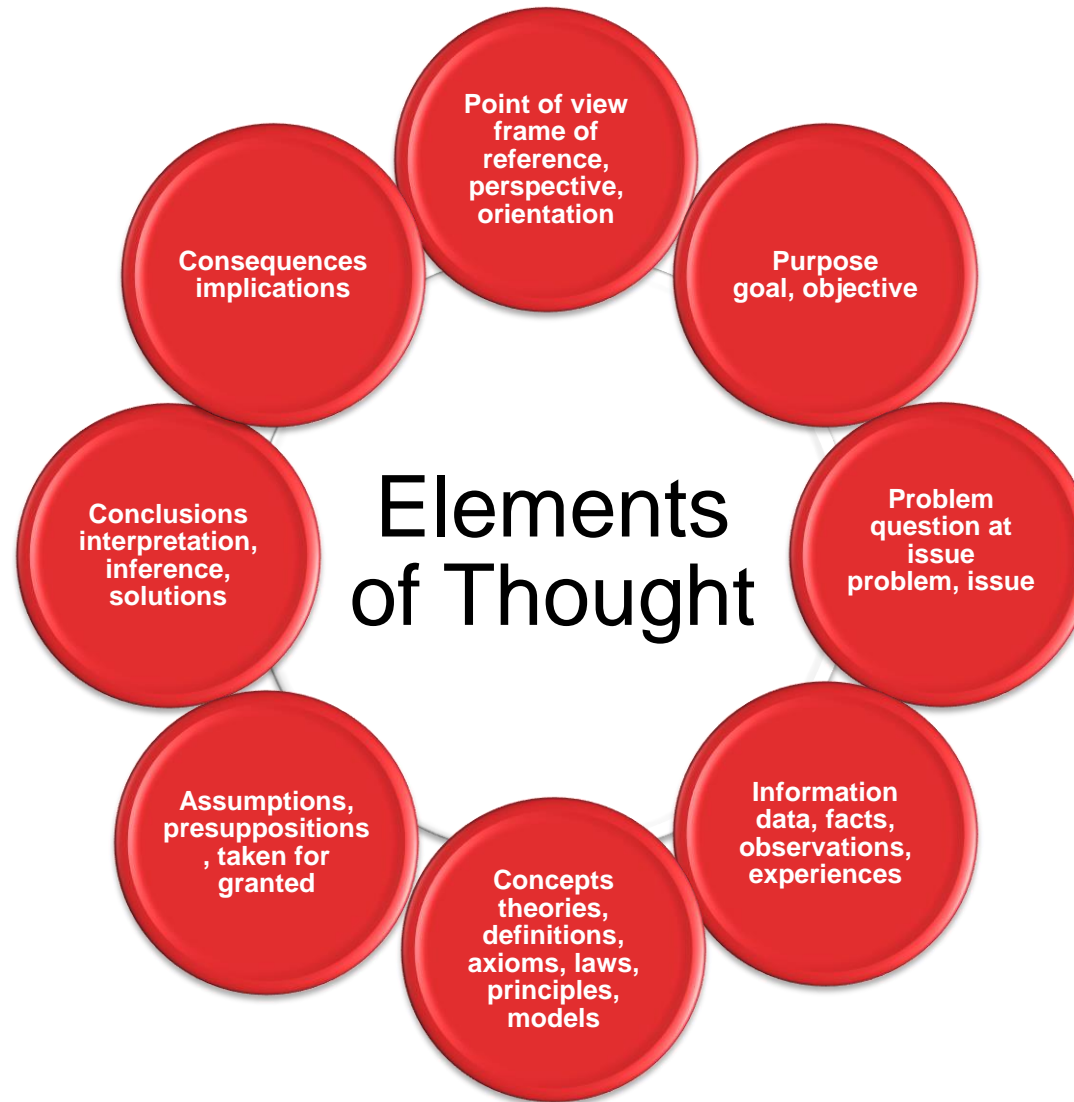
- How do we meet the standards of critical thinking?
 - Can the skills be learned and developed?
 - Yes
 - Are there competencies common to critical thinkers?
 - Yes
 - Can critical thinking be measured?
 - Yes, so can the results of our decisions
 - Are there tools and methods we should be aware of?
 - Yes, and we already use many of them
 - Do certain problems lend themselves to certain means of analysis?
 - Yes, all of them



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Critical Thinking Core Competencies

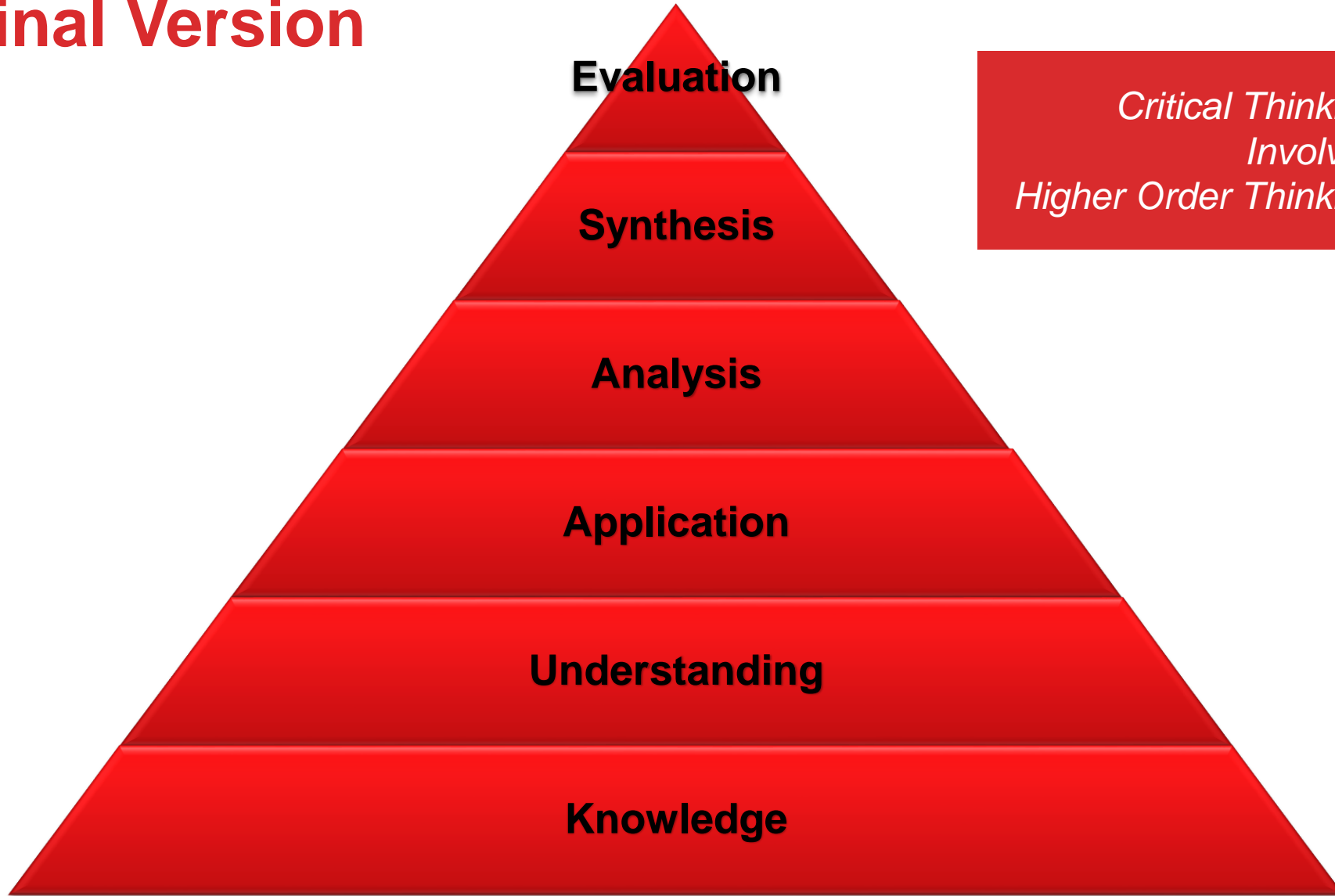
Consider the Elements of Thought



PICKAXE – Core Competencies and Considerations

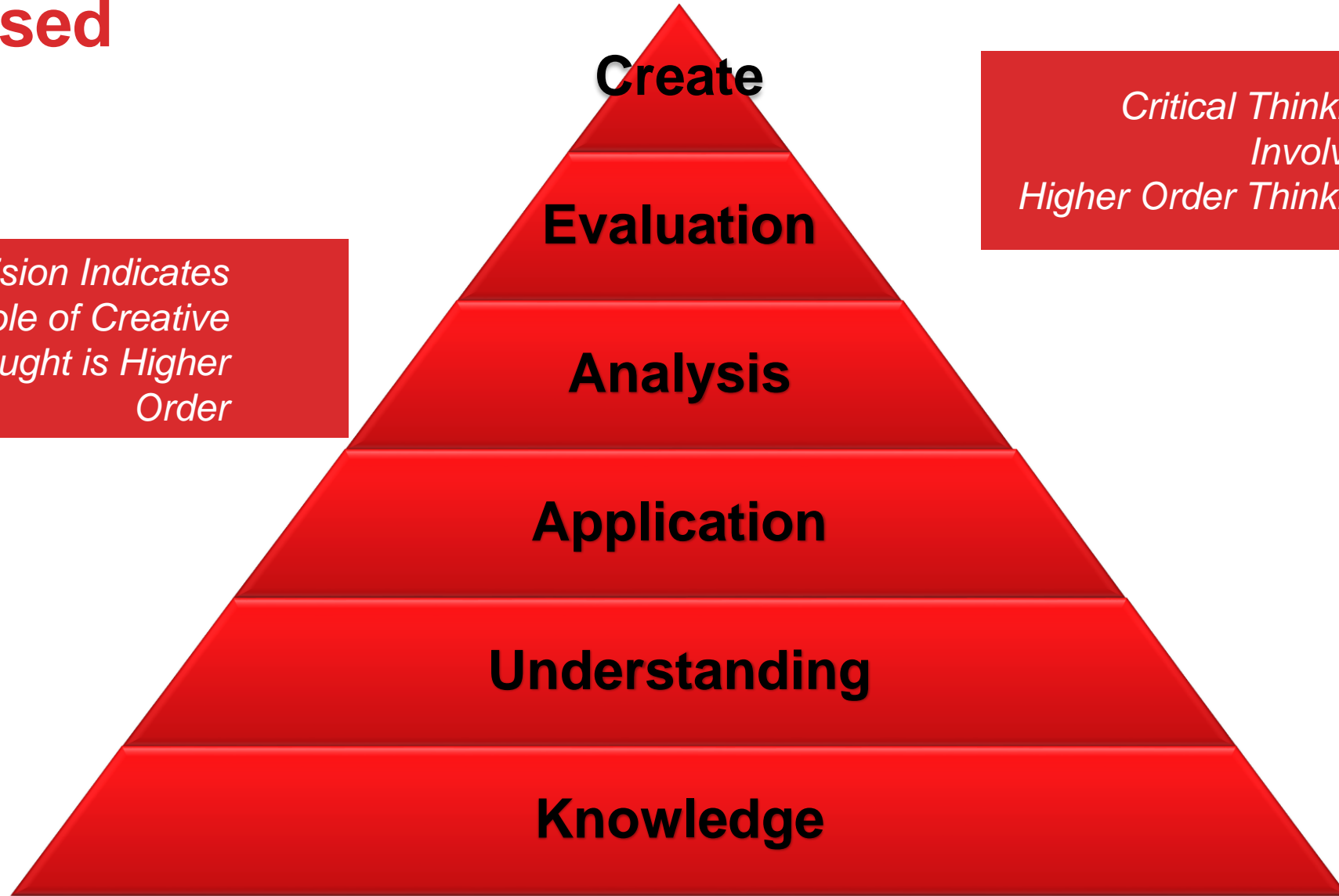
PPPICACC	
Point of View	All reasoning is done from some point of view
Purpose	All reasoning has a purpose
Problem	All reasoning is an attempt to figure something out, to settle some question, solve some problem
Information	All reasoning is based on data, information, & evidence
Concepts	All reasoning is expressed through, and shaped by, concepts and ideas
Assumptions	All reasoning is based on assumptions
Conclusions	All reasoning contains inferences or interpretations by which we draw conclusions and give meaning to data
Consequence	All reasoning leads somewhere or has implications and consequences

Bloom's Taxonomy Original Version



*Critical Thinking
Involves
Higher Order Thinking*

Bloom's Taxonomy Revised



*Critical Thinking
Involves
Higher Order Thinking*

*The Revision Indicates
the Role of Creative
Thought is Higher
Order*

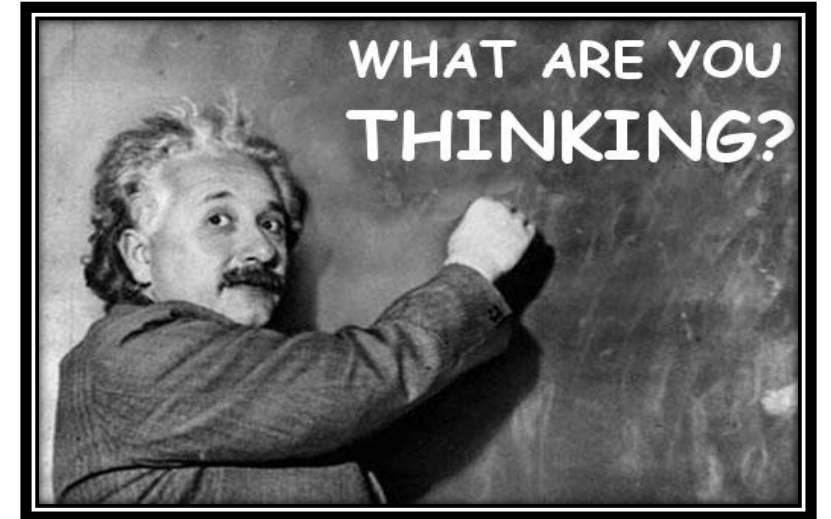


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Critical Thinking & Underwriting Bringing the Case Together

The Role of Critical Thinking: Underwriting and Problem Solving

- Underwriting has been described as both science and art
 - Science – critical thinking
 - Art – creative thinking
- Is there a distinction between critical and creative thinking?
- Can critical thinking be taught? Learned?
- Underwriters can begin with → problem plan solution



Problem, Plan, Solution

Elementary Critical Thinking Program for Underwriters

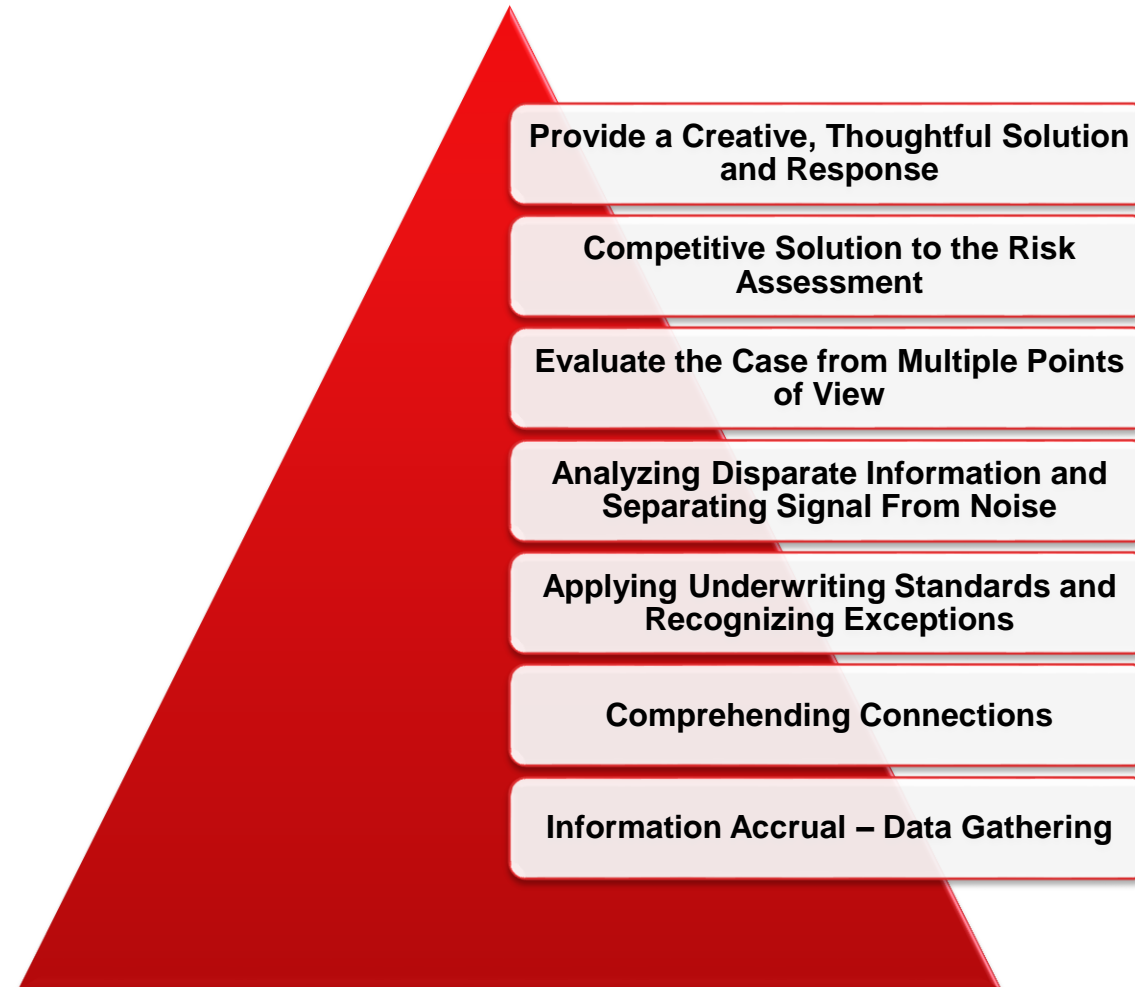
- Problem List
 - Identify factors critical to the case assessment
 - Outstanding requirements
 - Known problems
 - Any outstanding follow ups or tests not completed
 - Unresolved questions, conflicting information
 - Current status, last known status, trend line
- Plan
 - What steps to resolve outstanding issues
 - Requirement reminder
 - Co-signature or medical department review if necessary
 - Retention, auto-pool or facultative?
 - Tentative rating or quote
- Solution
 - Actual quote





Underwriters' Approach to Problems

Bottom Up Approach, Tip of the Hat to Bloom





Assessing a Case

Looking for Alternatives to Adverse Action

Assess the Points of View and Alternate Solutions

- Does the case require a co-sign or medical review?
 - Would a peer or manager review be helpful?
- Considerations
 - Time service
 - Do we have enough information?
 - If not, what is the most expeditious method to obtain the information?
 - Is the information:
 - Complete?
 - Accurate or suspect?
 - Adequately addressed or not? Any contradictions?
- Before deciding the final solution and sending a quote, consider the impact of a final decision or additional requirements
 - The company: underwriter
 - The company: pricing
 - The company: agent
 - Proposed Insured
 - Proposed insured's medical care provider
 - Other points of view?



The Tools of the Trade

Tools for decision analysis

- Underwriters actually use multiple tools to assist in analysis
- Sometimes we use them knowingly, sometimes it's because of the way we were taught
- As with any skill, critical thinking needs to be practiced until it becomes second nature and habitual
- Even then, we can't take the process for granted
- Use of tools and process helps keep us in critical thinking mode



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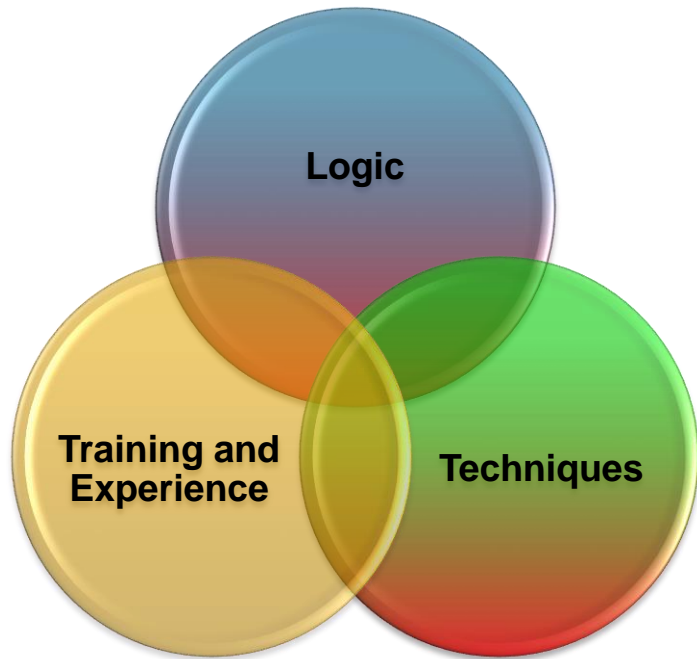
Tools & Techniques

Forestall thinking of
or mentally committing to
a decision or solution ...
until the problem is properly formulated

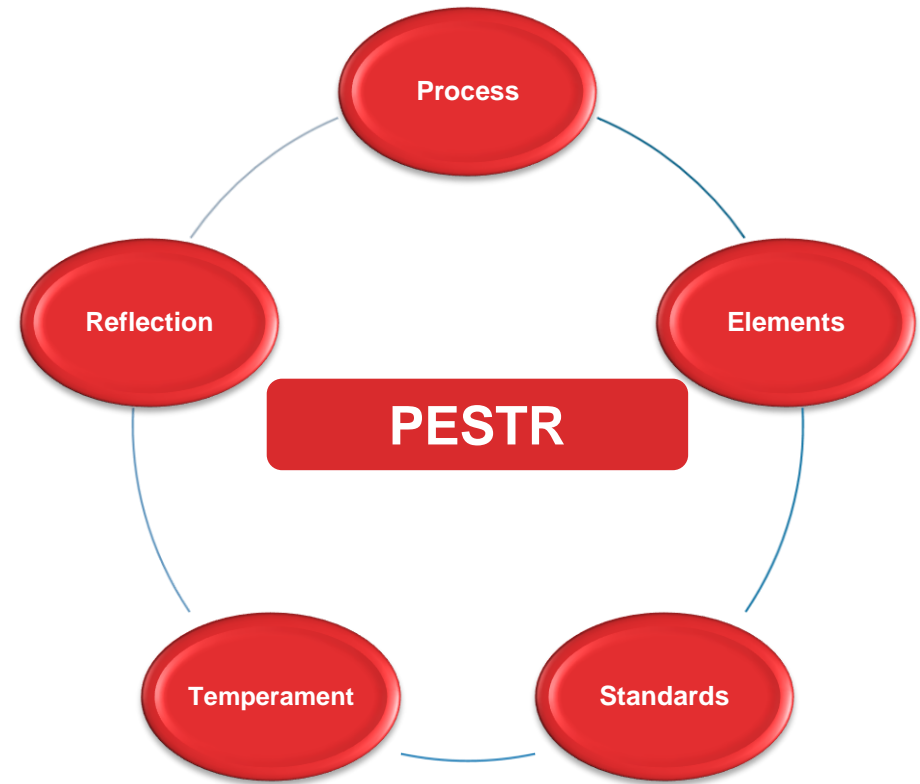
We Could Use the Tools, or We Could Guess



Tools for Critical Thinking – The Basics



Traditional View



Evolving View



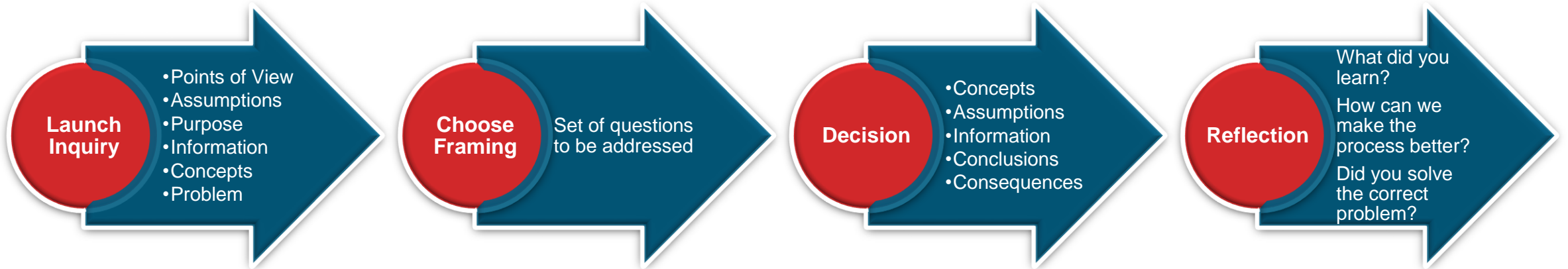
Critical Thinking Assessment Grid

PPPICACC pronounced “*PICKAXE*”
Be certain to use CARE

	Clear & Precise	Accurate & Logical	Relevant, Broad, Significant, Deep	Evenhanded & Ethical
Point of View				
Purpose				
Problem				
Information				
Concepts				
Assumptions				
Conclusions				
Consequence				

Problem Formulation – Individual Inquiry (I²)

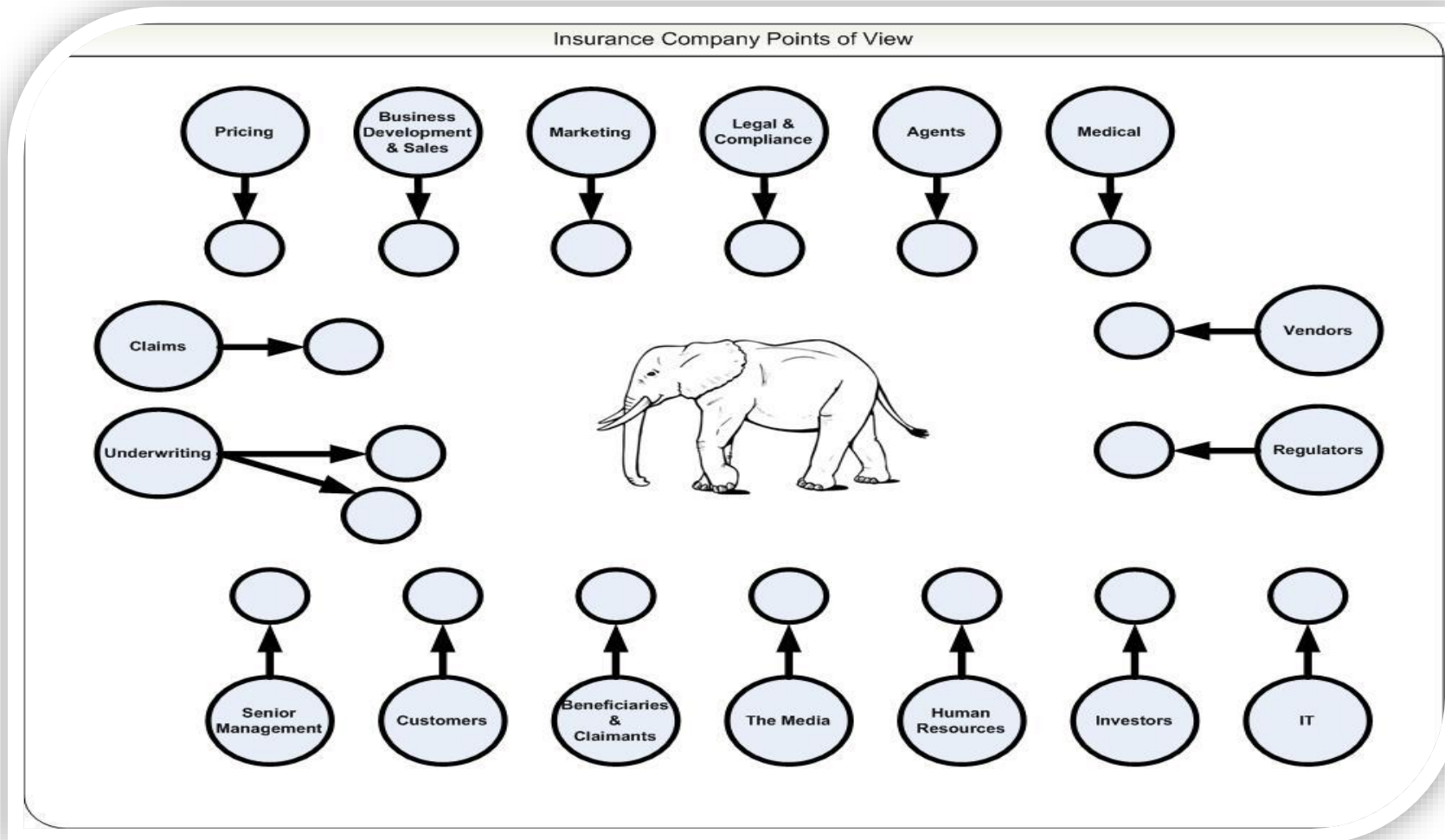
Getting to the correct problem



Forefall thinking of
or mentally committing to
a decision or solution ...
until the problem is properly formulated

Points of View

Looking for the Elephant in the Room



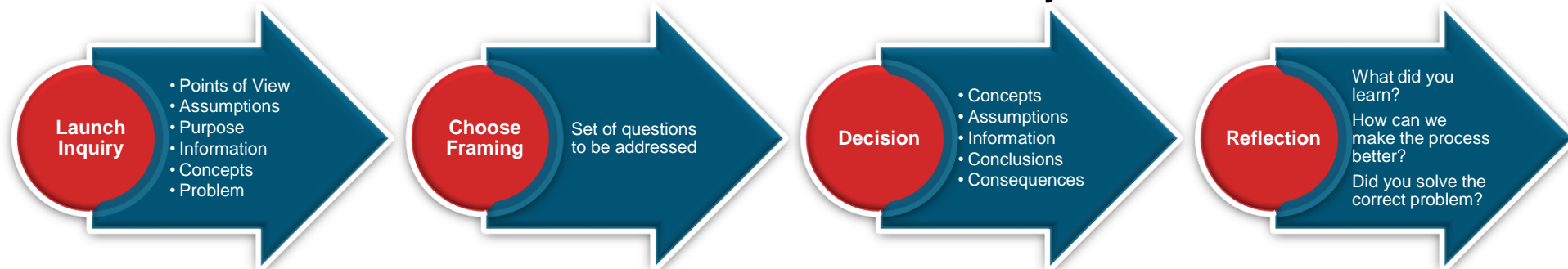


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Structured Analysis Tools of Trade

14 Techniques for Structured Analysis

- Problem restatement
- Pros-cons and fixes
- Divergent/convergent thinking
- Sorting
- Chronologies and timelines
- Causal flow diagrams
- Matrix
- Scenario tree
- Weighted ranking
- Hypothesis testing
- Devil's advocacy
- Probability tree
- Utility tree
- Utility matrix





Problem Restatement

- Reframing a problem a number of ways before selecting the problem statement that best captures the essence of the problem as one sees it
- Restating the problem several times during the problem solving process is also helpful
- Example:
 - Often restatement of the question back to the client underwriter or agent can clarify the problem for all parties
 - Try to cull statements of emotion-laden or volatile expressions; stick to the point

Everyone is entitled to his own opinion, but not his own facts.
~ Daniel Patrick Moynihan



Pros and Cons, and Fixes

- Evaluating the strengths and weaknesses of an idea and thinking up ways to correct its deficiencies
- Set-up in columns
- List all the pros
- List all the cons
- Review, consolidate and eliminate as many cons as possible
- Example:
 - Information is incomplete MIB Code unexplained
 - Options include going with (a) what we have, (b) getting additional information from source x, (c) getting information from source y, or (d) rejection (postpone or decline)



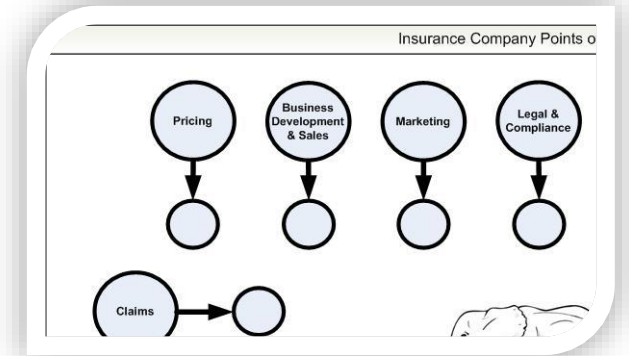
Pros and Cons - Column Format

Information is Incomplete

Options	Pros	Cons
(a) Going with what we have		
(b) Getting additional information from source: APS		
(c) Getting information from source: MIB details		
(d) Rejection (postpone or decline)		

Divergent / Convergent Thinking

- Generating alternative ideas, options, outcomes, and scenarios
 - Bouncing ideas
 - Buzz sessions
 - Team approach
 - Other points of view
- This can, and will be, a topic for another day
 - Creative thinking tools
 - Yet, getting all the points of view is extremely important to developing critical thinking skills!
- Example:
 - Seeking co-signs and consultations allows different perspectives to be applied, not merely exertion of a senior staff members prerogatives
 - Peers discussing a case



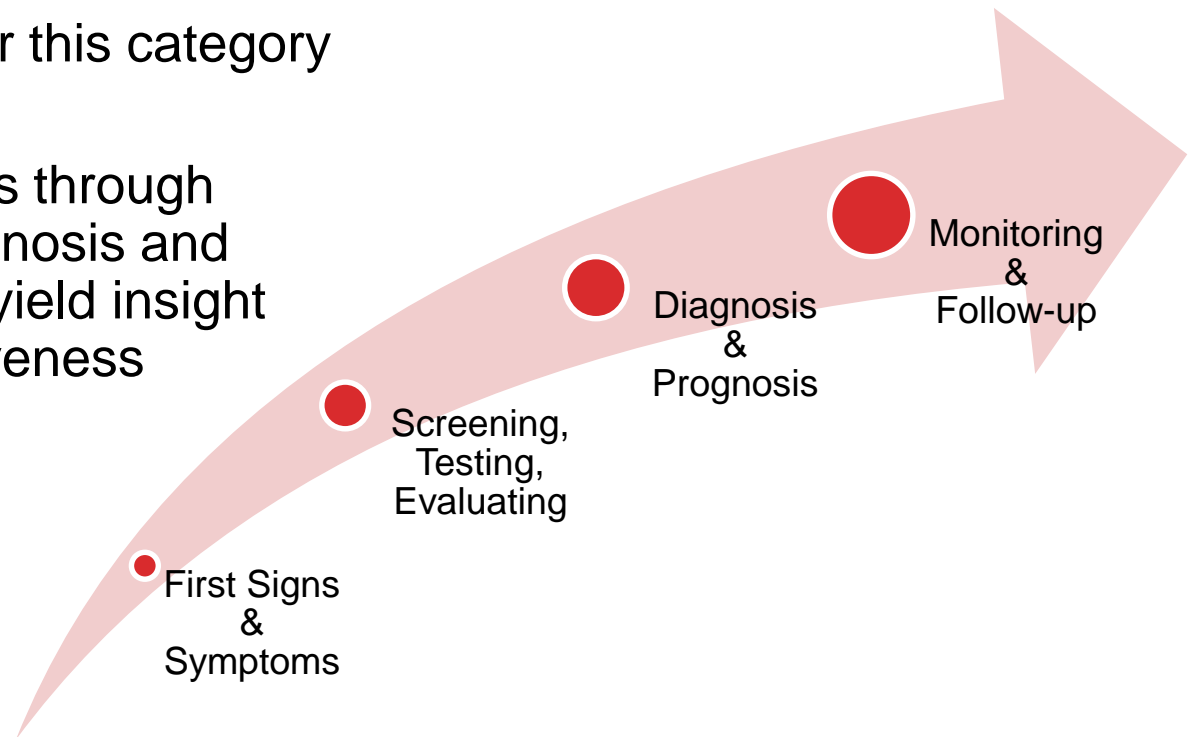
Sorting

- Separating and organizing information in a logical, useful way
 - By type, priority, system, etc.
- Example:
 - Sorting a large stack of underwriting “papers” by application forms, lab studies, ECG’s and cardiac tests, financial and non-medical information
 - Without applying some structure to the submitted materials, we have a jumble of disparate information amounting to a great deal of confusing elements and “mental noise”



Chronologies and Timelines

- Separating and organizing information chronologically
- Example:
 - APS information naturally falls under this category
 - Tracking a medical investigation from initial presentation of symptoms through the medical workup, differential diagnosis and finally diagnosis and treatment can yield insight to the severity, duration, and effectiveness of treatment, etc.



Causal Flow Diagrams

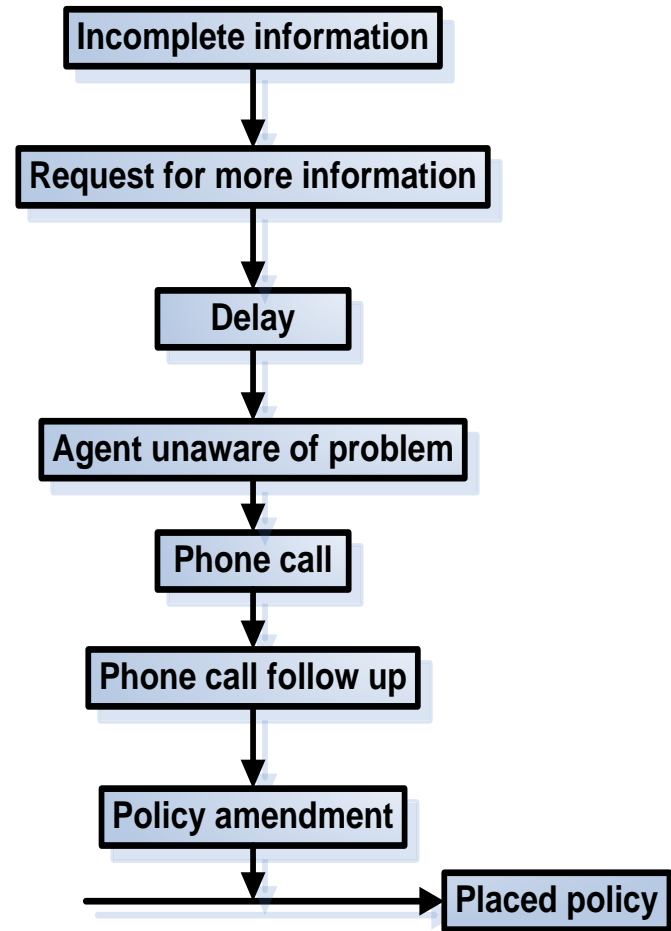
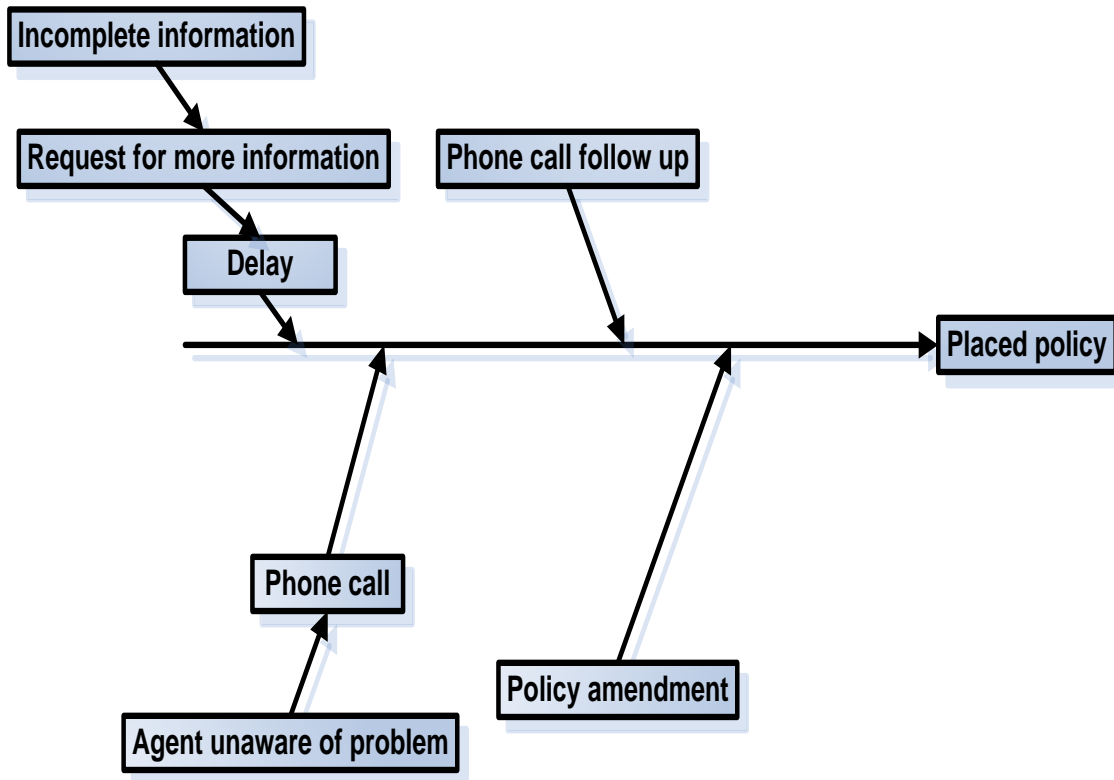
Representing graphically how cause-and-effect relationships among major factors give rise to a particular problem

	Direct Relationship		Inverse Relationship	
Casual Factor	↑	↓	↑	↓
Affected Factor	↑	↓	↓	↑

■ Examples:

- Rating cases higher than necessary causes a loss of business, and a decrease in profit
- Rating cases lower than necessary causes an increase in business, but also, a decrease in profit
- Supplying a less than full explanation for a decision causes confusion, a phone call, and additional messages

Causal Flow





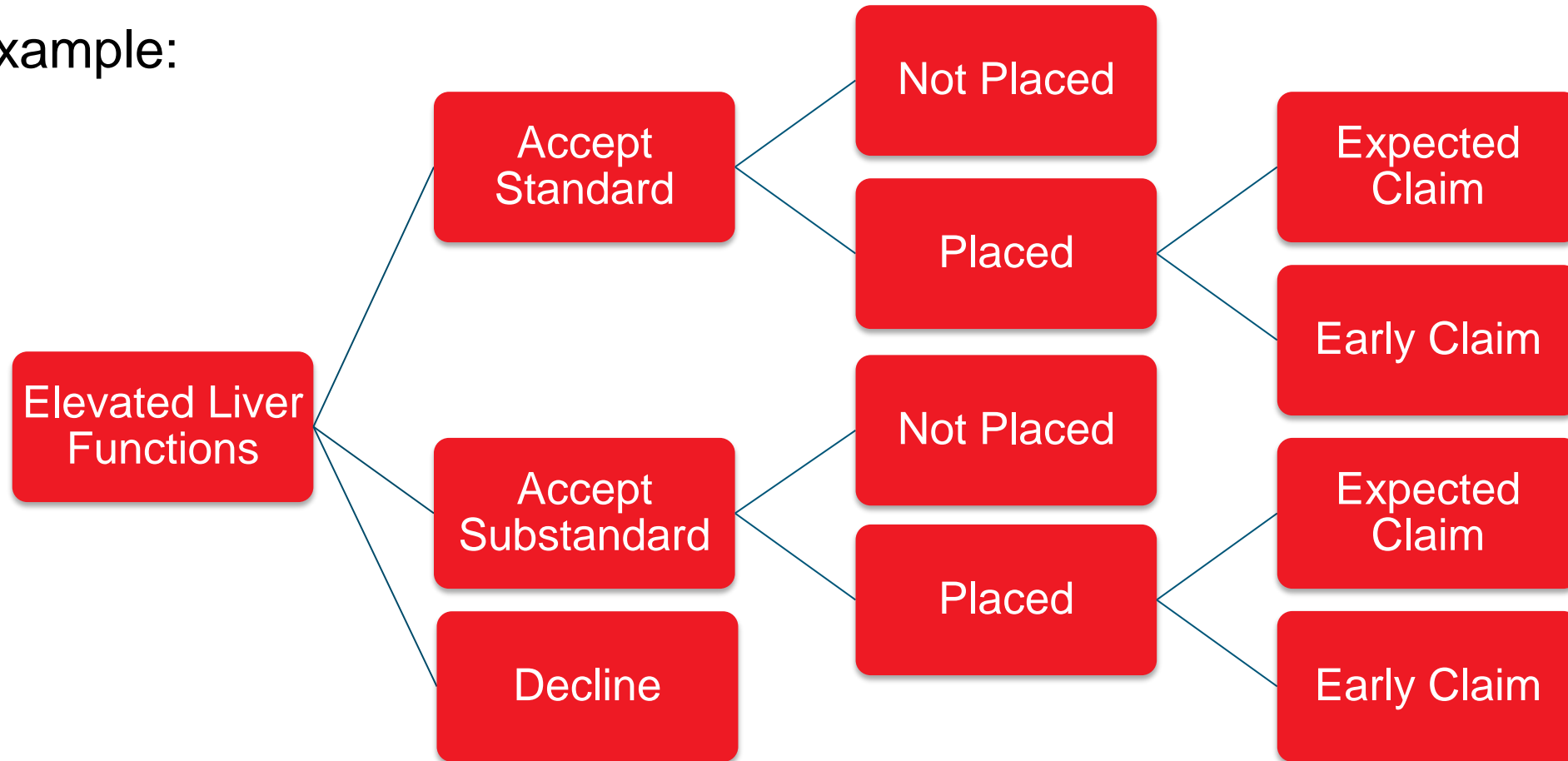
Matrix

- Array analytic elements of a decision or problem against one another to compare and correlate them
- Use a grid to sort information
- Example:

	Subject is telling the truth	Subject is lying
Subject has un-admitted history	1	2
Subject does not have un-admitted history	3	4

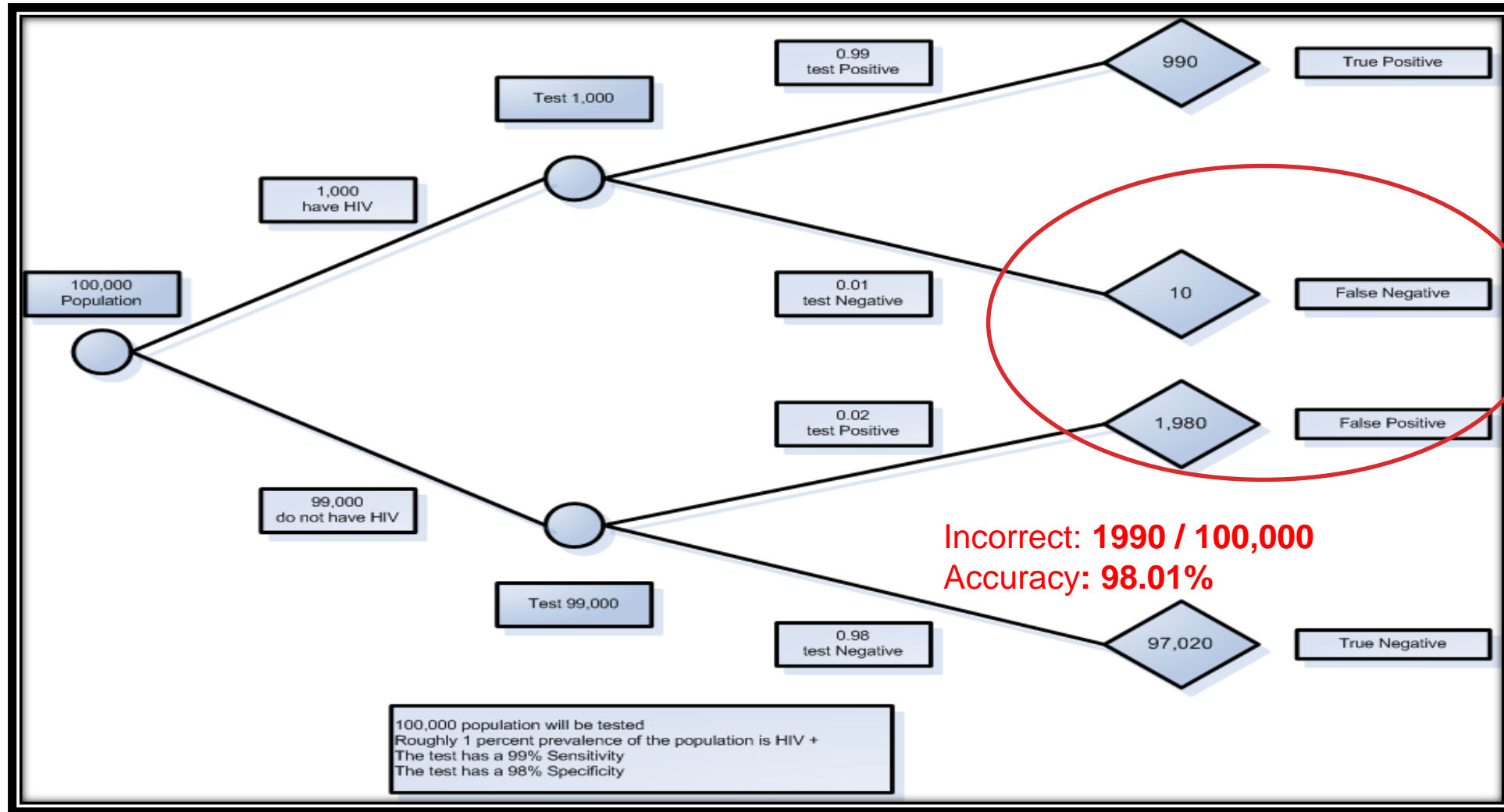
Scenario Tree

- Constructing and identifying alternative scenarios
- Example:



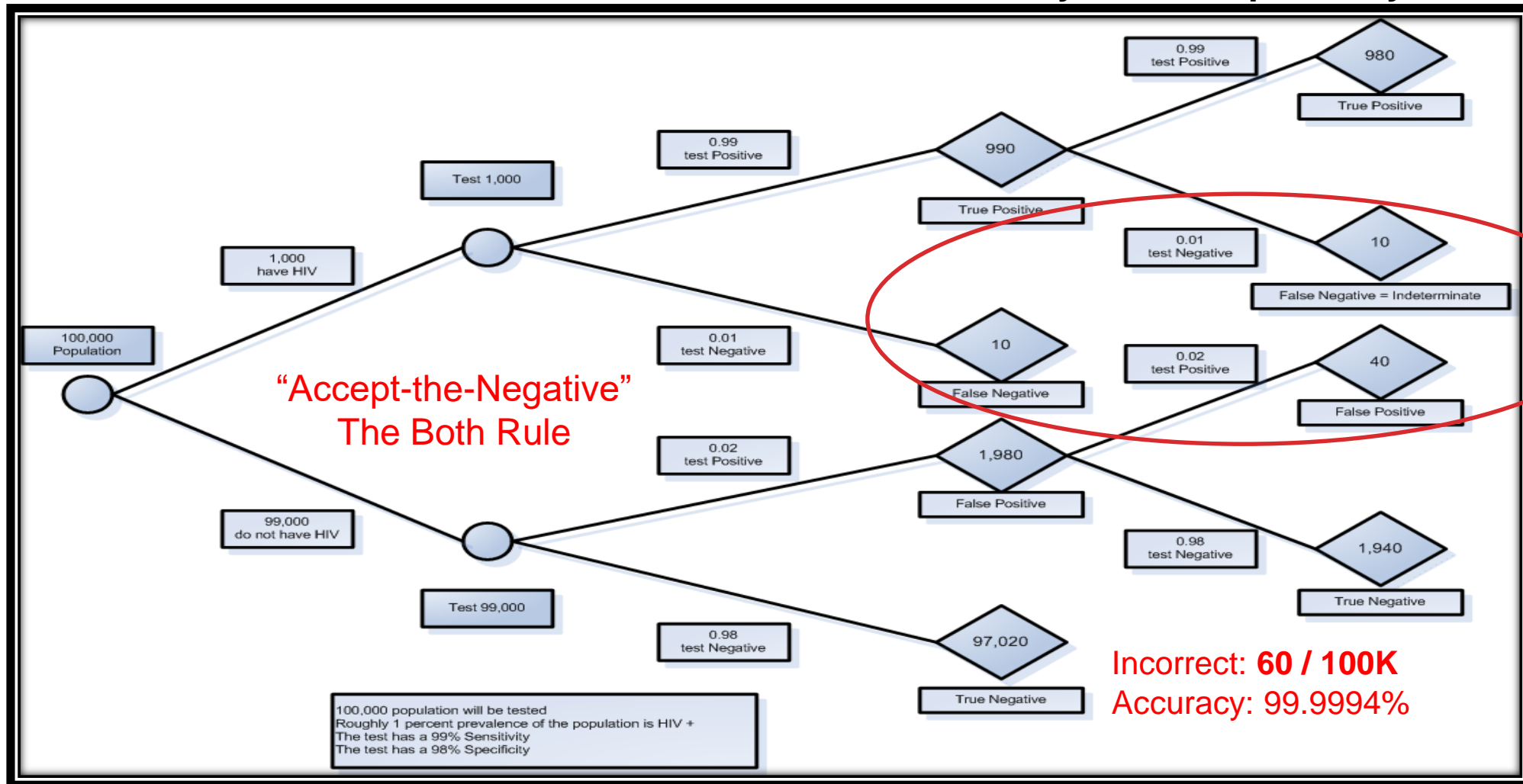
Screening with One Test

Sensitivity = 99% Specificity = 98%



Screening with Two Tests

Sensitivity = 99% Specificity = 98%



Bayes' Theorem and Predictive Value

Predictive Value Table*

	Number with positive test result	Number with negative test result.	Totals
Number with disease	TP	FN	TP+FN
Number without disease	FP	TN	FP+TN

TP = True positives: the number of sick subjects correctly classified by the test.

FP = False positives: the number of subjects free of the disease who are misclassified by the test.

TN = True negatives: the number of subjects free of the disease who are correctly classified by the test.

FN = False negatives: the number of sick subjects misclassified by the test.

Prevalence = Percent of total subjects examined who are diseased.

$$\text{Sensitivity} = \text{positivity in disease} = \frac{TP}{TP + FN} \times 100 = \frac{TP}{\text{No. diseased}} \times 100$$

$$\text{Specificity} = \text{negativity in health} = \frac{TN}{TN + FP} \times 100 = \frac{TN}{\text{No. without disease}} \times 100$$

$$\text{Predictive value of a positive test} = \frac{TP}{TP + FP} \times 100 = \frac{TP}{\text{No. positive}} \times 100$$

$$\text{Predictive value of a negative test} = \frac{TN}{TN + FN} \times 100 = \frac{TN}{\text{No. negative}} \times 100$$

* From Galen RS, Gambino SR: Beyond Normality: The Predictive Value and Efficiency of Medical Diagnoses. New York, John Wiley & Sons, Inc. , p 124.

Probability

- Determining the likelihood of different scenarios
- Mutually exclusive events vs. conditionally dependent events
- Develop the probability tree
- Example:
 - Sensitivity and specificity:
 - Bayes' Theorem & Predictive Value Tables





Weighted Ranking

- Evaluating competing proposals using the same criteria
- Example:
 - Abnormal ECG: T-inversion

Item	Criteria	Total	Final rank
Normal variant			
CAD			
Cardiomyopathy			
Bundle branch block			

Hypothesis Testing

- Ranking competing theories or explanations by the degree to which the pertinent evidence is inconsistent with each
- An hypothesis is a declarative statement that has not been firmly established as true
- Example:

Evidence	Hypotheses		
	H ₁	H ₂	H ₃
1. Elevated LFT's			
2. Hepatic Steatosis			
3. Rx = Lipitor			
4. DUI > 10 yrs ago			

- Hypothesis testing steps

Devil's Advocacy

- Seeking with the same or different evidence to challenge the validity or desirability of a particular viewpoint
- Example:
 - Let's consider for a moment that the person with an elevated GGT, does not use alcohol, and never has





As Opposed to Advocacy

- To suggest validity or desirability of a particular viewpoint due to bias toward one side using only evidence that supports their view
- Example:
 - Consider the doctor or agent's letter appealing an underwriting decision

Note: Not to be interpreted as the medical or sales professionals as being in league with the infernal regions

- Devils' advocacy is commonly encountered
 - Is inherently conflict driven
 - There can be many Das, but often there is too few "defenders of the faith"
 - Can lead groups to locking into emotional connection to a cause or solution before the problem is properly formulated



Utility Tree and Utility Matrix

- Choosing among alternative options (alternative courses of action) by separately evaluating their respective benefits and the probability of achieving those benefits
- Example:

Perspective	Class of Outcomes			Total EV (Expected Value)	Rank
	A	B	C		
Option 1					
Option 2					
Option 3					



Do Experts Use Structured Analysis?

- Yes, it's part of what makes them experts
- Is it “formal?”
 - Do they actually draw out the tables, matrixes, options, etc.?
 - Should they?
 - Do they need to?
- An expert can often be seen acting on “intuition” when often they are in fact doing a structured analysis – *very quickly*



Do Certain Problems Lend Themselves to Certain Means (Tools) of Analysis?

- No best answer for any particular problem
- Looking at a given problem using several tools can be enlightening
- Examples:
 - Medical history: sorting, timelines, weighted rankings
 - Laboratory studies: probabilities, timelines, weighted rankings
 - Underwriting decisions: scenario tree, divergent/convergent thinking, utility tree/matrix, hypothesis testing
 - Underwriting consultation: devil's advocacy, divergent/convergent thinking, scenario tree
 - Underwriting communications: problem restatement, pros-cons, matrix

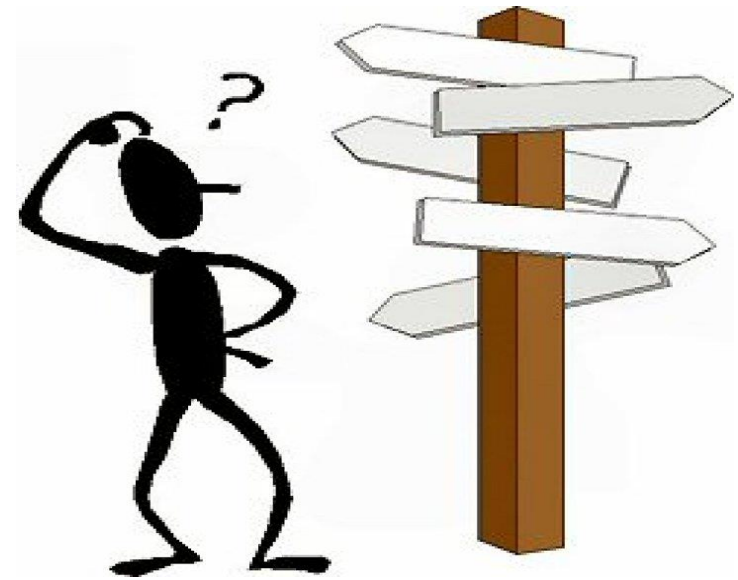


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Critical Thinking Obstacles

Tools Should Make Things Much Clearer, Shouldn't They?

- With the tools at hand, and already in use, why do cases and work in general get so confusing?
- Perhaps because we're not naturally "programmed" to think by using these structured forms





What Keeps Humanity from Critical Thinking?

- We may be adapted to use intuition
- We often call it by another name:

Instinct

- While intuition and instinct are not the same, they arguably use similar pathways
- Intuition can be fraught with error, and ultimately, result in failed outcomes
- There are many obstacles to a reasoned approach to problem solving
- It's not simply our own thoughts, but our social context as well

Clouding Objective Analysis: Blocks, Impediments, Obstructions


- Conflicting analytical approaches
- Personality differences
- Emotions
- Debating skills
- Hierarchy of the organization
- Seeking domination and control
- Groupthink
- Analysis paralysis
- Unstated assumptions – **bias**



Logical Fallacies vs Cognitive Bias



A logical fallacy is an error in logical argument.



A cognitive bias is a deficiency or limitation in thinking — a flaw in judgment that arises from errors of memory, social attribution, and miscalculations.

Groupthink

Going along and getting along

- Groupthink is a psychological phenomenon that occurs within groups of people
- It is the mode of thinking that happens when the desire for harmony in a decision-making group overrides a realistic appraisal of alternatives
- Group members try to minimize conflict and reach a consensus decision without critical evaluation of alternative ideas or viewpoints



“...And we are firmly opposed to any form of groupthink”...
“Right J.B.!”



Groupthink Symptoms

- To make groupthink testable, Irving Janis devised eight symptoms indicative of groupthink (1977)
- Type I: Overestimations of the group—its power and morality
 - Illusions of invulnerability creating excessive optimism and encouraging risk taking
 - Unquestioned belief in the morality of the group, causing members to ignore the consequences of their actions
- Type II: Closed-mindedness
 - Rationalizing warnings that might challenge the group's assumptions
 - Stereotyping those who are opposed to the group as weak, evil, biased, spiteful, impotent, or stupid
- Type III: Pressures toward uniformity
 - Self-censorship of ideas that deviate from the apparent group consensus
 - Illusions of unanimity among group members, silence is viewed as agreement
 - Direct pressure to conform placed on any member who questions the group, couched in terms of "disloyalty"
 - Mind guards — self-appointed members who shield the group from dissenting information



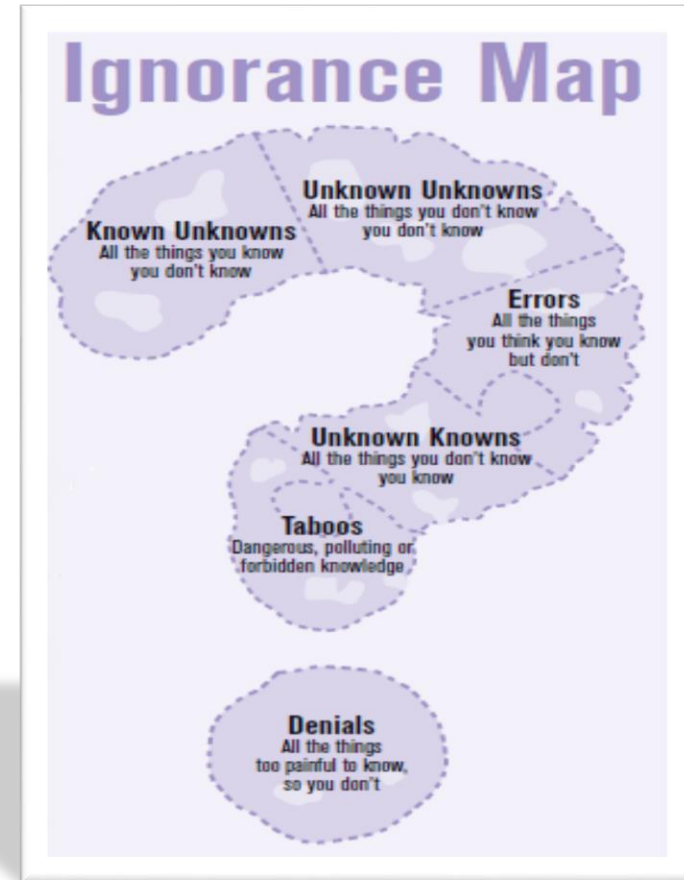
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**Critical Thinking -
Ignorance Is No Excuse**

Ignorance Map

Intellectual Humility: We don't know...

- Known unknowns
 - All the things you know you don't know.
- Unknown unknowns
 - All the things you don't know you don't know
- Errors
 - All the things you think you know but don't
- Unknown knowns
 - All the things you don't know you know
- Taboos
 - Dangerous, polluting or forbidden knowledge
- Denials
 - All the things too painful to know, so you don't





Decision Analysis is Not without Detractors

- Mankind has been using a “trial and error methodology” for millennia
- Trial and error works... sometimes
- Keep in mind the scientific method is a structured form of “trial and error”
- In one sense, Darwinian evolution is a trial and error method, but Darwinian evolution is not a logic based system

Decision Analysis Does Not Guarantee Success

- Sometimes intuition does win out
- Sometimes trial and error will work
- Sometimes depending on the structure or the numbers, decision analysis ignores the reality
- Sometimes our “facts” are wrong



So why use decision analysis?



Why Use Decision Analysis?

- To treat decisions more objectively and less subjectively
- To provide consistency
- To get to the root issues
- To find the right solution to the right problem



Conclusion

“A lot of what has been said in the preceding may have seemed very basic, very fundamental to many sophisticated underwriters. But too frequently in our approach, and in our thinking, the basic becomes submerged. Obviously we *should* always start our inquiries in the beginning, but *sometimes* start them in the middle. Cliché or not, we fail to see the forest for the trees.

So always, always on underwriting any application for life insurance ask yourself, ‘*does it make sense?*’ ”



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