

# Engineering, Ethics and Society: Ethical Decision Making

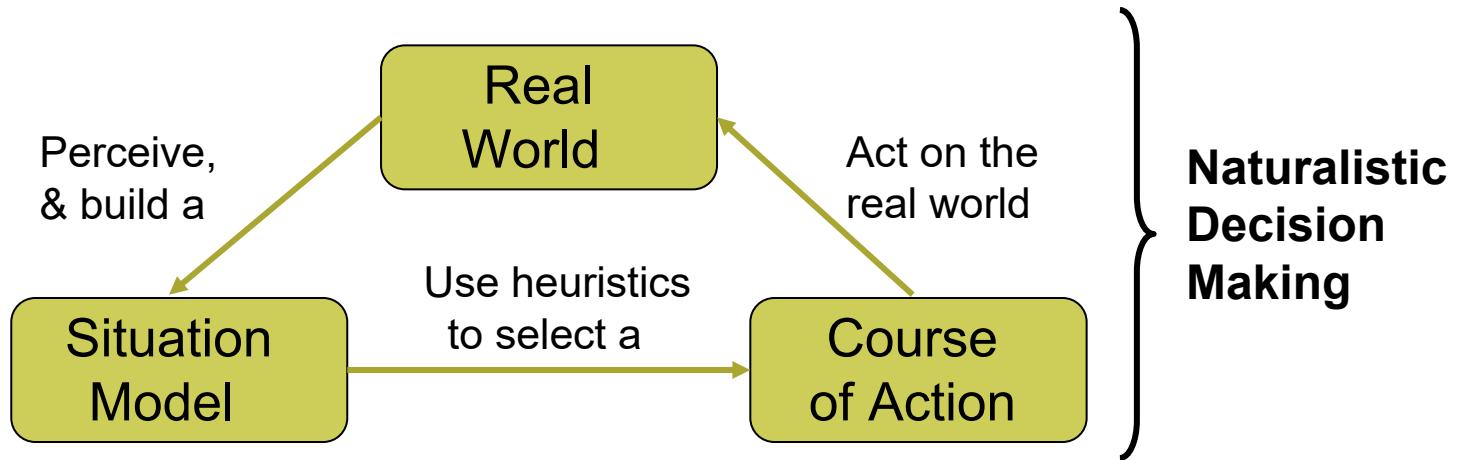
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Dr. Gershon Weltman  
Engineering 183EW, UCLA SEAS  
Lecture 16

# Lecture Contents

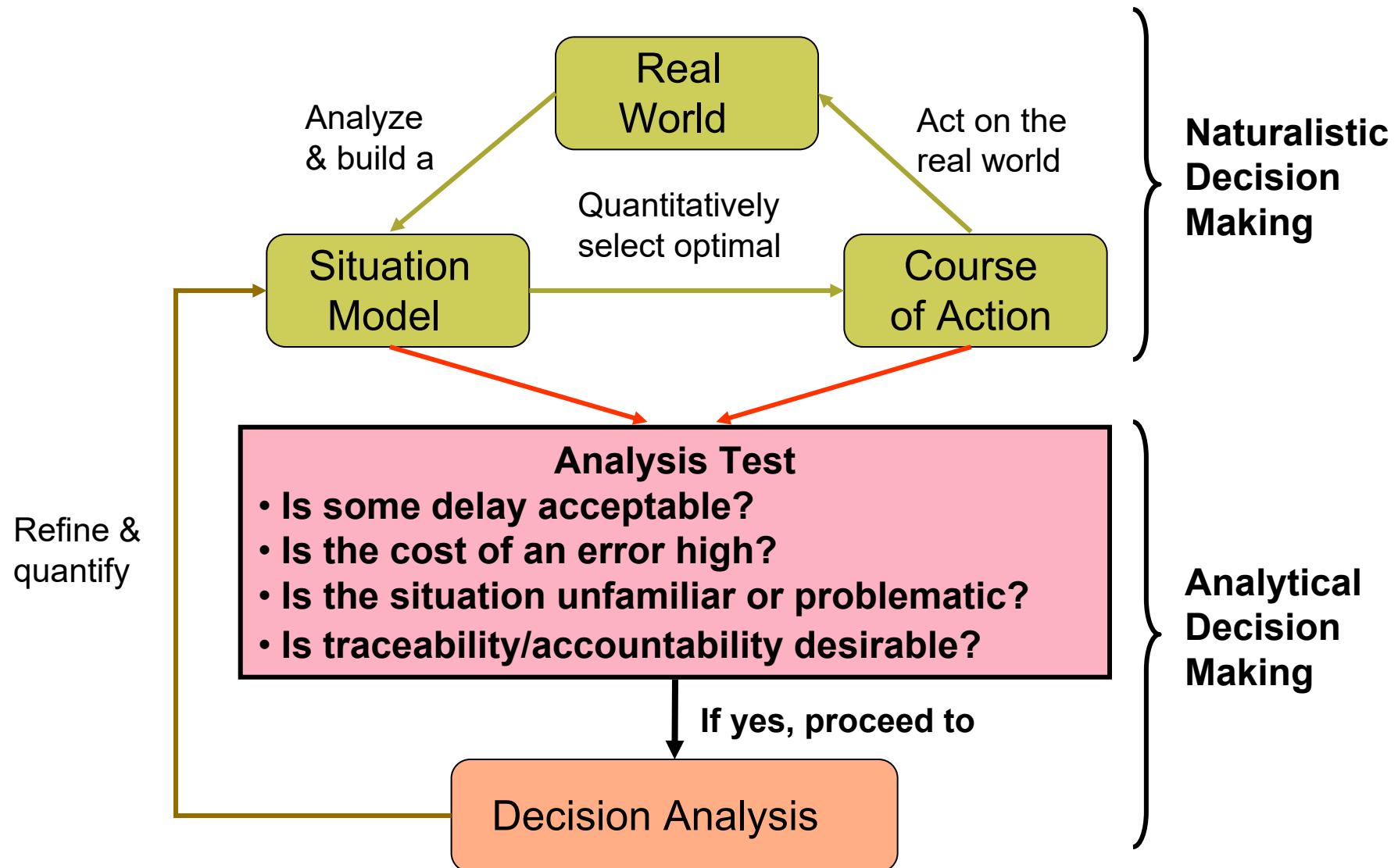
- The Decision Environment
  - Naturalistic Decision Making
  - Analytical Decision Making
- Decision Analysis Methodologies
  - Multi-Attribute Utility
  - Decision Tree
  - Influence Diagram/Causal Model
- Personal/Societal Factors in Decision Making
- Ethical Case Study 1: Martha Stewart's Decisions
- Ethical Case Study 2: Gordon Caplan's Decision
- Ethical Case Study 3: California Fraud Decision
- Pragmatic Influences
  - Decision Making in Groups
  - Decision Making under Stress
- Summary
  - Resolution of Cognitive Dissonance
  - Learning from Mistakes

# The Decision Environment



After: Cohen, M.S. "Improving Critical Thinking," Cognitive Technologies, Inc., 2005

# The Decision Environment<sup>1</sup>



<sup>1</sup>After: Cohen, M.S. "Improving Critical Thinking," Cognitive Technologies, Inc., 2005

# Analytical Decision Making

- **A Professional Requirement**
  - Working Level
  - Management Level
  - Strategic and Policy Level
- **A Conscious Process**
  - Cognitive Performance
  - Meta-Cognitive Evaluation
- **A Learnable Skill**
  - Methodologies
  - Experience and Practice
  - Feedback and Adjustment
  - Working Collaboratively
  - Dealing with Stress

In actuality, decisions are usually a combination of naturalistic and analytical

# Two Main Types of Decision Analyses

- “Certain” Outcomes
- “Probabilistic” Outcomes

# Decisions With Certain Outcomes

- Typical Conditions
  - Several acceptable Alternatives
  - Alternatives have *known* Attributes/Outcomes
  - Objective is to select best Alternative
- Typical “Best Decision” Criteria
  - Minimum Cost (\$)
  - Maximum Gain (\$)
  - Maximum Utility (U) = Universal Measure of Value)
- Useful Method: Multi-Attribute Utility Analysis (MAUA)
  - Alternatives
  - Attributes
  - Attribute Values
  - Attribute Importance (Weighting Function)

# MAUA 1: Options and Attributes

1	Car Purchase Options							
2	<u>Attribute</u>	<u>Alta</u>	<u>Bulldog</u>	<u>Cruiser</u>	<u>Delta</u>	<u>Egret</u>	<u>Fleet</u>	<u>Garnett</u>
3	<b>Cost</b>	\$40	\$36	\$32	\$28	\$24	\$20	\$30
4	<b>Lifetime</b>	10	10	8	8	6	6	8
5	<b>Carbon</b>	Low	Medium	Low	Medium	Medium	High	High
6								
7	<b>Cost:</b>	<b>Thousands of Dollars</b>						
8	<b>Lifetime:</b>	<b>Estimated Years</b>						
9	<b>Carbon:</b>	<b>3-Level Test Summary</b>						

## MAUA 2: Dominated Option

Car Purchase Options							
Attribute	Alta	Bulldog	Cruiser	Delta	Egret	Fleet	Garnett
Cost	\$40	\$36	\$32	\$28	\$24	\$20	\$30
Lifetime	10	10	8	8	6	6	8
Carbon	Low	Medium	Low	Medium	High	High	High

Cost: Thousands of Dollars

Lifetime: Estimated Years

Carbon: 3-Level Test Summary

Garnett costs more than the Delta, has the same lifetime and has a higher pollution rating; it is thus “dominated” and can be eliminated

# MAUA 3: Monetary Equivalents

1		Car Purchase Options					
2	<u>Attribute</u>	<u>Alta</u>	<u>Bulldog</u>	<u>Cruiser</u>	<u>Delta</u>	<u>Egret</u>	<u>Fleet</u>
3	<b>Cost</b>	\$40	\$36	\$32	\$28	\$24	\$20
4	<b>Lifetime</b>	-\$4	-\$4	-\$2	-\$2	-\$0	-\$0
5	<b>Carbon</b>	-\$12	-\$8	-\$12	-\$8	-\$0	-\$0
6	<b>Cost</b>	\$24	\$24	\$18	\$18	\$24	\$20
7							
8	<b>Cost</b>	\$ Thousand					
9	<b>Lifetime</b>	6 years = \$0, each additional year = -\$1000					
10	<b>Carbon</b>	High = \$0, Medium = -\$8,000, Low = -\$12,000					

We give Lifetime and Pollution dollar credits against Cost  
in order to make all attributes directly comparable

## MAUA 3: Monetary Equivalents

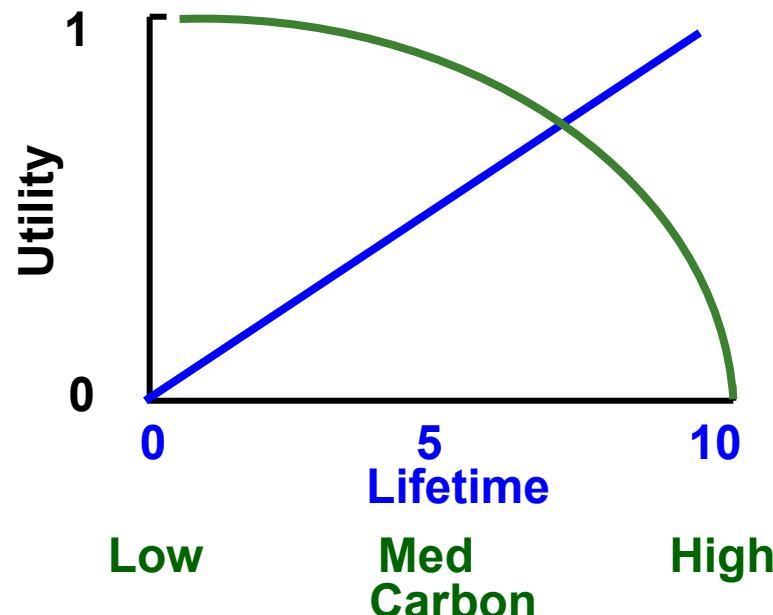
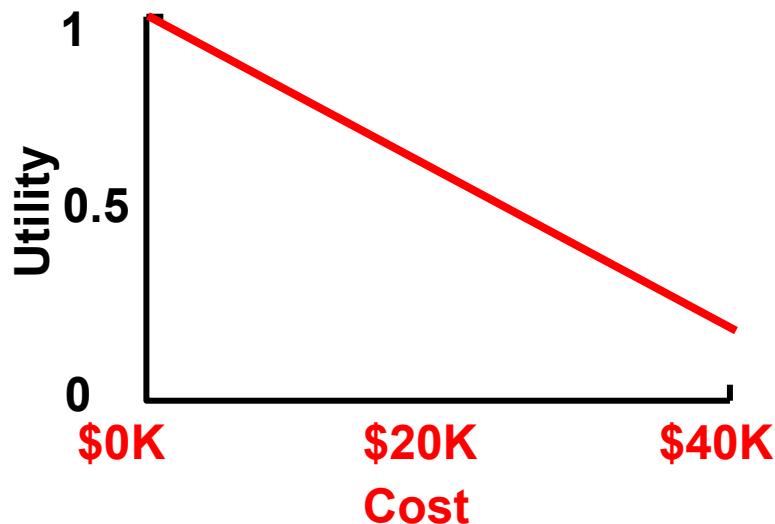
1		Car			
2	<u>Attribute</u>	<u>Alta</u>	<u>Bulldog</u>		
3	Cost	\$40	\$36		\$24
4	Lifetime	-\$4	-\$4		-\$0
5	Carbon	-\$12	-\$8		-\$0
6	Cost	\$24	\$24		\$24
7					\$20
8	Cost	\$ Thousand			
9	Lifetime	6 years = \$0, each additional year = -\$1000			
10	Carbon	High = \$0, Medium = -\$8,000, Low = -\$12,000			

Medium price, medium life and low or medium pollution make either the Cruiser or Delta the best choice on a **least cost** basis

## MAUA 4: Utility Values

### Utility (0 to 1)

- ❑ Cost:  $U(\$0) = 1, U(\$20,000) = 0.2$ ; linear
- ❑ Lifetime:  $U(0 \text{ years}) = 0, U(10 \text{ years}) = 1$ ; linear
- ❑ Carbon:  $U(\text{High}) = 0, U(\text{Medium}) = 0.8, U(\text{Low}) = 1$ ;



The Utility measure puts the various attributes on an **equivalent value** basis.

# MAUA 4: Attribute Weights

- Utility (0 to 1)
  - Cost:  $U(\$0) = 1, U(\$20,000) = 0.2$ ; linear
  - Lifetime:  $U(6 \text{ years}) = 0, U(10 \text{ years}) = 1$ ; linear
  - Carbon:  $U(\text{High}) = 0, U(\text{Medium}) = 0.8, U(\text{Low}) = 1$ ; non-linear
  
- Weight (0 to 1)
  - Cost = 0.50
  - Lifetime = 0.15
  - Carbon = 0.35  
Sum = 1.00 (Always)

**Utility** measures the **value** associated with each attribute level.

**Weight** measures the **relative importance** of each attribute to the final decision.

# MAUA 5: Utility Values

<u>Attribute</u>	Car Purchase Alternatives					
	<u>Alta</u>	<u>Bulldog</u>	<u>Cruiser</u>	<u>Delta</u>	<u>Egret</u>	<u>Fleet</u>
Cost	0.20	0.30	0.38	0.42	0.55	0.60
Lifetime	1.00	1.00	0.80	0.80	0.60	0.60
Carbon	1.00	0.80	1.00	0.80	0.00	0.00

Utility represents the value of the attribute for the specific option .

## MAUA 6: Weighted Utility Values

$$\text{Weighted MAU}_{\text{Car}} = w_{\text{Cost}} U_{\text{Cost}} + w_{\text{Life}} U_{\text{Life}} + w_{\text{Carbon}} U_{\text{Carbon}}$$

<u>Attribute</u>	Car Purchase Alternatives					
	<u>Alta</u>	<u>Bulldog</u>	<u>Cruiser</u>	<u>Delta</u>	<u>Egret</u>	<u>Fleet</u>
Cost x 0.50	0.10	0.15	0.19	0.21	0.28	0.30
Lifetime x 0.15	0.15	0.15	0.12	0.12	0.09	0.09
Carbon x 0.35	0.35	0.28	0.35	0.28	0.00	0.00
<b>Weighted MAU</b>	<b>0.60</b>	<b>0.58</b>	<b>0.66</b>	<b>0.61</b>	<b>0.37</b>	<b>0.39</b>

Weighted utility takes into account both the value and importance of the attributes.  
Using this criterion, the Cruiser emerges as the optimum choice.

# MAUA 7: Sensitivity

## ■ New Weights

- Cost = 0.80 (vs. 0.50)
- Lifetime = 0.10 (vs. 0.15)
- Carbon = 0.10 (vs. 0.35)

## ■ New Result

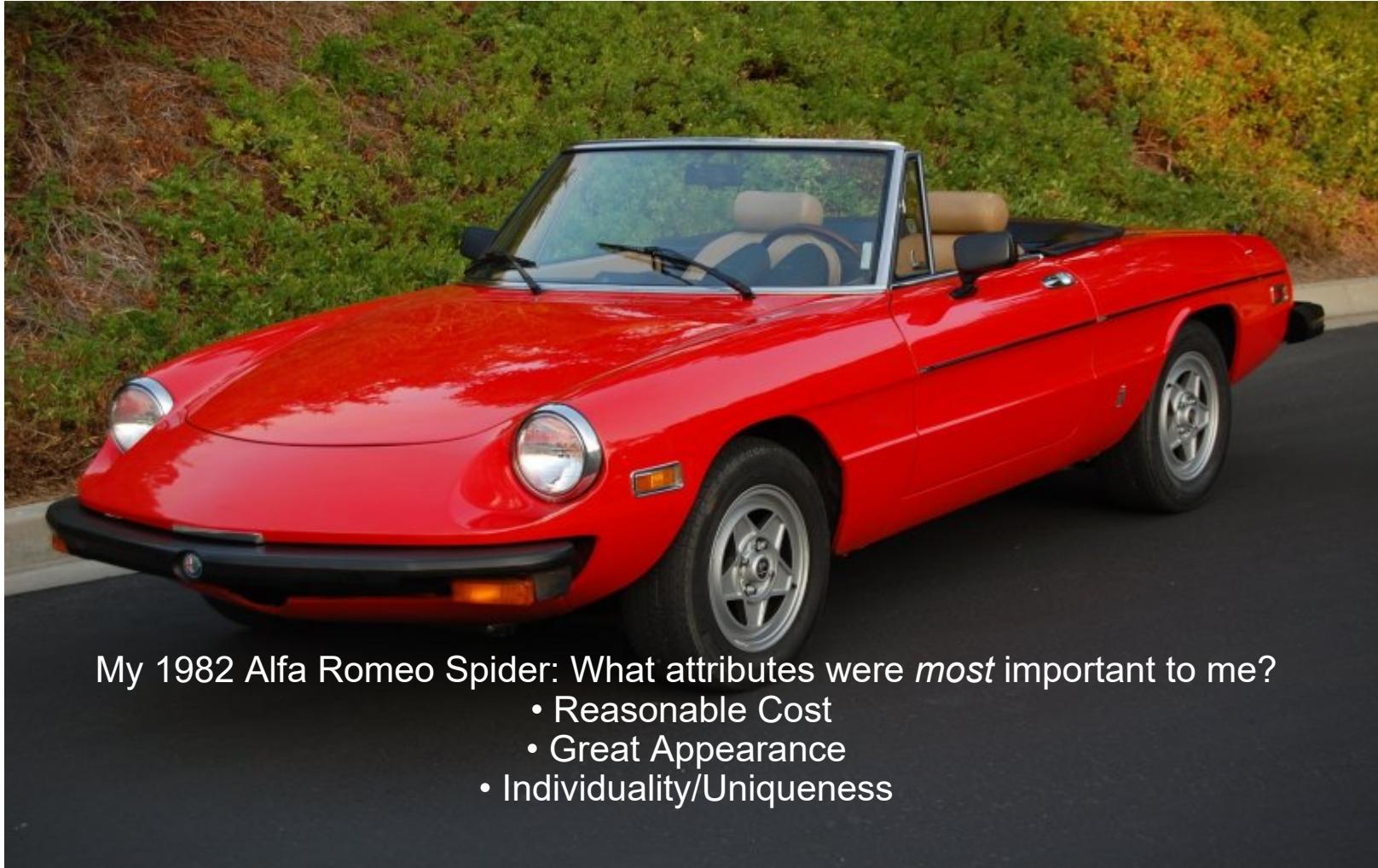
<u>Attribute</u>	Car Purchase Alternatives					<u>Fleet</u>
	<u>Alta</u>	<u>Bulldog</u>	<u>Cruiser</u>	<u>Delta</u>	<u>Egret</u>	
Cost (0.80)	0.16	0.24	0.30	0.34	0.44	0.48
Lifetime (0.10)	0.10	0.10	0.08	0.08	0.06	0.06
Carbon (0.10)	0.00	0.80	0.10	0.08	0.00	0.00
<b>Weighted Utility</b>	<b>0.36</b>	<b>0.42</b>	<b>0.48</b>	<b>0.50</b>	<b>0.50</b>	<b>0.54</b>

High relative weight makes Cost dominate the analysis. Sensitivity tests can help determine on which specific attributes an analysis should focus.

# MAUA Summary

- Chose Meaningful Value Measure
  - \$ Thousand, \$ Million, \$ Billion
  - $U = 0$  to  $\pm 1$ ,  $\pm 10$ ,  $\pm 100$
- Perform Realistic and Honest Decision Analysis
  - **Options:** *Include all reasonable*
  - **Attributes:** *Include the important ones*

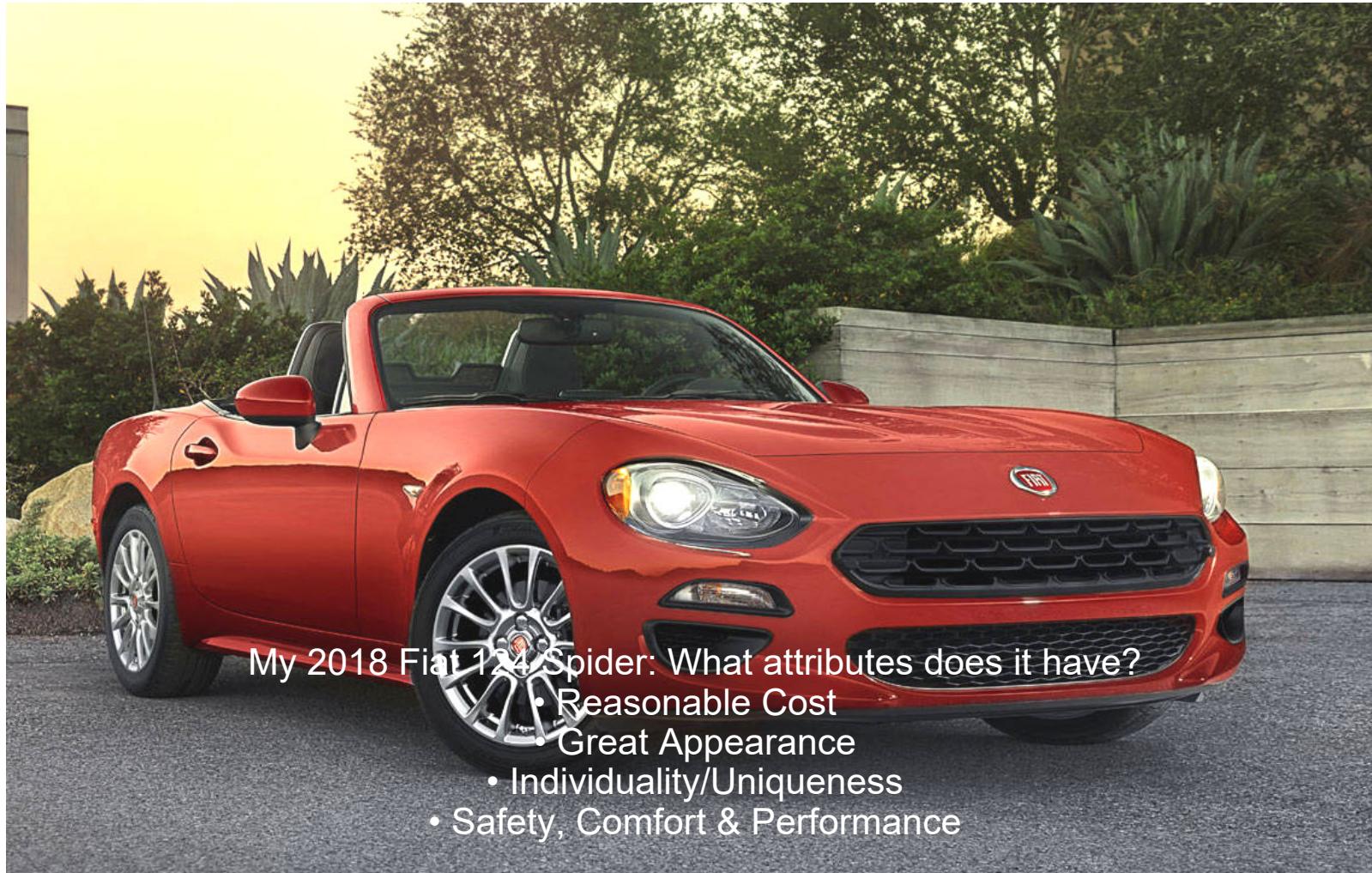
# Important Attributes: A Personal Example



My 1982 Alfa Romeo Spider: What attributes were *most* important to me?

- Reasonable Cost
- Great Appearance
- Individuality/Uniqueness

# Important Attributes: A Personal Example



My 2018 Fiat 124 Spider: What attributes does it have?

- Reasonable Cost
- Great Appearance
- Individuality/Uniqueness
- Safety, Comfort & Performance

# MAUA Summary

- Chose Meaningful Value Measure
  - \$ Thousand, \$ Million, \$ Billion
  - $U = 0$  to  $\pm 1, \pm 10, \pm 100$
- Perform Realistic and Honest Decision Analysis
  - **Options:** *Include all reasonable*
  - **Attributes:** *Include the important ones*
  - **Weights:** *Assign them honestly*
  - **Analysis:** A representative model is often more important than precise numbers

A major benefit of decision analysis is that it can prevent decision makers from making *really bad and disastrous* decisions.

# Example MAUA Software

Welcome to the Multi-Attribute Attitude Model Template													
For more information, please visit <a href="http://www.marketingstudyguide.com">www.marketingstudyguide.com</a>													
This is a scoring model (Using the Fishbein Model) Follow the four steps below							You can enter up to 10 product attributes and up to 8 brands Also see the two Summary Graphs Underneath the Table						
<p style="text-align: center;">Step One: Enter Brand Names below (where the letters A, B, C etc. are)</p> <p style="text-align: center;">Step Two: Enter the product attributes below (overtype the existing attributes)</p> <p style="text-align: center;">Step Three: Enter the importance ratings for each attribute</p> <p style="text-align: center;">Step Four: Enter the ratings of each attribute for each brand</p> <p style="text-align: right;">Please note that brand scores, totals, ranks and graphs calculate automatically.</p> <p style="text-align: right;">DO NOT TYPE IN THE SCORES - THEY WILL CALCULATE</p>													
ATTRIBUTES	IMPORTANCE	Classroom/Traditional	Computer based IMI	part task simulator	VR simulator	embedded env	hmd/ar w/o embedded	live	Score				
	NEEDS TO BE BASED ON	Rating	Score	Rating	Score	Rating	Score	Rating	Score				
	immersion	5	1.00	5	2.00	10	5.00	25	8.00	40	8.00	40	6.00
	ai/ml in instruction	9	1.00	9	7.00	63	6.50	59	7.00	63	8.00	72	9.00
	ai/ml in exercise design	7	1.00	7	7.00	49	8.50	60	6.00	42	8.00	56	9.00
	ai/ml in aar	7	1.00	7	7.00	49	9.00	63	4.00	28	8.00	56	9.00
	cost of dev	3	1.00	3	4.00	12	3.00	9	5.00	15	8.00	24	7.00
	cost of use	8	2.00	16	3.00	24	1.50	12	8.00	64	6.00	48	3.00
	availability at PoN	9	7.00	63	7.50	68	9.00	81	4.00	36	2.00	18	9.00
network/cloud based	7	1.00	7	6.00	42	2.00	14	7.00	49	5.00	35	5.00	
adapatability/reconfig	6	1.00	6	2.00	12	3.00	18	6.00	36	7.00	42	4.00	
		0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	
TOTAL			123	329	340	373	391		422		237		
RANK			7	5	4	3	2		1		6		

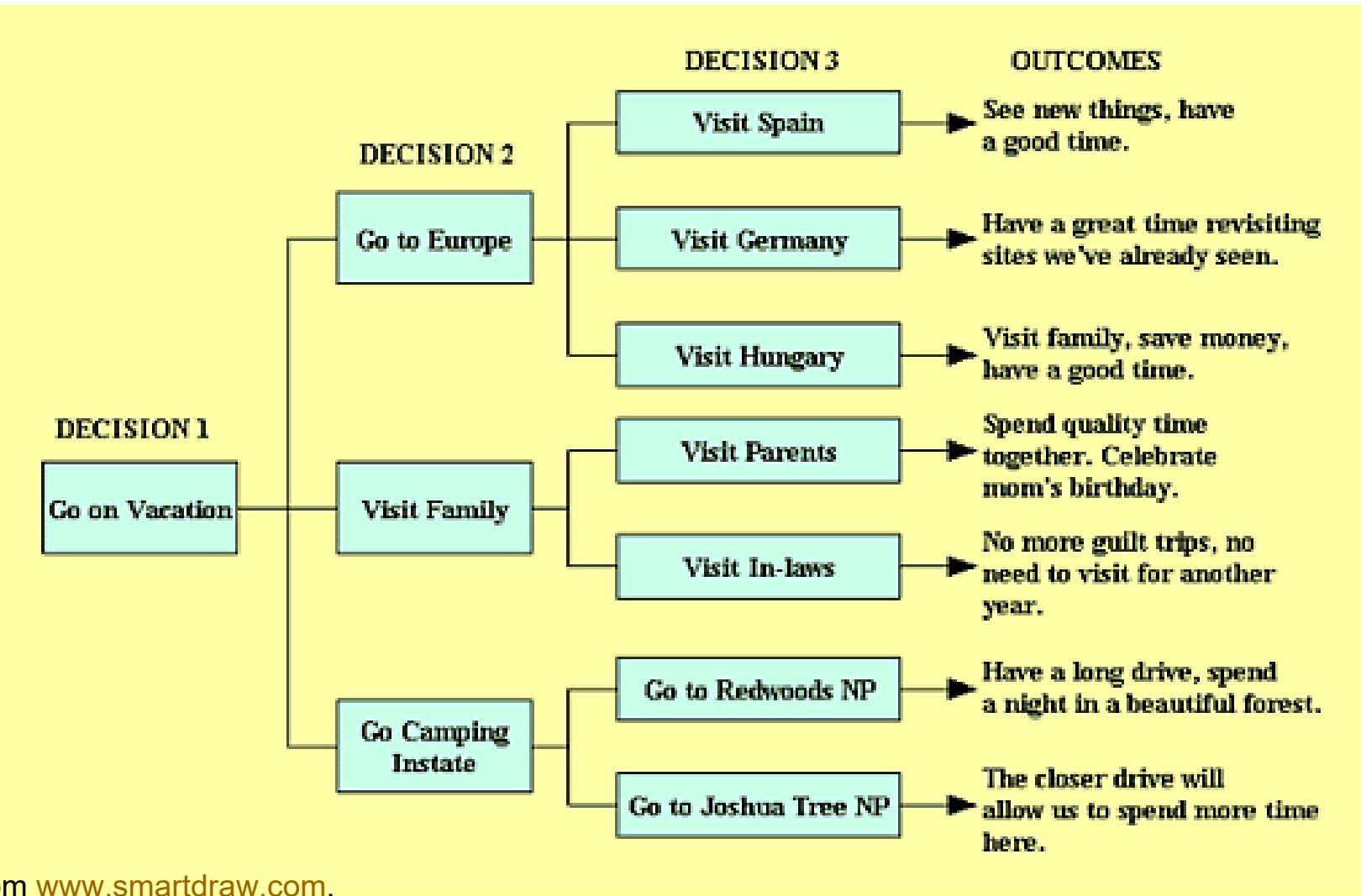
This MAUA modeling software allows up to 8 “brands” with up to 10 attributes

Courtesy of [www.marketingstudyguide.com](http://www.marketingstudyguide.com)

# Decisions With Probabilistic Outcomes

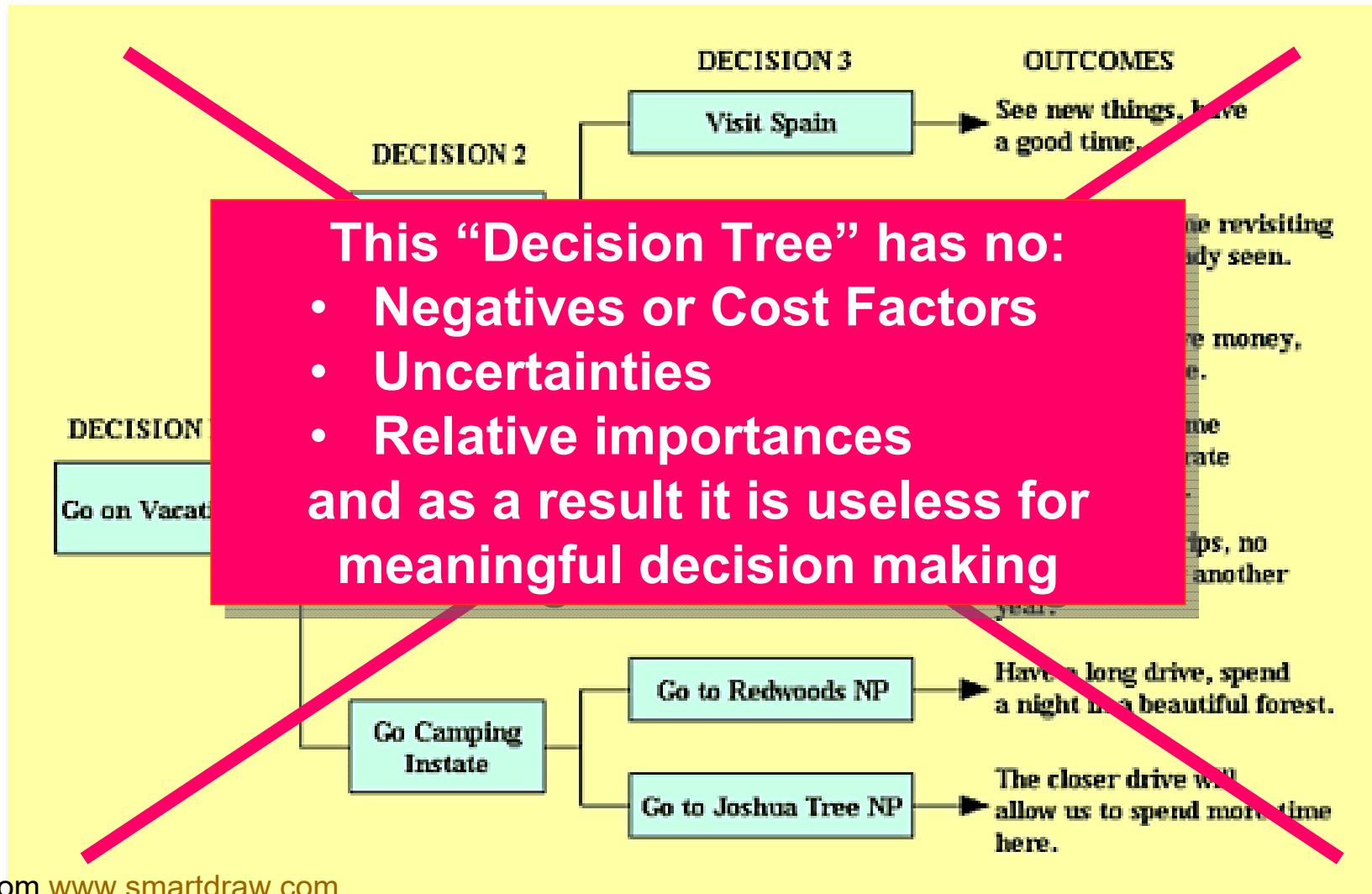
- Conditions
  - Several Alternatives
  - Probabilistic Outcomes and Consequences
  - Optimal Choice Among Alternatives
- Typical Decision Criterion
  - Minimum Cost (\$)
  - Maximum Gain (\$)
  - Maximum Utility (U)
- Useful Methods: Decision Tree & Casual Model/Influence Diagram
  - ***Alternative Actions*** & Intervening Factors
  - ***Outcomes*** Positive & Negative (Benefits & Costs)
  - ***Probabilities (Likelihoods)*** Affecting Factors & Outcomes
  - ***Expected Value*** of Alternative Actions

# A Trimmed Decision Tree<sup>1</sup>



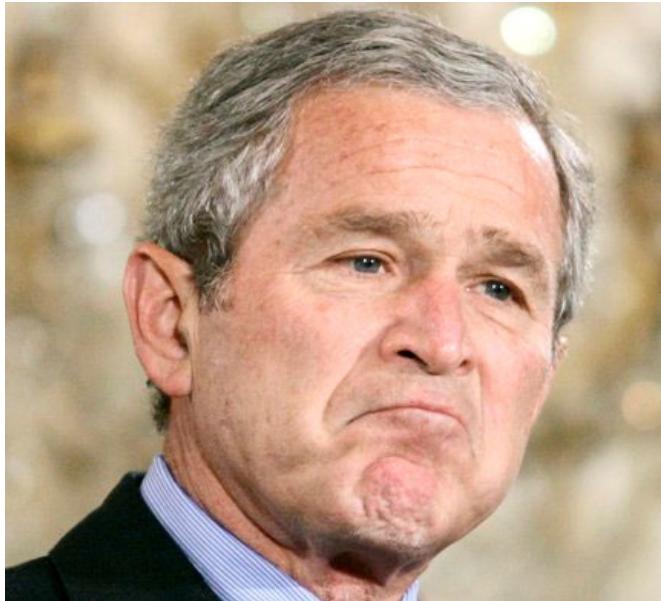
<sup>1</sup>From [www.smartdraw.com](http://www.smartdraw.com),

# A Trimmed Decision Tree<sup>1</sup>



<sup>1</sup>From [www.smartdraw.com](http://www.smartdraw.com),

# Top Level Decision Making: President G.W. Bush



*"One of Henry Kissinger's private criticisms of (President) Bush was that he had no mechanism in place, or even an inclination, to consider the downside of impending decisions. Alternative courses of action were rarely considered. At best Andrew Card could remember that there had been some informal, blue-sky discussions at times along the lines of 'What could we do differently?' But there had been no formal sessions to consider alternatives to staying in Iraq."*

Bob Woodward, State of Denial,  
Simon & Shuster, NY, 2006, p. 455

# Top Level Decision Making: President B. Obama



*"Obama personally reenergized the hunt (for Osama bin Laden)...He began pushing his national security team to come up with creative, new approaches to the manhunt, and once the intelligence community received its first big break, Obama and his team pursued a data-driven review of their options that would have made (McNamara) proud.*

*The final decision to launch the assault was not a cavalier roll of the dice. It was....backed up by one of the most elaborate and meticulous intelligence operations in American history."*

Daniel Klaidman, The Fortunate One  
Newsweek, November 19, 2012

# Top Level Decision Making: President D. Trump



*President Donald Trump is an even more intuitive decision maker than President Bush was because President Trump makes his decisions at the moment, mainly without benefit of counsel, and seemingly without an overall strategy.*

*According to Republican political analyst and columnist Jonah Goldberg: “He leads with his gut, listens to his instincts, keeps people guessing, and goes with the flow. ‘I prefer to come to work each day and see what develops,’ he says in his ghost-written autobiography ‘The Art of the Deal.’”*

*Jonah Goldberg, “Trump’s Iran policy is not a policy at all”*

*Los Angeles Times, January 7, 2020*

# Top Level Decision Making: President J. Biden



*"Biden's organizing principle seems to be a Barack Obama-inspired "no drama" insistence on minimizing the potential for conflict in his administration. Biden has put a premium on trust, general government experience, and a semblance of ideological balance over subject-matter virtuosity largely because he sees the country as facing a sprawling, interconnected crisis rather than a set of parallel disasters to be dealt with agency by agency."*

Gabriel Debenedetti  
"A Biden Style of Government Is Emerging:  
Lowest Drama Possible"  
*New York Intelligencer, Dec 20, 2020*

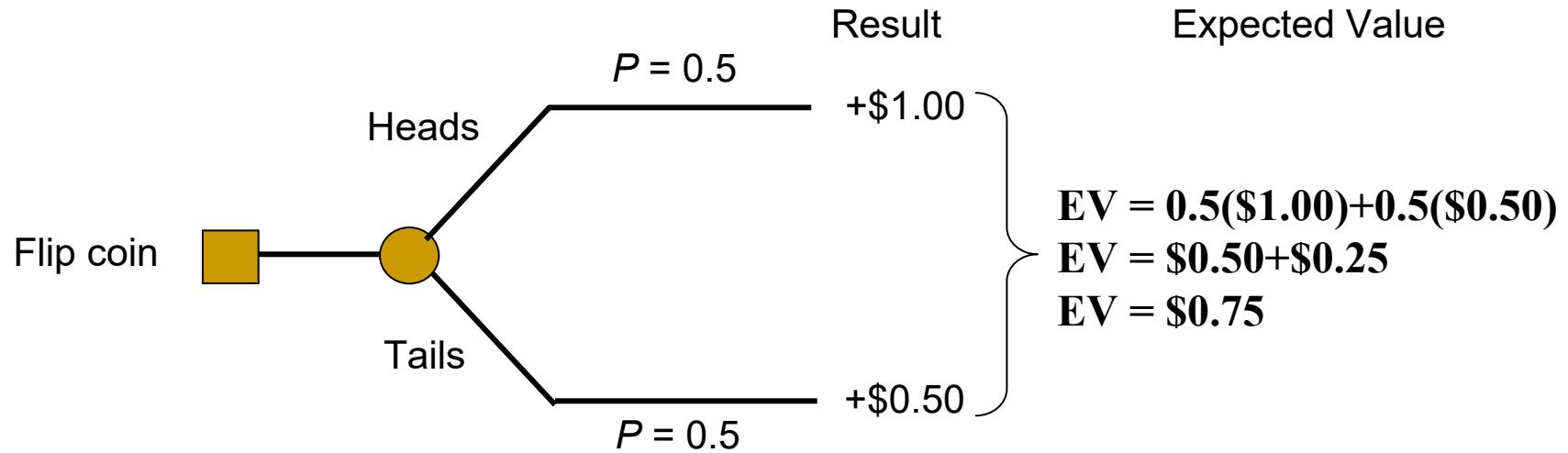
## Decision Tree: Simple Case

A friend says to you, “I’ll flip this coin: Heads I give you a dollar; tails I give you fifty cents.” What’s your ‘Expected Value’ for the flip?



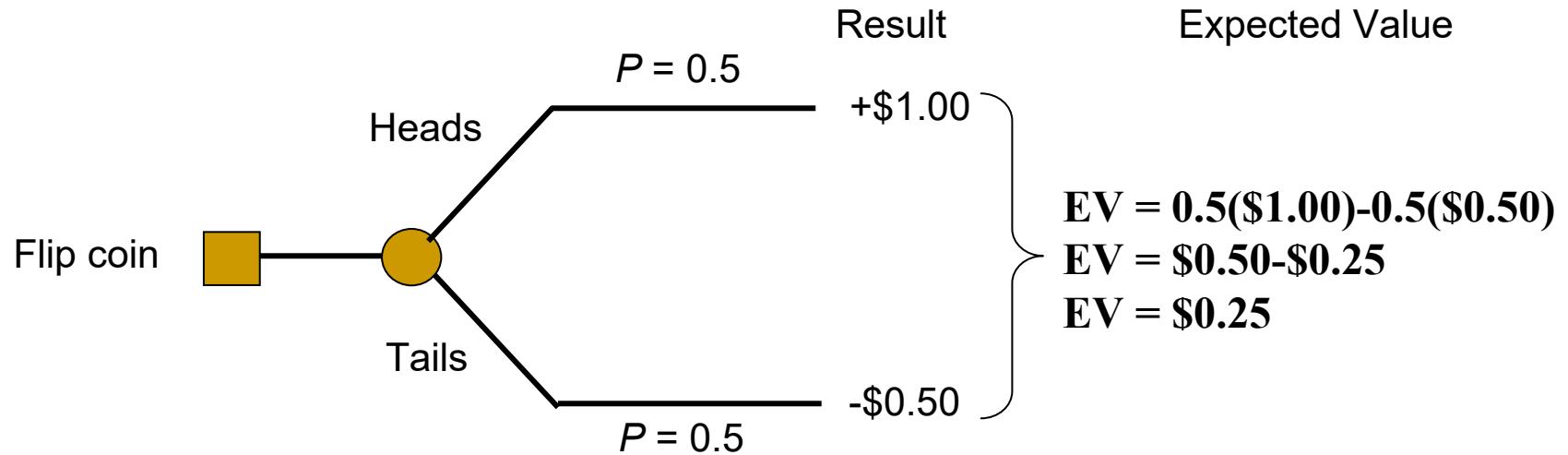
# Decision Tree: Simple Case 1

Proposition: “Heads you get \$1.00, tails you get \$0.50”  
What’s your expected value for the flip?



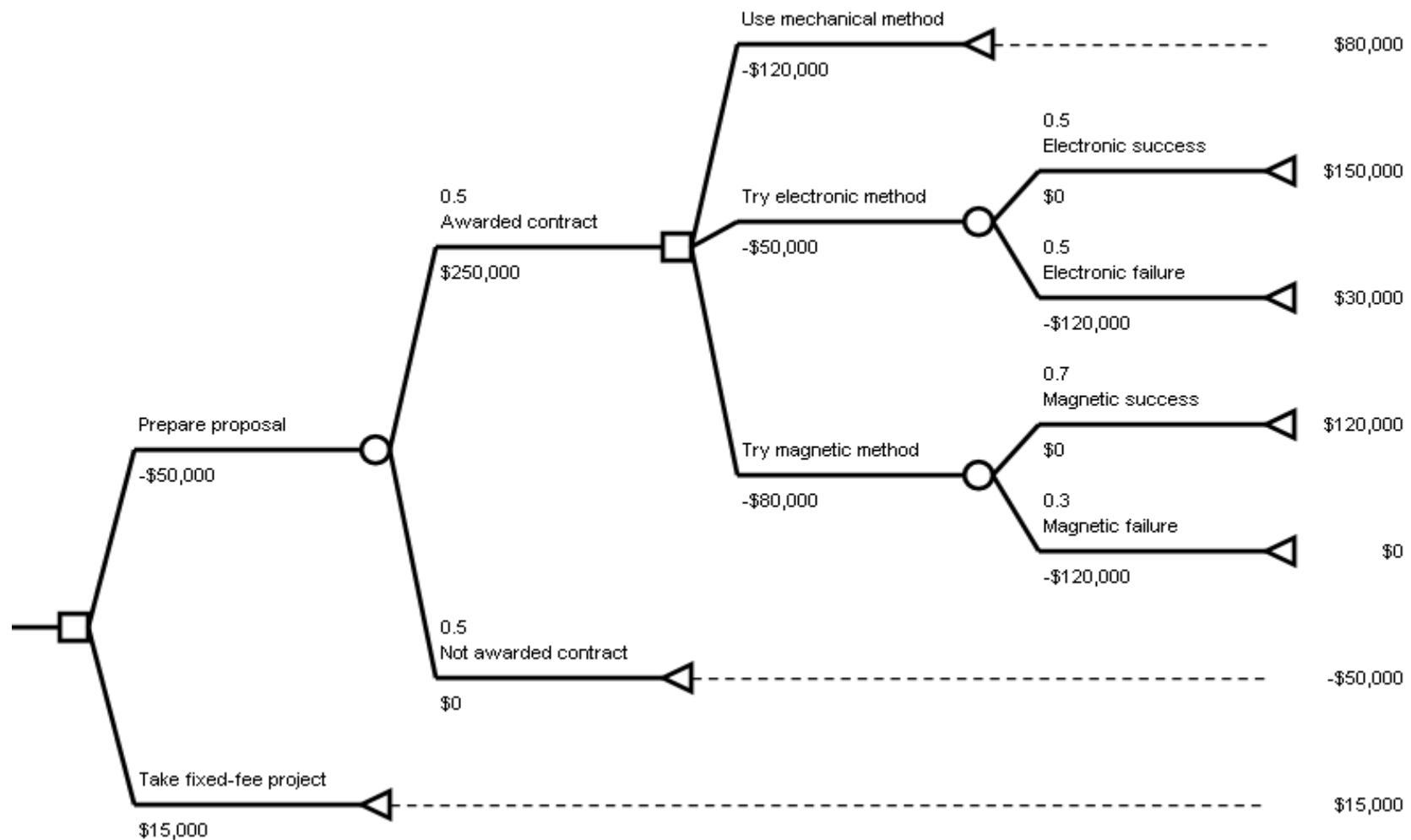
## Decision Tree: Simple Case 2

Proposition: “Heads you get \$1.00, tails you give me \$0.50”  
What’s your expected value for the flip?

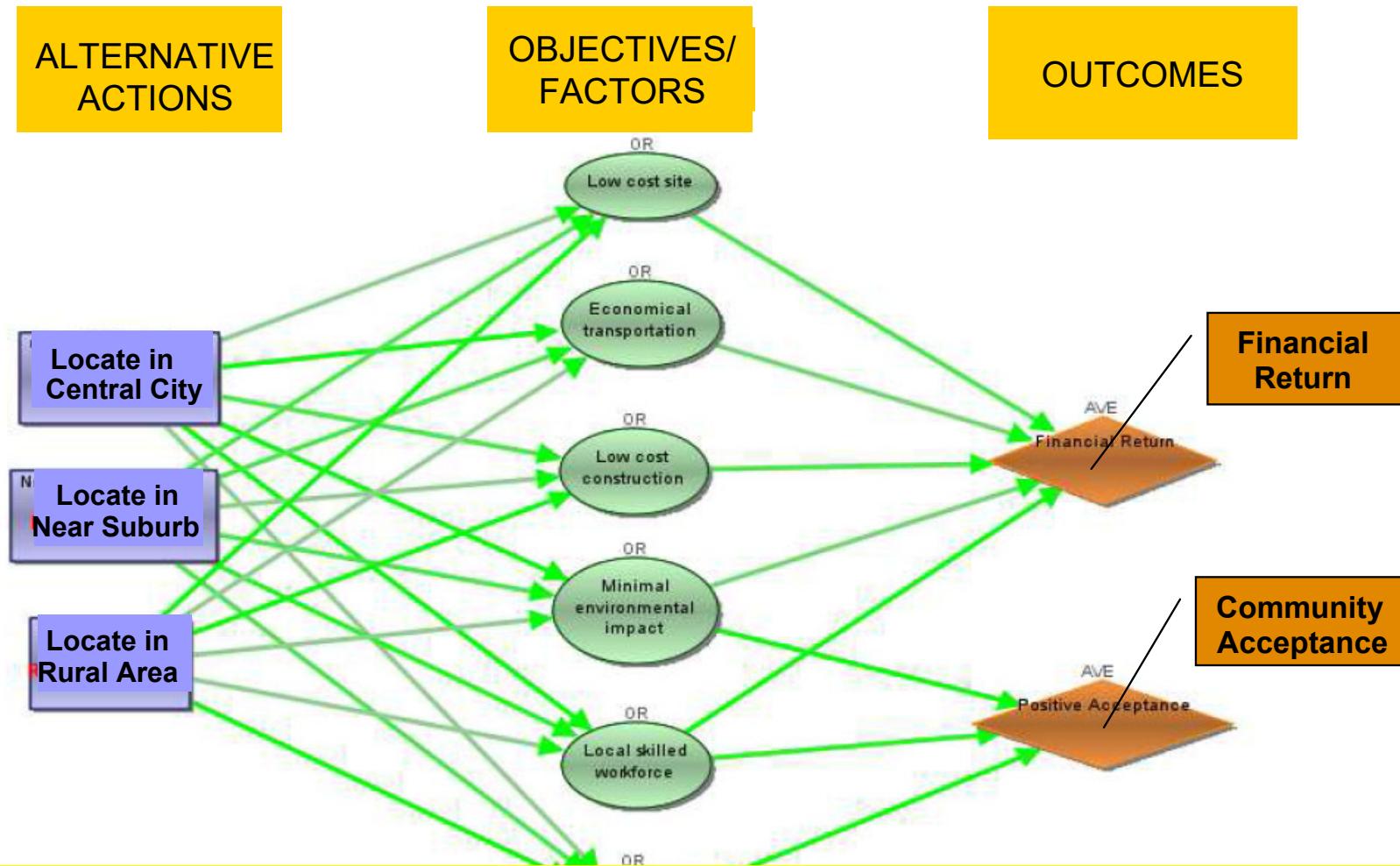


# Decision Tree: More Complex Case

TreePlan Decision Tree

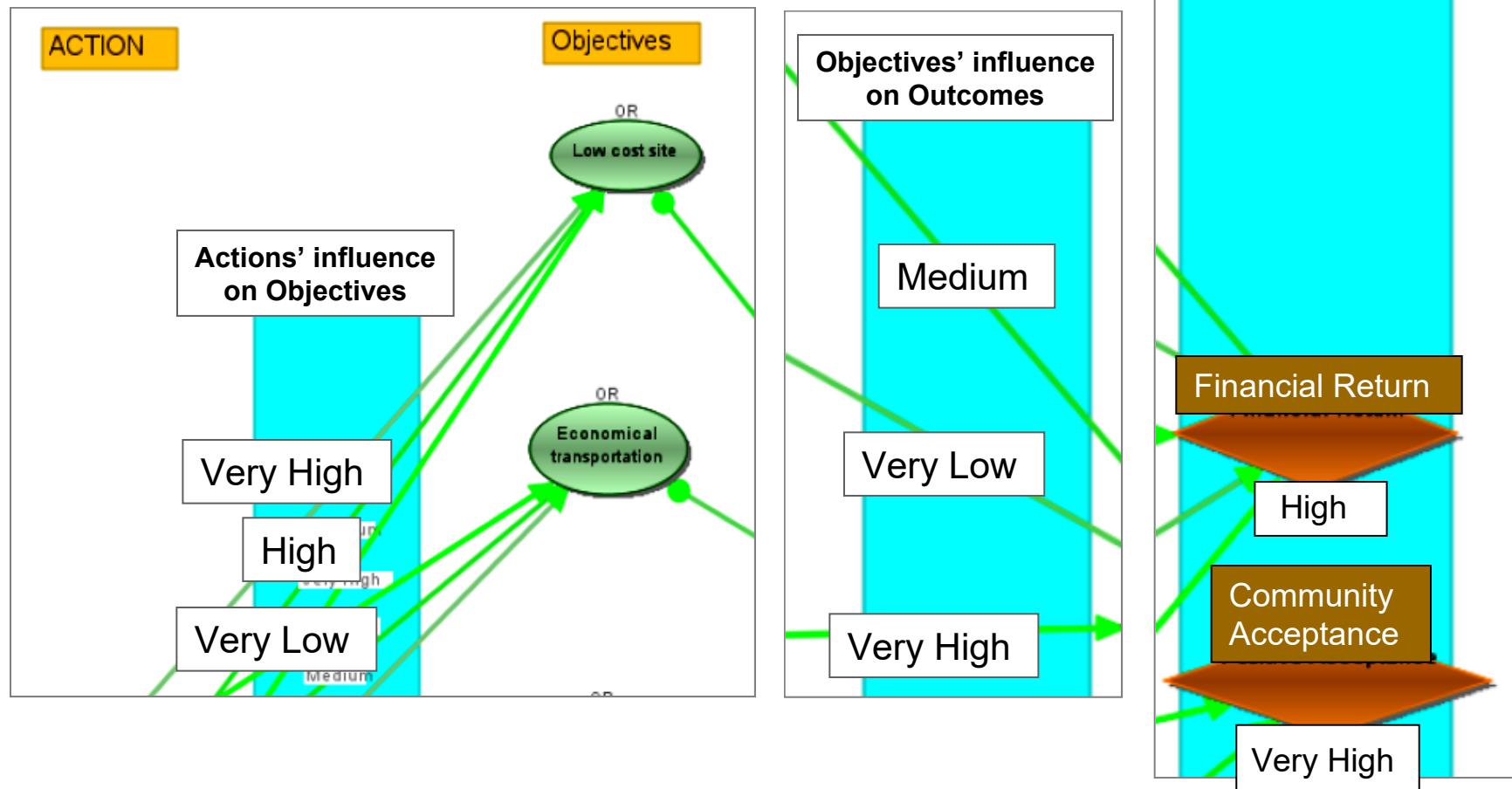


# Causal Model/Influence Diagram for a Factory Site



Causal Models, also called Influence Diagrams, are condensed ways of representing and computing what would be large and complex decision trees

# Influence Diagram: Assigning Values

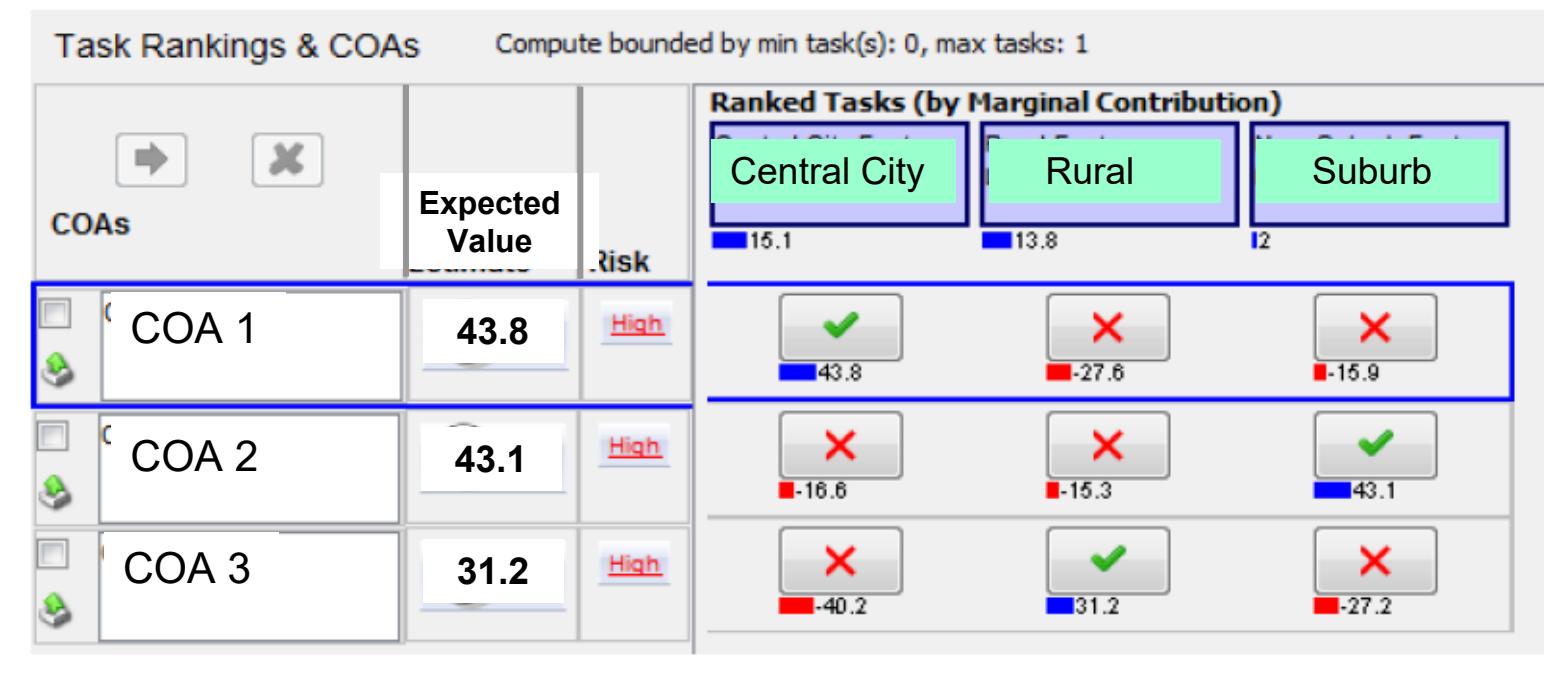


People prefer to assign qualitative levels to links rather than numerical probabilities

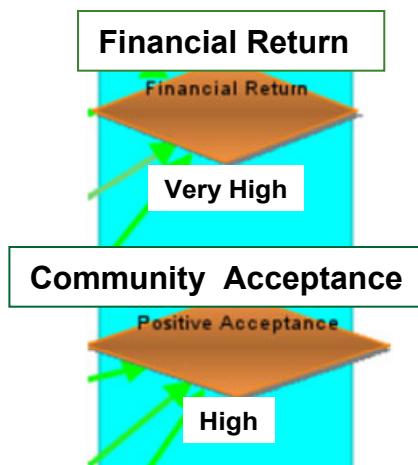
# Influence Diagram: Selecting the Action

With Community Acceptance higher than Financial Return:

Model recommends  
Central City location:



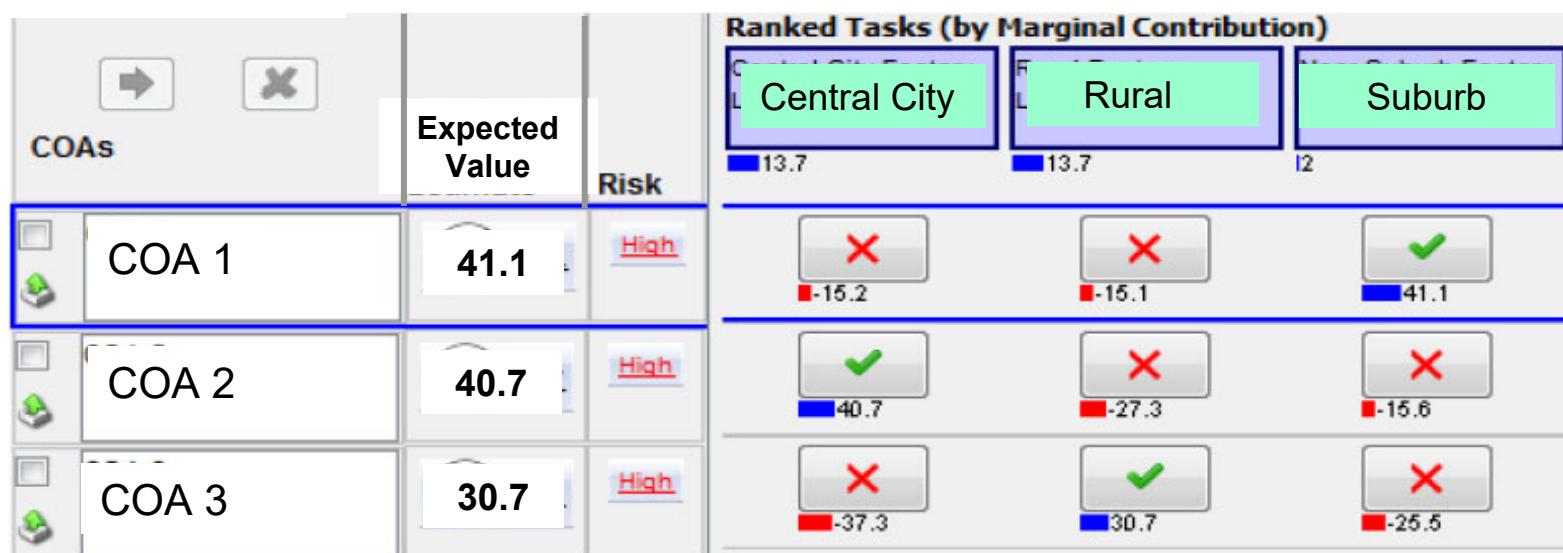
# Influence Diagram: Sensitivity



If we reverse the relative importance of the two outcome values, so that Financial Return now ranks higher than Community Acceptance

The model now recommends the Near Suburb location, again by a small margin over the next best

Rural location is far behind in both analyses.

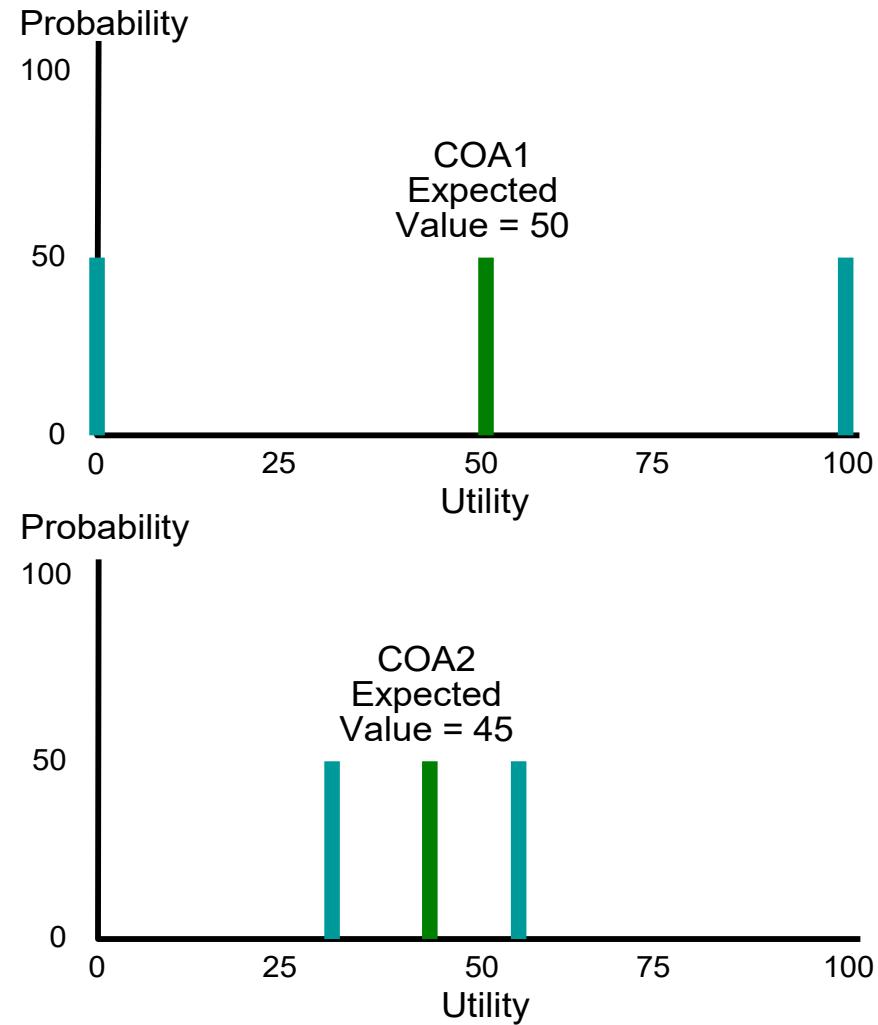


# The Factor of Acceptable Risk

Expected Values (EV) are generally the average of several possible values, so the spread of these possibilities is also a decision factor.

In the top graph the EV of COA1 (50) is the average of a big win and a total loss; in the bottom graph the EV of COA2 (45) averages a narrower range of possibilities.

Decision makers who are risk-adverse would choose COA2 even though it had a lesser EV. Those who are bigger gamblers would choose COA1 because of its larger expected payoff.

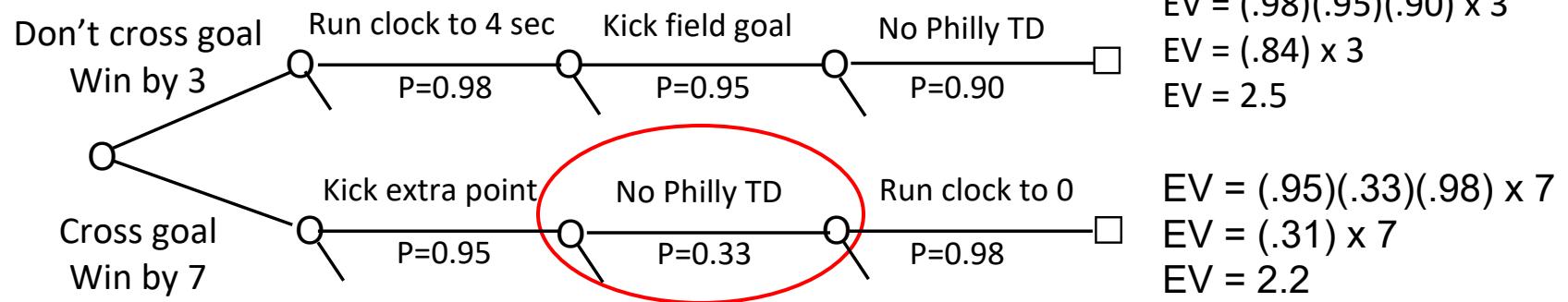


# E.g., 2023 Super Bowl Decision

With game tied and less than 2 minutes remaining, Kansas City Chiefs' Jerick McKinnon decides not to cross goal line for a sure touchdown. Why?



## Expected Value



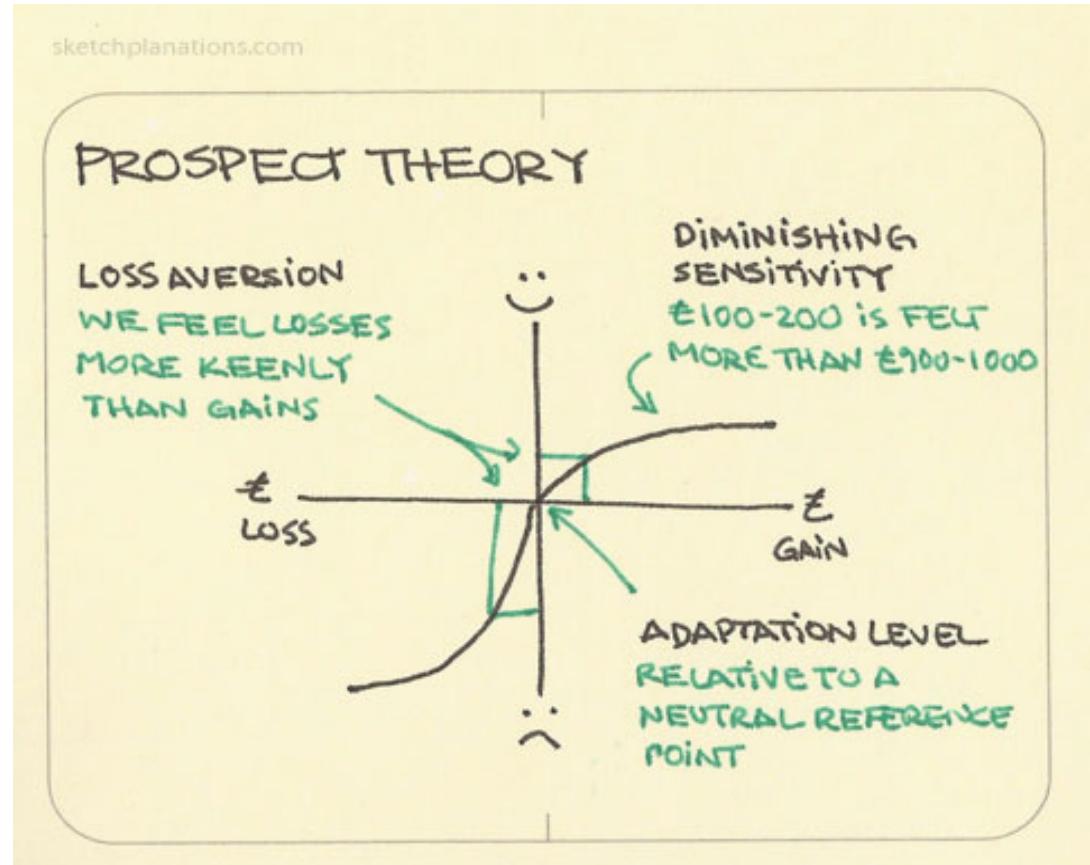
The decision is a good risk avoidance if KC thinks that Philly has a  $\geq 67\%$  chance of scoring

# Decision Making and Psychology

Amos Tversky and Danny Kahneman showed that:

- Heuristics can mislead
- Emotions create biases
- Biases affect decisions
- Humans are not naturally “rational” decision makers

They called their body of research “Prospect Theory”



Princeton University psychologist Dr. D. Kahneman was awarded the Nobel Prize for Economics in 2002; Dr. A. Tversky received a posthumous mention as co-developer.

# Online Poll: Preferred Choice

Would you rather have \$900 for sure, or a coin flip for \$2000 or nothing?



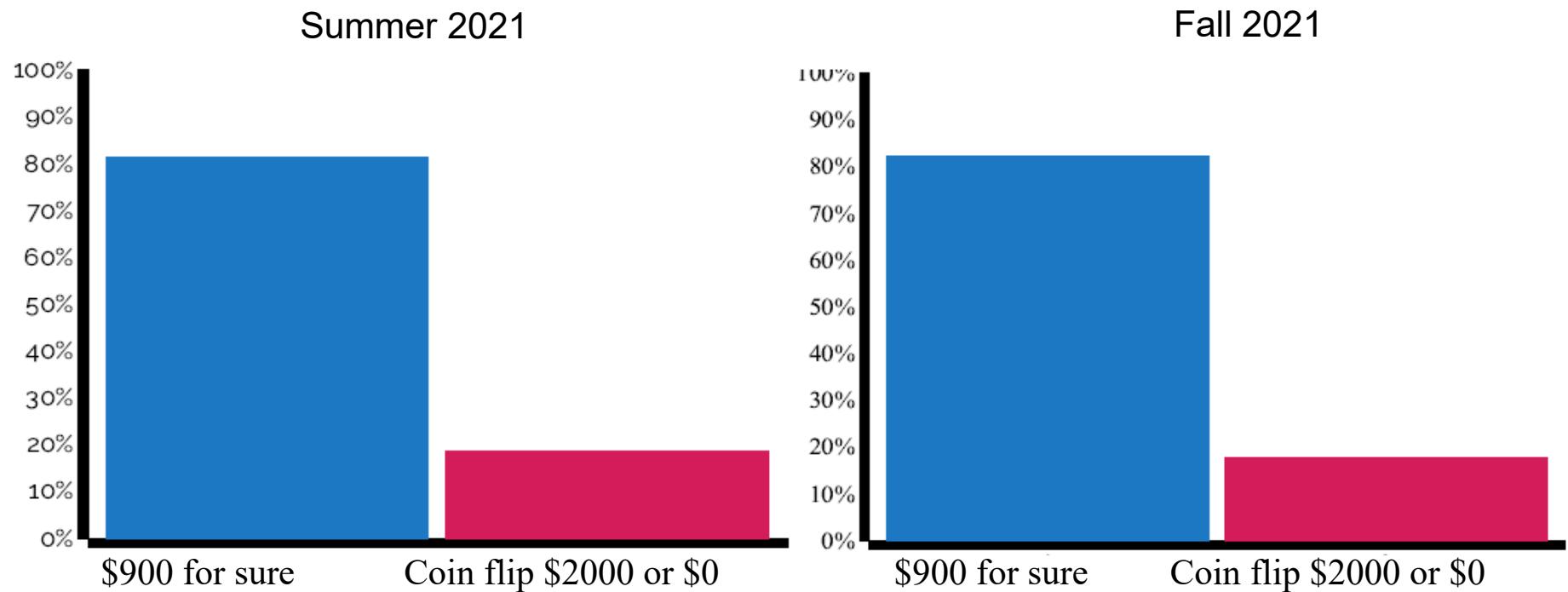
Heads = \$2000



Tails = \$0

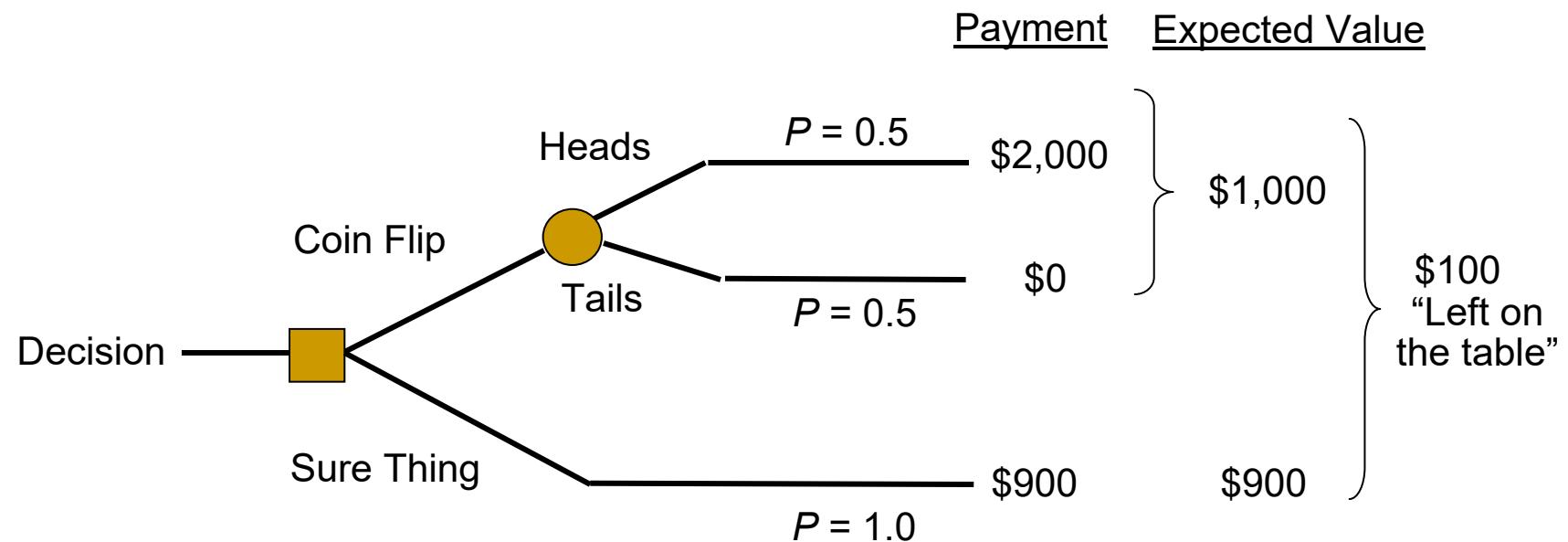
# Online Poll Results: Class Preference

Would you rather have \$900 for sure or a coin flip -- \$2000 or nothing?



In line with average respondents and previous classes, most students would rather have \$900 for sure than take a gamble with an expected value of \$1000.

# Onlinepoll Gamble: As a Decision Tree



This shows the decision tree for the previous example. The conclusion is that people are willing to pay to avoid the pain of getting nothing, and therefore that psychological factors are often a key part of their decision making process.

# Kahneman & Tversky Teachings

- *"I think one of the major results of the psychology of decision making is that people's attitudes and feelings about losses and gains are really not symmetric. **So we really feel more pain when we lose \$10,000 than we feel pleasure when we get \$10,000.**"*

Danny Kahneman

- *"Whenever there is a simple error that most laymen fall for, there is always a slightly more sophisticated version of the same problem that experts fall for."*

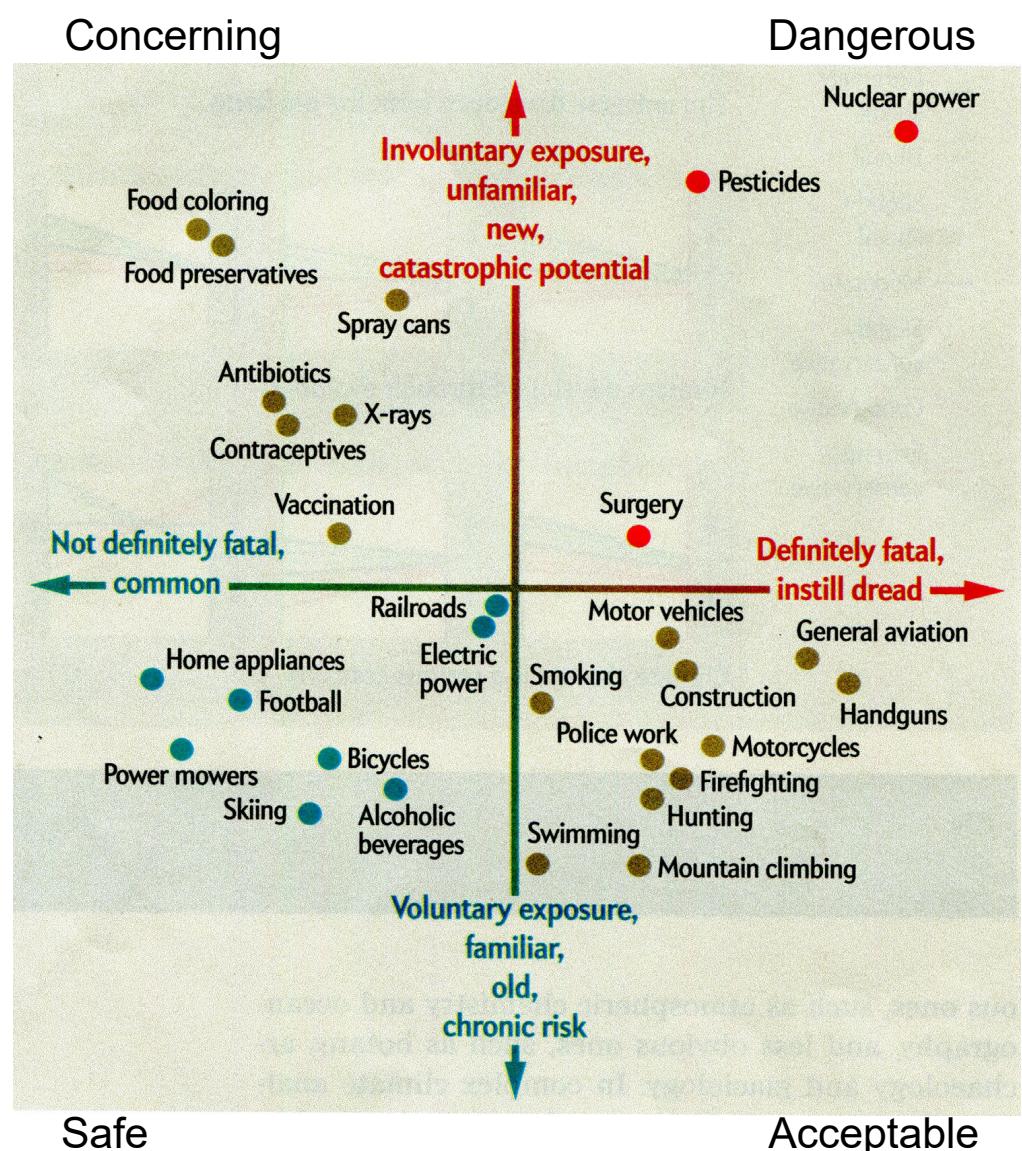
Amos Tversky

- *"It's frightening to think that you might not know something, but more frightening to think that, by and large, the world is run by people who have faith that they know exactly what is going on."*

Amos Tversky

# Subjective Estimates of Risk, c.1978

44 years later, where would people place GMO, self driving cars, AI, and COVID-19?  
Similar judgments are used to make important decisions in government and business by knowledgeable and not so knowledgeable decision makers.

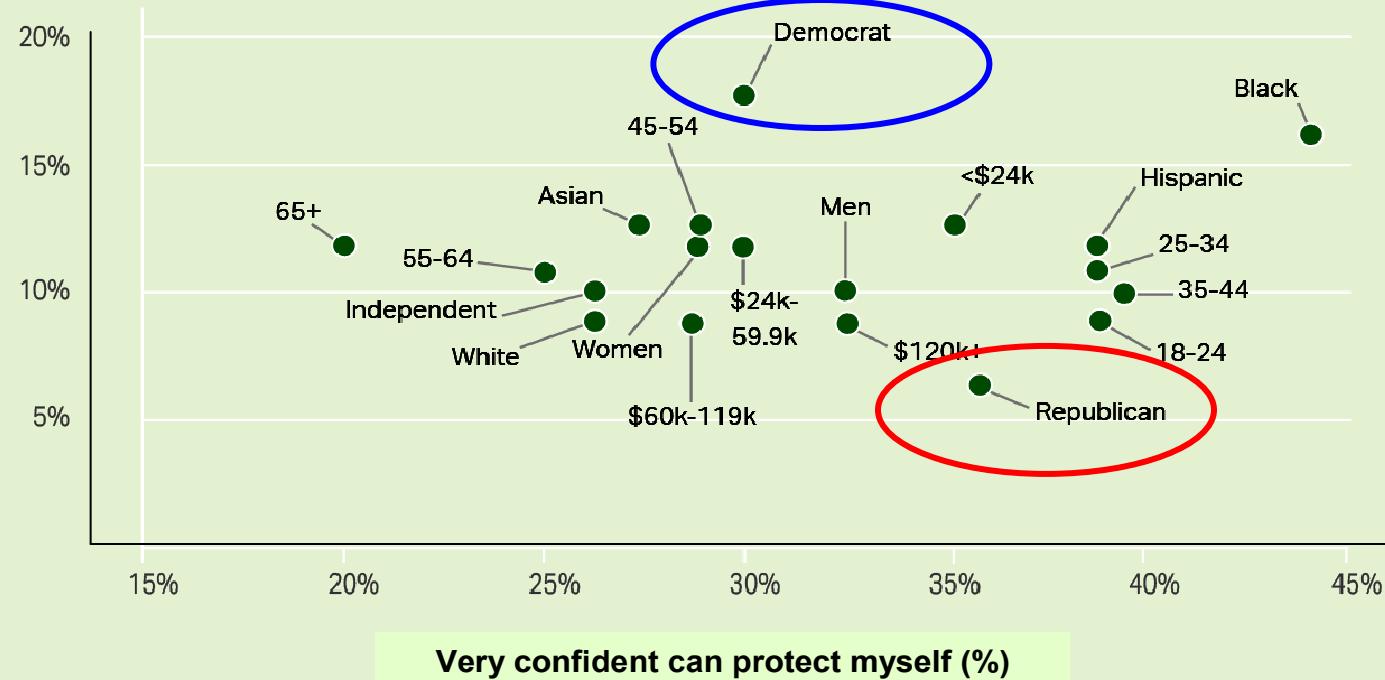


# Risk Estimates for Covid-19

## Americans' Concern About COVID-19 and Confidence in Protecting Themselves From the Disease, Among Key Demographic Groups

Does respondent have high concern (situation getting a lot worse and very worried about dying from COVID-19)? (%Yes)  
How confident are you that you can protect yourself when out in public from being infected by the coronavirus? (% Very confident)

### Very concerned/dying/getting worse (%)



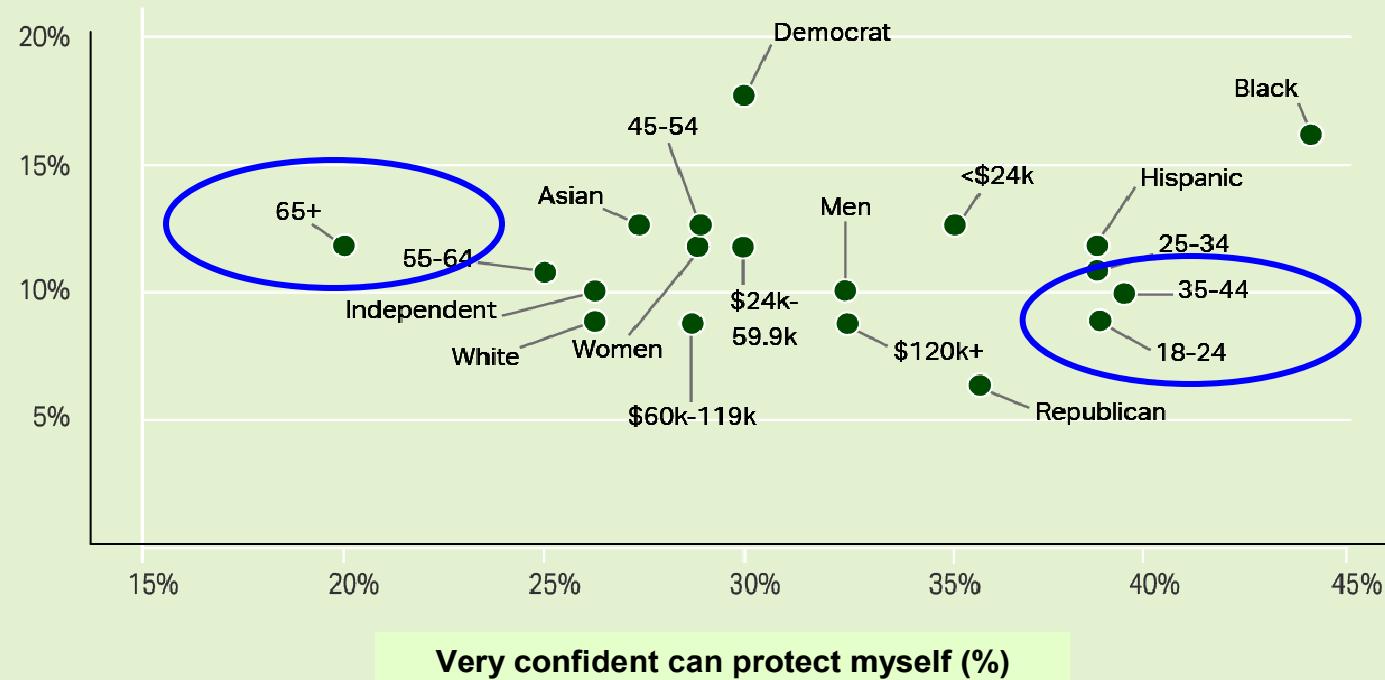
FRANKLIN TEMPLETON-GALLUP ECONOMICS OF RECOVERY STUDY, SEPT. 4-13 AND OCT. 1-9, 2020

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How confident are you that you can protect yourself when out in public from being infected by the coronavirus? (% Very confident)

### Very concerned/dying/getting worse (%)



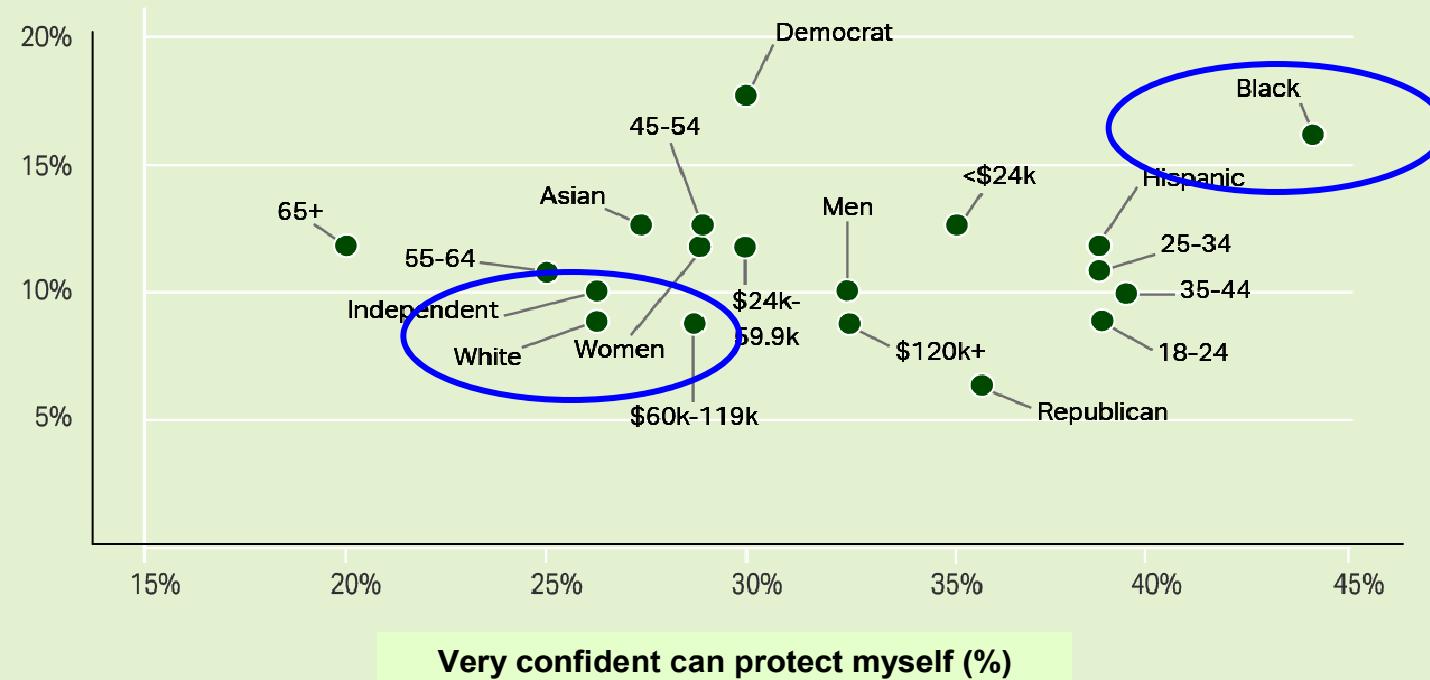
FRANKLIN TEMPLETON-GALLUP ECONOMICS OF RECOVERY STUDY, SEPT. 4-13 AND OCT. 1-9, 2020

# Risk Estimates for Covid-19

## Americans' Concern About COVID-19 and Confidence in Protecting Themselves From the Disease, Among Key Demographic Groups

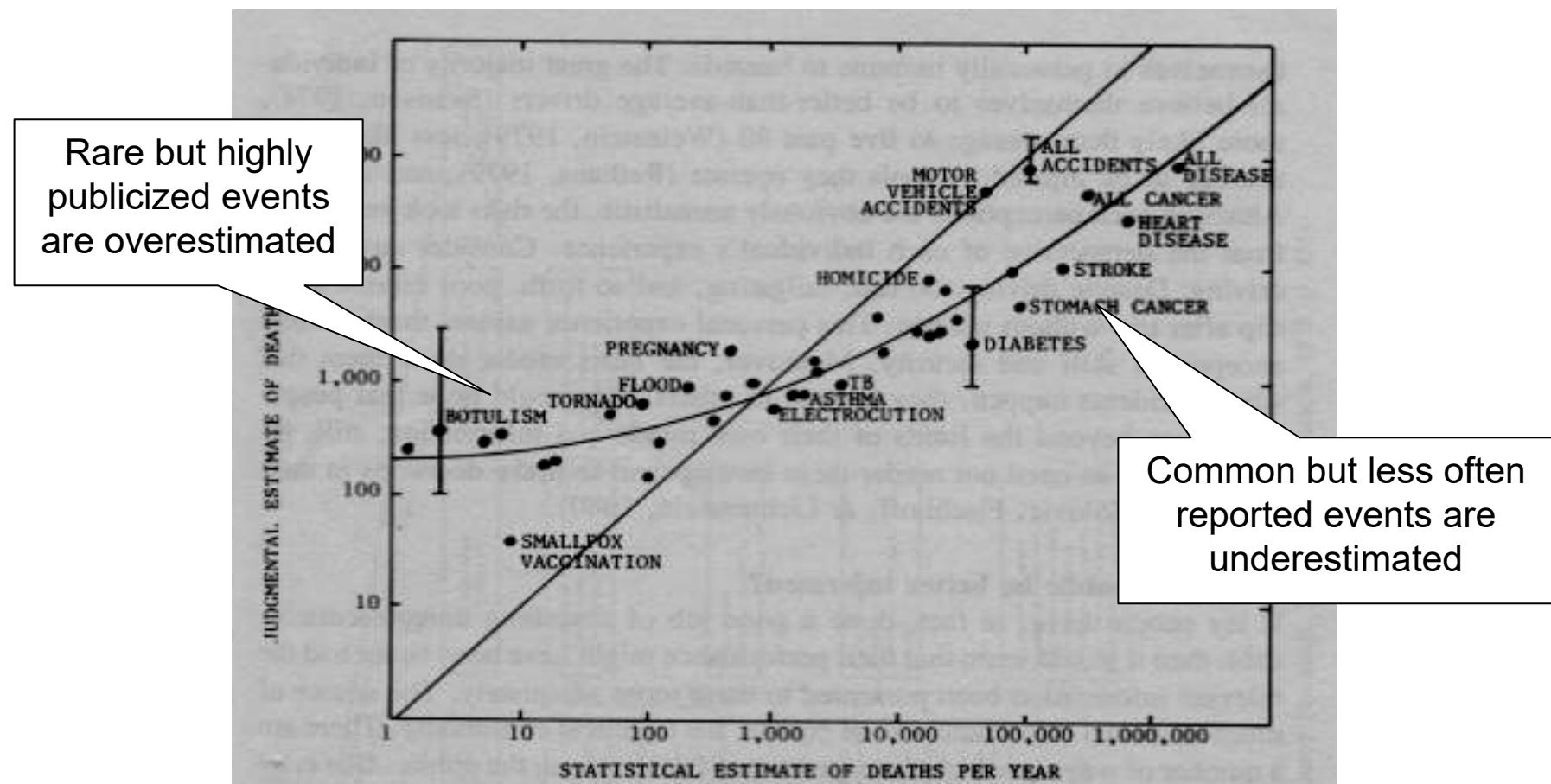
Does respondent have high concern (situation getting a lot worse and very worried about dying from COVID-19)? (%Yes)  
How confident are you that you can protect yourself when out in public from being infected by the coronavirus? (% Very confident)

### Very concerned/dying/getting worse (%)



FRANKLIN TEMPLETON-GALLUP ECONOMICS OF RECOVERY STUDY, SEPT. 4-13 AND OCT. 1-9, 2020

# Another Bias: The Availability Heuristic

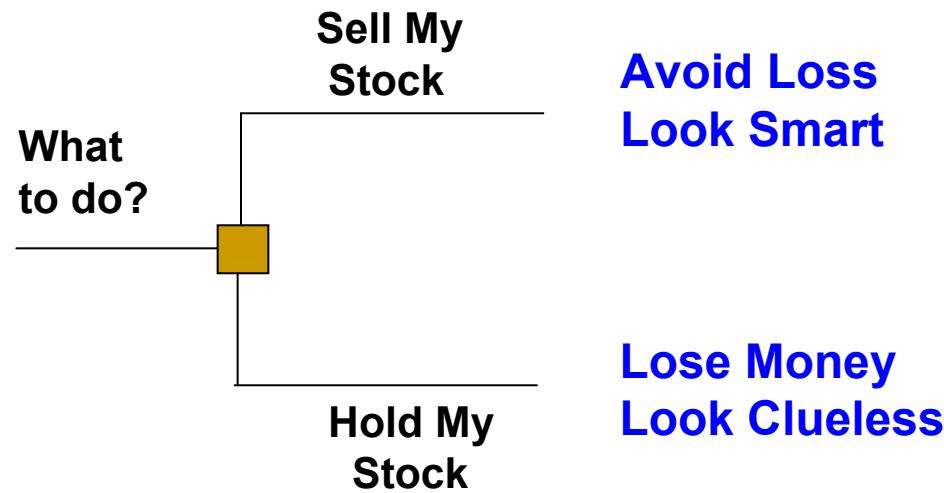


The “availability heuristic” is that people tend to estimate the probability of an event according to the ease with which examples of it come to mind.

# Analytical Decisions: The Take Away

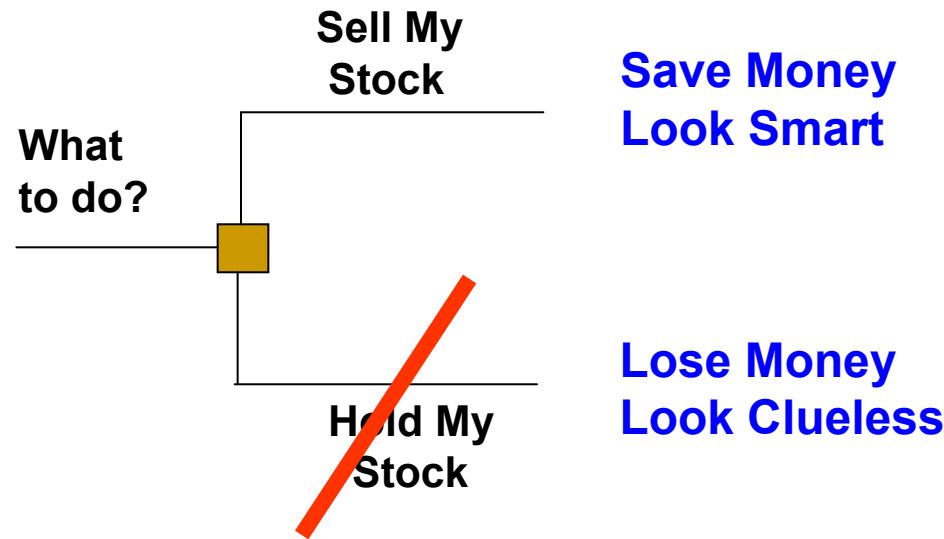
- ***Methodologies:*** There are useful formal ways of making analytical decisions,
- ***Societal/Ethical factors.*** The methodologies allow for the inclusion of societal/ethical factors
- ***Computer modeling and computation:*** Can greatly assist the process, but...
- ***Decision maker knowledge is generally included, so that...***
- ***Even analytical decisions are subject to biases, emotions and mind tricks:*** Decision makers need to guard against built in psychological factors and unwarranted assumptions

# Ethical Case Study 1: Martha Stewart's Decisions



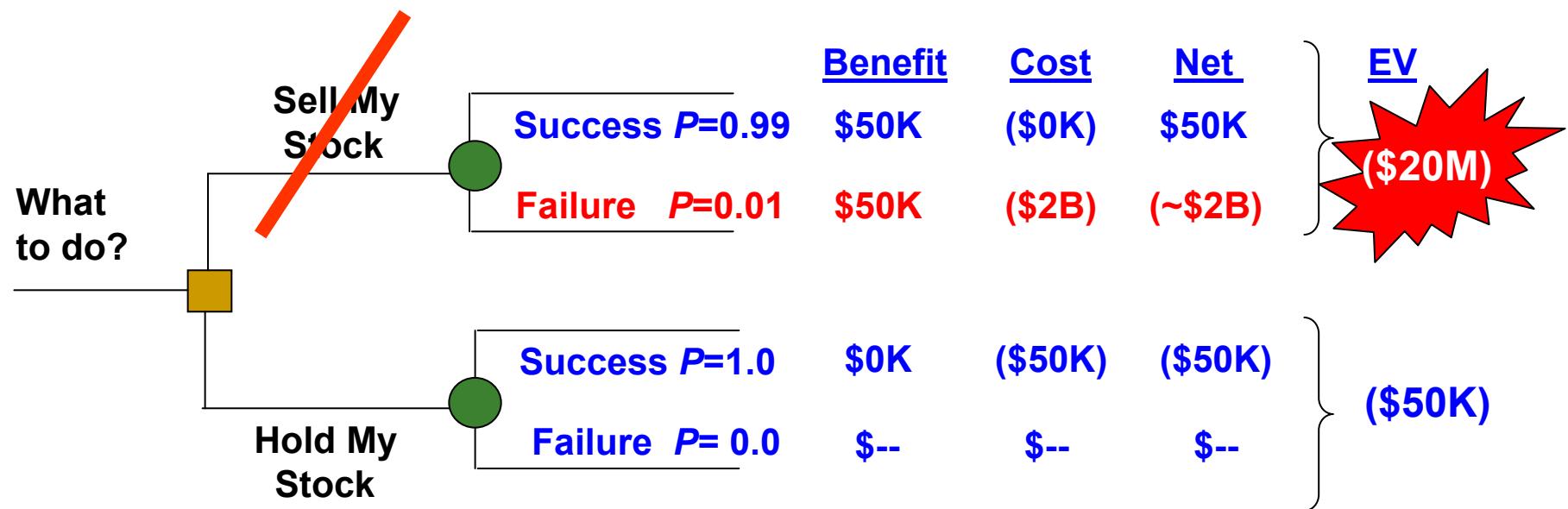
Martha's broker's assistant calls her while she is on vacation in Mexico and tells her that inside owners are rapidly selling their ImClone stock

# Martha Stewart Makes Two Bad Choices



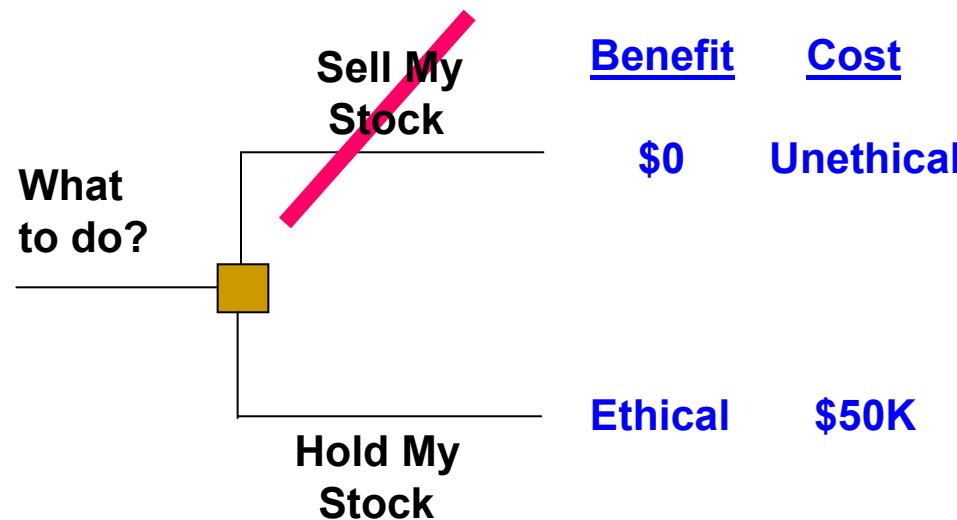
Martha Stewart decides to sell on basis of possible “inside” information. SEC investigates, Martha lies to them. She is convicted for obstruction of justice, and loses her position at Martha Stewart Enterprises, which suffers greatly.

# If Martha Stewart Made an Analytical Decision



Martha Stewart does a “back of the envelope” analysis, sees the big difference in Expected Value, holds her stock and parties on with no troubles at all.

# If Martha Stewart Made an Ethical Decision



(AP PHOTO)

Martha Stewart does an 'ethical audit' and recognizes that it is **unethical** for her to sell on suspected inside information, even if it might be legal. She holds her stock, loses momentarily, but again lives happily ever after.

## An Ethicist's Dilemma?

Bad decisions, even bad ethical decisions, may not all have bad consequences. Martha says: "I can't even remember what I was convicted for."

Did Martha and the American business community learn anything from this case history?

The 2008 financial crisis caused by rampant lying, cheating and stealing in the mortgage market suggests that it didn't.



Newsweek, March 7, 2005

# Maybe Not: Justice After All

## Stewart's fortunes are sinking

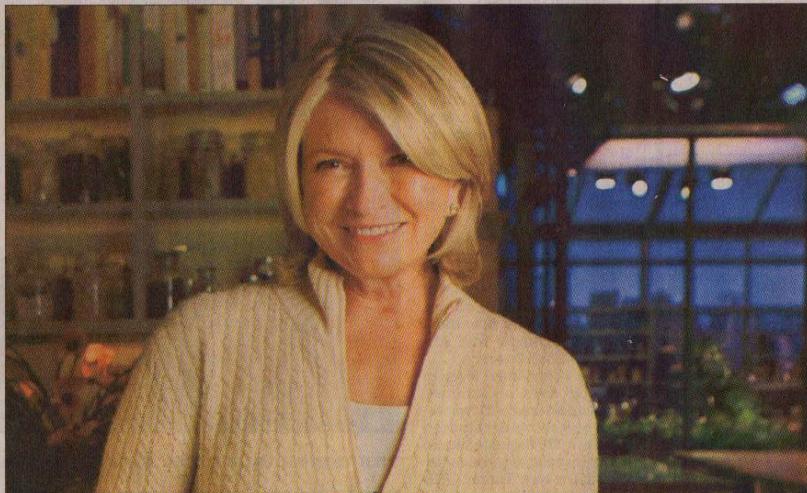
[**Stewart**, from D1] reputation-damaging jail stint and a subsequent billion-dollar loss to her company, that lifestyle has become a tougher sell. Her company, Martha Stewart Living Omnimedia, reported a \$14-million loss in 2009.

On the eve of her annual Christmas special bonanza — "Martha Stewart's Holiday Open House," guest-starring Jennifer Garner and Claire Danes, airs Monday on the Hallmark Channel — America's No. 1 Working Mom knows she's facing a do-or-die moment. In order to promote her merchandise, which is sold at Macy's, Home Depot and PetSmart, she needs television. And unlike her flawless croquembouche recipe, her TV ratings haven't been the very best they could be.

In September, looking to find a permanent home base for "The Martha Stewart Show" outside of syndication on NBC-owned stations, she launched an ambitious eight-hour programming block on the Hallmark Channel. But in the first month, "The Martha Stewart Show" averaged fewer than 200,000 viewers — less than half the audience of reruns of "The Golden Girls," which ran in the same time slot on Hallmark a year ago. A talk show co-hosted by Stewart's daughter, Alexis, attracted even fewer viewers, and a cooking show starring Martha Stewart Living's executive food editor Lucinda Scala Quinn didn't fare much better. In its annual report, filed in March, Martha Stewart Living Omnimedia suggested that reduced ratings could make it "economically inefficient" to continue to produce "The Martha Stewart Show."

### Still driven

So Hallmark's 69-year-old queen bee is pushing herself to be a smarter, faster, stronger Martha Stewart.



CAROLYN COLE Los Angeles Times

**BRAND NAME:** Martha Stewart's TV shows are key for driving sales of her merchandise.

## MARTHA ON THE MARGINS

### Stock closing price

High

(October 1999\*)

\$36.88

Low

(March 2009)

\$1.72

Current price: **\$4.67** (as of Dec. 1, 2010)

\*Date of IPO

entertainer ... with her bubbly personality, than she is a teacher, like me." Marking the main difference between her and Oprah, she says, "I'm a teacher, she's a preacher." By way of example, she opens up a promotional booklet on her desk and points to an old photo of herself surrounded by young girls. "There I am teaching my daughter and her friends the very best techniques when they were 10 years old," she says.

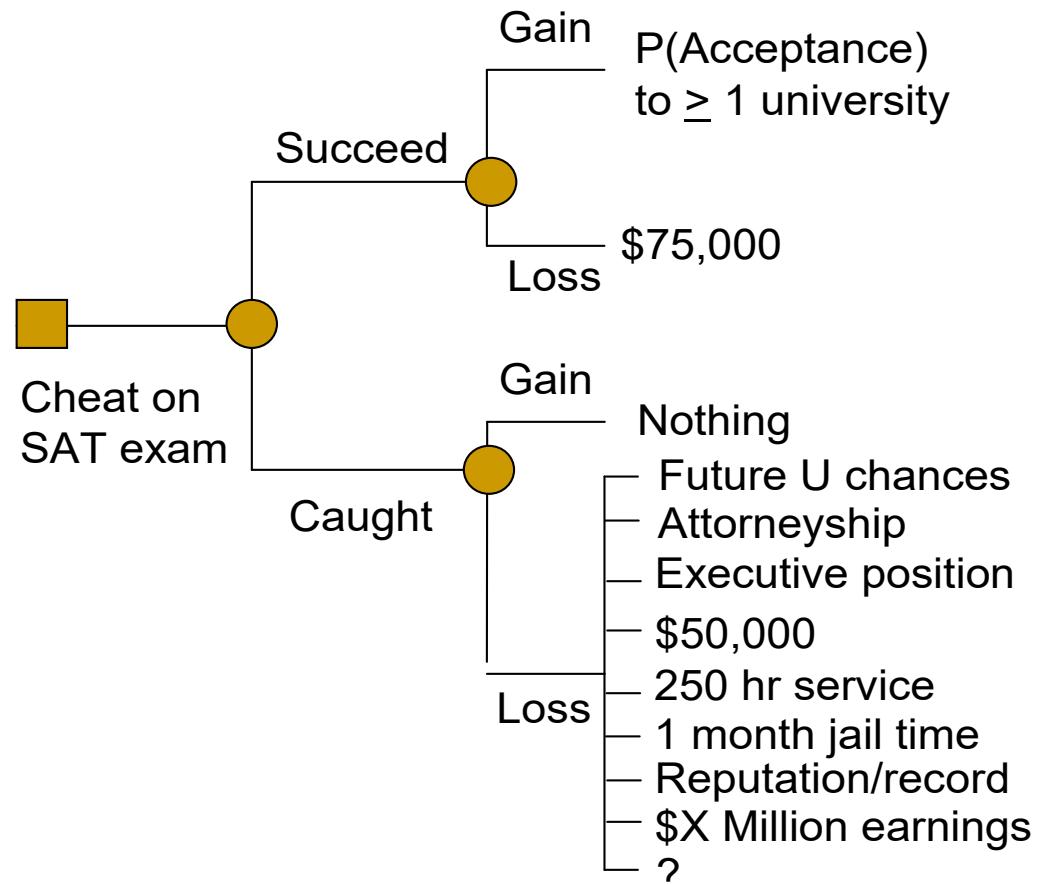
Stewart's demand for perfectionism, both from herself and her guests, has made her a superhero to millions of aspirational nesters. But she's up against a how-to market that's increasingly democratized. Home decor sites such as Apartment Therapy and Design Sponge focus on everyday readers and their unstaged, shabby-chic apartments. Food sites like NotMartha.org highlight simpler dishes instead of laboring over condiments made from scratch. Yes, these sites seem to say, you can have it all — but do you really want it all?

"What Martha's facing is that there are thousands of young Martha Stewarts out there with blogs," says Jessica Coen, editor in chief of the feminist website Jezebel, which often recaps Stewart's show. "With Martha, it's: 'The Martha Way is perfect.' Online, it's: 'Here's how I did it, but you could probably do it your own way with the same tools.' And they do it for much less cost."

Stewart's viewers don't necessarily need to think about budgeting. Koppelman says Stewart has the most affluent audience of any daytime talk show hostess. Her move to Hallmark raised the average household income of the network's viewers from \$50,000 to \$70,000, and not everyone was happy about it. When she brought *Martha Stewart Living* on her show, one

# Ethical Case Study 2: Gordan Caplan's Decision

“(I’m not worried about) the moral issue; I’m worried about the, if she’s caught doing that, you know, she’s finished.”



Attorney Gordon Caplan, a top executive in a prestigious international law firm, arranges with fixer Rick Singer to have his daughter achieve 97% on SAT.

# Ethical Case Study 3: California State Decision

A12 FRIDAY, DECEMBER 25, 2020

Los Angeles Times

LATIMES.COM

## State let down its guard against fraud

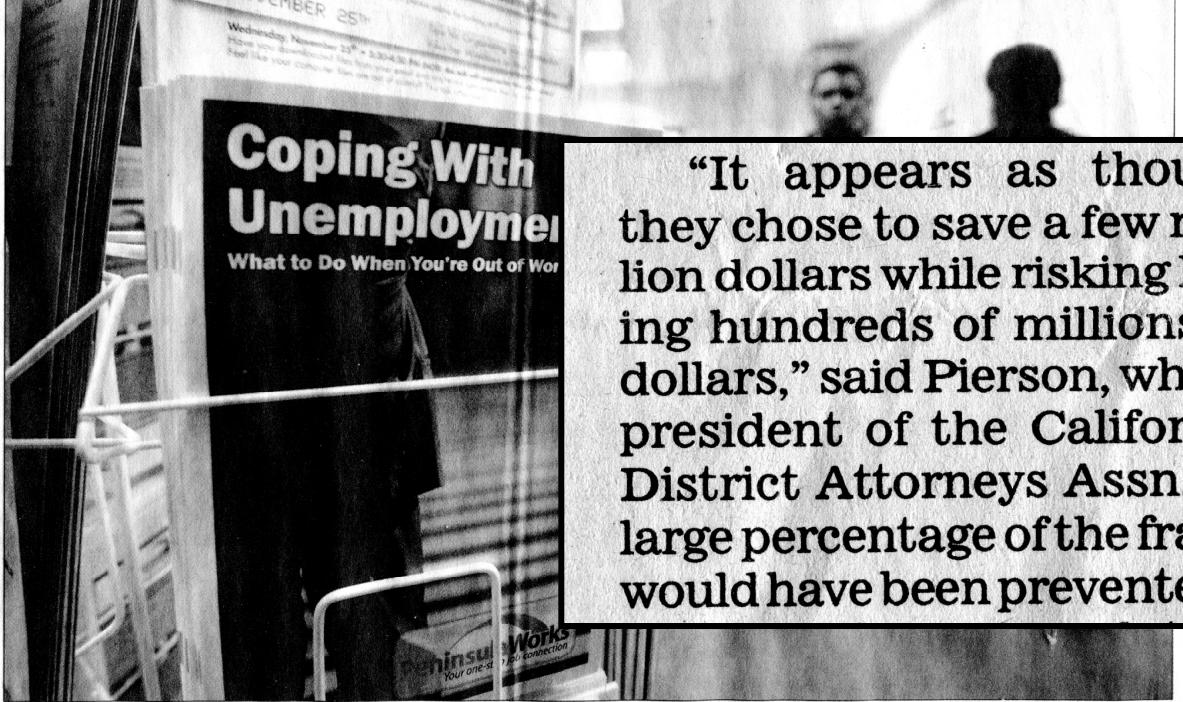
**[EDD, from A1]** to the state auditor, who said Washington and Texas are among states that do not include full numbers in mail.

In addition, legislators are questioning why the EDD canceled a contract five years ago with a firm that was using sophisticated software to help ferret out bogus claims. The firm is being used by dozens of federal and state agencies, including in Nevada and Wisconsin.

"On the face of it, the cancellation of a fraud detection system seems shortsighted," Petrie-Norris said.

As fraud totals continue to balloon — one prosecutor says there is unverified evidence it may total \$4 billion — the state is playing catch-up to right past wrongs in the unemployment system. Bolstered by the new legal opinion, it has finally begun cross-checking prison inmate data with unemployment claims, and it has rehired the antifraud contractor.

In addition, lawmakers have introduced several bills this month to fight fraud, including a measure by Petrie-Norris that would require EDD to cross-check prisoners' data with unemployed



“It appears as though they chose to save a few million dollars while risking losing hundreds of millions of dollars,” said Pierson, who is president of the California District Attorneys Assn. “A large percentage of the fraud would have been prevented.”

PAUL SAKUMA Associated Press

The California Unemployment Agency terminated a **\$1.75 million** annual fraud detection contract that would have prevented **\$6-8 billion** in fraudulent claims.

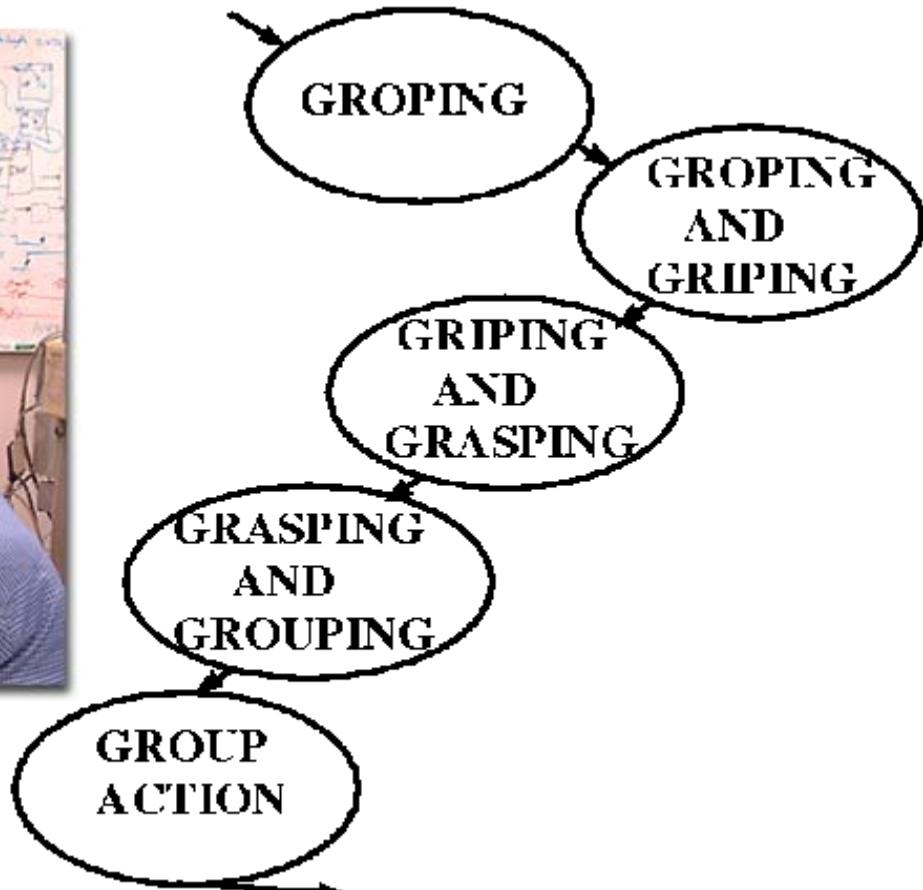
# Summary: Ethics in Decision Making

- The “Controlling Factor”
  - E.g. “Ethics trumps economics”
  - “We don’t do that!”
  - “We have to do this!”
- Another Benefit and/or Cost Factor
  - Personal, Organizational or Societal Values and Weights
  - Adequate consideration of negative consequences
- The Product of an Ethical Culture
  - Project and Team: Collaborative decisions
  - Organizational: Ethics Committees, Ethical Officers
  - National and International: Universal Ethical Standards
- A Personal Action
  - Being Ethical vs. Having Ethics
  - *What do you stand for?*
  - *What do you do about it?*

# Group Decision Making

- A Common Process Today
- Decision Groups Are:
  - *Long Standing or Ad hoc*
  - Generally *Multi-Disciplinary*
  - *Local or Remote*
  - *Advisory or Final*
- The Decision Making Procedure Is:
  - *Unstructured and Unaided*
  - Structured
    - Analytical (MAUA, decision tree)
    - Another Methodology
  - Structured and Aided

# Unstructured Decision Group Procedure



Evolving Solution....Maybe.

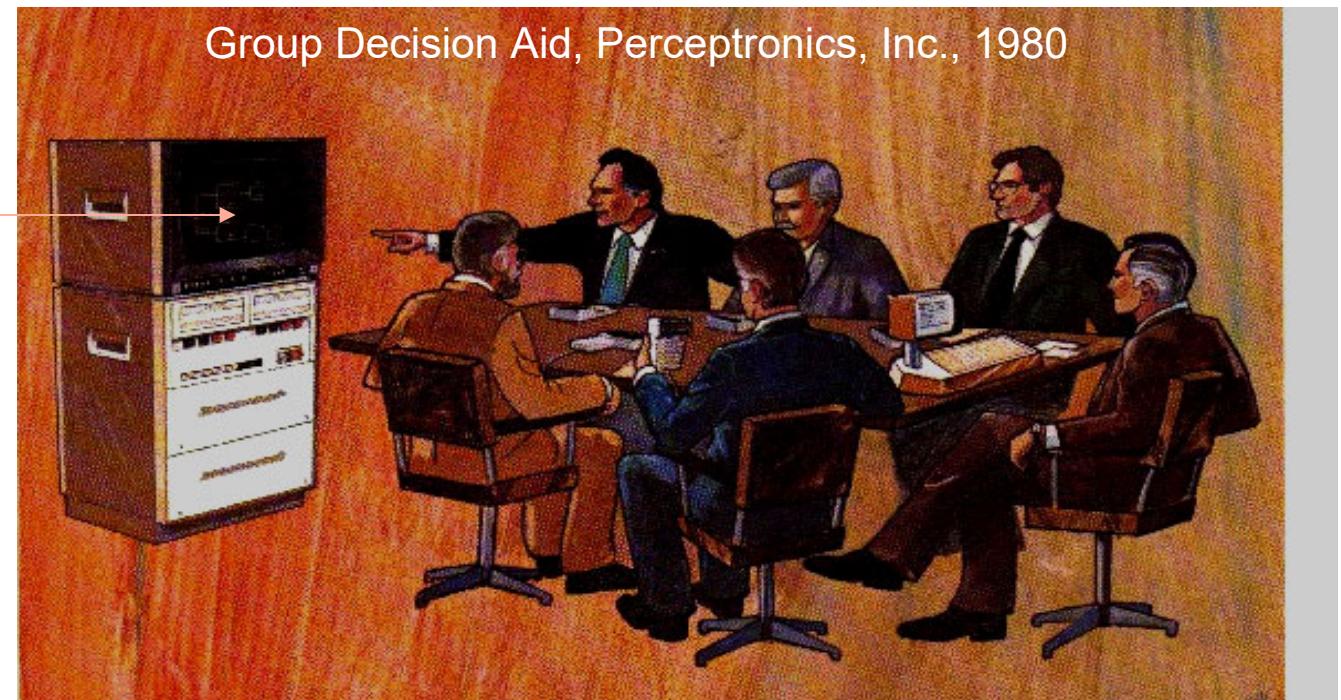
Purdue University, Personnel Briefing, 2005

Copyright Gershon Weltman, 2023

# Early Group Decision Analysis Aid

## Computer Aided:

- RT Participation
- Tree Construction
- Value Elicitation
- Conflict Resolution
- Option Analysis



# Aided vs Unaided Team Activities

Activity	Aided Groups	Unaided Groups
Objectives Definition	8%	6%
Information Exchange	14%	37%
Action Generation	26%	54%
Value Estimation	21%	4%
Probability Estimation	7%	0.9%
Attributed Weighting	10%	1.0%
Conflict Resolution	11%	0.0%

Aided groups spread their time more evenly over analytical decision activities.

# Contemporary Decision Support System

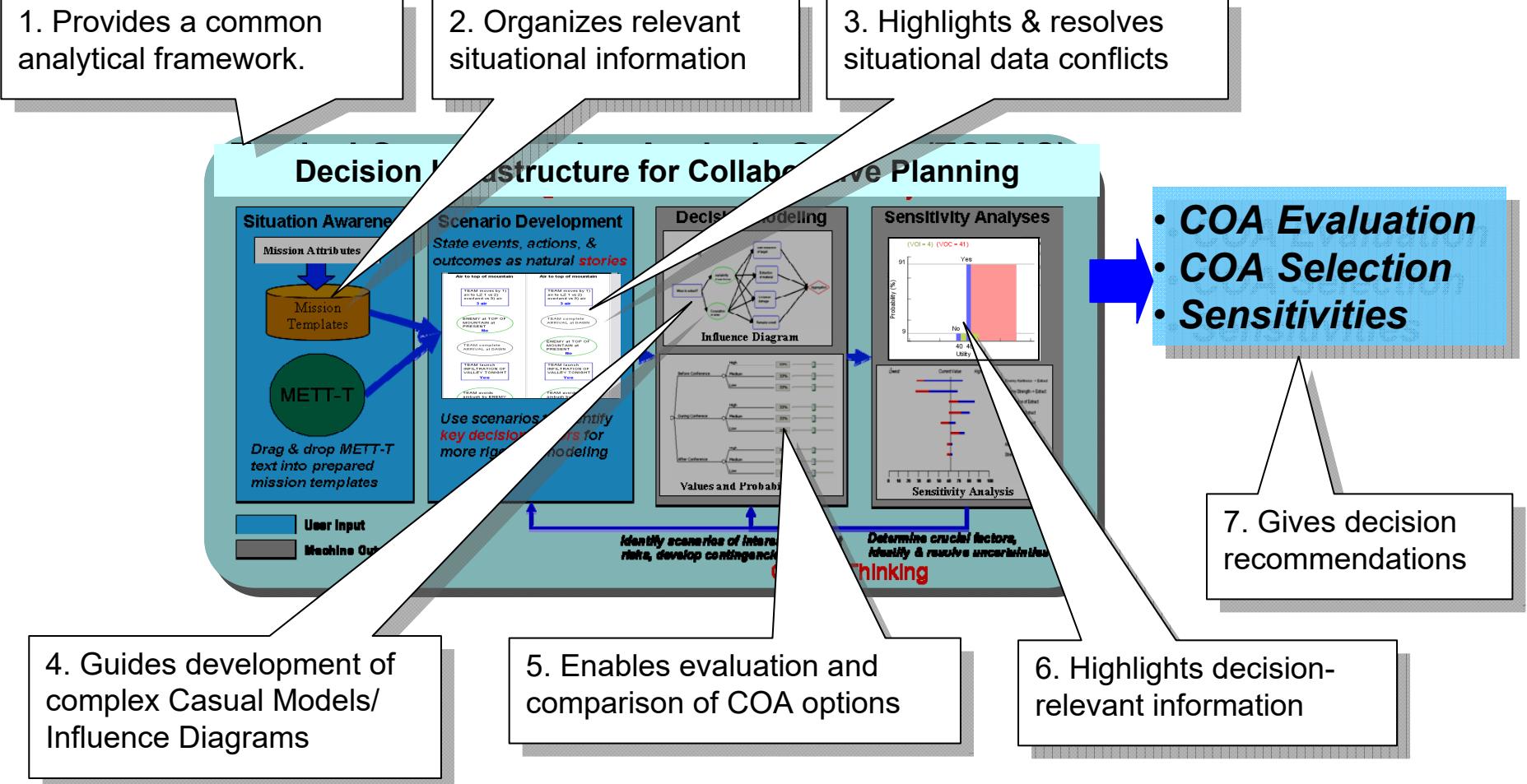


Diagram courtesy Perceptronic Solutions, Inc.

# Decision Making Under Stress: Conventional

- The cause of stress
  - Dangerous environment
  - Risk of injury or death



# Decision Making Under Stress: Operational

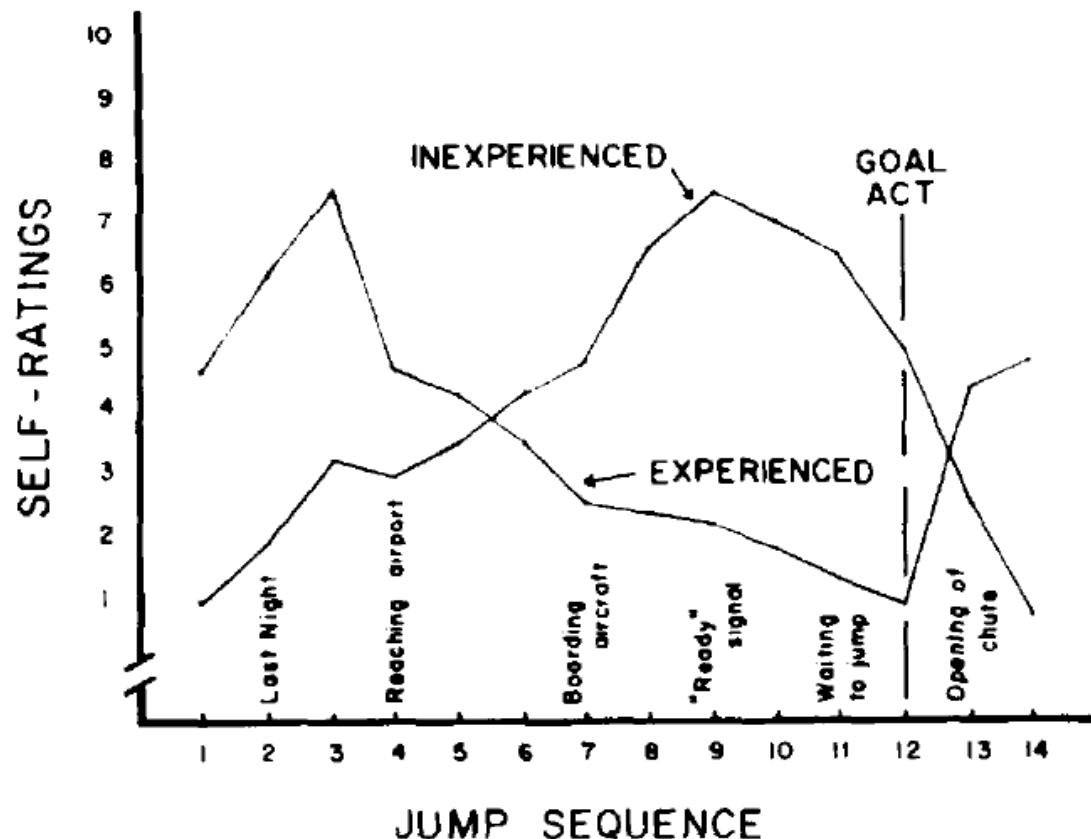
- The cause of stress
  - Assessment that task demands may exceed personal capacity
  - Realization that seriously bad outcomes may occur
- Response to stress
  - Physiological
  - Psychological



# Decision Making Under Stress

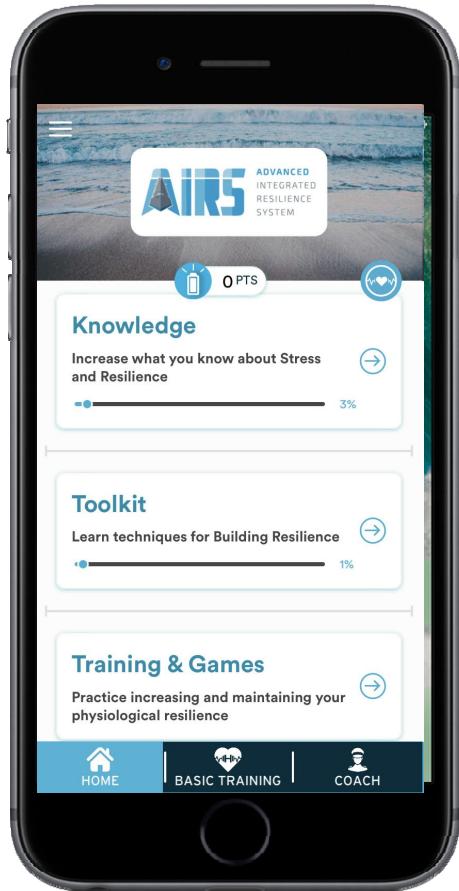
- The cause of stress
  - Assessment that task demands may exceed personal capacity
  - Realization that seriously bad outcomes may occur
- Response to stress
  - Physiological
  - Psychological
- The effects of stress on decision making
  - Narrowed attention reduces the set of options considered
  - Nervous system response leaves less capacity for problem solving
  - Decisions are hurried to relieve the stress effects
  - *Decision making is generally worse under stress*
- Strategies for mitigating the effects of stress
  - Recognize the stress level
  - Expect and understand the psycho-physiological effects
  - Depend more on structured, familiar procedures
  - *Learn to use the stress energy productively*

# Productive Use of Stress: Parachutist Study



Both groups of parachutists showed equal levels of stress. For the experienced parachutists the stress peaked 24 hours before the jump; for the inexperienced parachutists it peaked at the jump itself. The conclusion was that the experienced parachutists were able to make productive use of the stress energy.

# Advanced Integrated Resilience System (AIRS)



## ■ Knowledge

Provides a set of short narrated video modules that include: an introduction to SRTS; general information about stress effects, stress resilience and putting stress in perspective; and also specific instructions on preparing for, performing in, and recovering from stressful situations or operations.

## ■ Toolkit

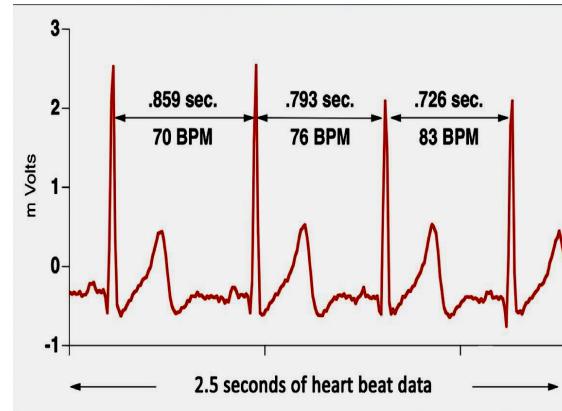
Teaches the HeartMath HRV Coherence biofeedback technique, which includes self-regulation of Heart Rate Variability (HRV) and shifting from negative to positive emotions.

## ■ Training & Games

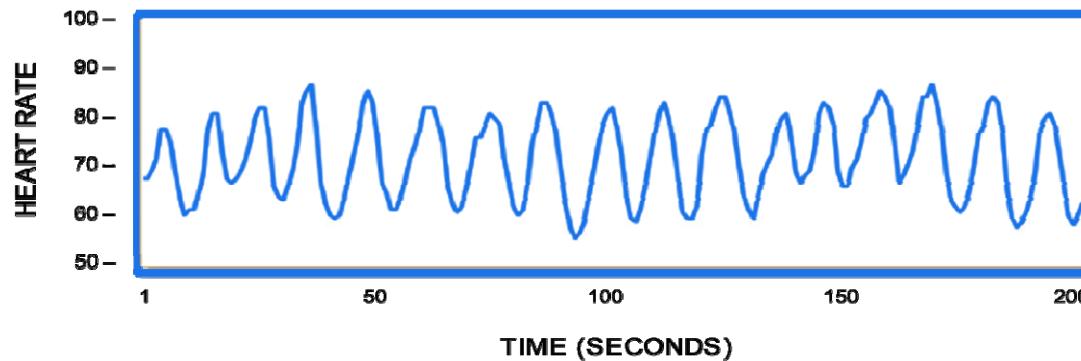
Provides a set of entertaining biofeedback-controlled games in which the trainee can practice maintaining HRV Coherence while performing under increasingly absorbing and challenging conditions.

Perceptronics Solutions' AIRS app focuses on controlling stress in order to maintain performance during stressful events and recover quickly afterward.

# HRV Coherence

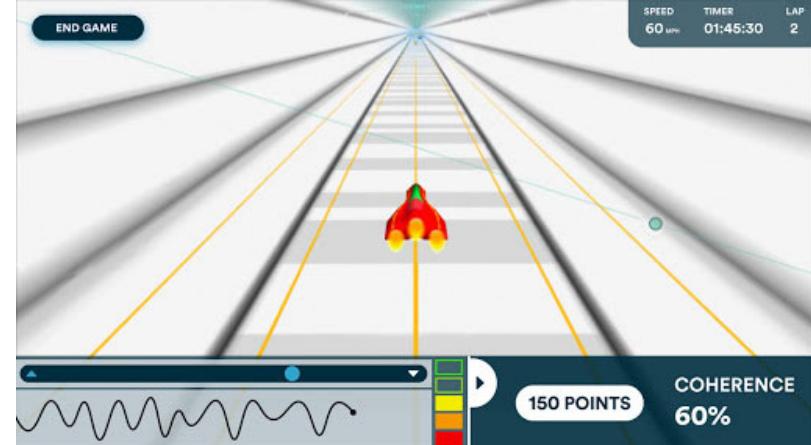
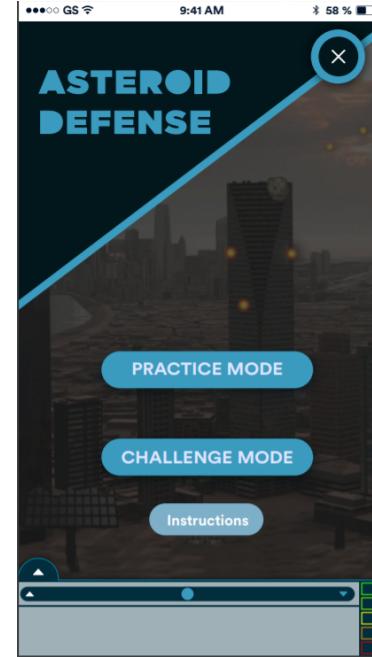


**Incoherence**  
Inhibits  
Brain Function



**Coherence**  
Facilitates  
Brain Function

# Instruction and Practice



Seven empirical studies with military and law enforcement have validated AIRS effectiveness

# The Decision Matrix

	Good Outcome	Bad Outcome
Good Decision	Expected	Unlucky
Bad Decision	Lucky	Expected

The right thing in Engineering Decision Making is:

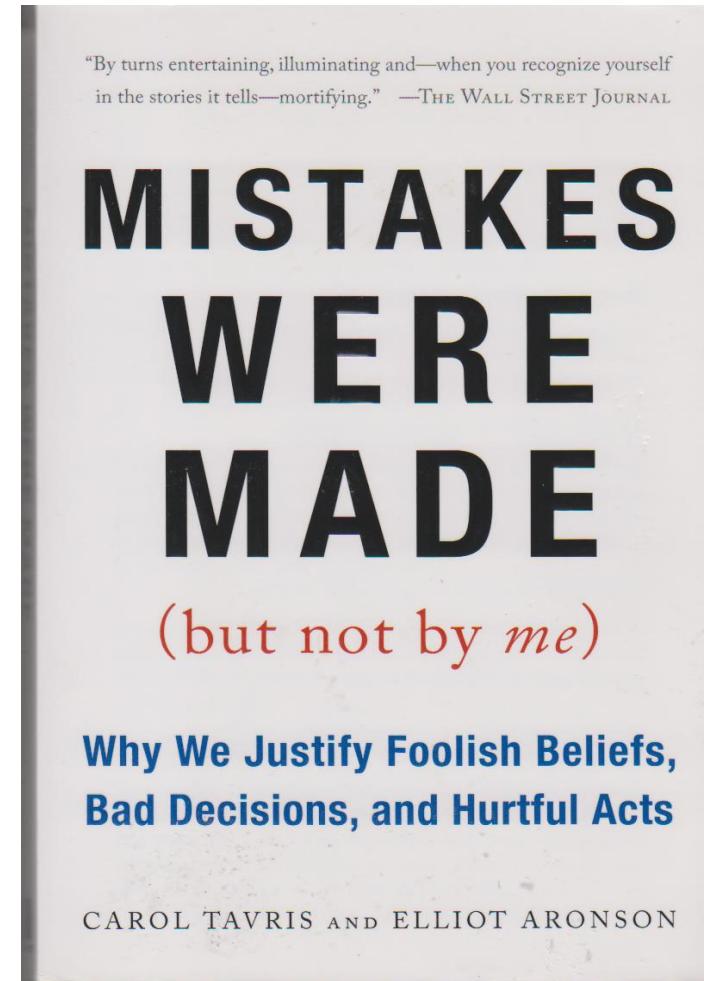
- 👉 Include ALL of the relevant factors
- 👉 Make BEST USE of the information at hand

***“Do the right thing enough times and the results take care of themselves.”***

Amarillo Slim, US Poker Champion

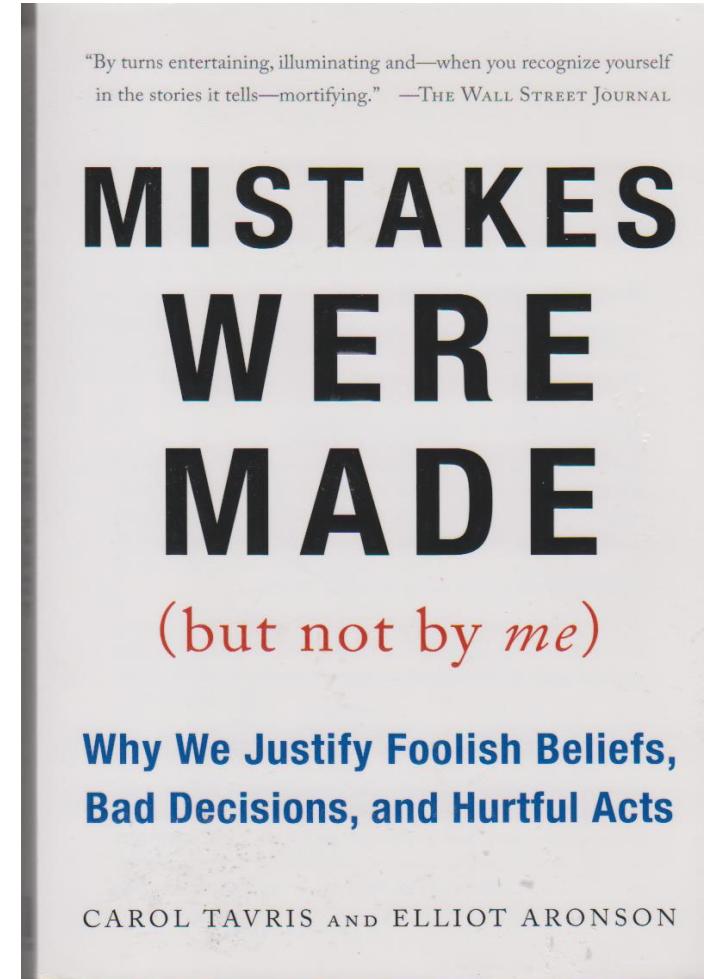
# Resolution of Cognitive Dissonance

- The Phenomenon
  - Alternatives look better *after* they are chosen than *before* the choice is made
  - The mind's form of self-congratulation
- The Positive Features
  - Don't sweat the small stuff
  - Helps you feel good about yourself



# Resolution of Cognitive Dissonance

- The Phenomenon
  - Alternatives look better *after* they are chosen than *before* the choice is made
  - The mind's form of self-congratulation
- The Positive Features
  - Don't sweat the small stuff
  - Helps you feel good about yourself
- The Negative Features
  - Holding on to false premises in the face of later facts
  - Rationalizing one's choices as the best possible under the circumstances
  - Continuing and/or escalating wrong courses of action
  - **Failing to learn from bad decisions!**



# Reflection: Not Really a New Idea



*A great man  
When he makes a mistake, he realizes it.  
Having realized it, he admits it.  
Having admitted it, he corrects it.  
He considers those who point out his faults  
as his most benevolent teachers.*

*Lao Tzu  
"Old Master" of China, Father of Taoism,  
6<sup>th</sup> Century B.C.*