

Decision Making as a Process (4 Phases)

1 Perception of problem

Recognition of problem, opportunity, source of dissatisfaction
 Framing of problem situation and deciding how to decide

2 Search

Search for alternatives (look for solutions)
 Generate alternatives (create, enact alternatives)

3 Evaluation

Compare and evaluate alternatives:
 Outcomes, consequences, probability of success

4 Choice

Select an alternative based on:
 Goal attainment, satisfying constraints, minimizing risks,
 affective responses, ethical considerations ...

(Implementation – Outcome – Learning)

1

Levels of DM	Perception	Search	Evaluation	Choice	Actors
Individual	<ul style="list-style-type: none"> •Search using accessible, familiar sources •Evaluation and choice based on habit, intuition, past experience 				
Group					
Organization					

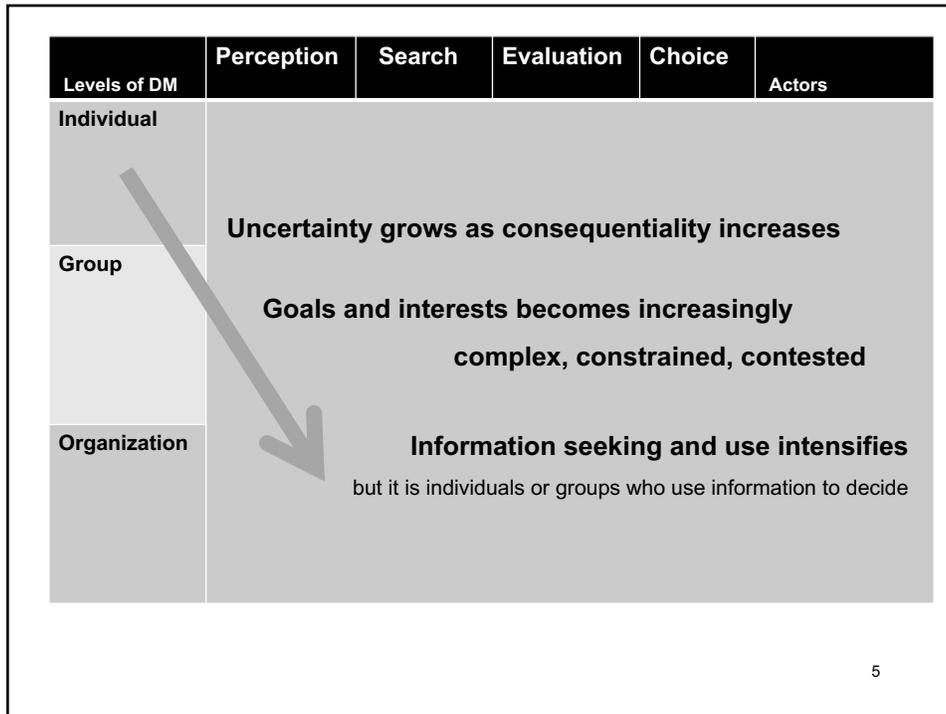
2

Levels of DM	Perception	Search	Evaluation	Choice	Actors
Individual		<ul style="list-style-type: none"> • Search using accessible, familiar sources • Evaluation and choice based on habit, intuition, past experience 			Individual ...
Group		<ul style="list-style-type: none"> • Groups are formed to improve DM by combining members' information, knowledge • Search can tap into a larger pool of options • Evaluation and choice can consider a wider range of criteria 			Group members, group dynamics, group norms

3

Levels of DM	Perception	Search	Evaluation	Choice	Actors
Individual		<ul style="list-style-type: none"> • Search using accessible, familiar sources • Evaluation and choice based on habit, intuition, past experience 			Individual ...
Group		<ul style="list-style-type: none"> • Groups are formed to improve DM by combining members' information, knowledge • Search requires information sharing among group members • Evaluation and choice influenced by group norms, cohesiveness, openness, ... 			Group members, group dynamics, group norms
Organization		<ul style="list-style-type: none"> • Organization defines problems to work on • Search guided by rules, routines • Evaluation and choice based on criteria and premises set by organization 			Designated decision makers, Policies and procedures

4



Individual Decision Making: Heuristics and Biases

(Kahneman and Tversky 1977, Kahneman 2011)

Heuristics are used subconsciously or intuitively to reduce mental effort in decision making ...

...but they may lead to systematic **biases** or errors in judgment in predictable situations.

1. Representativeness heuristic
2. Availability heuristic
3. Anchoring and adjustment
4. Decision framing
5. Prospect theory

6

Representativeness Heuristic

**Used to judge membership in a class
Based on similarity to cognitive stereotypes**

7

Representativeness Experiments (1)

Susan is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality.

A meek and tidy soul, she has a need for order and structure, and a passion for detail.

Which is more likely:

Susan is a Librarian

Susan is a Teacher

Susan is a Lawyer

Tversky, Amos, and Daniel Kahneman. 1974. Judgment Under Uncertainty: Heuristics and Biases. *Science* 185:1124-1131.

8

Representativeness Experiments (2)

Linda is 31 years old, single, outspoken, and very bright.

She majored in philosophy.

As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Which is more likely:

Linda is a Bank Teller

Linda is a Feminist Bank Teller

Tversky, Amos, and Daniel Kahneman. 1974. Judgment Under Uncertainty: Heuristics and Biases. *Science* 185:1124-1131.

9

Representativeness Examples (3)

Scenario 1.

An all-out nuclear war between US and Russia.

Scenario 2.

A situation in which neither country intends to attack the other side with nuclear weapons, but an all-out nuclear war between US and Russia is triggered by the actions of a third country such as Iran or North Korea.

Which scenario is more likely?

Plous, Scott. 1993. The Psychology of Judgment and Decision Making.

10

Representativeness Heuristic

**Used to judge membership in a class
Based on similarity to cognitive stereotypes**

**People are insensitive to prior probability of outcomes
They ignore relative sizes of categories or base rate frequencies**

**People are insensitive to sample size
They draw strong inferences from small number of cases**

**People have a misconception of Chance: Gambler's Fallacy
They see a 'normal' event and think it 'rare':
they expect chance will 'correct' a series of 'rare' events**

**People have a misconception of Regression:
They see a 'rare' event and think it 'normal':
they overlook chance as a factor causing extreme outcomes**

11

Availability Heuristic

**Used to judge likelihood or frequency of event, occurrence
Based on information that is easier to retrieve or recall**

12

Availability Examples

Consider these pairs of causes of death:

Lung Cancer vs Motor Vehicle Accidents

Emphysema vs Homicide

Tuberculosis vs Fire and Flames

From each pair, choose the one you think causes more deaths in the US each year.

Causes of Death	People's Choice	Annual US Totals	Newspaper Reports/Year
Lung Cancer	43%	140,000	3
Vehicle Accidents	57%	46,000	127
Emphysema	45%	22,000	1
Homicides	55%	19,000	264
Tuberculosis	23%	4,000	0
Fire and Flames	77%	7,000	24

(Combs & Slovic 1979,
see also Kristiansen 1983)

13

Availability Heuristic

Used to judge likelihood or frequency of event, occurrence

Based on information that is easy to recall or retrieve

People tend to be biased by information that is easier to recall:
they are swayed by information that is vivid, well-publicized, recent

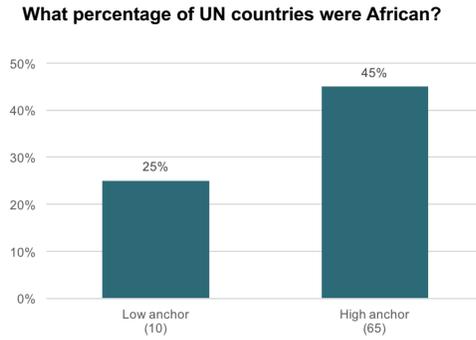
People tend to be biased by examples that they can easily retrieve:
they use these search examples to test hypotheses

People tend to be unaware that the information they have available
to them may be incomplete or misleading:
we make mistakes not because the right answer is hard to find, but
because the wrong answer comes to mind too easily.

14

Anchoring and Adjustment

Used to estimate value or size of quantity
Start from initial value and adjust to final estimate



Tversky, Amos, and Daniel Kahneman. 1974. Judgment Under Uncertainty: Heuristics and Biases. *Science* 185:1124-1131.

15

Anchoring Example

103 students at Berkeley asked to estimate the population of Chicago:

Is the population of Chicago more or less than 200,000?

What is the population of Chicago?

Is the population of Chicago more or less than 5 million?

What is the population of Chicago?

With the low anchor, the median estimate was 600,000.

With the high anchor, the median estimate was 5.05 million.

(Karen Jacowitz, Kahneman 1995)

16

Anchoring and Adjustment

Used to estimate value or size of quantity
Start from initial value and adjust to final estimate

People are influenced by an initial anchor value
anchor may be unreliable, irrelevant
adjustment is often insufficient

People overestimate probability of conjunctive events
People underestimate probability of disjunctive events

Anchors may be qualitative:
people form initial impressions that persist and influence decisions

Tversky, Amos, and Daniel Kahneman. 1974. Judgment Under Uncertainty: Heuristics and Biases. *Science* 185:1124-1131.

17

Individual Decision Making: Heuristics and Biases

(Kahneman and Tversky 1977, Kahneman 2011)

Heuristics are used to reduce mental effort in decision making, but they may lead to systematic **biases** or errors in judgment.

1. Representativeness heuristic
2. Availability heuristic
3. Anchoring and adjustment
4. Decision framing
5. Prospect theory

18