Week 2

Information processing

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Decision-making

Objectives

- Understand how humans make decisions

- Define skill-, rule, and knowledge-based behavior

- Describe and design some tools for improving decision-making

What is "good" decision making?

1. The decision that **maximizes expected value**.

2. Decisions that produce "good" outcomes

3. The decision choices made by experts

Biases vs heuristics

- Bias: a general tendency that usually makes a decision outcome less positive than one without such a bias

- Heuristic: a "mental shortcut" that reduces the mental effort (and/or time) of the diagnosis or decision, and usually produces a correct outcome.

Why humans can be poor decision makers

- Place undue weight on early information

- Do not "extract" optimal amounts of information

- Become more confident with more information, but we are not more accurate

- Seek more information than can be absorbed

- Treat all information as if it were equally reliable

Why humans can be poor decision makers

- Seek information that confirms our chosen course of action

- Can usually entertain only a few hypotheses

- View potential losses as having greater consequence than potential gains

- Focus on only a few critical attributes

Skill-, rule, and knowledge-based behavior

- Skill-based behavior
  - subconscious, automated
- Rule-based behavior
  - stored procedures
- Knowledge-based behavior
  - novel situation, no rules stored from past experience
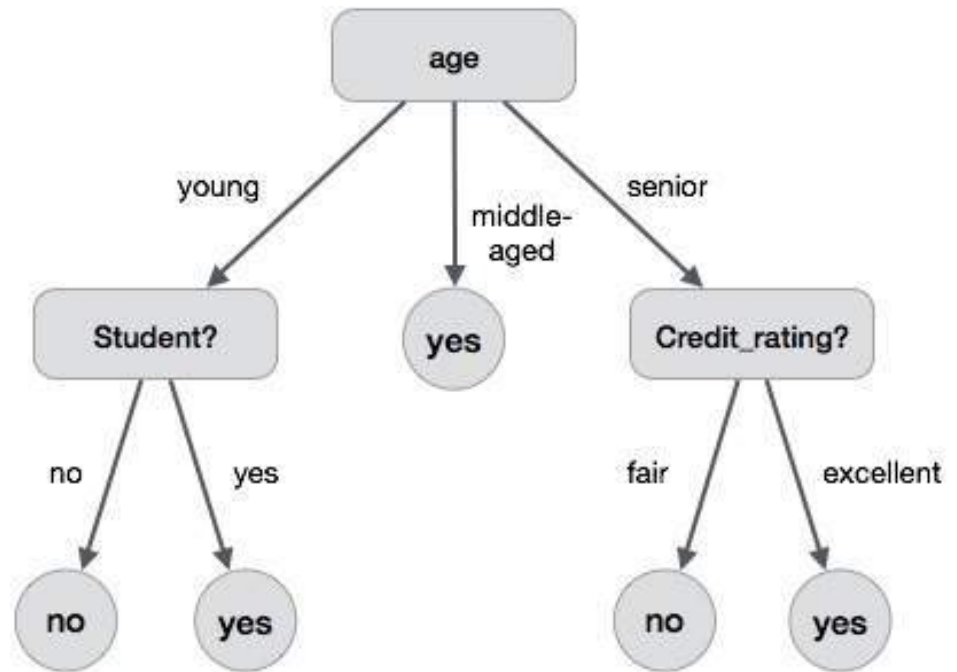 - develop plan, try it and see if it works

5 Ways to Improve Decision Making

1. Training de-biasing

2. Proceduralization

3. Good displays

4. Automation and decision support

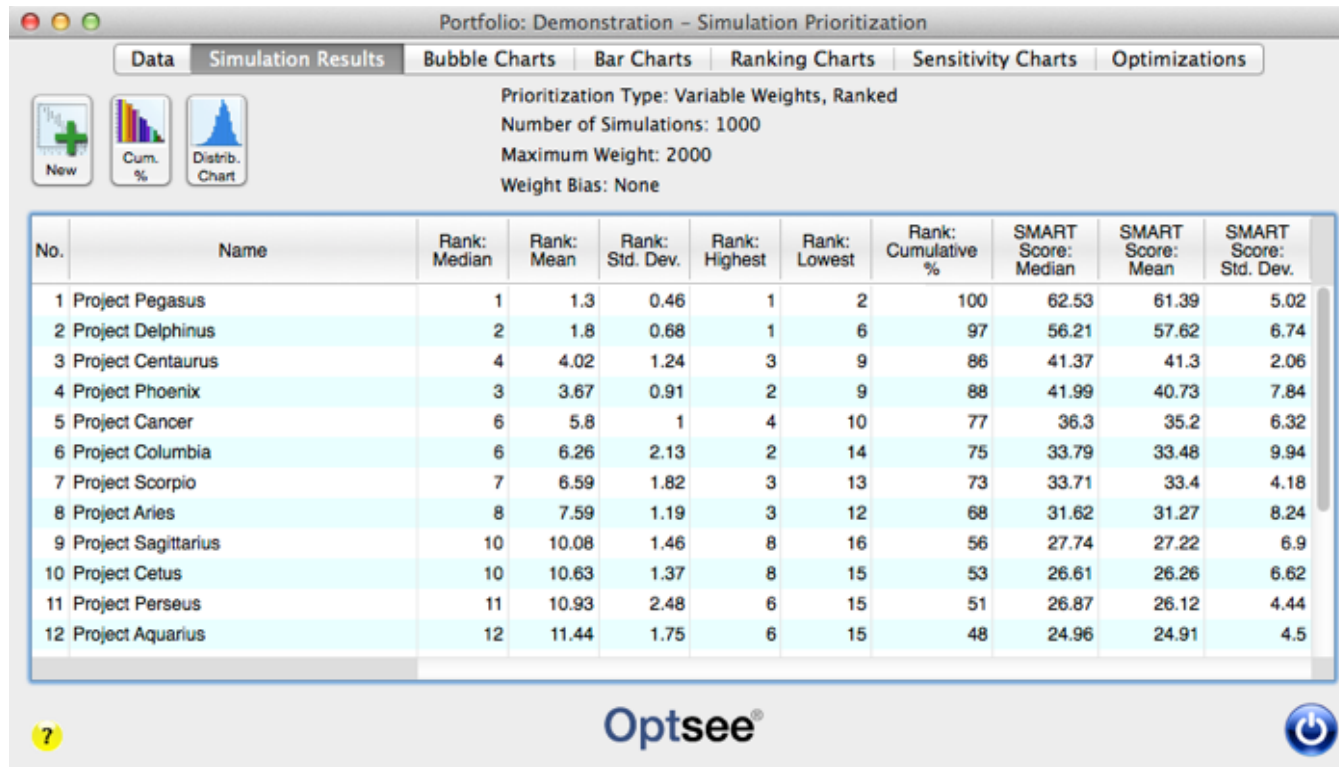5. Task redesign

Examples of decision support tools

Checklist

Decision tree

Examples of decision support tools

Simulations

Examples of decision support tools

Displays

Decision matrix

Summary

- Good decisions are judged based on expected value, outcome, and proximity to expert choices

- Biases and heuristics influence our decision-making processes

- Decision-making can be categorized as being skilled-based, rule-based, or knowledge-based

- De-biasing, policies and procedures, displays, and automation, and task redesign can be used to support good decision-making