

Well-defined problems

Obstacle: there are so many possible solutions.

Solving problems: finding the right solution from a large solution space.

Constraints / heuristics: strategies for choosing an operator

Hill-climbing heuristic: a problem with hill-climbing, ways to overcome the problem

Problem solving by analogy

Gick and Holyoak: the Duncker radiation problem and the attack problem.

Many subjects did not realize that the two problems are related.

Why do people fail to find analogies? How can you improve the ability to find analogy?

Two-stage model of access

Ill defined problems

Insight problems: people often get locked into one way of thinking about the problems.

What helps you generate new perspectives when you get stuck on a problem?

Experts are not just smart

They have a lot more practice than novices.

Expertise and performance are well predicted by the amount of practice.

Experts perceive the world differently from novices.

Describe the chess expert study: experts create larger chunks, not more memory capacity

Describe the physics problems study: experts have more abstract representations

In some fuzzy domains experts are no more accurate than novices.

Experts plus statistical models make better judgments than either one alone.

Why do experts sometimes perform poorly?

Reasoning

Irrationality: normative and descriptive accounts of judgments do not always agree.

What is a normative account of judgments?

What is a descriptive account of judgments?

Why is "irrationality" beneficial for humans?

Expected utility theory

Calculate the value of your decision

Value of your decision = $\sum [\text{probability}(\text{outcome } X) * \text{value}(\text{outcome } X)]$

Summing takes place for all possible outcomes X.

When there are two possible outcomes, $X = [x_1, x_2]$, the value of your judgment will be:

$\text{probability}(\text{outcome } x_1) * \text{value}(\text{outcome } x_1) + \text{probability}(\text{outcome } x_2) * \text{value}(\text{outcome } x_2)$

Representativeness

Base-rate neglect: Why does the base-rate neglect happen? What information do people attend to instead?

Under what condition people use the base rate information?

Conjunction fallacy: Why is conjunction fallacy non-normative?

Availability heuristic

What is a problem associated with the availability heuristic?

Confirmation bias

Wason 246 task, Wason selection task

Framing

Different expressions lead to different decisions

People want sure save when framed in terms of lives saved but take risks when framed in terms of loss

Sunk cost fallacy

The more investment you make, the more likely you continue to invest