
MODULE 3 1

Thinking

Module Preview

Concepts, the building blocks of thinking, simplify the world by organizing it into a hierarchy of categories. Concepts are often formed around prototypes, or the best examples of a category.

When faced with a novel situation for which no well-learned response will do, we may use problem-solving strategies such as trial and error, algorithms, heuristics, and insight. Obstacles to successful problem solving include the confirmation bias, mental set, and functional fixedness. Heuristics provide efficient, but occasionally misleading, guides for making quick decisions. Overconfidence, belief perseverance, and framing further reveal our capacity for error. Still, human cognition is remarkably efficient and adaptive. With experience, we grow adept at making quick, shrewd judgments.

Module Guide

Introduction and Concepts

- ▶ Introductory Exercise: Fact or Falsehood?
- ▶ Exercises: The Limits of Human Intuition; Differences in Thinking Styles
- ▶ Project: The Need for Cognition Scale
- ▶ Video: *Discovering Psychology, Updated Edition: Cognitive Processes*

31-1. *Define cognition, and describe the roles of categories, hierarchies, definitions, and prototypes in concept formation.*

Cognition refers to the mental activities associated with thinking, knowing, remembering, and communicating. *Cognitive psychologists* study these activities including the logical and illogical ways we create concepts, solve problems, make decisions, and form judgments.

- ▶ Exercises: Cognitive Complexity; Introducing Prototype
- ▶ PsychSim 5: My Head Is Spinning

To think about the countless events, objects, and people in our world, we organize them into mental groupings called **concepts**. To simplify things further, we organize concepts into category *hierarchies*. Although we form some concepts by definition—for example, a triangle has three sides—more often we form a concept by developing a **prototype**, a mental image or best example of a particular category. For example, a robin more closely resembles our “bird” category than does a penguin. The more closely objects match our prototype of a concept, the more readily we recog-

nize them as examples of a concept. Once we place an item in a category, our memory of it later moves in the direction of the category prototype.

Solving Problems

- ▶ Exercises: Dice Games to Demonstrate Problem Solving; The “Aha!” Experience; Confirmation Bias; Functional Fixedness
- ▶ Lectures: Jokes, Riddles, and Insight; The Confirmation Bias and Social Judgments
- ▶ Projects: The Tower of Hanoi Problem; Problem-Solving Strategies

- 31-2. *Compare algorithms, heuristics, and insight as problem-solving strategies, and explain how confirmation bias and fixation can interfere with effective problem solving.*

We approach some problems through *trial and error*, attempting various solutions until stumbling upon one that works. For other problems, we may follow a methodical rule or step-by-step procedure called an **algorithm**. Because algorithms can be laborious, we often rely instead on simple thinking strategies called **heuristics**. Speedier than algorithms, heuristics are also more error-prone. Sometimes, however, we are unaware of using any problem-solving strategy; the answer just comes to us as a sudden flash of **insight**. Researchers have identified brain activity associated with insight.

A major obstacle to problem solving is our eagerness to search for information that confirms our ideas, a phenomenon known as **confirmation bias**. This can mean that once people form a wrong idea, they will not budge from their illogic.

Another obstacle to problem solving is **fixation**—the inability to see a problem from a fresh perspective. The tendency to repeat solutions that have worked in the past is a type of fixation called **mental set**. It may interfere with our taking a fresh approach when faced with problems that demand an entirely new solution. Our tendency to perceive the functions of objects as fixed and unchanging is called **functional fixedness**. Perceiving and relating familiar things in new ways is an important aspect of creativity.

Making Decisions and Forming Judgments

- ▶ Exercises: The Representativeness Heuristic; The Base-Rate Fallacy; The Availability Heuristic; The Anchoring Heuristic or Bias; The Overconfidence Phenomenon
- ▶ Lectures: The Projective Way of Knowing; The Sunk Cost Fallacy; Risks in Everyday Life
- ▶ Videos: *Discovering Psychology, Updated Edition: Judgment and Decision Making*; Program 13 of *Moving Images: Exploring Psychology Through Film: Estimating Risk: The Availability Heuristic*

- 31-3. *Explain how the representativeness and availability heuristics can cause us to underestimate or ignore important information, and describe the drawbacks and advantages of overconfidence in decision making.*

The **representativeness heuristic** involves judging the likelihood of things in terms of how well they seem to represent, or match, particular prototypes. If something matches our mental representation of a category, that fact usually overrides other considerations of statistics or logic. The **availability heuristic** operates when we base our judgments on the availability of information in our memories. If instances of an event come to mind readily, perhaps because of their vividness, we presume such events are common. Both heuristics enable us to make snap judgments. However, these quick decisions sometimes lead us to ignore important information or to underestimate the chances of something happening.

Overconfidence, the tendency to overestimate the accuracy of our knowledge and judgments, can have adaptive value. People who err on the side of overconfidence live more happily, find it easier to make tough decisions, and seem more credible than those who lack self-confidence. At the same time, failing to appreciate one’s potential for error when making military, economic, or political judgments can have devastating consequences.

- ▶ Exercises: Framing Decisions; Framing Alternatives and Human Irrationality; Thinking Errors and International Conflict
- ▶ Lecture: The Disjunction Fallacy or Irrational Prudence
- ▶ Video: Segment 28 of the Scientific American *Frontiers* Series, 2nd ed.: *Teaching Computers to Think*

31-4. *Describe the effects that belief perseverance, intuition, and framing can have on our judgments and decision making.*

We exhibit **belief perseverance**, clinging to our ideas in the face of contrary evidence, because the explanation we accepted as valid lingers in our minds. Once beliefs are formed and justified, it takes more compelling evidence to change them than it did to create them. The best remedy for this form of bias is to make a deliberate effort to consider evidence supporting the opposite position.

Although human **intuition** is sometimes perilous, it can be, whether conscious or unconscious, remarkably efficient and adaptive. Moreover, it feeds our creativity, our love, and our spirituality. Smart intuition is born of experience. As we gain expertise in a field, we become better at making quick, adept judgments. Experienced nurses, firefighters, art critics, and hockey players learn to size up a situation in an eyeblink. Intuition is powerful, but sometimes perilous, and especially so when we overfeel and underthink, as we do when judging risks. So, we need to check our intuitions against reality.

The same issue presented in two different but logically equivalent ways can elicit quite different answers. This **framing** effect suggests that our judgments and decisions may not be well reasoned, and that those who understand the power of framing can use it to influence important decisions—for example, by wording survey questions to support or reject a particular viewpoint.

