

## CHAPTER 13: Reasoning: Thinking Through the Implications of What You Know

### Confirmation and Disconfirmation

➔ **Deduction**—a process where information is given and decisions or predictions are made based on that information

➔ **Value**—confirming evidence can be ambiguous; disconfirming evidence is of greater value but often ignored

➔ **Confirmation bias**—a tendency to seek out and use confirming evidence in decisions, and downplay of disconfirming evidence

Disconfirming evidence is often reinterpreted so the evidence does not conflict with beliefs; remembered in the reinterpreted form

Belief perseverance—a tendency to continue endorsing some assertion or claim, despite the presence of evidence undermining it

### Logic

➔ **Categorical syllogisms**—logical argument with two premises and a valid or invalid conclusion

**Example** all M are P and all S are M; therefore, all S are P

People are generally very bad at reasoning about syllogisms

➔ **Sources of syllogism errors**

**Belief bias** if a syllogism's conclusion is something believed to be true initially, people are likely to endorse the conclusion as correct

**Matching** endorsing conclusions that contain the same concepts and structures that appear in the premises

**Suggests** reasoning is based on principles, but not the principles of logic

➔ **Condition statements**—follow an “if X, then Y” format, where X provides a condition under which Y is guaranteed to be true

**Modus ponens** if P is true, then Q is true; P is true; therefore, Q must be true

**Modus tollens** if P is true, then Q is true; Q is false; therefore, P must be false

**Affirming the consequent** logical error: if A is true, then B is true; B is true; therefore, A is true

**Denying the antecedent** logical error: if A is true, then B is true; A is not true; therefore, B is not true

➔ **Abstract concepts**—errors in syllogisms and conditional statements are more likely if the problem is abstract, involves negatives, or conforms to a previously held belief

(continued)

<b>Four-card task</b> —Wason’s task examining the way people reason about “if–then” statements involving four cards with letters on one side and numbers on the other; one rule needs to be evaluated for accuracy	
<b>Performance</b>	people are not good at the original version of the task
<b>Content</b>	varying the content to be more concrete dramatically improves performance
<b>Detecting cheaters</b>	some psychologists suggest that people are better at reasoning about a logical rule if the problem involves detection of cheaters or betrayal
<b>Pragmatic reasoning schemata</b>	people are better at reasoning about a logical rule if the content involves obligations, permission, or situations involving cause-and-effect relationships
<b>Necessity and sufficiency</b>	performance on the four-card task varies because in some versions of the task interpretation is ambiguous
<b>Mental models</b> —can be used to make abstract problems more concrete, facilitating understanding and correct conclusions	

► **Necessity**—something must be true for the rest of the sentence to be true

► **Sufficiency**—something that, if true, guarantees the conclusion is true

## Decision-Making

<b>Utility theory</b> —decisions are made by applying a value to each option; costs and benefits of each option are weighed and the decision chosen should provide the best balance of the two	
<b>Expected value</b>	$(\text{probability of a particular outcome}) \times (\text{utility of the outcome})$
<b>Framing</b> —the way a problem is phrased can have a dramatic effect on the choices people make	
<b>Negative frames</b>	if a decision is phrased in terms of losses, people tend to be more risk-seeking
<b>Positive frames</b>	if a decision is phrased in terms of gains, people tend to be risk-averse, not wanting to lose what they have
<b>Framing should not have any effect on decision-making if utility theory is correct</b>	
<b>Reason-based choice</b> —in making decisions people will choose the option if and only if they have a persuasive reason for making that choice	
<b>Emotion</b> —people often base judgments on their feelings at the time	
<b>Regret</b>	people are powerfully motivated to avoid regret and make their decisions based on anticipated regret
<b>Somatic markers</b>	Damasio suggests we use bodily sensations as a guide to decision-making
<b>Predicting one’s own feelings</b> —people are not very good at predicting how they will feel about a decision in the future; they underestimate their ability to adapt to a situation	