CHAPTER 8: Associative Theories of Long-Term Memory

The Network Notion

- **Connections**—based on the notion that connections are memories
- **Associative network**—individual representations are called "nodes" and the connections between them are "associative links"
- **Spreading activation**—activation spreads across nodes through associative links, leading related nodes to be activated simultaneously
- **Hints**—help by providing two sources of activation for an answer, leading to overall greater activation
- **Context reinstatement**—facilitates memory by connecting contextual thoughts to the material

Direct Tests of the Network Claims

- **Lexical decision task**—use speed of response as a proxy for how quickly a word can be located in memory, and how priming affects search
- **Sentence verification**—speed of responding is used to determine how concepts are connected in a network
- **Degree of fan**—ability (and speed) to hunt through memory depends on how many connections lead from one concept to the next
  - Suggests the quantity of activation is limited

Retrieving Information From a Network

- **Search**—like an Internet search, associative links search through the network looking for the correct nodes
- **Entry nodes**—input nodes receive input from sensory organs (e.g., eyes, ears) and link to the rest of the network
- **Types of associative links**—there are different types of connections that link nodes
  - "isa" and "hasa" were early suggestions that have been dismissed
  - ACT (and ACT-R) is a model of a LTM network that uses propositions to describe the link between two nodes

(*continued*)

Refining the Network Models

Testing—can be done by creating a working model that includes the rules and procedures of the model and comparing it to human data

Tip of the tongue (TOT)—this state suggests that activation can flow to the correct area in a network, but not actually trigger the correct node

Distant connections—spreading activation suggests that millions of nodes could be activated given a broad concept (e.g., water), which would make finding the correct node difficult

Winner takes all	most strongly activated nodes will shut down other, weaker nodes so that one node stands out
Retrieval block	can occur if the node that is activated the most strongly (the "winner") is not the answer you are looking for; aka TOT

The Newest Chapter: Connectionism

Parallel distributed processing (PDP)—connectionist networks suggest that any particular idea is represented by a pattern of activation across the entire network

Simultaneous multiple constraint satisfaction	it is most efficient for the network to tackle all demands at once
There is no centralized authority in connectionist models	

Learning—occurs through the adjustment of connection weights among nodes across the network

Strengths and limits

Strengths	connectionist models make biological sense; they can learn to recognize patterns, and generalize appropriately what they have learned
Limits	learning is slower than it is in humans, and learning depends on whether the programmers design the models the correct way