Psychology 020
Chapter 8: Memory
Chapter 9: Thought & Intelligence

Chapter 8: Memory

Memory as Information Processing

- **Important Terms**
  - **Encoding (Automatic vs. Effortful)**
  - **Storage**
  - **Retrieval (or Forgetting)**

Short-Term Memory

- **Definitions:**
  - **information that is in consciousness right now**
  - **limited-capacity memory component**
  - **for temporary information storage & manipulation**
  - **mental workplace for retrieval & use of already known information**

Miller

- **The capacity of short term memory is 7, +/- 2, items of information**
- **How can we function on such a small short-term memory capacity?**
  - **Techniques that aid memory**
    - **Rehearsal**
      - **Maintains info in ST memory**
      - **Eases transfer to LTM**
    - **Mnemonic Devices**
      - **Chunking**
      - **Organization**
      - **Imagery**

Factors Affecting Memory

Chunking

IFYOUGROUPTOGETHERYOUREMEMBERBETTER

4165657892 vs. 416 565 7892

Meaningful information is easier to remember

CHJ MLK ODW or FBI PHD IBM

Length of the word

AFGHANISTAN or CUBA

Single Use Mnemonics

- **Acronyms**
  - **ROY G. BIV**
- **Rhymes**
  - **i before e, except after c**
- **Phrases**
  - **Spring forward, fall back**
  - **Never Eat Shredded Wheat**
  - **Every Good Boy Deserves Fudge**
- **Personal Meaning**
  - **My student Kate reminds me of Kate Blanchet playing Galadriel**

Encoding:

Imagery

- **Many mnemonics use visual imagery**
- **Propositional Coding - visual-spatial information is stored as a set of verbal descriptions**
- **Analog Coding –store info as a mental image**
- **Dual-coding hypothesis (Paivio):**
- **Concrete words (cigar, truck) can be stored twice in long-term memory, once as a word, and once as a picture, but abstract words only verbally**
- **Concrete remembered better than abstract (e.g. justice, idea)**
- **Imagery aids learning & Memory**
  - **(better storage & retrieval)**

- **Depth of Processing**
  - **Shallow processing**
    - **Physical features**
  - **Deep processing**
    - **Meaning**
- **Memory is affected by the way information is encoded**
  - **Not just whether it is in the system**
  - **How was it encoded into the system?**

Encoding Specificity

- **Study word pairs**
  - **Encode based either on meaning or sound**
- **Meaning**
  - **Is the target related to the word CAT?**
- **Sound**
  - **Does the target rhyme with the word CAT?**

STORAGE: Ability to retain information

MEMORY AS A NETWORK

- **Associative Networks - massive network of associated ideas and concepts.**
- **Example: Word association**

MEMORY AS A NETWORK

- **Neural networks - each concept is represented by a node (or pattern of nodes) that become activated simultaneously.**
- **Linked to neural networks**

<u>Episodic vs. Semantic Memory</u>

- **<u>Episodic Memory</u>**
  - **Memory for specific events / episodes**
    - ***Where were you when??***
- **<u>Semantic Memory</u>**
  - **Memory for general world knowledge**
    - ***date of the attack on the world trade center?***
    - ***In what city?***
    - ***What does "trade" mean?***

- **Memory for skills**
    - ***"doing things" in particular situations.***
      - **Motor skills (e.g. skiing)**
      - **Cognitive skills (e.g. problem-solving)**

Procedural Memory

- **Classical Conditioning Effects**
    - ***conditioned reactions***
      - ***fear responses***
      - ***e.g. aversive conditioning***

<u>Other important Terms</u>

- **Explicit Memory - Conscious or intentional memory retrieval**

- **Implicit Memory - Unconscious or unintentional memory retrieval**

<u>Some Common Sense about the Self</u>

- **1. Continuous over time, past, present and in the future**
- **2. Singular**
- **3. Responsible for controlling the mind and the body ('will power')**
- **4. Determines your individuality**

<u>Memory's Influence on Self-Perception</u>

- **Past experiences (personal history)**
- **Learning (& skills)**
- **Emotions**
- **Interactions with others ("Looking Glass self")**

Our Perception of who were are as a person is dependent upon our memories.

FACILITATING MEMORY

FACTORS EFFECTING MEMORY

- **Self-generated cues**
- **Multiple cues.**

Encoding Specificity Principle

- **memory is enhanced when the conditions for retrieval match those of encoding**
    - **Context**
    - **State**
    - **Mood**

THE ACCURACY OF MEMORY

- **Reproductive Memory**
    - **A highly accurate, verbatim recording of an event**
- **Reconstructive Memory**
    - **Remembering by combining elements of experience with existing knowledge**

***Scripts* – expected procedures for events**

- **What is your Restaurant script?**
    - **What happens first?**
    - **And then?**
    - **And then?**
    - **Scripts also effect memory**

LEADING QUESTIONS EFFECT MEMORY

(Loftus & Colleagues)

- **Estimate how fast the cars were going**
    - **When they "hit" each other**
    - **When they "smashed" each other**
- **Did you see the broken glass?**

Why Does This Happen?

- **Possible Explanations**
    - **Memory Impairment**
    - **The Response Bias Explanation**
    - **Source Misattribution**
    - **Misinformation Acceptance**

RELIABILITY OF EYEWITNESS ACCOUNTS ?

Lost in the Mall

- **Can you produce false memories through suggestion?**

- ***Controvery*: False Memory Syndrome**
  - **Asked to write about 4 memories**
    - **3 real**
    - **1 false (lost in mall)**
  - **When told one was incorrect, picked one of the real memories**

Lost Again…..

- **Replicated on a group of people**
  - **What memories did people remember?**
    - **7 out of 24 remembered the false event**
  - **How are the events remembered?**
    - **True memories described more**
    - **True memories rated more clear**
    - **False memories' clarity increased over time**
  - **Can they choose the false memory?**
    - **19 out of 24 figured out which was false**
    - **Process of elimination?**

Individual Differences

- **Some people are more susceptible to misinformation than others**
  - **7 out of 24 participants**
- **People high at risk for misinformation acceptance have**
  - **Poor general memory**
  - **High scores on imagery vividness**
  - **High empathy scores**

Technical vs. Content Accuracy

- **Technical Accuracy**
  - **Recalling or recognizing exactly what was experienced**
  - **Generally quite poor**
- **Content Accuracy**
  - **Recalling or recognizing the meaning or content of what was experienced**
  - **Generally quite accurate**

Flashbulb Memories

- **Flashbulb memories are**
  - **Vivid**
  - **Detailed**
  - **Long-lasting**
  - **Memories we will "never forget"**
  - **Personally meaningful**
- **Personal Examples**
  - **Your first date**
  - **The death of someone close to you**

Accuracy of Flashbulb Memories

- **Neisser & Harsch (1992)**
  - **Ask people to remember what they were doing when they first heard about the Challenger shuttle explosion**

- Asked them again 2½ years later
- Measured the similarity of both memory reports
  - Same memory reported very differently over time

The Hippocampus

- plays a critical role in memory encoding & retrieval

* Declarative (factual/personal)

Cerebral Cortex

- Where LTM are stored spread across cortex but bound together via consolidation in Hippocampus
- Storage of semantic memories
- Frontal lobes (prefrontal cortex) important in STM

Memory's Influence on Continuity

- Continuity depends on access to the full range of memories for past experiences
- Our 'self-identity' now may be constructed out of our most recent memories

Long term memory

- > synaptic connections

"Neurons that fire together wire together."

Forgetting

- Reasons for Forgetting
  - Decay
  - Interference
    - Proactive Interference
    - Retroactive Interference
  - Retrieval Failure

Motivated Forgetting

- Psychodynamic theory
  - Repression - unconsciously pushing unpleasant or anxiety-provoking material out of conscious awareness.
  - Suppression – consciously push out of awareness.

* Freudian defense mechanisms.
* Evidence is mixed.
* So, controversial

MEMORY DISORDERS: AMNESIA

Retrograde Amnesia

- Loss of memory for time prior to injury

Anterograde Amnesia

- Inability to form new long term memories
- Many syndromes can result in both types of amnesia (e.g., electroconvulsive therapy, head injuries, concussions, Alzheimer's disease)

Patient H.M.: Damage

- had severe epilepsy in his late 20's

- **in 1953, at age 29, a surgeon removed both of his hippocampi to stop the seizures**
- **most well-studied memory patient**
    - **over 100 studies**
- **above average I.Q. (118)**
    - **normal "digit span"**
- **generally good memory for events prior to surgery**
    - **has memories from childhood and teen years**
    - **some loss of memories from immediately prior to surgery (partial retrograde amnesia)**
- **severe anterograde amnesia**
    - **remembers almost nothing since 1953**
    - **can't remember anything after a delay**

<u>Causes of Retrograde Amnesia</u>

- **Depression.**
    - **– May be cured by drug or ECT.**
- **Shock/trauma**
    - **– May also be temporary.**
    - **– Return of memory is disorganized.**
    - **– Evidence that episodic memories may be stored in sequence in adjacent locations in the brain.**
- **Disease.**
    - **– Disease effects are chronic or progressive.**
        - **Retrograde amnesia also a component of Korsakoff's syndrome, Huntington's disease, and Alzheimer's disease.**

<u>Strategies for Improving Your Memory</u>

- **Enhance attention (minimize distractions)**
- **Encoding:**

- Rehearsal (verbally or mentally)
- Progressive Part Learning: Breaking learning task into a series of short sections.
- Practice Mnemonic strategies
    - Chunking
    - Hierarchies
    - Visual imagery
- Deeper processing

<u>Practical Applications</u>

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CHAPTER 9: THOUGHT & INTELLIGENCE

●Reasoning and Problem-Solving

Deductive Reasoning

-Top down reasoning
-From general principles to a conclusion about a specific case
-If X, then Y
Formula mathematics & logic

Inductive Reasoning

-Bottom up reasoning
-From specific facts to a general principle
-Laws and theories are developed in this manner
Less certainty about conclusions

Defining Intelligence

-Intelligence is a set of abilities which allow us to:
→Acquire knowledge
→Think rationally
→Act purposefully
→Deal effectively with the environment (intelligence having adaptive or survival value)

-Intelligence can be thought of as a capacity rather than a thing

Theories of Intelligence

●**Key Issue:** Is intelligence a single capacity or multiple capacities?
●**Spearman:** a single unitary factor **(g).**
→observed that school grades in different subjects were positively correlated.
→So, attributed to general intelligence "g"
●**Factor Analysis**
-Reduces variables to related clusters
-Called Factors

●**PROBLEMS:** with a single unitary factor
→**Savant**-below average intelligence, but excel in one particular area.
→**Learning Disabilities**-usually effect only specific skills.
→**Problems with making causal statements based on correlations.**
→3rd Related Factors?

●**Thurstone:**

-7 Primary mental abilities
1) S-Space
2) V-Verbal
3) W-Word fluency
4) N-Number facility
5) P-Perceptual speed
6) M-Rote memory
7) R-Reasoning (more abstract reasoning)
→Performance on a task is more influenced by the specific abilities than a "general" intelligence.

●Guliford:
-More than 100 distinct measurable mental abilities.
→Containing operations, contents, and products

●Cattell:
●Crystallized Intelligence
-Ability to apply previously acquired information to a current problem
→Adequate LTM

●Fluid Intelligence
-Ability to deal with novel problems, reason abstractly, think logically, adequate ST working memory.

= Age Variations in the above 2 types of intelligence
→earlier ages rely more on fluid intelligence
→as we age, rely more on crystallized intelligence

●The Triarchic View of Intelligence
-Sternberg argues for 3 dimensions of intelligence:
-**Analytic:** Involves the kinds of academically oriented problem-solving skills assessed by traditional IQ test.
-***Practical:*** The ability to use experiences in dealing with everyday tasks
-***Creative*:** The mental skills needed to deal with novel (new) problems.