

## Retrieval from Long-Term Memory



EXP 4404 - Psychology of Learning  
Chapter 10

## Theories about Memory Retrieval

### ☞ Single-Process Model of Retrieval

- ♦ *retrieval depends on activation of a memory trace*
  - *stronger memory traces are more easily activated*
  - *activation depends on the quality of the retrieval cues*
- ♦ *suggests that performance on a recognition task should always be better than recall*
- ♦ *suggests that variables that improve or harm recognition will have the same effect on recall*

### ☞ Word Frequency Effect

- ♦ *rare words are recognized better than they are recalled*
- ♦ *frequent words are recalled better than they are recognized*

## Forms of Memory Tests

### ☞ Explicit memory tests

- ♦ *tasks that measure the retention of information in memory by requiring direct access of memory information*
- ♦ *recollection includes a subjective experience of “remembering”*

### ☞ Implicit memory tests

- ♦ *tasks that measure the retention of information in an indirect manner*
- ♦ *retention is demonstrated by changes in task performance*
- ♦ *participant might not be aware that performance has changed or experience this change as “remembering”*

## Generation-Recognition Hypothesis

### ☞ Proposes that Recall is a two-step process

- ♦ *generate an item from memory (retrieval) - requires searching through LTM (memory activation)*
- ♦ *recognize the item as an item studied in the task - requires making a decision about the familiarity of the item (based on trace strength)*

### ☞ Recognition tests only require the second step

- ♦ *items are generated by the experimenter - multiple items are presented to the participant to respond to during the recognition test*
- ♦ *participants need only make a decision about the item's familiarity*

## Explicit Tests of Memory

### ☞ Recognition

- ♦ *yes/no recognition tests*
- ♦ *choose between a studied item and one or more distractors*

### ☞ Recall

- ♦ *studied items must be retrieved from memory and produced by the participant*
- ♦ *Free Recall Tests*
- ♦ *Serial Recall Tests*
- ♦ *Cued Recall Tests*

☞ Any variable that affects the strength of a memory trace will affect both recognition and recall

☞ Any variable that affects the ability to activate an item in memory with a retrieval cue will affect only recall performance

## Recognition Failure of Recallable Words

Tulving & Thomson (1973)

☞ Experiment Required Four Memory Tasks:

☞ Task 1: Learn a list of Paired-Associates

- ♦ *Study Items: head - LIGHT*
- ♦ *TRB Items were the response word of the Paired-Associate: LIGHT*

## Task 4: Cued Recall of Paired-Associate List

☞ Cues were stimulus items from the paired-associate list

- ♦ *e.g.: head - ???*

☞ Responses were the response items from the paired-associate list

- ♦ *LIGHT*

## Task 2: Free Association Task

☞ Cue Word

- ♦ *e.g., DARK*

☞ Generate first four words you think of for **DARK**

- ♦ *night*
- ♦ *light*
- ♦ *black*
- ♦ *basement*

☞ Cue words were strong associates of response words in the Paired-Associate Task

## Results

☞ Recognition Test

- ♦ *only 25% of the response words from the paired-associate list that were written down as free associations were recognized*

☞ Cued Recall Test

- ♦ *when given the stimulus cue for the paired-associate list, subjects retrieved 60% of the correct response items*

☞ Subjects were able to *recall* more response words than they were able to *recognize*

- ♦ *Does "light" have the same meaning in the context of "head" as in the context of "dark"?*

## Task 3: Recognition Test

☞ Subjects were asked to review the words they generated in the free association task and circle any words that were response words from the paired associate list

☞ **night**   *light*   **black**   **basement**

## New Interpretations of Recognition

☞ Recognition might also entail a type of memory search process

☞ synergistic ecpohry (Tulving)

- ♦ *proposes that several processes operate simultaneously during recognition and recall*
- ♦ *memory search:*
  - *recall: search is activated by a context cue*
  - *recognition: search is activated by a copy cue (the actual item)*
- ♦ *differences between recall and recognition are due to differences in the way these 2 retrieval cues activate information in memory*

## Two Types of Memory Strength

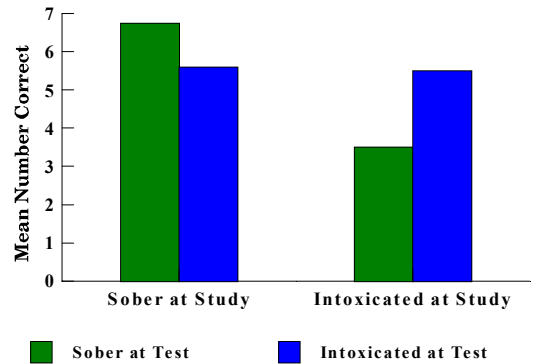
### Storage Strength

- ♦ strength of memory trace
- ♦ related to the depth & breadth of encoding
- ♦ increases with study, practice, & frequency of retrieval

### Retrieval Strength

- ♦ ease of activation of a memory trace by a retrieval cue
- ♦ retrieval strength is limited by general limitations on the ability to activate information in memory
- ♦ retrieval of one item might inhibit activation of nearby (related) items - e.g., Tip-of-the-tongue conditions
- ♦ repeated retrievals are easier, but this benefit is temporary

Recall as a Function of Study/Recall State



## Encoding Specificity Hypothesis

### Retrieval cues are effective *only* when they are

- ♦ encoded at the time of study
- ♦ available at the time of test

### Mismatches produce poor memory performance

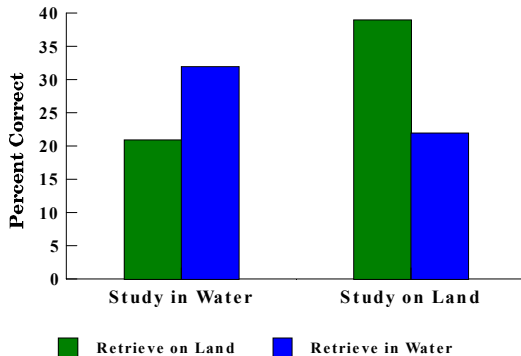
- ♦ e.g., context effects (Godden & Baddeley, 1975)
  - studied either on land or under water
  - recalled either on land or under water
- ♦ state-dependent learning

## Memory Retrieval as a Reconstructive Process

### Bartlett's (1932) study of repeated recollection of stories

- ♦ Argued that memory is schematic
- ♦ Memories changed over repeated recollections
  - details that were inconsistent with schematic organization tended to be forgotten
  - new details that were introduced during recall to enhance organization tended to persist in later recollections

Results for Godden & Baddeley (1975)



## Memory Distortion: Misinformation Effect

### New information introduced after witnessing an event can alter memory for the event

### Loftus

### Participants watched a film showing an automobile accident

- ♦ answered one of 2 questions:
  - How fast were the cars going when they "contacted" each other?
  - How fast were the cars going when the "smashed" into each other?
- ♦ Answered the question: Did you see broken glass?

### Effects of Misleading Post-Event Information

- ☞ Distortions in the estimates of auto speed can be created by using either “contacted” or “smashed” in a post-event questionnaire
- ☞ Memory for color of the car, types of street signs seen, and other visual details can be altered by the wording of post-event questions
- ☞ Inferences that people make while answering questions can be incorporated into the memory for the witnessed event (False Memory Effects)

### Seven “Sins” of Memory

Schacter (1999)

- ☞ Memory failures are by-products of otherwise adaptive features of the memory system
- ☞ Transience
- ☞ Absent-Mindedness
- ☞ Blocking
- ☞ Misattribution
- ☞ Suggestibility
- ☞ Bias
- ☞ Persistence

### Roediger-McDermott False Memory Paradigm

- ☞ Subjects study a list of related words
- ☞ Lists are constructed from words that are associated with a target word
- ☞ Target words are likely to be falsely recalled or recognized at the time of test, although these words were never presented in the study lists

### Applications: The Cognitive Interview

- ☞ Fisher & Geiselman
- ☞ Interview technique developed to minimize memory distortions while maximizing the amount of information recalled by a witness
- ☞ Avoid leading questions
  - ◆ *the answer suggested might not be an accurate detail*
- ☞ Reinstatement of the context of the witnessed event
- ☞ Ask open-ended questions for maximum retrieval