

## Chapter 6

### Acquisition and Retrieval

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### Retrieval Cues

- Retrieval from memory starts from some given information, e.g. a question. – *retrieval cue*
- Need connections between retrieval cue and target information. Connections must have been acquired during learning.
- Problem about right-angled triangle in circle
- Provided everyone did some geometry, everyone should solve the problem.

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### State-Dependent Learning Context Reinstatement

- Two learning conditions: e.g. drugged or not (alcohol, marijuana, or other drug), under water or on land, odor present or absent, same or different rooms, happy or sad mood, etc.
- Two test condition: match or mismatch with learning conditions
- 2 by 2 design: See diagram

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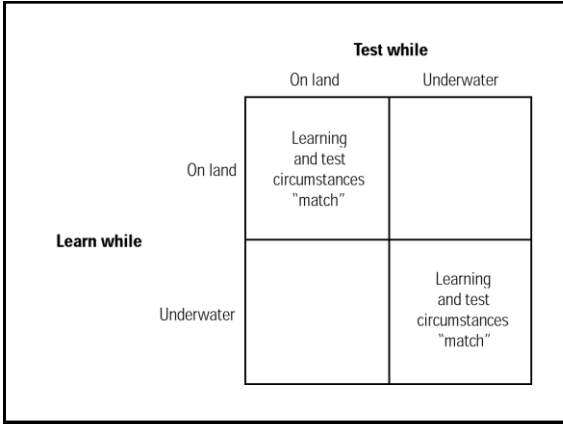
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### State-Dependent Learning - 2

- **Results:** Retention usually better if test conditions same as learning conditions
  - May also have main effects e.g. of drugs
- Aspects of environment associate with target info.
- Psychological context critical –if Ss moved to different room are asked to think about the room where they learned, retention is improved.
- Mood effect not always reliable

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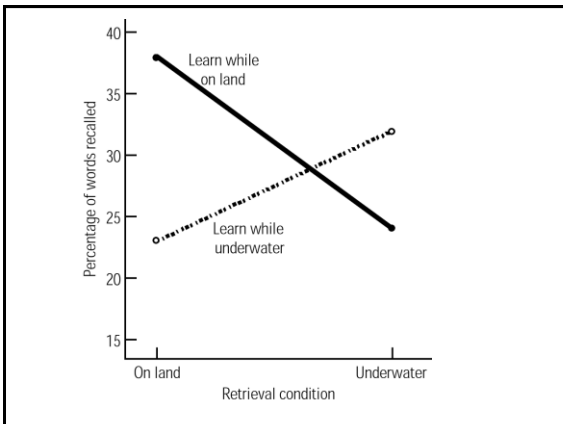
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### Fisher & Craik (1977)

- Ss learned target words in context of question-answering task in which reaction time (RT) was measured
- Questions
  - Does the word rhyme with \_\_\_\_?
  - Does the word belong to the category \_\_\_\_?
  - Does the word fit into the following sentence?

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### Fisher & Craik (1977) - 2

- At test, Ss given retrieval cues which were rhyming words, categories or sentences.
- Words not necessarily given same cues at learning and test.
- Analyzed words receiving 'yes' and 'no' responses separately. (Text combines the two.)

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### Fisher & Craik (1977) - 3

#### Results: 'Yes' Responses only

Encoding Question

Retrieval Cue	Encoding Question			Mean
	Rhyme	Category	Sentence	
Rhyme	40	43	29	37
Category	15	81	46	47
Sentence	10	50	78	46

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### Fisher & Craik (1977) - 4

- Results
  - Levels of Processing effect: 2 “meaning” conditions better than rhyme condition
  - Interaction between input and test conditions
  - For all levels of processing, recall best if input question matched question at test (green numbers).

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### Encoding Specificity

- Present target words in context of another cue word.
- Test cued recall (or free recall) or recognition
- Recall cued by cues present at input → high performance.
- Free recall (no cues) lower
- Recognition *in presence of wrong cues* → very low performance

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### Encoding Specificity - 2

- One learns target word plus context (other words or sentence, orienting task) as whole or *Gestalt*.
- Recognition in presence of new cue, not associated with target during learning, is low
  - S doesn't recognize the complex (target plus new cue)
- Meaning of target word (JAM) changed
- E.g. Learn *AIR – plane*. (Target is in caps.) On test, S sees *AIR – port* & reports recognition judgement separately for each word. Get low recognition of *AIR* because S is not thinking about airplane.
- Relevant episode not retrieved.

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### Encoding Specificity - 3

- What counts as effective learning depends on what cues are available at time of retrieval.

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### Recall vs. Recognition

- Recall: given cue, recall specific item or information
  - Involves memory search, connections needed from retrieval cue (question) to target information
- Recognition: given the specific item, have to recall specific context or episode
  - Recall image or association made to memory word
  - Feeling of familiarity

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### Remembering Source vs. Familiarity

- Remembering source = remembering context or an episode.
  - Who told you? Where did you see this person? Where did you take this photo?
- Familiarity = feeling of having encountered person, scene etc. before.
- Source memory and familiarity = different memory processes
  - Can have one without the other (e.g. Capgras syndrome)
- Recall requires source memory; recognition can sometimes occur without source memory.

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### Remembering Source vs. Familiarity - 2

- Can base recognition judgement on recall of episode, or just feeling of familiarity plus inference that word (picture etc) was in list just → Remember (source memory) vs know (familiarity) judgements
- fMRI measures taken during learning
  - Activity in hippocampus → Remember judgements
  - Rhinal cortex activity → Know judgements

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### Remembering Source vs. Familiarity - 3

- fMRI measures taken during recognition testing
  - Activity in hippocampus → Remember judgements
  - Activity in parahippocampus (area medial to hippocampus) → Know judgements.
- Remember & Know judgements have different underlying processing

– [?]

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### Remembering Source vs. Familiarity - 3

- Ss expecting memory test → relate words on a list, make up stories, use visual imagery etc.
- Elaborative rehearsal → source memory
- Orienting task that encourages maintenance rehearsal → promotes familiarity

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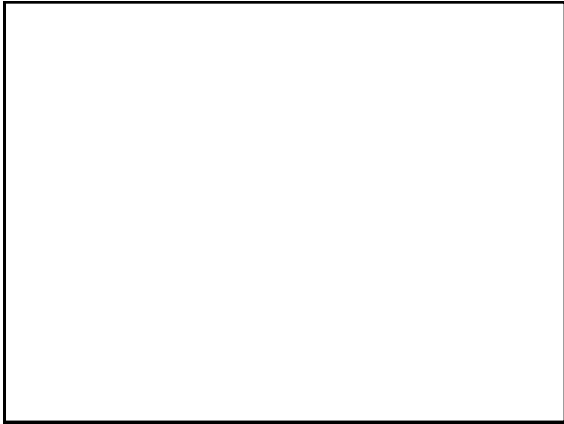
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### Implicit Memory

Jacoby & Dallas (not in 4<sup>th</sup> ed.)

- Ss shown words with (a) no context, or (b) context - antonym present, (c) antonym alone was presented and S had to generate target word (generate condition)
- (c) requires 'deepest' processing, (a) most shallow
- Ss later given recognition test or perceptual identification test. (Words presented briefly on T-scope and S had to say the word.)

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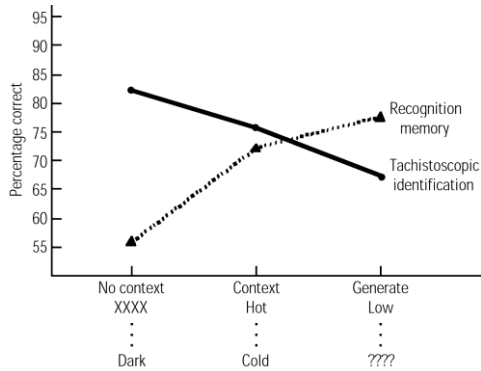
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### Implicit Memory - 3

- For recognition test, get effect of Levels of Processing (LOP)
  - Ss need associations between item & context, need source memory. Deep processing strengthens those associations.
- For identification, get “reverse” LOP effect
  - Identification task – previous presentation → Repetition priming
  - Most sensory processing in No Context condition, least in Generate condition.

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### Implicit Memory - 4

- Get results similar to T-scope identification with tasks other than perceptual identification
  - Lexical decision: Is the letter string a real word?
  - Word-stem completion: neg....
  - Performance depends on having recently SEEN the word
- Can have subject recall no words from a list learned e.g. 3 weeks ago, but can show priming on lexical decision or word stem completion task.
  - Memory without awareness

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### Implicit Memory - 5

- 2 types of memory: explicit & implicit (or direct & indirect)
- 1) Explicit: Do you remember ....?
- 2) Implicit: Faster identification or lexical decision, production of recently perceived words in word fragment completion.
  - measured by priming effects
- Explicit memory usually depends on *conceptual* processing & having made associations with target item.
- Implicit memory usually depends on *perceptual* processing & having recently perceived the target item.
- Can have one type of memory without the other.
  - Priming without any conscious recollection of having seen the word → *Memory without awareness*

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## “It rings a bell.”

Jacoby et al. (1989)

- Phase 1: Ss read aloud list of names of nonfamous people. Some names presented once, some 4 times.
  - Overlap condition. Names read not included in Phase 2.
- Phase 2: Ss read a list of names to be judged as famous or not so famous.
  - List included not-so-famous people from Phase-1 list, and famous and not-so-famous people not in Phase 1.
- Phase 2 immediately after Phase 1 or delayed 24 hours.

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## “It rings a bell.” - 2

Predictions

■ Immediate Judgements

- S has source memory for Phase 1, better memory for items presented 4 times than items presented once
- Source memory → S attributes familiarity of Phase-1 names to recent presentation

■ Delayed Judgements

- Source memory lost → S attributes familiarity of Phase-1 names to fame

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## “It rings a bell” - 2

Probability of Judging a Name Famous

	Famous		Nonfamous	
	New	1	4	
Immed	.64	.21	.12	.03
Delayed	.55	.08	.16	.08
No Overlap	.68	.28	-	-

- Famous people more likely than nonfamous people to be judged famous
- Old (familiar) names more likely to be called famous than new names
- Ss interpret feeling of familiarity as “person must be famous”

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### Illusion of Truth

- Begg et al. (1992)
- Ss heard sentences & judged “interestingness”
- Later judged credibility of “old” and “new” sentences (certainly true to certainly false)
- Result: Familiarity (having recently heard the sentence) increased its credibility rating
- Ss interpret feeling of familiarity in terms of having heard it somewhere credible
- Effect found even when subjects told some of the sentences were false during initial presentation.

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### Attributing Implicit Memory to the Wrong Stimulus

- Jacoby et al. (1988) had Ss make judgements about loudness of noise. Sentences embedded in noise.
- Some sentences previously heard in the study in another task.
- Familiar sentences perceived more easily in noise than unfamiliar sentences.
- Noise stimulus containing familiar sentence judged as being less loud than noise containing unfamiliar sentence.
- Ss attributing familiarity of sentences to loudness of noise.

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### Attributing Implicit Memory to the Wrong Stimulus - 2

- Ss can attribute implicit memory to wrong episode.
- Ss witnessed staged crime
- Several days later, Ss shown “mug” shots of people not in staged event, but Ss were told they were
- 4 – 5 days later, Ss picked out “perps” from lineup. Selected people in “mug” shots.
- Incorrectly attributed familiarity of people in line up to original event rather than to “mug” shots.

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### Attributing Implicit Memory to the Wrong Stimulus - 3

- E.g. Crime victim identified a sailor as person who had robbed him, but sailor had alibi.
- Victim was ticket agent at railway station & sailor had purchased tickets several times.
- Sailor elicited feeling of familiarity – attributed to mugging incident rather than ticket purchasing.
- Source confusion

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### Implicit Memory: A Hypothesis

- Practice perceiving a stimulus → fluency or ease in processing that stimulus, but not others.
- Analogous ‘top down’ effects, e.g. sudoku strategies, word retrieval in reading or crossword puzzles, understanding complex logic.
  - More practice on strategies or responses increases speed
- Implicit memory = practice effects & increase in fluency of processing.
- People sensitive to degree of fluency.
  - Unexpected fluency → stimulus is ‘special’

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### Implicit Memory: A Hypothesis - 2

- “Specialness” → attribution process
  - Need to understand why stimulus feels ‘special’
  - May attribute ‘specialness’ to different causes (fame, credibility, likeability, recency, familiarity)
  - May attribute ‘specialness’ to wrong episode, wrong stimulus (noise study) or to general knowledge (illusion of truth)
- Decrease in fluency → Person notices change in friend’s appearance but doesn’t attribute change correctly

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## Specificity of Implicit Memories

(not in 4<sup>th</sup> edition)

- Implicit memories are specific to the activities practiced (e.g. perceiving a printed word, generating a word from a fragment)
- Present words auditorily or visually in first phase, the present words visually in lexical-decision or word-identification task.
- auditory → reduced priming when visual presentation used for 2nd presentation
  - - changing the detectors used to perceive the word
- - Priming with word fragments – changing the letters eliminates priming effect. (e\_e\_h\_n\_ vs. \_l\_p\_a\_t)

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## Specificity of Implicit Memories -2

- Illusion of Truth experiments – probably not perceptual fluency that is important.
- Ss think about statements, ‘Crocodiles sleep with their eyes open.’
- → conceptual fluency, not perceptual fluency important.

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## Explicit vs. Implicit Memory

- Implicit Memory: no age effect
- Explicit Memory: improves with age up to adulthood & middle age, declines with old age

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## Amnesia

- Retrograde amnesia – can't recall events immediately prior to injury
- Anterograde amnesia – can't acquire new memories

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## Amnesia - 2

- Review case of HM (see Chapter 1)
- Surgery for epilepsy, bilateral removal of hippocampus → inability to form new memories
- No memory for events since surgery
- Can converse about events prior to surgery
- Korsakoff syndrome – found in alcoholics, due to thiamine (vitamin B1) deficiency
  - Korsakoff patients confabulate

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## Amnesia - 2

- Anecdote
  - Claparede (1911) shook hands with amnesic patient, had pin in his hand
  - Next day, patient had no conscious recollection of the pin prick, but refused to shake hands again
  - "Sometimes pins are hidden in people's hands."
  - No explicit recollection, but some implicit memory.

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### Amnesia - 3

- Amnesic people can sometimes learn
  - E.g. Tower of Hanoi problem: S could learn to solve the problem efficiently, but kept saying he didn't know how.
  - Schacter et al. (1981) Trivia questions – multiple-choice
  - Ss given feedback
  - Ss performance improved on the task even though they had no conscious recollection of learning the items & thought they were guessing

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### Explicit Memory without Implicit

- Johnson et al. (1985)
- Ss with Korsakoff's amnesia heard melodies & then did recognition test
  - No evidence of memory for melodies
- When asked to rate liking of melodies, Ss preferred previously heard melodies
- Patients had no explicit memory for melodies, but had some implicit memory

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### Explicit Memory without Implicit - 2

- Korsakoff patients have intact implicit memory, but damaged explicit memory.
- Patient with amygdala damage showed reverse effect.
  - Blue light → loud horn; red, yellow & green lights → no horn
- Amygdala patient could recall which lights preceded horn, showed no arousal change;
- Hippocampal patients showed reverse pattern

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### Explicit Memory without Implicit - 3

- Occipital lobe patient → visual problems
  - Shown words & tested for recognition memory → normal performance
  - Tachistoscope identification → no evidence of repetition priming.
- Not only can implicit memory be demonstrated without explicit (Memory without awareness), but explicit memory can be demonstrated without implicit.

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### Theme of Chapter 6

- What makes for “good” learning depends on how the memory is to be used.
- Different types of encoding (deep, elaborative or semantic encoding) produce good explicit memory & recall.
- Repetition alone can produce implicit memory (word-stem completion, judgements of credibility or fame)& sometimes recognition
- Explicit and implicit memories appear to involve different parts of the brain

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End of lecture.

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