Memory III

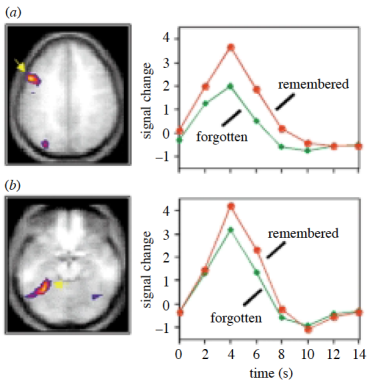
PSYC 313 - Lecture 12
Dr. J. Nicol

Encoding and Retrieval

- ***Encoding*—**the process of acquiring information and transferring it into long-term memory
- ***Retrieval*—**bringing information into consciousness by transferring it from long-term memory to working memory
- Encoding and retrieval are related processes

Left Inferior Prefrontal Cortex

Left Medial Temporal Lobe



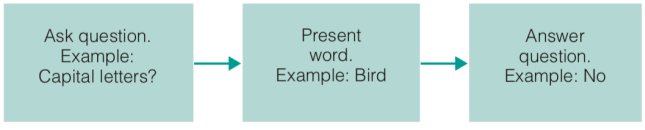
Wagner et al. (1999)

Rehearsal and Elaboration

- ***Maintenance rehearsal*** keeps information in STM, but is not an effective way of getting information into LTM
- ***Elaboration*** an effective way of getting information into LTM that involves thinking about the meaning of to-be-remembered information, or making connections between that information and previous knowledge

Levels-of-Processing Theory

- Depth of processing is determined by the nature of the encoding task
- Deep encoding processes result in better encoding and retrieval compared to shallow encoding processes (Craik & Lockhart, 1972)

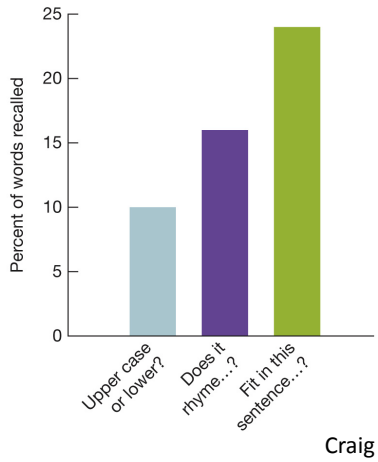


Craik & Tulving (1975)

Level of processing	Type of encoding	Example of questions used to elicit appropriate encoding
Shallow processing	*Structural encoding:* emphasizes the physical structure of the stimulus	Is the word written in capital letters?
Intermediate processing	*Phonemic encoding:* emphasizes what a word sounds like	Does the word rhyme with *weight?*
Deep processing	*Semantic encoding:* emphasizes the meaning of verbal input	Would the word fit in the sentence: "He met a _____ on the street"?

Depth of processing

Craik & Tulving (1975)



Craig & Tulving (1975)

Simple Sentence

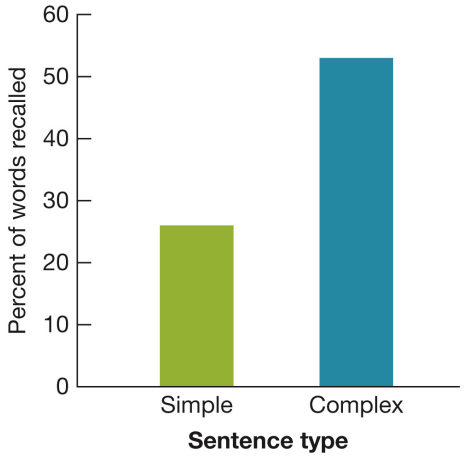
Target word: table

The ____ had four legs

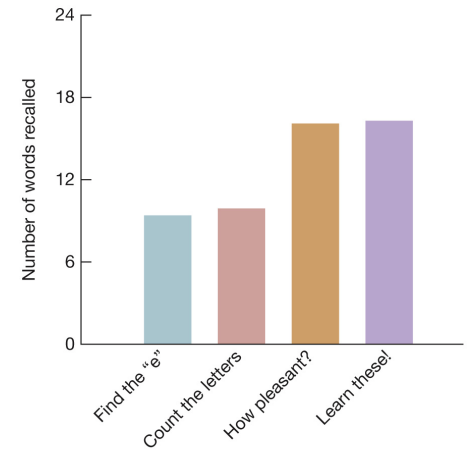
Complex Sentence

Target word: table

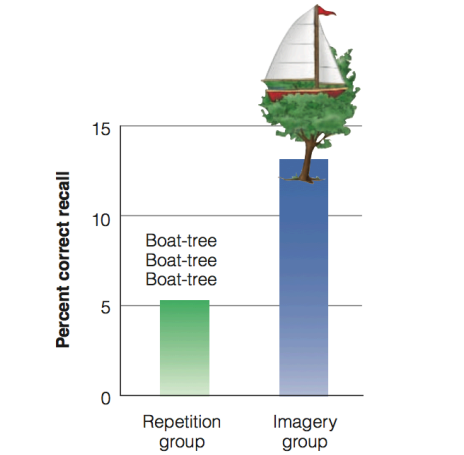
The long dining room _____ was a made of solid teak, had four legs, and sat 12 people



Irving (1975)



Hyde & Jenkins (1969)

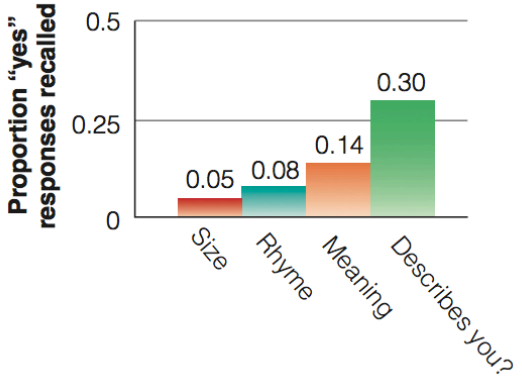


Bower & Winzenz (1970)

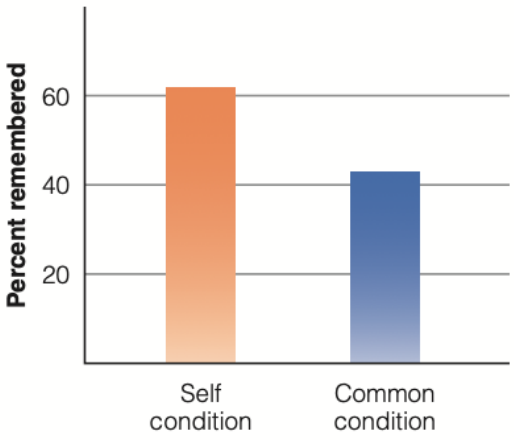
Self-Referent Encoding

- Making material personally relevant can also enrich encoding (Hamami et al., 2011)
- Self-referent encoding involves deciding how or whether information is personally relevant
- ***Self-reference effect***—memory is better if you are asked to relate a word to yourself

1. Physical characteristics of word
   "Printed in small case?
   Word: *happy*
2. Rhyming
   "Rhymes with *happy*?"
   Word: *snappy*
3. Meaning
   "Means the same as *happy*?"
   Word: *upbeat*
4. Self-reference
   "Describes you?"
   Word: *happy*



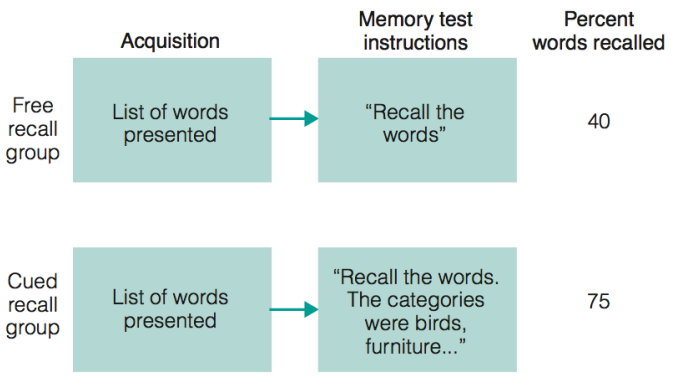
Rogers et al. (1977)



Leshikar et al. (2015)

Retrieval Cues

- The memory system uses organization to access information and research has shown that we spontaneously organize items when we recall them (Jenkins & Russell, 1952)
- Most of our memory failures are failures of retrieval, and one way to enhance recall is through the use of ***retrieval cues***—stimuli that help us remember information that we have stored in memory



Tulving & Pearlstone (1966)

1. *Read group*: Read these pairs of related words. king–crown; horse–saddle; lamp–shade; etc.
2. *Generate group*: Fill in the blank with a word that is related to the first word. king–cr _____; horse–sa _____; lamp–sh _____; etc.

Slameka & Graf (1978)

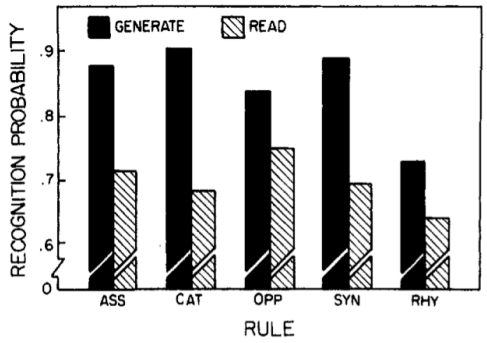
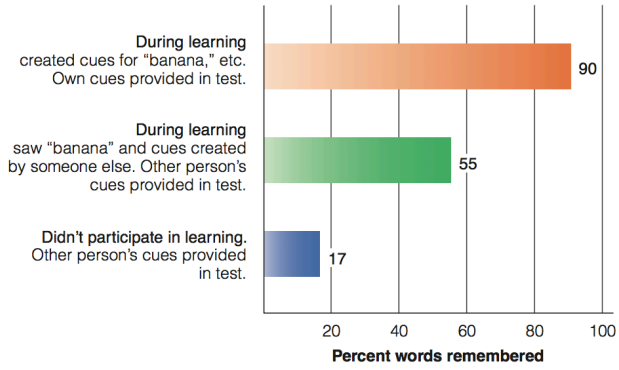


Figure 1. Mean recognition probabilities for each condition for each rule of Experiment 1. (ASS = associate; CAT = category; OPP = opposite; SYN = synonym; RHY = rhyme.)

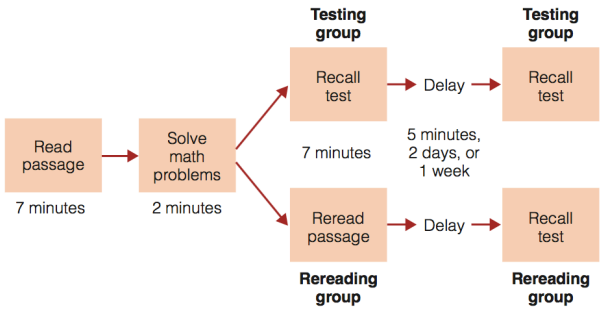
Slameka & Graf (1978)



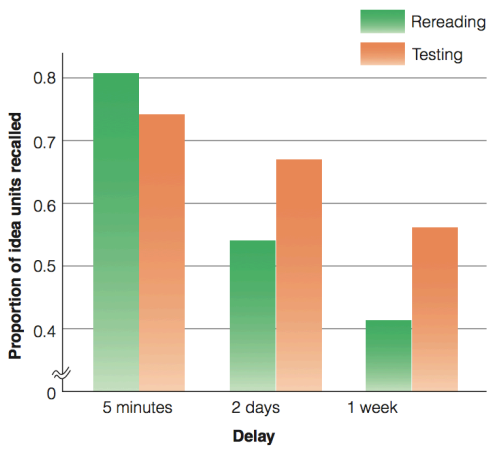
Mantyla (1986)

The Testing Effect

- A recent survey of student study techniques found that re-reading the material to be learned is the predominant method used for studying (Karpicke et al., 2009)
- Research shows that being tested on the material to be remembered results in better memory than shallow study techniques like re-reading the material



Roediger & Karpicke (2006)



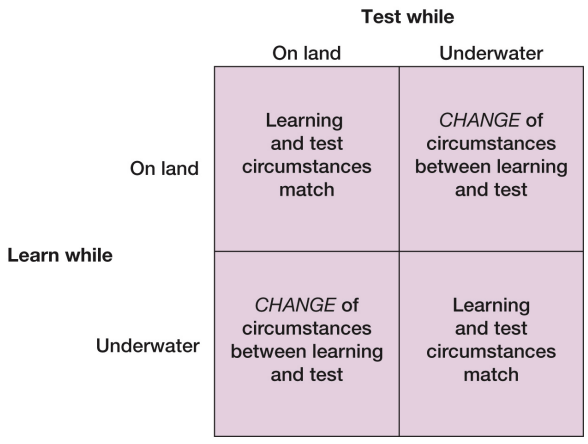
Roediger & Karpicke (2006)

	First Study and Test Session		Repeat Study and Test Sessions		Test After One Week % Correct
	STUDY	TEST	STUDY	TEST	
Group 1	All pairs	All pairs	All pairs	All pairs	**81**
Group 2 (less studying)	All pairs	All pairs	Only pairs NOT recalled in previous tests	All pairs	**81**
Group 3 (less testing)	All pairs	All pairs	All pairs	Only pairs NOT recalled in previous tests	**36**

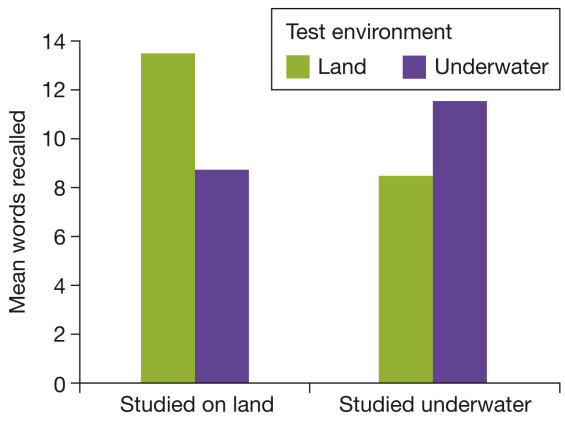
Karpicke & Roediger (2008)

Matching Encoding and Retrieval

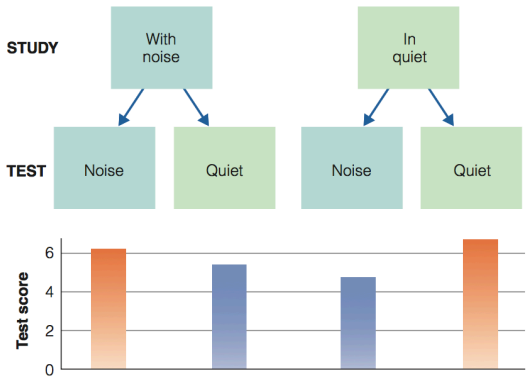
- "A critical condition for effective retrieval is the extent to which the processing that occurs during retrieval reinstates the processing that took place during encoding" (Koriat, 2000, p.337)
- Memory retrieval is increased by matching conditions at retrieval to conditions at encoding through:
  - *Principle of encoding specificity*
  - *State-dependent learning*
  - *Transfer-appropriate processing*



Godden & Baddeley (1975)



Godden & Baddeley (1975)

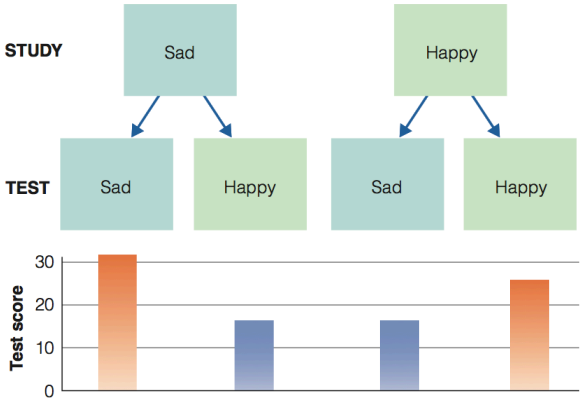


Grant et al. (1998)

Group	Instructions prior to free recall	*M* recall
SC	None	18.0
DC–C	Recall Room B, view photos of Room B	18.8
DC–R	Recall Room B, think about Room B	17.2
DC	None	12.0
DC–P	Recall room at home, think about room at home	9.6

Note. SC = same context, DC–C = different context-cued, DC–R = different context-remember, DC = different context, DC–P = different context-placebo instruction.

Smith (1979)



Eich & Metcalfe (1989)

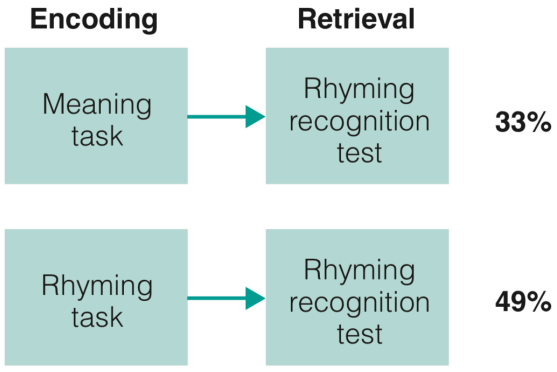
Meaning Condition

1. Sentence: The *blank* had a silver engine.
   Target word: *train* Correct answer: "yes"
2. Sentence: The *blank* walked down the street.
   Target word: *building* Correct answer: "no"

Rhyming Condition

1. Sentence: *Blank* rhymes with pain.
   Target word: *Train* Correct answer: "yes"
2. Sentence: *Blank* rhymes with car.
   Target word: *Building* Correct answer: "no"

Morris et al. (1977)



Morris et al. (1977)