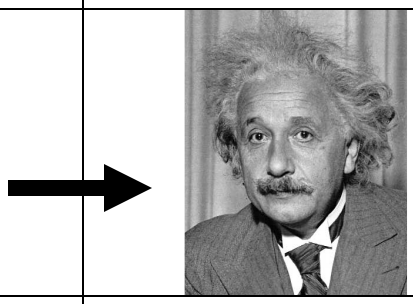
Memory as Information Processing

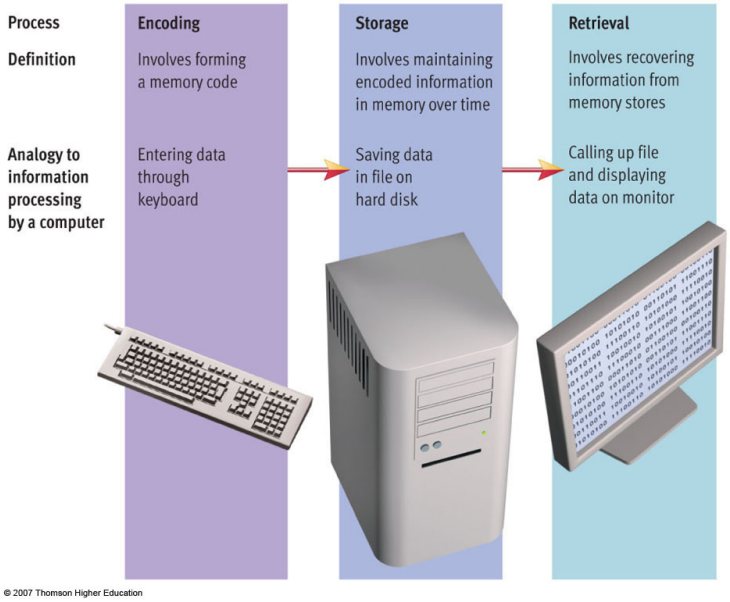
Psychologists use the *metaphor* that the brain is an information processor that

- encodes,
- stores and
- retrieves

information.

Encodes information	Stores information	Retrieves information
		
gets it in	holds it	gets it out

A *rough* analogy is that the brain is like computer processes.



Strategies to Encoding Information--Getting Information into Memory

Before we can have a memory to retrieve, it needs to be encoded and stored. If you don't effectively encode information, it will be more difficult to retrieve that information.

Effective strategies:

- Elaboration,
  - elaborative rehearsal
  - encode with "depth" or semantic meaning
- Visual imagery,
- Organization
  - hierarchies
  - categories
  - associative networks
  - mnemonics

Less Effective strategies:

- Encode with superficial characteristics
- Maintenance rehearsal (extends short-term memory)

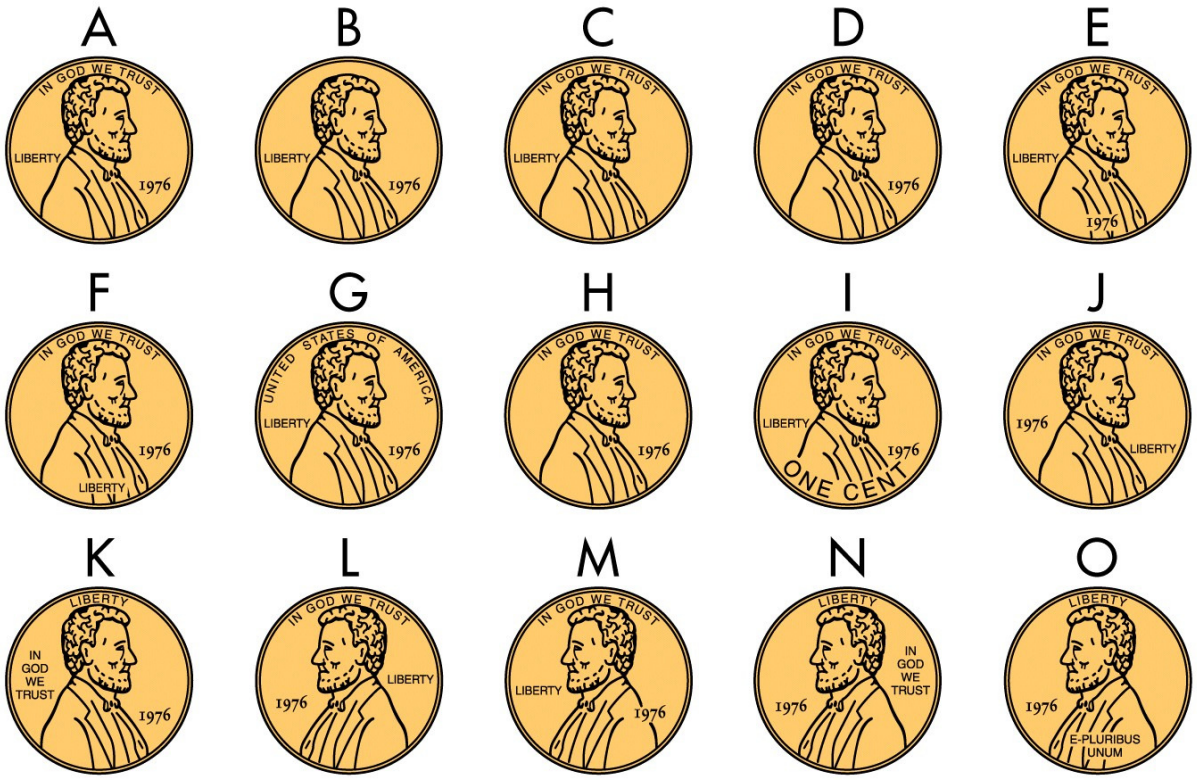
Reasons why me might forget:

- Encoding failure
- Multitasking
- Interference

- What were examples of these strategies?
- How can you use these strategies?
- Why is understanding these strategies important?

Encoding Failure

Which coin portrays a real penny?



The reason why most people can't pick out the correct penny is due to encoding failure—the tendency to not encode ALL the features of the penny.

We might not be paying attention to all the details for a variety of reasons. We may not care about the specific details, we may be anxious, tired, unable to concentrate or distracted (e.g. texting).

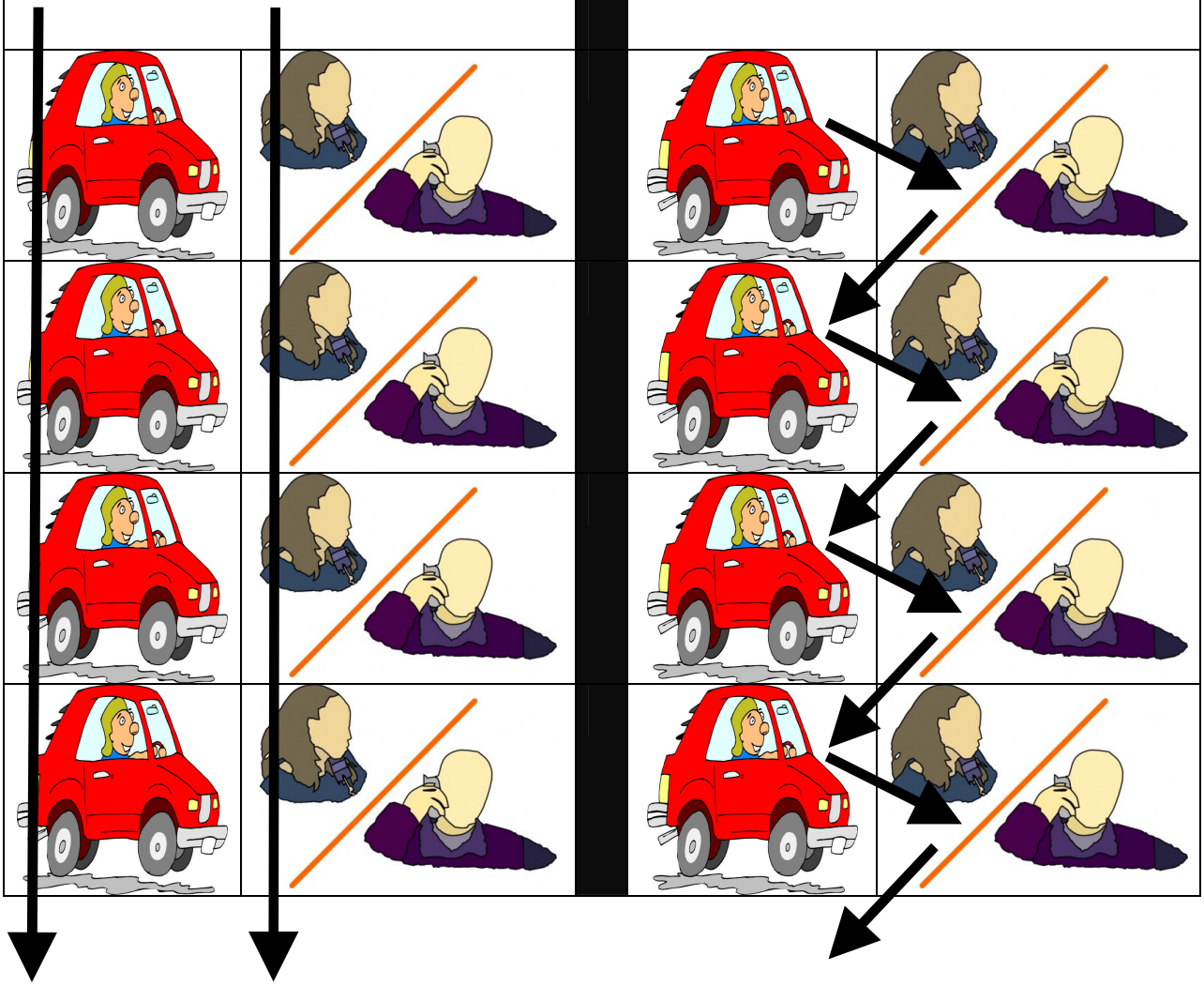
If we know in advance what details we are expected to pay attention to, we are more likely to pay attention to it, encode it, and remember it.

What is the Psychology of Multitasking?

When people are multitasking, they are switching between tasks, you really aren't doing two things simultaneously. You are switching between your different tasks.

Multitasking: Driving and Talking on the Cell Phone

What people commonly believe about multitasking	What is occurring while multitasking
We believe we can do multiple tasks simultaneously	We are switching between tasks



What is Psychologically Occurring While Multitasking

It takes your brain some time to switch between two tasks.

As a simple demonstration of the loss of efficiency of multitasking,

- Recite the letters A through J as fast as possible
- Recite the numbers 1 through 10 as fast as possible

Next, interweave the these two tasks as fast as you can

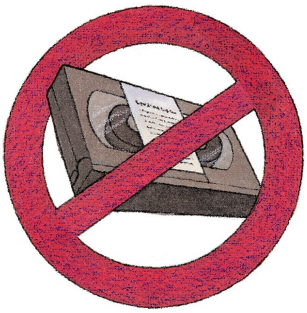
- A, 1, B, 2, C, 3…

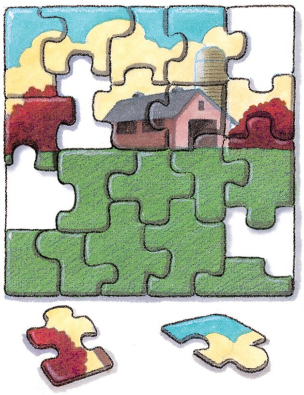
First Set: Serial	Second Set: Task Switching
A	A
B	1
C	B
D	2
E	C
F	3
G	D
H	4
I	E
J	5
1	F
2	6
3	G
4	7
5	H
6	8
7	I
8	9
9	J
10	10

Memory as Information Processing

The analogy doesn't capture other features of memory such as that people forget and distort information and sometimes remember events in a way that is different than how the event actually occurred.

Memory is NOT like a video tape that records everything. It is more like a jigsaw puzzle where we remember certain events and reconstruct the missing pieces.





What memories are real?

It is very difficult to distinguish between “actual memories” and reconstructed memories. Reconstructed memories are potentially inaccurate.

A student example:

In middle school I was asked to write a paper on the earliest memory I could recall. I whacked my brain for hours trying to remember something from my early childhood, when suddenly it came to me: I was running along the coast on a very cold and drizzly day, wearing an aqua green quilted jacket, and I could see my long hair escaping on both sides of the hood, flying in the wind.

Reconstructed Memories

When you picture yourself taking a recent walk on the beach, do you see yourself as an outside observer would (an "observer memory")? If so, such a recollection provides compelling evidence that memory can be reconstructive.

Retrieval: Accessing Information

Recall: A test of long-term memory that involves retrieving information without the aid of retrieval cues. This is sometimes called free recall. Recall involves a two-step process:

1. the generation of possible targets, and
2. the identification of genuine ones.
    - Name the Seven Dwarves.
    - Name Oregon's two senators in the United States Congress.

Cued recall: A test of long-term memory that involves remembering an item of information in response to a retrieval cue.

Retrieval cue: A clue, prompt, or hint that helps trigger recall of a given piece of information stored in long-term memory.

- Name the Seven Dwarves. Hint: One was always smiling, one was smart, one never talked, one seemed always to have a cold…

Having multiple cues increase the likelihood that you will recall what you are looking for. Why?

Recognition: A test of long-term memory that involves identifying correct information out of several possible choices. Unlike recall, the generation of possible targets is already done.

- Which of the following were among the Seven Dwarves: Sneezy, Sleazy, Dopey, Dippy, Hippy, Happy…?

4th Edition, Kalat, J. (1996)

A Recall Test

A Test for Recall

Close your eyes and try to *recall* the names of Santa's nine reindeer. Most people can only recall four to five names. Now turn to page 281 for a *recognition* test on the same material.

Michel Tcherevkoff Ltd. /The Image Bank/GettyImages

A Recognition Test

Of the following names, which are the names of Santa's nine reindeer?

Rudolph,	Dancer,	Cupid,	Lancer,
Comet,	Blitzen,	Crasher,	Donder,
Prancer,	Dasher,	Vixen	

Retrieval: Encoding Specificity Principle

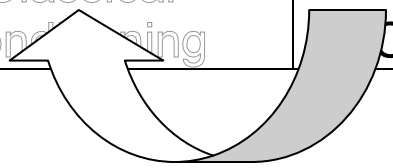
context effects	The tendency to information to be retrieved easier when the retrieval occurs in the same setting or environment as the original learning of the information. • I cannot recall my voice-mail number until I get to the phone. • Wolverine couldn't remember his past until he returned to the "secret lab" • Or remember your name outside of class
state-dependent learning	The tendency to remember information when the physiological state matches the physiological state in which it was learned. • If you learned information while using drugs, being tired, etc., it is more likely that you will recall that information while in the same state (ie. drugged state, tired, etc.). However, drugs impair your ability to learn, so taking drugs does not facilitate learning.
mood congruence	The tendency for a given mood to evoke memories that is consistent with that mood. • Happy memories are easier to retrieve when in a happy mood. • Sad memories are more likely to be retrieved than happy ones when in a sad mood.

Interference

The details of our memories fade as time passes. As our lives move forward, new memories can interfere with old ones.

- Retroactive Interference: Later learning impairs memory for information acquired earlier; backward-acting memory interference

Information yesterday	Information today	Information tomorrow
Classical conditioning	Operant Conditioning	Psychology of Memory



- Proactive Interference: Earlier learning impairs memories for information acquired later; forward-acting memory interference.

Information yesterday	Information today	Information tomorrow
Classical Conditioning	Operant Conditioning	Psychology of Memory