Memory and Information Processing

Which penny is correct?

Sequence of Info. Processing

Sensory Register -> Initial Processing -> Rehearsal and Coding -> Retrieval
Long-term Memory

Short-term Memory

Forgotten
Repetition
Sensory Register
- Information comes into you and reaches your senses (sensory memory)
- Information is constantly coming in
- If you don’t pay attention to it ever so briefly, it’s gone!! – Forgotten!!
- In sensory memory, usually lasts for very briefly (fraction of second!!)

Encoding: Getting Info Into Memory
- You need to pay attention to info if you intend to remember it
- **Attention** involves focusing awareness on a narrowed range of stimuli or events
- **Selective attention** is critical to everyday functioning
  - Just imagine how poorly you would function if everything in your environment demanded equal attention

Encoding: Getting Info Into Memory
- Attention acts like a filter that screens out most stimuli
  - people have difficulty if they try to focus their attention on two or more inputs simultaneously
  - Divided attention impairs performance (e.g., cell phones/texting!!!)
Guidelines on gaining students’ attention

1. Use cues which suggest “this is important”
   • raise or lower voice
   • gestures
   • repetition
2. Increase emotional content of material

gaining attention (continued)

3. Use unusual, inconsistent, or surprising stimuli
4. Tell students that “this is important!”

Short-term (Working) Memory

the memory system for holding a limited amount of info for short time

• Capacity is limited
• (7 +/- 2) = 5 to 9 bits/chunks
• Amount of time info can be held is limited (up to about 30 seconds)
• One way to hold info in short-term memory longer is by rehearsal
Short-term (Working) Memory (Con’t)

• The longer we can keep info in STM., the better our chances of transferring it to LTM.
• How is info typically lost from short-term memory???

*Principle of Displacement*
Info in short-term memory is pushed out *(displaced)* by new info if there is no rehearsal

Example of Principle of Displacement
Meeting people at a party – one after the other quickly……
• Ginger Baker
• John Bonham
• Buddy Rich
• Mitch Mitchell
• Neil Peart

Short-term (Working) Memory (continued)

• This is why the opportunity to rehearse new info is so important to teaching -- gives students time to rehearse new info -- or let it “sink in”
Short-term (Working) Memory (continued)

Examles demonstrate 2 important processes

1. **Chunking** - how we organize info is very important. The better it is organized the better STM can handle it and then transfer it to LTM.

2. The **interplay** of STM & LTM -- We can use LTM to assist STM.

Long-term Memory

The memory system for holding a **large** amount of info for a **very long** time.
3 Types of Long Term Memory
1. Episodic (mental images)
2. Semantic (schemata)
3. Procedural (stimulus-response connections)

- These differ in how they store and organize info

1. *Episodic* - Our memory of our personal experiences.
   - Stored as *Mental Images*
   - space & time cues helpful for retrieval.
   - hard to remember -- unless something memorable happens during episode.

2. *Semantic* - facts, concepts, and general info, as well as problem solving skills. Includes most things learned in schools.
   - Organized very differently -- *Network of connected ideas (Schemata)*
   - we gain access by mentally following paths.
3. **Procedural** - involves knowing “how” to do something.
   - Stored in the form of *stimulus-response connections*

**Forgetting**

3 stages of Memory:
- Encoding
- Storage
- Retrieval

**Interference/Inhibition**

2 types of Interference/Inhibition:
1. Retroactive Inhibition
2. Proactive Inhibition
Retroactive Inhibition
Newer or later learning interferes with older learning

Proactive Inhibition
Old learning interferes with newer learning

Retroactive and proactive interference
Mnemonics  
(memory aiding strategies)

1. Keyword Method  
• good for paired-associate learning  
• helps make connection between image & word  
  payaso = clown  
  pato = duck

2. Loci Method  
• good for serial learning  
  ball, bread, cow, shirt

3. Rhyming

Mnemonics  
(continued)

4. Initial Letter Strategies  
Roy G Biv  
Arithmetic  
Homes  
My Very Educated Mother Just Served Us Nine Pickles
Massed vs Distributed Practice

Rote vs Meaningful Learning
- Ability to recall rote info is limited
- We can retain meaningful info much better
- Mnemonics impose meaning to the arbitrary
- But, not all rote learning is bad
- However, it has been overused at times

End of Info Processing and Memory