What is Metacognition?

- Knowledge and awareness of how our cognitive system works
- Ability to control and manipulate our own cognitive processes

Metamemory

- Identify memory strategies for different situations or content
- Identify which particular strategies work for us
- Evaluate the quality of our learning
- Decide when we have “studied enough”
- Predict future performance on a memory task
- Estimate the likelihood that a retrieval is correct
Metacomprehension

- Monitor our ability to comprehend instructions, explanations, or other material that we read or hear
- Identify when we do not understand something
- Know how to select and employ strategies to correct our misunderstandings when these occur

Self-Regulation Skills

- Use feedback about our learning to adjust the strategies we use to learn
- Select the right strategy, apply it, & monitor its usefulness
- Need to know:
  - Which strategies are available
  - How the strategies work
  - When the strategies are useful

Strategies to Improve Memory

- Attention
- Create effective retrieval cues
- Distribution of practice
- Recognize and correct overconfidence
- Self-testing
- Mnemonics
- Improving Prospective Memory
Attention

Divided attention and multi-tasking reduce the resources allocated to processing information in a given task.

We remember what we process and attend to.

Tasks interfere with one another to the extent that they share similar processing resources.

Create Effective Retrieval Cues

Levels of processing – Process deeply
- Maintenance rehearsal (rote rehearsal)
- Elaborative rehearsal (deep, semantic rehearsal)

Self-reference effects – Connect material to what you know
- Generation effect

Encoding specificity – Anticipate and encode for the retrieval context
- State-dependent learning & context effects
- Metacognitive skill in anticipating retrieval context

Distribution of Practice

Total Time Hypothesis
- Massed practice
- Distributed practice (spaced learning)

Distributing study time:
- Expanded practice strategy
  - Practice weaker items/material over short intervals to quickly strengthen retrieval cues (mass practice for initial learning)
  - Practice stronger items over increasingly long intervals (distributed practice for items that are partially learned)
**Overconfidence**

Retrieval that occurs immediately after study makes use of information in both Working Memory and LTM. Ease of retrieval from WM contributes to overestimates of quality of learning for long-term retention (based on LTM retrieval alone).

**Value of Self-Testing**

Tests provide practice in using existing retrieval cues—a test is also a type of practice session. Make use of practice tests and self-constructed tests before a high-stakes test:
- Calibrate judgments of learning
- Correct problems of overconfidence
- Evaluate the quality of retrieval cues

**Mnemonics**

- Imagery mnemonics
- Chunking
- Hierarchical Organizations
- Acronyms (First Letter Organizations)
What About Learning Styles?

Several models of learning styles

- **Kolb (1984)**
  - Concrete experience, Reflective observation, Abstract Conceptualization, Active experimentation
- **Felder & Silverman (1988)**
  - Active/Reflective, Sensing/Intuitive, Visual/Verbal, Sequential/Global
- **VAK model**
  - Visual, Auditory, Kinesthetic

Multi-Modal Approach to Memory Improvement

Develop and use a variety of encoding strategies

Practice less-preferred strategies and learning styles

- Expand your “toolbox” and improve your skill with multiple strategies

Multiple forms of encoding increase the success of retrieval in future contexts

Consider the effects of non-cognitive influences on learning and control these to maximize your performance

- Fatigue, stress, nutrition, general health, depression, etc.

Prospective Memory

- Encode the **content** of a future action
  
  *What do I intend to do?*
  
  - Return a book to the library.
  - Deliver a message to Fred.

- Encode the **intention** to complete the action and a triggering cue.
  
  *When do I intend to do this?*
  
  - Return the book before the due date. (internally cued)
  - The next time I see Fred. (externally cued)
**Metamemory**

Predicting future memory performance
Judgments of Learning (JOL)

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**Tip-of-the-Tongue States**

Brown & McNeil (1966)
- Partial retrieval hypothesis

Schwartz (1999, 2002)
- Subjective experiences associated with memory retrieval and memory failure

Feeling of Knowing (FOK) judgments

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**Metacomprehension**

Overconfidence in estimating understanding

How can we improve metacomprehension?

- Self-tests of comprehension
- Develop deliberate strategies to improve comprehension
  - Look up unfamiliar words in dictionary or glossary
  - Try to discover connections between new material and earlier material or your own knowledge
  - Attempt to paraphrase sections periodically
  - Preview the content of a reading and check your expectations against what you read