

Lesson Plan

NEUROHEADWAY

Neuroscience Into Education

Memory – KS3+KS4

Slide 1/5 min

- Introduction to the topic.
- Brain is body's most important and most complex organ.
- Memory is the most complex process.

Slide 2/10 min

- Introduce the general principles of memory to the class.
- Activity - how to test short-term-memory: read aloud 10 word and repeat them immediately 3 times.

Slide 3/5 min

- Give examples for different kind of memories (e.g., cycling, facts).
- Discuss what is special for human memory compared to that of animals (e.g., abstract thought).

Slide 4/5 min

- Give a classical example of spatial memory - London taxi drivers, spatial memory and hippocampus.
- Show a video clip.

Slide 5/5 min

- Discuss the importance of emotions (e.g., love, odor).

Slide 6/5 min

- List of main reasons for memory problems.
- Discuss sport injuries and their consequences.
- Give an example of NHL roles and show a video (it can be football as well).

Slide 7/5 min

- Give Alzheimer's disease as an example of severe memory problem.
- Explain the typical symptoms, pathology and diagnosis (e.g., imaging, neuropsychological examination).
- Progressive disease, not cure, only symptoms can be treated.
- A huge problem in future.

Slide 8/5 min

- Discuss how to prevent memory problems.
- The same list applies to so many other brain diseases!

Slide 9/5 min

- Discuss how it might be possible to improve your memory.
- Activity - ask to repeat the list of 10 words (long-term memory).

Take a home message:

- 1) memory is a complex process involving several brain areas,
- 2) sport accident may lead to memory problems, and
- 3) memory training is safe and effective.

Power point Example

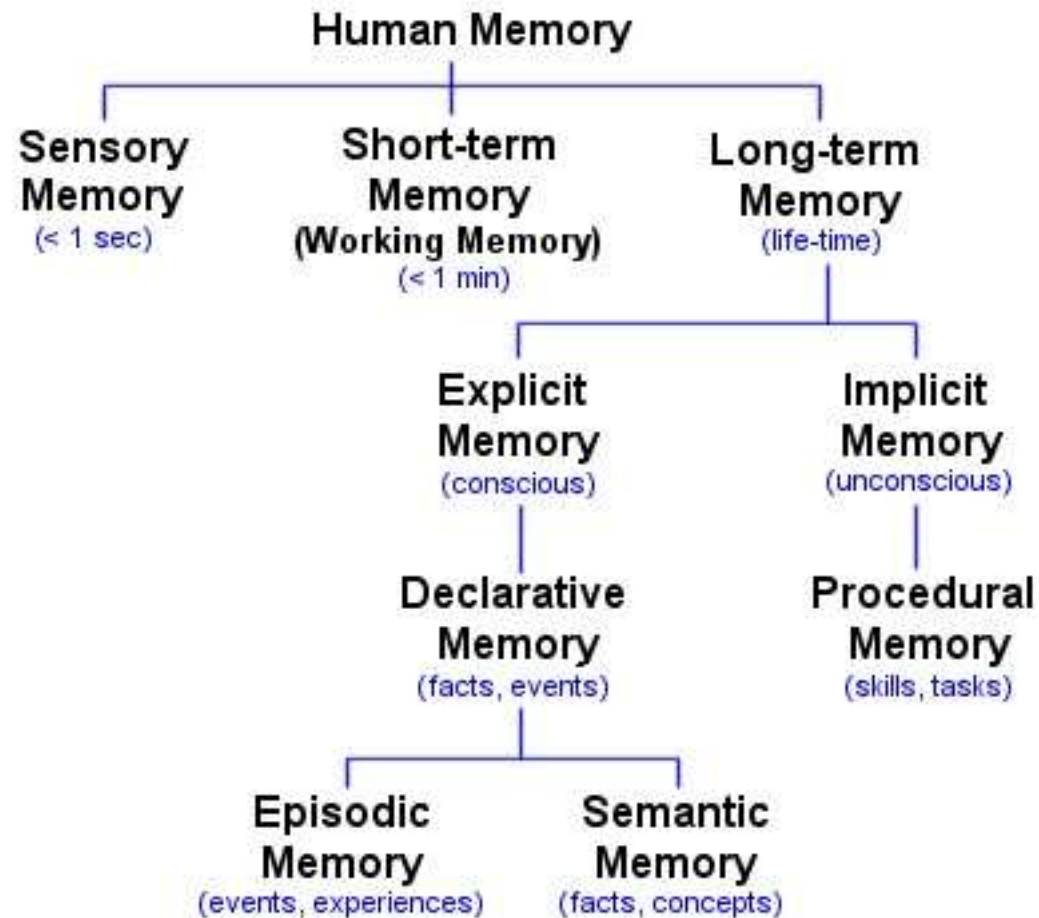
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General Principles

- Multiple memory systems are present in the brain
- Declarative memory = memorize information
- Nondeclarative memory = perform skill without recalling
- Short-term memory = allows recall for a period of several seconds to a minute without rehearsal
- Long-term memory = informative knowledge can be stored for long periods of time (requires new protein synthesis)
- Different brain areas involved (e.g., hippocampus = spatial memory)

Multiple forms of memory



Memory and Emotions

- We remember emotionally charged events better than boring ones
- Pleasant emotions are usually remembered better than unpleasant ones
- Positive memories contain more contextual details (which in turn, helps memory)
- Strong emotion can impair memory for less emotional events and information experienced at the same time
- Brain region called the amygdala play an important role in emotional memory



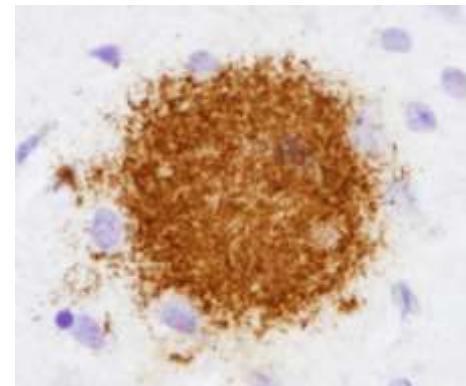
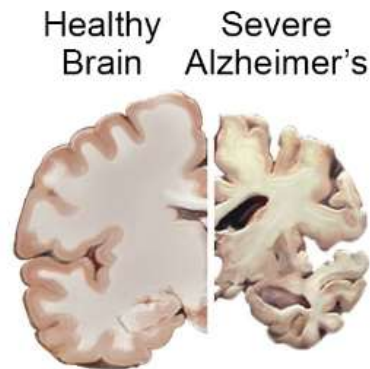
What is causing memory problems?

- Brain diseases such Alzheimer' disease and depression
- Brain trauma
- Vitamin deficiency
- Aging
- Lack of sleep
- Stress
- Alcohol
- Drugs



Alzheimer's disease

- Alzheimer's is the most common form of dementia
- Strongly age related
- Difficulty remembering newly learned information
- Characterized by typical brain pathology (e.g., neuronal loss, amyloid plaques)
- Worsens over time
- No therapy to prevent progression
- A huge problem because of aging population



Teachers Evaluation and Handouts

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