Chapter 4 – Working Memory

1. **Identify three different aspects in human memory processes.**
    a. Encoding
    b. Storage
    c. Retrieval

2. **Know the 3-stage processing model of memory proposed by Atkinson & Shiffrin and its limitations**
    a. Information processing approach (Pg. 117): a theory of cognition proposing that mental processes are similar to the operations of a computer, and information progresses through the cognitive system in a series of stages, one step at a time
    b. Atkinson and Shiffrin model (Pg. 117): proposal that memory involves a sequence of separate steps; in each step, information is transferred from one stage area to another
        i. External stimuli from the environment first enter sensory memory – this model proposes that information in sensory memory is stored for two seconds or less, and then most of it is forgotten
            1. Sensory memories – iconic (visual) and echoic (auditory)
        ii. Proposes that some material from sensory memory then passes on to STM – Memories in STM are fragile, but not as fragile as sensory memory
            1. Information in STM can last about 30 seconds without some kind of rehearsal or memory strategy
        iii. According to the model, only a fraction of the information is passed on to LTM, they also believed that information in LTM is relatively permanent
        iv. Proposed central processes (Pg. 119): internal strategies, such as rehearsal, that people may use to improve their memory
    c. Limitations of Atkinson and Shiffrin
        i. Only focused on the role of STM in memory and learning, but not on its role in other cognitive tasks
        ii. Raised a question about the distinction between STM and LTM – "are they really that clear cut in their distinction and roles?"
        iii. Lead to the change from STM to working memory (WM)

3. **Be able to define STM (classical term) and know related terms (Rehearsal, decay, magic number seven, etc.) and how they work in STM**
    a. STM (Pg. 111): the part of memory that holds on the small amount of information that a person is actively using; information that's recently been taken from the environment. Has a limited capacity for the

amount of information that one can hold at a time, and a limited capacity for the length of time it can be held
    i. Keeps information active and accessible, temporarily
b. Magical number seven (George Miller) – "7, plus or minus 2"
    i. Suggests that people can hold about 7 items, give or take 2. So somewhere between 5 and 9 items can be held in STM
    ii. Miller used the term chunk to describe the basic unit of STM. Chunk (Pg. 111) a memory unit that consists of several components that are strongly associated with one another
        1. Suggests that the magical number 7 refers to chunks (or items if nothing is being chunked)
            a. Example → we could remember about 7 items of random numbers or letters, or we can organize several numbers or letters so that they form a chunk, allowing us to remember more
            b. Example → the phone number 617-346-3421. If your area code is 671, and all of FSU's phone numbers began with 346… the phone number consists of 6 chunks. 617 is one chunk, 346 is another chunk, and then 3, 4, 2, 1 are all individual chunks
c. Without rehearsal, the "pure capacity" of STM is probably closer to 3-5 items
    i. Rehearsal: repetition strategy that maintains information in STM (or wm)
    ii. Decay: without rehearsal, items are quickly forgotten
        1. Decay is one way to lose information from STM

4. **What is the serial position effect? What is the source of primacy? What is the source of recency?**
    a. Serial position effect (Pg. 113): the U shaped relationship between a words position in a list and its probability of recall. Recall is especially accurate for the initial words and final words in a list, and recall is lease accurate for the words in the middle of a list
    b. U curve shows a strong recency effect (Pg. 114): tendency for items at the end of a list to be better recalled than items in the middle of list
        i. Argued that this recall is because these words were still in WM/STM at the time of recall with less interference
    c. U shaped curve shows a strong primacy effect (Pg. 114): tendency for items at the beginning of a list to be recalled better than the items in the middle of a list, at least partially because people rehearse these items more frequently, and also, because they don't need to compete with any earlier items
        i. Stored in LTM because of rehearsal

5. **Know two different types of interference**

a. Proactive interference (Pg. 115): difficulty learning or recalling new material because some previously learned material continues to interfere with the formation of new memories
    i. OLD material gets in the way of new material
    ii. Example → you learned XCJ, HBR, and TSV in one task – and then in the second you learned KRN, TLK, and MCW. You'll have trouble remembered the letters from the second task because of the letters you remembered from the first task
        1. But, if the task switches categories, from letters to shapes, you'll experience a rise from proactive interference (Pg. 116): a memory phenomenon in which proactive interference is reduced when a person switches from one category of stimuli to another. This release leads to increased recall for the new category
b. Retroactive interference (Pg. 172): In memory, people often experience difficulty in learning or recalling old material, because some recently learned material interferes with these older memories
    i. NEW material gets in the way of old material

6. Be able to define WM and explain differences between STM and WM

a. Working memory (Pg. 121): the brief, immediate memory for the limited amount of material a person is currently processing. Part of WM also actively coordinates ongoing mental activities
    i. Briefly holds information so its accessible (function 3), you can keep a few items active and accessible (function 1), so you can use the activated items for a variety of cognitive tasks (coordinates ongoing mental activities, function 2), and these items can be integrates with additional incoming information – WM actively works with information
    ii. Temporary "mental workspace"
    iii. STM is limited to the function of the memory span – in WM, we take in information, transform and manipulate it, and then remember it
        1. STM implies a passive process, it just holds information – WM emphasizes the simultaneous processing and storage of information
    iv. A digit span task is used to measure the capacity of STM – but in the WM span task, you have to hold the information in your memory and work on different types of activities in the task

7. Know the 4 different parts in WM and their roles, and be able to how those four-part work in WM. What is an acoustic confusion? And subvocalization? What's the evidence of phonological loop and visuo-spatial sketchpad (Know how Baddley attempted to prove it)